



**CMS Bundled Payments for Care
Improvement Initiative
Models 2-4: Year 5 Evaluation &
Monitoring Annual Report – Appendices**

Prepared for:

CMS

Prepared by:

The Lewin Group

With our partners:

Abt Associates, GDIT, and Telligen

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Authors:

Laura Dummit, Grecia Marrufo, Jaclyn Marshall, Tristan Ackerman, Sarah Bergman, Aylin Bradley, Rebecca Cherry, Andrea Chung, Inna Cintina, Daniel Cooper, Syvart Dennen, Ayah Fannoun, Gina Gerding, Dan Gregory, Megan Hyland, Ashley Johnson, Susan Joy, Jordan Kahn, Jon Kelly, Alex Lampert, Karla Lopez de Nava, Brandon Maughan, Court Melin, Sebastian Negrusa, William Sheahan, Julie Somers, Aditya Subramanian, Katarina Swanson, Ellen Tan, Kyi-Sin Than, Peter Weidner, David Zhang, Dean Farley, Ian Breunig, Andrea Hassol, Qian Gu, Sean McClellan, Matt Trombley, Christine LaRocca, Becky Blystone, Colleen Kummert

Lewin's address:

3130 Fairview Park Dr, Suite 500, Falls Church, VA 22042

Federal Project Officer:

Daver Kahvecioglu
Division of Data, Research, and Analytic Methods (DRAM)
Research and Rapid Cycle Evaluation Group (RREG),
Center for Medicare and Medicaid Innovation (CMMI),
Centers for Medicare and Medicaid Services (CMS)

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The statements contained in this report are solely those of the authors and do not necessarily reflect the views or policies of the Centers for Medicare & Medicaid Services. The Lewin Group assumes responsibility for the accuracy and completeness of the information contained in this report.

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Appendix A: Glossary of Terms & Acronym List

Exhibit A.1: Glossary

Name	Definition
30-, 90-, 120-day Post-Discharge Period (PDP)	The 30, 90, or 120 days following discharge from the anchor hospitalization (Models 2 and 4) or the qualifying hospital stay (Model 3)
30-, 90-day Post-Bundle Period (PBP)	The 30 or 90 days following the end of the bundle period.
Acute care hospital (ACH)	A health care facility that provides inpatient medical care and other related services for acute medical conditions or injuries.
Anchor hospital stay	The hospitalization that triggers the start of the episode of care for Models 2 and 4.
Awardee	A risk-bearing, financially responsible organization in the BPCI initiative. This entity may or may not be an episode initiator (EI).
Awardee Convener (AC)	Parent companies, health systems, or other organizations that assume financial risk under the Model for Medicare beneficiaries that initiate episodes at their respective Episode Initiating Bundled Payment Provider Organization (EI-BPPO). An AC may or may not be a Medicare provider or initiate episodes.
Baseline time period	The period of time that precedes the intervention period as a basis for comparison in difference-in-difference modeling. The baseline period spans from Q4 2011 through Q3 2012.
Beneficiary Incentive	This is one of the waivers of fraud and abuse law an Awardee may utilize. This allows Awardees to offer patients certain incentives not tied to standard provision of health care, if it supports a clinical goal.
BPCI Savings Pool	Collection of funds that consists solely of contributions from EIPs of Internal Cost Savings (ICS) and contributions from the Awardee of positive NPRA (collectively, “BPCI Savings”) that are made available to distribute as Incentive Payments pursuant to Section III.C of the Awardee Agreement.
Bundle	The services provided during the episodes that are linked for payment purposes. The bundle varies based on the model and chosen episode length.
Bundle length	A pre-specified duration of time: 30, 60, or 90 days.
Care stinting	A potential unintended consequence of BPCI where services are reduced, resulting in lower quality of care outcomes.
Cherry-picking	A potential unintended consequence of BPCI where providers change their patient mix through increased admissions of less complex patients.
Clinical episode	One of the 48 episodes of the BPCI initiative related to a specific set of MS-DRGs.
Convener approach	The level at which an episode initiator is participating in the initiative. This informs whether an episode initiator is under a Facilitator Convener or Awardee Convener, or if the episode initiator is a Single Awardee.
Designated Awardee (DA)	An entity that initiates episodes but, unlike a Single Awardee, joins the initiative under a Facilitator Convener (FC). The DA would have an agreement with CMS and assume financial risk for episodes initiated at its institution.
Designated Awardee Convener (DAC)	Parent companies, health systems, or other organizations that assume financial risk under the Model for Medicare beneficiaries that initiate episodes at their respective Episode Initiating Bundled Payment Provider Organization (EI-BPPO). These Awardees may or may not be Medicare providers or initiate episodes themselves. Unlike an Awardee Convener, this Awardee joined the initiative under a Facilitator Convener.

Name	Definition
EPI Start 30, 60, 90	The first 30, 60, or 90 days of the episode of care.
Episode Initiator (EI)	Under Model 2, an EI is the participating hospital where the BPCI episode begins or a participating PGP if one of its physicians is the patient’s admitting physician or surgeon for the anchor hospitalization. Under Model 3, an EI may be a participating PGP or a participating SNF, HHA, IRF, or LTCH that admits the patient within 30 days following a hospital discharge for an MS-DRG for the relevant clinical episodes (anchor hospitalization). Under Model 4, an EI is the participating hospital where the BPCI episode begins. SAs and DAs are EIs. ACs and DACs may or may not be EIs themselves and also have one or more EIs under their Awardee structure.
Episode-Integrated Provider (EIP)	A Medicare provider or supplier, including but not limited to an episode initiator, that is (1) participating in Care Redesign through a Gainsharing Arrangement that is set forth in a Participant Agreement with the Awardee (or is the Awardee itself); and (2) listed in the Gainsharing List.
Episode Initiating Bundled Payment Provider Organization (EI-BPPO)	Those individual Medicare providers that deliver care to beneficiaries. EI-BPPOs are EIs associated with an AC or DAC and initiate episodes. EI-BPPOs do not bear financial risk directly with CMS.
Episode of Care	For all three models, an episode of care is triggered by an inpatient hospitalization for one of 48 clinical groupings of MS-DRGs. For Model 2, the episode is defined as an anchor hospitalization plus post discharge services provided within 30, 60, or 90 days of discharge from the anchor stay, including all readmissions that are not explicitly excluded (certain services unrelated to the triggering hospitalization are excluded from the episode). For Model 3, the episode begins upon admission to a post-acute care setting (including home health) within 30 days of discharge from the qualifying hospitalization and includes all services provided within the 30, 60, or 90 days of this admission (again, certain services unrelated to the triggering hospitalization are excluded from the episode). For Model 4, the episode is defined as an anchor hospitalization plus post discharge services provided within 30 days of discharge from the anchor stay, including all readmissions that are not explicitly excluded (certain services unrelated to the triggering hospitalization are excluded from the episode).
Episode-specific	Specific to one of the 48 clinical episodes.
Facilitator Convener (FC)	An entity that submits a BPCI application and serves an administrative and technical assistance function on behalf of one or more Designated Awardees or Designated Awardee Conveners. A Facilitator Convener does not have an agreement with CMS, nor does it bear financial risk under the Model.
Gainsharing	This is one of the waivers of fraud and abuse law an Awardee may utilize. This allows participants to develop a methodology and share any Internal Cost Savings (ICS) and/or Net Payment Reconciliation Amounts (NPRA) as applicable.
Implementation Protocol	Awardee-submitted document that contains general Awardee information, care redesign interventions, gainsharing plan/methodology if applicable, and other details regarding waiver use.
Internal Cost Savings (ICS)	For each EIP, the measurable, actual, and verifiable cost savings realized by the EIP resulting from Care Redesign undertaken by the EIP in connection with providing items and services to Model 2, 3, or 4 beneficiaries within specific episodes of care. Internal Cost Savings does not include savings realized by any individual or entity that is not an EIP.
Lemon-dropping	A potential unintended consequence of the BPCI initiative where providers change their patient mix by avoiding high cost patients.

Name	Definition
Model 2	Retrospective acute and post-acute care episode. The episode of care includes inpatient stay in the acute care hospital and all related services during the episode. The episode ends 30, 60, or 90 days after hospital discharge.
Model 3	Retrospective post-acute care only. The episode of care is triggered by an acute care hospital stay and begins at initiation of post-acute care services. The post-acute care services must begin within 30 days of discharge from the inpatient stay and end 30, 60, or 90 days after the initiation of the episode.
Model 4	Prospective acute care hospital stay only. CMS makes a single, prospectively determined bundled payment to the hospital that encompasses all services furnished during the inpatient stay by the hospital, physicians, and other practitioners. Related readmissions for 30 days after hospital discharge are included in the bundled payment amount.
Net Payment Reconciliation Amount (NPRA)	The Target Price minus the total dollar amount of Medicare fee-for-service expenditures for items and services (collectively referred to as “Aggregate FFS Payment” or “AFP”) furnished by the Awardee, the episode initiator, EIPs, gainsharers, or third party providers during an episode of care. Not applicable for Model 4.
Participant	A hospital, PGP, SNF, LTCH, HHA, or IRF that is actually initiating episodes under the BPCI initiative <i>or</i> an Awardee that is not an episode initiator.
Phase 1	An initial period before a participant is “at financial risk”. During this time period,” CMS and the potential participant prepare for implementation of the BPCI initiative and assumption of financial risk.
Phase 2	The phase of the initiative when a participant is considered “at risk” and is allowed to begin initiating some or all of its clinical episodes and bearing financial risk, as applicable.
Post-acute care (PAC)	All care services received by the beneficiary after discharge from the qualifying hospital stay. Includes care from the PAC provider (SNF, IRF, LTCH, HHA) as well as any potential inpatient hospitalizations (readmissions), professional services, and/or outpatient care.
Post-acute care qualifying admission	An admission to a participating (or comparison group) PAC provider within 30 days of discharge from the qualifying hospitalization upon which a Model 3 episode begins.
Post-bundle care	The care within an episode of care that is not covered under the BPCI initiative.
Post-discharge period (PDP)	Period of time starting on the day of the anchor hospitalization (Model 2 and 4), qualifying hospitalization (Model 3), or transfer hospital discharge.
Qualifying hospital stay	The acute care hospitalization that precedes the start of a Model 3 episode of care. All Model 3 episodes of care start within 30 days of discharge from this acute care qualifying hospitalization.
Risk adjustment	When sufficient sample size was available, we risk adjusted our outcomes. Without adequate risk adjustment, providers with a sicker or more service intensive patient mix would have worse outcomes and providers with healthier patients would have better outcomes even if nothing else differed. All measures were risk adjusted for service mix; demographic factors, prior health conditions based on Hierarchical Chronic Conditions (HCC) indicators, measures of prior care use, and provider characteristics.
Salesforce	A database where CMS stores secure, frequently-updated data about BPCI initiative participants and episodes, from which Lewin can process various reports at any time.
Single Awardee (SA)	An individual Medicare provider that assumes financial risk for episodes initiated at its institution. SAs are also episode initiators.

Name	Definition
Three-day SNF Waiver	This is one of the Medicare payment policy waivers an Awardee may utilize. This allows Model 2 participants to waive the three-day hospital stay requirement for Part A skilled nursing facility coverage.
Within-Bundle Care	Model 2: Any care provided during the anchor hospital stay and the first 30, 60, or 90 days of the post-discharge period, depending on the bundle length. Model 3: any care provided during the 30, 60, or 90 days from the BPCI initiative participating PAC provider admission, depending on the bundle length.

Exhibit A.2: Acronyms

Acronym	Definition
AC	Awardee Convener
ACE	Medicare Acute Care Episode ACE Demonstration
ACH	Acute Care Hospital
ACO	Accountable Care Organization
AHRF	Area Health Resource File
APC	Ambulatory Payment Classification
BPCI	Bundled Payments for Care Improvement
CBO	Congressional Budget Office
CBSA	Core-Based Statistical Area
CCN	CMS Certification Number
CCW	Chronic Conditions Data Warehouse
CMG	Case-mix group
CMS	Centers for Medicare & Medicaid Services
COPD	Chronic Obstructive Pulmonary Disease
DAC	Designated Awardee Convener
DiD	Difference in Difference
ED	Emergency Department
EDB	Enrollment Database
EI	Episode Initiator
EI-BPPO	Episode Initiating Bundled Payment Provider Organization
EIP	Episode-Integrated Provider
ESRD	End-Stage Renal Disease
FC	Facilitator Convener
FFS	Fee-for-service
HCC	Hierarchical Condition Category
HCPCS	Healthcare Common Procedure Coding System
HH	Home Health
HHA	Home Health Agency
HIE	Health Information Exchange
HIT	Health Information Technology
HRR	Hospital Referral Region
ICS	Internal Cost Saving
IDR	Integrated Data Repository
IPPS	Inpatient Prospective Payment System
IQR	Inpatient Quality Reporting
IRF	Inpatient Rehabilitation Facility
IRF-PAI	Inpatient Rehabilitation Facility Patient Assessment Instrument
LOS	Length of stay
LTC	Long Term Care

Acronym	Definition
LTCH	Long Term Care Hospital
MBSF	Medicare Beneficiary Summary File
MCC	Major Complication or Comorbidity
MDM	Master Data Management
MDS	Minimum Data Set
MS-DRG	Medicare Severity-adjusted Diagnosis Related Group
NHC	Nursing Home Compare
NOA	Notice of Admission
NPRA	Net Payment Reconciliation Amount
NQF	National Quality Forum
OASIS	Outcome and Assessment Information Set
OIP	Other Inpatient
ONC	Office of the National Coordinator
PAC	Post-acute Care
PACE	Program of All-Inclusive Care for the Elderly
PBP	Post-Bundle Period
PCP	Primary Care Physician
PDP	Post-Discharge Period
PECOS	Provider Enrollment and Chain/Ownership System
PGP	Physician Group Practice
PM/RC	Program Monitoring, Rapid Cycle
POS	Provider of Service
PPDP	Post-PAC Discharge Period
RUG	Resource Use Group
SA	Single Awardee
SAS	Statistical Analysis Software
SFTP	Secure File Transfer Protocol
SNF	Skilled Nursing Facility
TEP	Technical Expert Panel

Appendix B: BPCI Clinical Episodes and Medicare Severity Diagnosis Related Groups (MS-DRGs)

Episode	MS-DRGs that trigger the clinical episode														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Acute myocardial infarction	280	281	282												
AICD generator or lead	245	265													
Amputation	239	240	241	255	256	257	474	475	476	616	617	618			
Atherosclerosis	302	303													
Back & neck except spinal fusion	490	491	518	519	520										
Cardiac arrhythmia	308	309	310												
Cardiac defibrillator	222	223	224	225	226	227									
Cardiac valve	216	217	218	219	220	221	266	267							
Cellulitis	602	603													
Cervical spinal fusion	471	472	473												
Chest pain	313														
Chronic obstructive pulmonary disease, bronchitis, asthma	190	191	192	202	203										
Combined anterior posterior spinal fusion	453	454	455												
Complex non-cervical spinal fusion	456	457	458												
Congestive heart failure	291	292	293												
Coronary artery bypass graft	231	232	233	234	235	236									
Diabetes	637	638	639												
Double joint replacement of the lower extremity	461	462													
Esophagitis, gastroenteritis and other digestive disorders	391	392													
Fractures of the femur and hip or pelvis	533	534	535	536											
Gastrointestinal hemorrhage	377	378	379												
Gastrointestinal obstruction	388	389	390												
Hip & femur procedures except major joint	480	481	482												

Episode	MS-DRGs that trigger the clinical episode														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Lower extremity & humerus procedure except hip, foot, femur	492	493	494												
Major bowel procedure	329	330	331												
Major cardiovascular procedure	237	238	268	269	270	271	272								
Major joint replacement of the lower extremity	469	470													
Major joint replacement of the upper extremity	483	484													
Medical non-infectious orthopedic	537	538	551	552	553	554	555	556	557	558	559	560	561	562	563
Medical peripheral vascular disorders	299	300	301												
Nutritional and metabolic disorders	640	641													
Other knee procedures	485	486	487	488	489										
Other respiratory	186	187	188	189	204	205	206	207	208						
Other vascular surgery	252	253	254												
Pacemaker	242	243	244												
Pacemaker device replacement or revision	258	259	260	261	262										
Percutaneous coronary intervention	246	247	248	249	250	251	273	274							
Red blood cell disorders	811	812													
Removal of orthopedic devices	495	496	497	498	499										
Renal failure	682	683	684												
Revision of the hip or knee	466	467	468												
Sepsis	870	871	872												
Simple pneumonia and respiratory infections	177	178	179	193	194	195									
Spinal fusion (non-cervical)	459	460													
Stroke	61	62	63	64	65	66									
Syncope & collapse	312														
Transient ischemia	69														
Urinary tract infection	689	690													

Appendix C: Count of Episodes by Model, Episode Initiator Type, and Clinical Episode, Q4 2013 – Q4 2016

Table C.1: Count of Model 2 Patient Episodes during BPCI Intervention Period by Episode Initiator Type and Clinical Episode, Q4 2013 – Q4 2016

Clinical Episode	Patient episodes (N=694,382)		
	Hospitals (N=401,071)	PGP (N=293,311)	%
Major joint replacement of the lower extremity	135,016	90,362	32.5%
Sepsis	33,332	34,789	9.8%
Congestive heart failure	39,311	16,745	8.1%
Simple pneumonia and respiratory infections	27,219	18,402	6.6%
Chronic obstructive pulmonary disease, bronchitis, asthma	22,536	13,939	5.3%
Stroke	14,489	6,831	3.1%
Urinary tract infection	10,072	10,204	2.9%
Renal failure	9,099	10,015	2.8%
Hip & femur procedures except major joint	8,863	9,157	2.6%
Medical non-infectious orthopedic	8,552	6,031	2.1%
Other respiratory	6,149	8,007	2.0%
Acute myocardial infarction	7,095	6,610	2.0%
Cardiac arrhythmia	7,261	5,523	1.8%
Cellulitis	6,423	5,483	1.7%
Esophagitis, gastroenteritis and other digestive disorders	5,184	6,298	1.7%
Percutaneous coronary intervention	6,736	4,395	1.6%
Gastrointestinal hemorrhage	5,212	4,602	1.4%
Nutritional and metabolic disorders	3,312	5,000	1.2%
Spinal fusion (non-cervical)	4,420	3,124	1.1%
Cardiac valve	5,870	382	0.9%
Major joint replacement of the upper extremity	1,900	4,001	0.8%
Coronary artery bypass graft	5,094	342	0.8%
Gastrointestinal obstruction	2,091	2,734	0.7%
Syncope & collapse	1,699	2,666	0.6%
Diabetes	1,907	2,395	0.6%
Major bowel procedure	3,705	425	0.6%
Red blood cell disorders	1,234	2,031	0.5%
Fractures of the femur and hip or pelvis	1,400	1,613	0.4%
Revision of the hip or knee	1,621	1,160	0.4%
Chest pain	1,207	1,527	0.4%
Transient ischemia	1,310	1,410	0.4%
Cervical spinal fusion	1,974	638	0.4%
Other vascular surgery	1,849	578	0.3%

Clinical Episode	Patient episodes (N=694,382)		
	Hospitals (N=401,071)	PGP (N=293,311)	%
Medical peripheral vascular disorders	1,277	1,027	0.3%
Pacemaker	1,251	1,039	0.3%
Lower extremity and humerus procedure except hip, foot, femur	1,382	731	0.3%
Major cardiovascular procedure	1,188	338	0.2%
Amputation	574	883	0.2%
Double joint replacement of the lower extremity	433	712	0.2%
Atherosclerosis	409	406	0.1%
Cardiac defibrillator	364	228	0.1%
Back & neck except spinal fusion	410	127	0.1%
Combined anterior posterior spinal fusion	189	243	0.1%
Removal of orthopedic devices	188	35	0.0%
Other knee procedures	95	49	0.0%
Complex non-cervical spinal fusion	104	28	0.0%
Pacemaker device replacement or revision	58	38	0.0%
AICD generator or lead	7	8	0.0%

Table C.2: Count of Model 3 Patient Episodes during BPCI Intervention Period by Episode Initiator Type and Clinical Episode

Clinical Episode	Count of patient episodes by EI type (N=88,680)					
	SNF (N=56,515)	HHA (N=16,852)	IRF (N=950)	LTCH (N=151)	PGP (N=14,212)	%
Major joint replacement of the lower extremity	9,657	4,026	127	2	6,790	23.2%
Congestive heart failure	4,080	4,818	69	19	102	10.2%
Sepsis	5,823	477	38	61	1,201	8.6%
Simple pneumonia and respiratory infections	3,905	1,429	51	17	451	6.6%
Hip & femur procedures except major joint	3,940	285	96	2	537	5.5%
Stroke	2,388	495	374	0	530	4.3%
Urinary tract infection	2,797	512	0	0	344	4.1%
Medical non-infectious orthopedic	3,425	76	0	0	31	4.0%
Chronic obstructive pulmonary disease, bronchitis, asthma	1,758	935	0	13	490	3.6%
Other respiratory	1,692	462	0	37	260	2.8%
Renal failure	2,048	149	0	0	232	2.7%
Acute myocardial infarction	887	393	0	0	288	1.8%
Cardiac arrhythmia	1,036	241	0	0	284	1.8%
Cellulitis	1,031	39	0	0	302	1.5%
Nutritional and metabolic disorders	942	79	0	0	228	1.4%

Clinical Episode	Count of patient episodes by EI type (N=88,680)					
	SNF (N=56,515)	HHA (N=16,852)	IRF (N=950)	LTCH (N=151)	PGP (N=14,212)	%
Esophagitis, gastroenteritis and other digestive disorders	807	24	0	0	349	1.3%
Revision of the hip or knee	594	347	18	0	163	1.3%
Spinal fusion (non-cervical)	487	463	43	0	113	1.2%
Gastrointestinal hemorrhage	895	37	0	0	128	1.2%
Fractures of the femur and hip or pelvis	979	45	21	0	14	1.2%
Major bowel procedure	849	56	0	0	62	1.1%
Lower extremity and humerus procedure except hip, foot, femur	662	53	0	0	250	1.1%
Diabetes	397	58	0	0	308	0.9%
Other vascular surgery	474	163	0	0	109	0.8%
Cardiac valve	586	146	0	0	1	0.8%
Syncope & collapse	537	22	0	0	169	0.8%
Coronary artery bypass graft	344	334	0	0	36	0.8%
Medical peripheral vascular disorders	456	77	0	0	14	0.6%
Percutaneous coronary intervention	353	112	0	0	18	0.5%
Major joint replacement of the upper extremity	267	142	1	0	66	0.5%
Pacemaker	393	11	0	0	52	0.5%
Red blood cell disorders	318	21	0	0	40	0.4%
Gastrointestinal obstruction	277	3	0	0	72	0.4%
Transient ischemia	231	11	0	0	45	0.3%
Cervical spinal fusion	90	133	32	0	1	0.3%
Double joint replacement of the lower extremity	97	8	55	0	72	0.3%
Major cardiovascular procedure	139	50	0	0	9	0.2%
Back & neck except spinal fusion	147	26	25	0	0	0.2%
Amputation	190	4	0	0	0	0.2%
Chest pain	106	30	0	0	40	0.2%
Other knee procedures	109	7	0	0	0	0.1%
Complex non-cervical spinal fusion	61	25	0	0	0	0.1%
Cardiac defibrillator	60	23	0	0	0	0.1%
Combined anterior posterior spinal fusion	65	4	0	0	0	0.1%
Removal of orthopedic devices	56	0	0	0	1	0.1%
Pacemaker device replacement or revision	40	0	0	0	5	0.1%
Atherosclerosis	36	1	0	0	3	0.0%
AICD generator or lead	4	0	0	0	2	0.0%

Table C.3: Count of Model 4 Patient Episodes during BPCI Intervention Period by Clinical Episode

Clinical Episode	Patient episodes (N= 13,551)	
	N	%
Major joint replacement of the lower extremity	5,849	43.2%
Coronary artery bypass graft	1,366	10.1%
Spinal fusion (non-cervical)	1,116	8.2%
Sepsis	1,048	7.7%
Percutaneous coronary intervention	968	7.1%
Cardiac valve	897	6.6%
Congestive heart failure	474	3.5%
Cervical spinal fusion	451	3.3%
Pacemaker	408	3.0%
Revision of the hip or knee	271	2.0%
Back & neck except spinal fusion	223	1.6%
Complex non-cervical spinal fusion	149	1.1%
Acute myocardial infarction	101	0.7%
Combined anterior posterior spinal fusion	81	0.6%
Cardiac defibrillator	63	0.5%
Double joint replacement of the lower extremity	38	0.3%
Pacemaker device replacement or revision	22	0.2%
Other knee procedures	21	0.2%
AICD generator or lead	5	0.0%

Appendix D: Methods

This appendix includes the details on the methods used for the analyses included in the Year 5 report.

A. Data sources

Exhibit 1 lists the data sources and their uses for this study. Overall, we used provider-level data sources to identify and describe Bundled Payments for Care Improvement (BPCI) participant providers and select comparison providers. Medicare claims and enrollment data were used to construct episodes of care for patients at BPCI-participating sites (BPCI population) and at matched comparison providers. We also used claims and patient assessment data to create outcome measures and beneficiary risk factors associated with the outcomes. The beneficiary survey was used to explore differences in patient care experiences and functional outcomes between Medicare beneficiaries cared for by BPCI providers and similar beneficiaries whose providers do not participate in BPCI. We used primary data sources to describe BPCI patient and participant experiences in the initiative. Technical expert panels (TEPs) were also convened to provide clinician insights into patterns of care identified through other data collection methods.

Exhibit D.1: Data Sources used in the BPCI Evaluation

	Dataset Name	Date Range	Dataset Contents	Use
Provider-level secondary data sources	CMS BPCI database	2013-2016	Information compiled by CMS on BPCI participants and their clinical episodes, including participant name, CMS Certification Number, location, type (hospital, skilled nursing facility (SNF), etc.), BPCI “role”, Model, clinical episode(s) and length(s), BPCI participation start and end dates, and contact information.	Used to identify Quarter 4 2013 through Quarter 4 2016 BPCI participating providers and clinical episodes. Identified participants in Model 1 of BPCI to exclude from comparison group.
	Medicare Provider Enrollment, Chain, and Ownership System (PECOS)	2011-2014	Information on Medicare providers, including ownership and chain relationships among providers.	Used to identify ownership of BPCI providers and potential comparison providers and to create an indicator of whether the provider was part of a chain. Both of these characteristics were used in the creation of the comparison groups.
	Provider of Services (POS) file	2011-2015	Information on Medicare-approved institutional providers, including provider number, size, and staffing.	Used within descriptive analysis of BPCI and non-BPCI participants. Used as predictors in provider propensity model on participation in BPCI or characteristics for Mahalanobis matching.
	Area Health Resource File (AHRF)	2011	County-level data on population, environment, geography, health care facilities, and health care professionals.	Descriptive analysis of BPCI and non-BPCI market characteristics. Used as predictors in provider propensity model on participation in BPCI or characteristics for Mahalanobis matching.
	Implementation protocols	2013-2016	Information provided by an Awardee to CMS when joining BPCI (may be updated quarterly with any changes). The Awardee describes their care redesign activities, notes whether they will be participating in the OIG or CMS waivers, provides SNF partner lists, and lists beneficiary incentives and gainsharing methodology, if relevant.	Used to identify the count and percentage of Awardees and episode initiators (EIs) participating in various care redesign activities and utilizing the waivers. Used as potential characteristics of interest when evaluating what BPCI characteristics are associated with success/failure in the initiative.
	Master Data Management (MDM)	2013-2016	Provider- and beneficiary-level information on participation in CMMI payment demonstration programs.	Used to identify providers who are involved in an Accountable Care Organization (ACO) or other Medicare Shared Savings programs.
	Inpatient Prospective Payment System (IPPS) annual files	2011	Hospital-level file containing provider characteristics such as bed count, resident-bed ratio, and discharge counts.	Used as predictors in provider propensity model on participation in BPCI or characteristics for Mahalanobis matching.

	Dataset Name	Date Range	Dataset Contents	Use
Provider-level secondary data sources (cont'd)	Nursing Home Compare	2011	Information about every Medicare and Medicaid-certified nursing home in the country.	“Overall Rating” used as a predictor in the SNF propensity model on participation in BPCI. A handful of other variables were used to assess SNF comparison group balance, but not as matching variables.
Transaction-level secondary data sources	Medicare fee-for-service (FFS) claims	Jan 2010-Dec 2016	Medicare Part A and B claims.	Used to create episodes of care and outcome measures such as readmissions, emergency department (ED) visits, number of days in each care setting (e.g., SNF). Also used to create risk factors including hierarchical condition categories and health care utilization prior to anchor/qualifying hospitalization.
	Medicare standardized payments	Jan 2011-Dec 2016	Medicare standardized payments for 100% of Part A and B claims received via the Integrated Data Repository (IDR) from another CMS contractor.	Used to create Medicare standardized payment amounts (Part A and B) and allowed standardized payment outcomes (including beneficiary out-of-pocket amounts).
	The Master Beneficiary Summary File (MBSF)	Jan 2010-Dec 2016	Beneficiary and enrollment information, including beneficiary unique identifier, address, date of birth/death, sex, race, age, and Medicare enrollment status.	Used to identify eligibility for episodes of care, beneficiary demographic characteristics, and beneficiary eligibility for inclusion in the denominator for each of the outcome measures.
	Minimum Data Set (MDS)	2011-2016	Comprehensive post-acute patient assessments completed by clinicians. Required for residents of Medicare-certified SNF facilities. Administered at entry to the facility, at discharge, days 14, 30, 60, 90, and quarterly thereafter.	Provided functional status outcomes (early-loss, mid-loss, and long-form activities of daily living) for BPCI and comparison groups, and provided conditions and functional status upon admission to SNF within Model 3.
	Outcome and Assessment Information Set (OASIS)	2011-2016	Comprehensive post-acute patient assessments completed by clinicians. Required for Medicare-paid home health patients. Completed at the start of care and at discharge, and when care resumes following a hospitalization. Modified assessments are completed at recertification (60 days), if the patient’s condition changes significantly, at transfer to an inpatient facility, and at death.	Provided functional status outcomes (bathing, upper- and lower-body dressing, ambulation/locomotion, and bed transferring) for BPCI and comparison groups, and provided conditions and functional status upon admission to a home health agency (HHA) within Model 3.
	Episode files from reconciliation contractor	2013-2016	Episode-level net payment reconciliation amount (NPRA) from the Reconciliation contractor.	Used to validate our implementation of the BPCI episode construction methodology and to investigate the role of target pricing on Net Medicare Savings due to BPCI.

	Dataset Name	Date Range	Dataset Contents	Use
Primary data sources	Beneficiary survey	2015-2017	Surveys completed by Medicare beneficiaries or their proxies. Received approximately 90 days after hospital discharge.	Used to create outcomes measures such as self-reported change in functional status, care experience, and overall satisfaction with recovery.
	Site visits	2014-2017	Site visit summary documents that describe the findings of multi-day site visits and cover a wide range of subjects related to an Awardee’s or an EI’s experience in BPCI.	Site visits involved interviews with key individuals responsible for different aspects of BPCI implementation and management, including clinical and administrative leaders and operational staff, at episode-initiating sites. During site visits, we focused on why organizations chose to participate, how they selected their clinical episodes and their partners, their initial infrastructure investments to participate in BPCI, and their goals for the BPCI initiative. We also asked about the processes they adopted to meet the incentives offered through participation in BPCI, including those used in contracting, gainsharing, care redesign, quality and cost monitoring, reconciliation results, the use of programmatic waivers, and both the perceived challenges and successes.
	Focus groups	2014-2017	Summaries from focus groups conducted with multiple Awardees, EIs, or other stakeholders. Each focus group centered on a specific topic of interest.	We conducted focus groups to expand our understanding of the effect of BPCI on participants, their partners, and their markets. Focus group participants were staff members with sufficient experience on these topics who were able to offer personal insights, experiences, and opinions to the interviewing team. Topics included post-acute care partnerships and SNFs’ strategies to reduce readmissions for specific BPCI episodes.

	Dataset Name	Date Range	Dataset Contents	Use
Primary data sources (cont'd)	Participant interviews	2014-2017	Summaries from participant interviews conducted with Awardee and EIs. The interviews were held quarterly, and each quarter’s sample was designed to inform a specific domain.	Designed with input from CMS, the interview protocols elicited information on best practices and lessons learned, and challenges that may affect the ability to scale this initiative to a broader group of providers. Interviewees discussed various topics, including but not limited to, key factors in the decision to terminate from BPCI, gainsharing experiences, care redesign and cost savings opportunities and challenges within specific episodes and across participant characteristics (e.g., rural markets, teaching hospitals) and lessons learned for future success in BPCI.
	Technical expert panels	2015-2017	Information obtained from five TEPs provided clinician insights into patterns of care and changes in care for BPCI beneficiaries identified through case studies or quantitative data analysis.	Each TEP focused on a single clinical episode; therefore, the TEP panelists represented the range of clinicians and specialists that care for that type of case. The clinical episodes included major joint replacement of the lower extremity (MJRLE), congestive heart failure (CHF), coronary artery bypass graft (CABG), sepsis, and spinal fusion. Information from the TEP was used to explain quantitative results and to inform additional analyses to better understand the results we were producing.
	Awardee-submitted data	2015-2017	Awardees submitted data quarterly to Lewin through an online reporting platform. For each data submission period, Awardees that had active episodes at any point in the reporting quarter were required to submit data. Data submission occurred at the Awardee level and each Awardee was responsible for ensuring that data was submitted for any affiliated EIs.	The Awardee-submitted data was used for the following purposes in the evaluation: 1) track use of program rule waivers; 2) measure quality with data not available through secondary sources; 3) document participant characteristics; and 4) gather initiative-related information, such as progress towards implementing care redesign.

1. Qualitative data source description, sample, and methods

In this section we describe the sample included in each of the primary qualitative data collection activities, the data collected, and the methods for analyzing the data.

a. Technical expert panels

Information obtained from five Technical Expert Panels provided clinician insights into patterns of care and changes in care for BPCI beneficiaries identified through case studies or quantitative data analysis. Each TEP focused on a single clinical episode; therefore, the TEP panelists represented the range of clinicians and specialists that care for that type of case. There were five TEPs, each on one of the following conditions: MJRLE, CHF, CABG, sepsis, and spinal fusion. For each TEP, eight panelists of various backgrounds and expertise were identified through professional contacts and vetted by CMS.

The objectives of the TEPs were to:

- Identify potential outcomes associated with the observed care patterns.
- Identify care patterns that may suggest questionable utilization and signal potentially lower quality care.
- Identify markers of appropriate versus inadequate care.
- Identify beneficiary populations that may be susceptible to poor quality care.
- Identify outcomes measures to include in quarterly rapid cycle evaluation reports and other quantitative analyses.

All TEPs were administered in the same manner and convened via webinar. We created a pre-work packet consisting of relevant BPCI background information, panelist biographies, an agenda, general expectations for the TEP, and presentation slides that included evaluation results and the probing questions for discussion. CMS approved the materials prior to distribution to the panelists.

Through webinars, Dr. Christine LaRocca, geriatric medicine physician and medical director at Telligen, led a discussion structured on questions based on the evaluation results to date. Each question was discussed for approximately 20 minutes and all participants were given an opportunity to answer. The meetings were recorded and transcribed to ensure accurate records of the discussions. See **Appendix Q** for a summary of the evaluation results shared with the TEP, the probing questions, the findings from the TEP discussion, and the list of panelists.

b. Case study site visits

Case studies were based on one or two day, in person site visits that involved interviews with key individuals responsible for different aspects of BPCI implementation and management, including clinical and administrative leaders and operational staff, at episode initiating sites (both Awardees and EIs under Awardees). The information collected during each site visit complements data submitted by Awardees through their implementation protocol and quarterly Awardee data submissions.

During our site visits conducted from Q4 2013 through Q3 2017, we focused on why organizations chose to participate, how they selected their clinical episodes and their partners, their initial

infrastructure investments to participate in BPCI, and their goals for the BPCI initiative. We also asked about the processes they adopted to meet the incentives offered through participation in BPCI, including those used in contracting, gainsharing, care redesign, quality and cost monitoring, reconciliation results, implementation of beneficiary incentives, and both the perceived challenges and successes. Beginning in Q3 2016, we added episode specific interviews to learn more about sites' experience with specific clinical episodes, such as MJRLE, chronic obstructive pulmonary disease (COPD), simple pneumonia and respiratory infections (SPRI), and various cardiovascular surgery episodes.

Case study sites

Case study sites were selected based on descriptive characteristics that inform a wide range of BPCI approaches and perspectives. The study sites varied in several key aspects that could affect provider incentives and the impact of the intervention. These aspects included: Model, participant size, convener approach, and tenure in the initiative. **Exhibit D.2** compares the characteristics of the case study sites to all BPCI EIs.

Exhibit D.2: Characteristics of Case Study Participants and All BPCI Episode Initiators, 2013-2017

		Case study participants (N=105)		All BPCI episode initiators (N=1,870*)	
		N	%	N	%
Model	2	48	46	695	37
	3	50	48	1,152	62
	4	7	7	23	1
Participant Role	DA	24	23	214	11
	AC	2	2	5	0
	SA	16	15	70	4
	DAC	1	1	4	0
	EI-BPPO	62	59	1,577	84
Type of Participant	Hospital	49	47	446	24
	HHA	9	9	116	6
	IRF, LTCH	4	4	10	1
	SNF	35	33	882	47
	PGP	8	8	416	22
Clinical Episodes	Orthopedic surgery	87	83	1,307	70
	Non-surgical: other medical	55	52	940	50
	Non-surgical: neurovascular	38	36	566	30
	Non-surgical: respiratory	65	62	898	48
	Non-surgical: cardiovascular	68	65	949	51
	Non-surgical and surgical: GI	32	30	613	33
	Cardiovascular surgery	52	50	850	45
	Non-surgical: Ortho	40	38	582	31
Spinal surgery	40	38	478	26	

		Case study participants (N=105)		All BPCI episode initiators (N=1,870*)	
		N	%	N	%
Geographic Region	Northeast	29	28	479	26
	South	33	31	653	35
	West	23	22	363	19
	Midwest	20	19	375	20

Source: Lewin analysis of CMS BPCI database, as of April 2018, on BPCI participants interviewed from Q4 2013 through Q3 2017.

*Reflects the number of episode-initiating BPCI participants as of Q4 2015, the last quarter to join BPCI. Awardees that serve administrative functions and do not, by definition, initiate episodes, are omitted from these columns.

Note: Physician Group Practices (PGPs) are permitted to participate in Models 2 and 3 simultaneously for different clinical episodes. These PGPs are counted twice in the ‘All BPCI’ columns. There are 277 distinct PGP providers. Because participants can select in multiple episodes across groups, the clinical episode rows will not sum to the total number of episode initiators.

Interview protocols

The site visit protocols were designed to gather information about the design, implementation, and initial results of BPCI from EI clinical and administrative leadership and managers involved with the initiative (**Appendix R**). Questions pertained to BPCI entry decisions and structure, experience with BPCI, market effects, successes and challenges, ability to replicate, quality management, care redesign, and care management. Separate interview protocols were tailored to each type of respondent, ensuring consistency and appropriateness in question presentation.

During site visits, participant leadership were asked about decisions that led to joining the initiative and why they chose to participate. They were asked about their partners (e.g., post-acute care (PAC) providers, physician groups), care redesign approaches, gainsharing, and reasoning behind their decisions for each of these topics. They were also asked how they would determine whether their approaches are successful and what they expect to gain.

Operational managers were also interviewed, including financial managers, clinical managers, quality and outcomes directors, and data and IT managers involved in the BPCI initiative at each site. Interviews were also conducted with clinical staff (e.g., case managers, nurses, and therapists), who provide care directly to BPCI beneficiaries. Interviewees were identified in consultation with management at each site through several planning calls in advance of the site visit. Convener staff were included, where appropriate, although all site visits focused on the experience of the EI. Interviewees were asked about their expected goals for their tasks related to the initiative, how their efforts differed from prior practice, how their jobs have changed, the types of materials (e.g., educational materials, care protocols, risk stratification tools) or practice programs they put in place to affect changes, and why the approaches were chosen. They were also asked about their perceptions about actual implementation and whether they viewed the initiative as meeting its stated goals. Interviews typically lasted one hour.

c. Focus groups

In total, we conducted 22 focus groups, centered on four different topics. Details on topics, discussion points, and focus group participants are included in Exhibit D.3 below. Selection criteria for focus group sites consisted of prospective sites’ ability to identify a sufficient number of staff with the experience needed to yield a successful focus group. For example, when identifying

possible sites for the “care redesign under the same convener” focus group, we determined that a convener should have staff from a minimum of three EIs to participate.

These focus groups complemented the site visit data and expanded our understanding of the effect of BPCI on participants, their partners, and their markets. Focus group participants were staff members with sufficient experience on these topics to offer personal insights, experiences, and opinions to the interviewing team. Participants included care coordinators, case managers, and nurses with comparable levels of responsibility. We selected participants with the same level of seniority, to the extent possible, because we wanted them to feel comfortable in expressing their opinions. Information on the topic and number of participants is included in Exhibit D.3.

Exhibit D.3: Description of BPCI evaluation focus groups, 2014-2017

Topic	Points for Discussion	Model	Participants
Care redesign under the same Awardee Convener	<ul style="list-style-type: none"> Relationships between EIs and ACs AC services provided to EIs How ACs adapt their approach to address needs of the distinct EIs 	2	We held three focus groups, each for a different AC. Two focus groups had three EI participants and one focus group had five EIs.
		3	We held four focus groups, each for a different AC. One focus group had four EI participants, one focus group had five EIs, and two focus groups had six EIs.
Relationship between PAC providers and EIs working together in same local region	<ul style="list-style-type: none"> How EIs and PAC providers work together to change processes for 1) care delivery, 2) hospital discharge and 3) PAC admission PAC providers’ views of BPCI 	2	We held nine focus groups, each with PAC providers working with unique BPCI EIs. One focus group had three PAC providers, four focus groups had four PAC providers, and three focus groups had seven PAC providers, and one focus group had 11 PAC providers.
		3	We held one focus group with PAC providers working with one BPCI EI. Seven PAC providers participated in this focus group.
Experiences of primary care physicians (PCP) in BPCI	<ul style="list-style-type: none"> Experiences of PCPs whose patients have participated in a BPCI clinical episode How EIs and PCPs communicate about BPCI Unintended benefits or consequences of BPCI 	2	We held one focus group with PCPs working with the same EI. The focus group had three participants.
SNFs and readmission strategies, related to a specific clinical episode (COPD, CHF, or SPRI)	<ul style="list-style-type: none"> Strategies used by BPCI-participating SNFs to reduce hospital readmissions Approaches to identify patients who may be at high-risk for clinical decline Interventions used when a patient’s condition deteriorates after a SNF discharge 	3	We held four focus groups with SNFs. Two of the focus groups centered on SPRI, one on COPD and one on CHF. Two of the focus groups had six participants and the other two focus groups had eight participants.

The Lewin team, in consultation with CMS, selected the topics and questions for these focus groups. A unique protocol was created for each focus group topic and split into two sections. The first section was designed to elicit important information for the evaluation related to the focus group topic and the second section addressed lessons learned. Focus groups were 60-90 minutes in

length, were conducted in-person or virtually, and introductions were scripted to explain the goals of the focus group to participants. The protocols used for these focus groups are included in **Appendix R**.

d. Interviews with Awardees that terminated BPCI participation

Upon receiving notice of their termination from CMS, we reached out to BPCI Awardees that terminated their participation. A letter to the Awardees requested a 60-minute call with their key staff involved in the BPCI initiative to discuss their reasons for termination. Thirteen of twenty-five Awardees that were contacted participated in interviews.

Designed with input from CMS, the interview protocol elicited information on potential challenges that may affect the ability to scale this initiative to a broader group of providers. Awardee respondents described various topics: key factors in the decision to terminate from BPCI, suggestions for initiative improvement for future participants, and lessons learned for future success in BPCI. Interviews were typically conducted with two to three individuals and lasted between 30 to 60 minutes. The sample of Awardees interviewed are included in Exhibit D.4. The interview protocols are included in **Appendix R**.

Exhibit D.4: Awardees that terminated participation in BPCI and were contacted for an interview, 2014 – 2016

Model	Awardee BPID	Awardee Name
2	2042-000	Physicians of Central Florida
	2054-001	Bayonne Medical Center
	2065-001	Maine Heart Center
	2070-005	Hackensack University Medical Center
	2077-001	Touchstone Health
	2078-001	Vanguard Health Chicago
	2087-000	Centra Health
	2308-000	Pocono Medical Center
	2314-000	Harrisburg Hospital, Community General Osteopathic Hospital, and The West Shore Hospital
	2802-000	Billings Clinic
	2900-000	SSM Managed Care Organization
	6245-000	West Houston Medical Center
3	3053-001	Optum
	3053-018	ManorCare Oak Lawn East
	3057-000	Amedisys
	3403-001	Premier Health & Rehabilitation
	3996-000	Stillhouse Rehabilitation and Healthcare Center
	9009-000	Riverside Health & Rehabilitation Center
	9600-000	Ensign Services
	9605-000	Timberwood Nursing and Rehabilitation Center

Model	Awardee BPID	Awardee Name
4	4022-000	St. Luke's Hospital
	4058-001	Sisters of Charity of Leavenworth Health System
	4060-001	Summa Health Care System
	4064-001	Abrazo Region Services
	4067-000	University of Colorado Hospital Authority

e. Participant interviews

We conducted interviews with 20 to 25 Awardees or EIs each quarter to collect qualitative and quantitative data for analysis. Semi-structured interviews lasted up to one hour with the Awardees' or EIs' choice of representatives. Interviews were conducted over a period of two to three weeks prior to the end of the calendar quarter. Each quarter's sample was designed to inform a specific domain (e.g., gainsharing, market characteristics, episode-specific care redesign). In this report, we summarize findings from the participant interviews conducted from Q1 2014 through Q2 2017, during which we conducted 259 participant interviews with a total of 285 Awardees or EIs (Exhibit D.5).

Exhibit D.5: Characteristics of Awardees and EIs Interviewed, 2014 – 2017

		Q1 2014 – Q2 2017 (N = 285 ^a)	
		N	%
Model	2	186	65
	3	83	29
	4	16	6
Role	DA	77	27
	AC	39	14
	SA	52	18
	DAC	6	2
	EI-BPPO	103	36
	FC	8	3
Organization Type	Hospital	127	45
	HHA	11	4
	IRF	1	0
	SNF	38	13
	PGP	62	22
	Other ^b	46	16

^a Table accounts for every BPID interviewed in each quarter. Some BPIDs were interviewed more than once, across multiple quarters.

^b Non-episode initiating Awardees or Facilitator Conveners

Source: Lewin quarterly analysis of CMS BPCI database for Phase 2 Awardees between Q1 2014 – Q2 2017.

The Lewin team selected interview topics, in consultation with CMS, based on themes identified through other BPCI qualitative and quantitative analyses. Exhibit D.6 displays the topic, Model, and number of Awardees and EIs with whom we held interviews by quarter. Protocols for participant interviews are included in **Appendix R**.

Exhibit D.6: Number of Awardees and Episode Initiators Interviewed by Quarter, Q1 2014 – Q2 2017

Quarter	Topic	Model(s)	Number of Interviewees
Q1 2014 - Q2 2014	Awardee entry decisions	2	24
		3	10
		4	3
Q3 2014 – Q4 2014	Awardee care redesign and cost saving strategies	2	30
		3	5
		4	7
Q1 2015	Entry decisions, partnerships, and experiences of FCs	2	4
		3	4
Q2 2015	Awardee use of 3 Day SNF waiver, relationships between Awardees and SNFs, and Awardee impact on PAC use	2	18
Q3 2015	Drivers of PAC use, impact of care redesign on PAC use, and successes and challenges in changing PAC use among Model 2 and Model 4 awardees	2	12
		4	4
Q4 2015 – Q1 2016	Entry decisions, organizational structure, partnerships, and successes and challenges among PGP participants	2	32
		3	17
Q2 2016	Care redesign and cost saving strategies of Model 3 Awardees	3	25
Q3 2016	Gainsharing experiences, impact of gainsharing on care delivery, and cost savings strategies	2	17
		3	4
		4	2
Q4 2016 – Q1 2017	Care redesign and cost savings opportunities and challenges in the acute myocardial infarction and sepsis episodes	2	31
		3	10
Q2 2017	Successes and challenges in care delivery, care redesign, and cost savings among BPCI EIs in rural markets and teaching hospitals	2	18
		3	8

f. Qualitative methods

We conducted an analysis of the qualitative themes from site visits, participant interviews, and focus groups to identify themes across case studies, across participants, and across markets to understand the range of participant experiences in the BPCI initiative.

We used either notes or summary reports for our qualitative analysis. For site visits conducted from October 2015 through December 2015, interviewers developed a single set of notes for the two-day interview session. These notes were added to the ATLAS.ti (version 7.5.17; Scientific Software Development GmbH, Berlin, Germany) qualitative database and coded for qualitative themes. For

site visits from January 2016 through August 2017, coders used the site visit narrative report as source data (rather than the notes document) to improve coding efficiency and standardization. Focus group summary reports were also analyzed in the ATLAS.ti database. Data from participant interviews was gathered by means of note-taking in a standardized template during each call. These standardized notes were also added to and coded in the ATLAS.ti qualitative database.

Each team member who participated in qualitative coding received training in using ATLAS.ti and was familiar with the BPCI initiative through model documents, IPs, the evaluation and monitoring plan. They also participated in data gathering during site visits, participant interviews, or focus groups.

Analysis of the qualitative themes from case studies and interviews was guided by Research Questions A and C and the constant comparative method, a systematic data coding and analysis process during which specific quotes were categorized into themes with codes developed iteratively to reflect the data.¹ We developed the codes in steps, drafting a preliminary code structure after independent review by senior researchers.² The site visit code set from the most recent year of data collection was refined from the prior year's code set, with codes added to reflect new topic areas and new themes for each year. The same code set was used to analyze the focus groups as well. Codes were developed independently for each set of participant interviews. After coding, we reviewed themes relevant to the specified research questions, cataloguing them by specific topics (e.g., organizational structure, waiver use, PAC utilization). Coding results were compared to identify concordant themes. We added new codes to capture new concepts as needed.

B. Characteristics of the initiative and participants

We relied on both secondary quantitative and primary qualitative data to describe the BPCI-participating providers and their implementation of the initiative. To summarize characteristics of the initiative and participants at the baseline and during the course of the initiative, Lewin ran a series of descriptive analyses on the measures included in Exhibits D.7 through D.10. Please see section A.1 above for a descriptive of the qualitative data and methods.

Exhibit D.7: Provider Characteristics Variable Definitions, Model 2 and Model 3

Variable Name	Definition	Model(s)	Source
Ownership	The ownership type of a provider (e.g. for-profit, non-profit, government)	2, 3	2013 POS file
Urban/Rural	CBSA urban/rural indicator	2, 3	2013 POS file
Bed Count	Number of beds	2, 3	2011 CMS IPPS annual files
BPCI Discharges	Number of hospital discharges for any of the 48 BPCI clinical episode groups in 2011	2, 3	2011 Medicare claims
Medicare Days	Medicare days as a percent of total inpatient days according to CMS IPPS data	2, 3	2011 CMS IPPS annual files

¹ Glaser, B.G. & Strauss, A.L. (1967). *The Discovery of Grounded Theory: Strategies for Qualitative Research*. New Brunswick, New Jersey: Aldine Transaction.

² Crabtree, B.F. & Miller, W.L. (1999). *Doing Qualitative Research*. Thousand Oaks, California: Sage Publications, Inc.

Variable Name	Definition	Model(s)	Source
Resident-Bed Ratio	Average number of residents assigned per bed according to CMS IPPS data	2, 3	2011 CMS IPPS annual files
Hospital Market Share	Proportion of the hospital discharges to all discharges for the 48 BPCI clinical episodes in the market	2	2013 Medicare claims
SNF Market Share	CBSA-level market share of provider (number of provider MS-DRGs divided by all MS-DRGs in the CBSA), for the 48 BPCI clinical episodes	3	2013 Medicare claims
Part of Chain	Indicator of whether the provider is part of a chain, based on if they share a TIN with another hospital	2, 3	October 2012 PECOS
Disproportionate Share Percent	The sum of the percentage of Medicare inpatient days attributable to patients eligible for both Medicare Part A and Supplemental Security Income (SSI), and the percentage of total inpatient days attributable to patients eligible for Medicaid but not Medicare Part A	2	2011 CMS IPPS annual files
Nursing Home Overall Score	Number of points out of 5 in overall rating and in three areas: Quality, Survey/Health Inspections, and Staffing	3	2011 Nursing Home Compare
IRF in CBSA	Indicator of whether or not there is an IRF in the CBSA	3	2011 AHRF
SNF in Hospital	Indicator of whether or not a SNF is part of a hospital	3	2011 Nursing Home Compare

Exhibit D.8: Waiver Use Characteristics Variable Definitions, Model 2 and Model 3, Q4 2013 – Q4 2016

Variable Name	Description	Technical Definition	Source
Participants allowed to use the three-day hospital stay (Model 2) or beneficiary incentives (Model 2 & 3) waiver	Number and proportion of EIs participating in the waiver	All EIs that requested to use the three-day hospital stay or beneficiary incentives waiver on their respective Awardees' IPs and had at least one BPCI episode among EIs that had at least one BPCI episode from Q4 2013 – Q4 2016	IPs submitted and accepted by CMS from Q4 2013 – Q4 2016; BPCI episode evaluation research file through Q4 2016
Participants allowed to use waiver for gainsharing	Number and proportion of Awardees participating in the waiver	All Awardees that requested to participate in gainsharing on their IPs among Awardees that submitted IPs from Q4 2013 – Q3 2016.*	IPs submitted and accepted by CMS from Q4 2013 – Q3 2016
EIs that used the three-day hospital stay waiver (Model 2)	Number and proportion of Model 2 EIs that used the waiver	All Model 2 EIs that discharged at least one BPCI episode to SNF within 30 days, with inpatient length of stay of less than 3 days, not including the discharge day, and the SNF claims had the waiver treatment authorization code of "62" among EIs that were allowed to use the three-day hospital stay waiver and had at least one BPCI episode from Q4 2013 – Q4 2016	BPCI episode evaluation research file through Q4 2016; Medicare Part A claims
Patients in BPCI episodes with the three-day hospital stay waiver	Number and proportion of patients in BPCI episodes that used the waiver	All patients in BPCI episodes that used the three-day hospital stay waiver among all episodes from EIs that were allowed to use the three-day hospital stay waiver and had at least one BPCI episode from Q4 2013 – Q4 2016	BPCI episode evaluation research file through Q4 2016

Variable Name	Description	Technical Definition	Source
Els that used the telehealth waiver	Number and proportion of Els that used the waiver	All Els that had at least one BPCI episode with a telehealth claim billed under Healthcare Common Procedure Coding System (HCPCS) code “Q3014” and submitted by providers that were not in a rural primary care Health Professional Shortage Area and were in a Metropolitan Statistical Area among Els with at least one BPCI episode from Q4 2013 – Q4 2016	BPCI episode evaluation research file through Q4 2016; Medicare Part B claims
Els that used the post-discharge home visits waiver	Number and proportion of Els that used the waiver	All Els that had at least one episode with one post-discharge home visit in a 30-day episode of care, two visits in a 60-day episode of care, or three visits in a 90-day episode of care billed under HCPCS code “G9187” among Els that had at least one BPCI episode from Q4 2013 – Q4 2016	BPCI episode evaluation research file through Q4 2016; Medicare Part B claims
Els that used the beneficiary incentives waiver	Number and proportion of Els that used the waiver	All Els that distributed incentives to beneficiaries among Els that were allowed to use the waiver from Q4 2013 – Q4 2016	Awardee-submitted data from Q4 2013 – Q4 2016; IPs submitted and accepted by CMS from Q4 2013 – Q4 2016
Awardees that used the waiver for gainsharing	Number and proportion of Awardees that used the waiver	All Awardees that distributed Net Payment Reconciliation Amount (NPRA) or Internal Cost Savings (ICS) to gainsharing partners among Awardees participating in the waiver	Awardee-submitted data from Q4 2013 – Q2 2017; IPs submitted and accepted by CMS from Q4 2013 – Q3 2016
BPCI episodes that received beneficiary incentives	Number and proportion of BPCI episodes that received beneficiary incentives	All BPCI episodes that received beneficiary incentives among all episodes from Awardees and Els participating in the waiver and had at least one BPCI episode	Awardee-submitted data from Q4 2013 – Q4 2016; BPCI episode evaluation research file through Q4 2016
Awardees and Els allowed to use beneficiary incentives	Number of Awardees and Els allowed to distribute beneficiary incentives in each incentive category	All Awardees and Els that described incentives in their IPs in each incentive category	IPs submitted and accepted by CMS from Q4 2013 – Q4 2016
Awardees that provided one or more beneficiary incentives	Number of Awardees that distributed one or more incentives in each incentive category	All Awardees that distributed one or more incentives in each incentive category	Awardee-submitted data from Q4 2013 – Q4 2016
Episodes receiving one or more beneficiary incentives	Number of BPCI episodes receiving one or more beneficiary incentives in each incentive category	All BPCI episodes that received one or more beneficiary incentives in each incentive category	Awardee-submitted data from Q4 2013 – Q4 2016

Variable Name	Description	Technical Definition	Source
Average cost per incentive provided	Average value of beneficiary incentive provided in each category	The total dollar amount of beneficiary incentives in each category divided by the total number of incentives in each category	Awardee-submitted data from Q4 2013 – Q4 2016
Total Net Payment Reconciliation Amount (NPRA) earned	Total amount of NPRA earned by Awardees participating in gainsharing	The total dollar amount of NPRA earned by Awardees participating in gainsharing	Episode files from reconciliation contractor Q4 2013 – Q3 2016
Total Internal Cost Savings (ICS) realized	Total amount of ICS realized by Awardees participating in gainsharing	The total dollar amount of ICS realized by Awardees participating in gainsharing and submitted data through Awardee data collection	Awardee-submitted data from Q4 2013 – Q2 2017; IPs submitted and accepted by CMS from Q4 2013 – Q3 2016
Total NPRA distributed	Total amount of NPRA distributed by Awardees participating in gainsharing	The total dollar amount of NPRA distributed by Awardees participating in gainsharing and submitted data through Awardee data collection	Awardee-submitted data from Q4 2013 – Q2 2017; IPs submitted and accepted by CMS from Q4 2013 – Q3 2016
Total ICS distributed	Total amount of ICS distributed by Awardees participating in gainsharing	The total dollar amount of ICS distributed by Awardees participating in gainsharing and submitted data through Awardee data collection	Awardee-submitted data from Q4 2013 – Q2 2017
Awardees that reported eligible partners of this type	Number of Awardees that reported eligible partners in each partner category	The number of Awardees that reported eligible partners in each partner category	Awardee-submitted data from Q4 2013 – Q2 2017
Number of partners receiving a distribution	Number of gainsharing partners receiving NPRA or ICS distributions	The number of gainsharing partners that received NPRA or ICS distributions	Awardee-submitted data from Q4 2013 – Q2 2017
Number of partners receiving NPRA	Number of gainsharing partners receiving NPRA distributions	The number of gainsharing partners that received NPRA distributions	Awardee-submitted data from Q4 2013 – Q2 2017
Number of partners receiving ICS	Number of gainsharing partners receiving ICS distributions	The number of gainsharing partners that received ICS distributions	Awardee-submitted data from Q4 2013 – Q2 2017

* The time period for participation was lagged from gainsharing distribution period through Q1 2017 because the Awardees' Net Payment Reconciliation Amount (NPRA) was available for distribution approximately three quarters after the end of a quarter.

Exhibit D.9: BPCI-participating PGP Characteristics Variable Definitions, Model 2³

Variable Name	Description	Technical Definition	Eligible Sample	Source
Physician Specialty Distribution	Percentage of physicians by broad specialty categories (see Exhibit D.10)	Each clinician was assigned the specialty associated with their NPI in Part B claims data from 2012 to 2016. When a physician was matched to more than one specialty, which occurred in approximately 8% of cases, we assigned a single specialty and category. ⁴ Hospitalists identified using the methodology for the ‘hospitalist PGP,’ as described in third row of this exhibit, were placed in the hospital-based category.	All physician NPIs associated with BPCI PGP TINs. Approximately 3.9% of clinicians were dropped from the analysis due to lack of a specialty in the data.	TIN/NPI Crosswalk as of Q4 2016 from reconciliation contractor; 2012–2016 Part B Claims
Single-specialty PGP	Number of PGPs identified as single-specialty PGPs	Using the specialty categories assigned to each physician when calculating the physician specialty distribution, we calculated the percentage of physicians in each of the specialty categories at each PGP. Based on the methodology of Welch et. al. (2013), a PGP was then defined as single-specialty if at least 90% of physicians at the practice were in the same specialty category. A PGP identified as a single-specialty practice in any year from 2012–2016 is counted as a single-specialty practice.	All BPCI Model 2 PGPs with at least one NPI during the baseline period and at least one NPI during the intervention period.	TIN/NPI Crosswalk as of Q4 2016 from reconciliation contractor; 2012–2016 Medicare Part B Claims
Hospitalist PGP	Number of PGPs identified as hospitalist PGPs	We identified BPCI PGP hospitalist practices using a two-step process based on the methodology described in Welch et. al. (2014). To lessen the impact of fluctuation in the claims data, PGPs were counted as hospitalist practices if they met the criteria of the methodology in any year from 2012–2016. Step 1: Each physician is flagged as a hospitalist if the physician’s specialty fell into the primary care category and at least 90% of their total Part B allowed charges billed under the PGP TIN occurred in a hospital setting. Step 2: PGPs were considered a hospitalist practice if at least 70% of the physicians at the practice during the year were flagged as a hospitalist.	All BPCI Model 2 PGPs with at least one NPI during the baseline period and at least one NPI during the intervention period.	TIN/NPI Crosswalk as of Q4 2016 from reconciliation contractor; 2012–2016 Medicare Part B Claims

³ To count clinicians at a PGP, each clinician was weighted by the proportion of the year that they were employed at the PGP, as reported on the TIN/NPI crosswalk. For example, if a PGP had a clinician with a listed start date of February 1, 2012 and an end date of August 1, 2012, the clinician was employed for 183 days (inclusive of the end date) out of 366, for a count of 0.5.

⁴ CMS. (February 2017). Medicare Data on Provider Practice and Specialty (MD-PPAS): User Documentation Version 2.2.

Variable Name	Description	Technical Definition	Eligible Sample	Source
Non-physicians as a Proportion of PGP Clinicians	Proportion of clinicians that are non-physicians within BPCI PGPs	Clinicians were identified as non-physicians according to the Medicare provider specialty associated with their NPI in Part B claims from 2012–2016. We then calculated the percentage of non-physicians out of total clinical staff for each PGP and each year included in the analysis.	All BPCI Model 2 PGPs with at least one NPI during the baseline period and at least one NPI during the intervention period.	TIN/NPI Crosswalk as of Q4 2016 from reconciliation contractor; 2012–2016 Medicare Part B Claims
Average Quarterly Discharges per BPCI PGP	Average number of Part A hospital discharges for BPCI clinical episodes at BPCI PGPs	To obtain these averages, both the operating and attending physician NPIs on the 2012–Q32016 Part A claims dataset were mapped to the NPIs on the TIN/NPI crosswalk. If a discharge fell within a physician’s dates of employment at a PGP, the discharge was counted for that PGP. The total discharges for each PGP for each year were counted and divided by 4 to obtain a quarterly figure (they were divided by three for 2016, as the data included only three quarters of claims). Discharges related to any MS-DRG, including those that do not trigger a BPCI clinical episode, were counted in order to give an estimate of total practice size. Assigning discharges by both attending and operating physician occasionally allowed a single discharge to be counted at two different PGPs; however, this had a negligible effect on the results.	All BPCI Model 2 PGPs with at least one NPI during the baseline period and at least one NPI during the intervention period.	TIN/NPI Crosswalk as of Q4 2016, 2010–2016 Medicare Part A Claims
Average Quarterly Discharges per BPCI Physician	Average number of Part A hospital discharges per physician for BPCI clinical episodes at BPCI PGPs	For this outcome, total annual discharges for each PGP were divided by the count of physicians at the PGP for the year. The figure was then divided by four to obtain a quarterly average for each PGP. To obtain physician-level averages, we calculated each physician’s total annual discharges within their employment dates at BPCI-participating PGPs on the TIN/NPI Crosswalk. These were divided by the fraction of the year that each physician was employed to obtain an annualized figure, which was then divided by 4 to obtain a quarterly average. This method was also applied to obtain the figures for MJRLE only, restricted to physicians identified as orthopedic surgeons in the Part B claims data.	All BPCI Model 2 PGPs with at least one NPI during the baseline period and at least one NPI during the intervention period.	TIN/NPI Crosswalk as of Q4 2016, 2010–2016 Medicare Part A Claims

Variable Name	Description	Technical Definition	Eligible Sample	Source
Average Quarterly Discharges per Physician	Average number of MJRLE Part A hospital discharges per NPI across all NPIs (BPCI and Non-BPCI)	For each year from 2012-2016, total annual discharges for each NPI with at least one discharge were divided by 4 to obtain the quarterly average. This method was also applied to obtain the figures for MJRLE only, restricted to physicians identified as orthopedic surgeons in the Part B claims data.	All NPIs with at least one MJRLE discharge in the given year.	2010-2016 Medicare Part A Claims

Exhibit D.10: Definition of Physician Specialty Categories Used to Define PGP Characteristics

Broad Specialty Category	Included Physician Specialties
Psychiatry	Psychiatry, Geriatric Psychiatry, Neuropsychiatry
Hospital-based	Hospitalist, Emergency Medicine, Physical Medicine And Rehabilitation, Critical Care (Intensivists), Diagnostic Radiology, Anesthesiology, Pathology, Pain Management, Interventional Pain Management, Radiation Oncology, Interventional Radiology, Nuclear Medicine
Ob-Gyn	Obstetrics & Gynecology, Gynecological Oncology
Surgical specialty	Orthopedic Surgery, General Surgery, Hand Surgery, Sports Medicine, Neurosurgery, Otolaryngology, Urology, Vascular Surgery, Ophthalmology, Plastic And Reconstructive Surgery, Thoracic Surgery, Cardiac Surgery, Colorectal Surgery, Surgical Oncology, Peripheral Vascular Disease.
Medical specialty	Cardiovascular Disease, Pulmonary Disease, Nephrology, Gastroenterology, Infectious Disease, Neurology, Hematology-Oncology, Rheumatology, Endocrinology, Dermatology, Allergy/Immunology, Medical Oncology, Sleep Medicine, Addiction Medicine, Hematology, Interventional Cardiology
Primary care	Internal Medicine, Family Practice, Pediatric Medicine, Geriatric Medicine, General Practice, Hospice And Palliative Care, Osteopathic Manipulative Medicine, Preventive Medicine
Other physician	Clinic Or Group Practice, Undefined Physician Type

Note: The specialty categories in this exhibit were used to create the physician specialty distribution, single specialty PGP, and hospitalist PGP variables defined in Exhibit D.10 above. In the case that a physician had more than one listed specialty, the precedence logic in the MD-PPAS was employed. The categories are listed in approximate descending precedence order; for example, psychiatry takes precedence over emergency medicine and internal medicine.

Source: CMS. (February 2017). Medicare Data on Provider Practice and Specialty (MD-PPAS): User Documentation Version 2.2.

C. Impact of BPCI on claim and assessment-based outcomes

In this section, we describe the BPCI population and the methodology for creating comparison groups for each combination of Model, clinical episode, and provider type (“stratum”) analyzed in this report. We also define the outcomes and the methodology used to estimate the impact of BPCI on payment, utilization, and quality as well as the characteristics included in the patient mix analysis.

1. Outcomes

We used data from claims and patient assessments to create outcomes on payments, utilization of health care services, and quality, as well as characteristics of the patient mix. The following exhibits define these outcomes and characteristics. Exhibit D.11 provides detailed information about each outcome, including the name, description, technical definition, and eligible sample, organized by outcome domain.

Exhibit D.11: Claim- and Assessment-based Outcomes Definitions

Domain	Outcome Name	Description	Technical Definition	Eligible Sample ^a	Model(s)
Payment	Total Medicare Part A & B Standardized Allowed Payment Amount	Average total Medicare Part A & B standardized allowed amount, during the anchor/ qualifying hospital stay + 90-day PDP, during the anchor/ qualifying hospital stay + 120-day PDP, and during the post-bundle period days 1-30	The sum of Medicare payment and beneficiary out-of-pocket amounts for all health care services. Payments in the lower/upper ends are winsorized. ^b	Beneficiaries who: 1) maintained FFS A&B enrollment throughout the measurement period or until death; 2) had a measurement period that ended on or before March 31, 2017 for 90 day post-discharge payment outcomes and June 30, 2017 for 120-day post-discharge and post-bundle payment outcomes; 3) had non-missing Part A and B payments during the bundle period and anchor/qualifying hospital stay; 4) were alive at the beginning of the measurement period for post-bundle payment outcomes.	2, 3
Payment	Medicare Part A & B Standardized Allowed Included in the Bundle Definition	Average total Medicare Part A & B standardized allowed amount, included in the definition of the bundle, during the bundle period	The sum of Medicare payment and beneficiary out-of-pocket amounts for all Part A and Part B services included in the bundle definition, by bundle length. Payments in the lower/upper ends are winsorized. ^c	Beneficiaries who: 1) maintained FFS A&B enrollment throughout the measurement period or until death; 2) had a measurement period that ended on or before March 31, 2017; 3) had non-missing Part A and B payments during the bundle period and anchor/qualifying hospital stay.	2, 3
Payment	Part A & B Standardized Amount Paid by Medicare	Average total Part A & B amount paid by Medicare, during the anchor/ qualifying stay + 90-day PDP	The sum of Medicare payments for all health care services, without beneficiary cost sharing. Payments in the lower/upper ends are winsorized. ^d	Beneficiaries who: 1) maintained FFS A&B enrollment throughout the measurement period or until death; 2) had a measurement period that ended on or before March 31, 2017; 3) had non-missing Part A and B payments during the bundle period and anchor/qualifying hospital stay.	2, 3
Payment	Medicare Part A Standardized Allowed Amount (various settings)	Average Medicare Part A standardized allowed amount, for various settings, totaled within the 90-day PDP	The sum of Medicare payment and beneficiary out-of-pocket amounts for Part A health care services provided for inpatient readmissions, SNF, HHA, IRF, and LTCH during the 90-day PDP. Payments in the lower/upper ends are winsorized. ^e	Beneficiaries who: 1) maintained FFS A&B enrollment throughout the measurement period or until death; 2) had a measurement period that ended on or before March 31, 2017; 3) had non-missing Part A payments during the bundle period and anchor/qualifying hospital stay.	2, 3

Domain	Outcome Name	Description	Technical Definition	Eligible Sample ^a	Model(s)
Payment	Total Medicare Part B Standardized Allowed Amount	Average Medicare Part B standardized allowed amount, totaled across various service categories and within the 90-day PDP	The sum of Medicare payment and beneficiary out-of-pocket amounts for all Part B services, including outpatient therapy (speech, occupation, and physical therapy), imaging and lab services, procedures, physician evaluation & management services, all other non-institutional services, and other institutional services. Payments in the lower/upper ends are winsorized. ^f	Beneficiaries who: 1) maintained FFS A&B enrollment throughout the measurement period or until death; 2) had a measurement period that ended on or before March 31, 2017; 3) had non-missing Part B payments during the bundle period and anchor/qualifying hospital stay.	2, 3
Utilization	Anchor Hospital Length of Stay	Average number of inpatient days during the anchor stay	The number of days between the anchor admission date and the anchor discharge date (including any transfer stays). The upper end of this data is winsorized. ^g	No additional restrictions	2
Utilization	Number of Days in a SNF	Average number of SNF days of care during the 90-day PDP	The number of days of skilled nursing facility (SNF) care (not necessarily consecutive) during the 90-day PDP.	Beneficiaries who: 1) maintained FFS A&B enrollment throughout the measurement period or until death; 2) had a measurement period that ended on or before March 31, 2017; 3) were alive at the time of anchor/qualifying discharge; 4) had at least one SNF day during the 90-day PDP.	2, 3
Utilization	Number of Home Health Visits	Average number of home health visits during the 90-day PDP	The number of home health visits on home health claims during the 90-day PDP.	Beneficiaries who: 1) maintained FFS A&B enrollment throughout the measurement period or until death; 2) had a measurement period that ended on or before March 31, 2017; 3) were alive at the time of anchor/qualifying discharge; 4) had at least one home health visit during the 90-day PDP.	2, 3

Domain	Outcome Name	Description	Technical Definition	Eligible Sample ^a	Model(s)
Utilization	Discharged to Any Post-acute Care Setting	The proportion of episodes that were discharged from the anchor hospital to any PAC setting, including HHA	The proportion of episodes where the first PAC setting was SNF, LTCH, IRF, or HHA.	Beneficiaries who: 1) maintained FFS A&B enrollment throughout the measurement period or until death; 2) had a measurement period that ended on or before March 31, 2017; 3) were admitted to SNF, LTCH, or IRF within 5 days of discharge from the hospital or were admitted to home health within 14 days of anchor discharge.	2
Utilization	Discharged to Institutional Post-acute Care Setting Relative to Discharged Home with Home Health	The proportion of episodes discharged from the hospital to an institutional PAC setting among episodes that were discharged to any PAC setting (including HHA)	The proportion of episodes where the first PAC setting was SNF, LTCH, or IRF among episodes that were discharged to any PAC setting.	Beneficiaries who: 1) maintained FFS A&B enrollment throughout the measurement period or until death; 2) had a measurement period that ended on or before March 31, 2017; 3) had a first PAC setting of SNF, LTCH, IRF or HHA; 4) were admitted to SNF, LTCH, or IRF within 5 days of discharge from the hospital or were admitted to home health within 14 days of discharge from the hospital.	2
Quality	Unplanned Readmission Rate	Episodes with one or more unplanned, all-cause readmissions for any condition, 30 & 90 days after anchor discharge for Model 2, and within the first 30 and 90 days of the episode start for Model 3	Binary outcome (1= at least one readmission during measurement period; 0= no eligible readmissions during measurement period). Eligible readmissions are inpatient prospective payment system (IPPS) claims with an MS-DRG not on the list of excluded MS-DRGs for the given clinical episode. ^h	Beneficiaries who: 1) maintained FFS A&B enrollment throughout the measurement period or until death; 2) had a measurement period that ended on or before March 31, 2017; 3) were discharged from the anchor/qualifying hospital stay in accordance with medical advice; 4) were alive at the time of anchor discharge for Model 2 and at the time of PAC admission for Model 3.	2, 3
Quality	Emergency Department (ED) Use without Hospitalization	Episodes with one or more ED visits for which the beneficiary requires medical treatment but is not admitted to the hospital 30 and 90 days after discharge from an anchor hospital stay for Model 2 and within the first 30 and 90 days of the episode start for Model 3	Binary outcome (1= at least one ED visit without readmission during measurement period; 0= no eligible ED visits without readmission during measurement period). Eligible ED visits are outpatient claims with a code indicating the beneficiary used the emergency room but was not admitted.	Beneficiaries who: 1) maintained FFS A&B enrollment throughout the measurement period or until death; 2) had a measurement period that ended on or before March 31, 2017; 3) were discharged from the anchor/qualifying hospital in accordance with medical advice; 4) were alive at the time of anchor discharge for Model 2 and at the time of PAC admission or Model 3.	2, 3

Domain	Outcome Name	Description	Technical Definition	Eligible Sample ^a	Model(s)
Quality	All-cause Mortality	Death from any cause during 30 and 90 days after discharge from the anchor hospital stay for Model 2 and within the first 30 and 90 days of the episode start for Model 3	If date of death occurred during the measurement period, then mortality outcome =1.	Beneficiaries who: 1) maintained FFS A&B enrollment throughout the measurement period or until death; 2) have a measurement period that ends on or before March 31, 2017; 3) were not enrolled in the Medicare Hospice program in the six months prior to the anchor/qualifying admission; 4) had reliable mortality status in the data; 5) were discharged from the anchor/qualifying hospital in accordance with medical advice; 6) were alive at the time of anchor/qualifying hospital discharge. <i>For beneficiaries with multiple anchor hospitalizations, one hospitalization per quarter was randomly selected for inclusion in this measure.</i>	2, 3
Quality	Successfully Discharged to the Community	Discharged from the initial SNF stay to the community (home with or without home health services) and remained in the community for 30 days	If any of the following occurred during the measurement period, then successfully discharged to the community outcome =0: death from any cause, unplanned admission/readmission to inpatient hospital, and admission/readmission to SNF. The outcome is limited to Model 3 SNF patients who were discharged to the community from the initial SNF stay. ⁱ	Model 3 SNF beneficiaries who: 1) maintained FFS A&B enrollment throughout the measurement period or until death; 2) had a measurement period that ended on or before March 31, 2017; 3) were not enrolled in the Medicare Hospice program in the six months prior to the qualifying admission or during the SNF stay; 4) were discharged from the qualifying hospital in accordance with medical advice; 6) were discharged to the community (home with or without HHA services) within 100 days of SNF admission. ^j	3, SNF EIs

Domain	Outcome Name	Description	Technical Definition	Eligible Sample ^a	Model(s)
Quality	Improvement in Overall ADL Function	The proportion of SNF episodes that improved status or remained completely independent in long-form ADL function, a measure of overall function	ADL items included in this measure consist of bed mobility, transfer, locomotion on unit, dressing, eating, toilet use, and personal hygiene. If patient improved or remained independent all seven ADL items from the 5-day assessment (within 30 days after qualifying hospital discharge) to the discharge assessment or the latest available assessment (within 120 days after qualifying hospital discharge), then the outcome =1. The outcome is limited to eligible Model 3 SNF episodes.	Beneficiaries who: 1) maintained FFS A&B enrollment throughout the measurement period or until death; 2) had a measurement period that ended on or before March 31, 2017; 3) were discharged from the qualifying hospital in accordance with medical advice; 4) were alive at the time of SNF discharge; 5) had a valid 5-day assessment within 30 days after qualifying hospital discharge and a valid discharge or other assessment within 120 days after qualifying hospital discharge. ^j	3, SNF EIs
Quality	Improvement in Early-loss ADL Function	The proportion of SNF episodes that improved status or remained completely independent in early-loss ADL function, a measure of self-care function	ADL items included in this measure consist of dressing and personal hygiene. If patient improved or remained independent in both ADL items from the 5-day assessment (within 30 days after qualifying hospital discharge) to the discharge assessment or the latest available assessment (within 120 days after qualifying hospital discharge), then the outcome =1. The outcome is limited to eligible Model 3 SNF episodes.	Beneficiaries who: 1) maintained FFS A&B enrollment throughout the measurement period or until death; 2) had a measurement period that ended on or before March 31, 2017; 3) were discharged from the qualifying hospital in accordance with medical advice; 4) were alive at the time of SNF discharge; 5) had a valid 5-day assessment within 30 days after qualifying hospital discharge and a valid discharge or other assessment within 120 days after qualifying hospital discharge. ^j	3, SNF EIs

Domain	Outcome Name	Description	Technical Definition	Eligible Sample ^a	Model(s)
Quality	Improvement in Mid-loss ADL function	The proportion of SNF episodes that improved status or remained completely independent in mid-loss ADL function, a measure of mobility	ADL items included in this measure consist of transferring, locomotion on unit, and walk in corridor. If patient improved or remained independent in all three ADL items from the 5-day assessment (within 30 days after qualifying hospital discharge) to the discharge assessment or the latest available assessment (within 120 days after qualifying hospital discharge), then the outcome =1. The outcome is limited to eligible Model 3 SNF episodes.	Beneficiaries who: 1) maintained FFS A&B enrollment throughout the measurement period or until death; 2) had a measurement period that ended on or before March 31, 2017; 3) were discharged from the qualifying hospital in accordance with medical advice; 4) were alive at the time of SNF discharge; 5) had a valid 5-day assessment within 30 days after qualifying hospital discharge and a valid discharge or other assessment within 120 days after qualifying hospital discharge. ^j	3, SNF EIs
Quality	Improvement in Bathing	The proportion of HHA episodes that improve status or remain completely independent in bathing (a measure of self-care function)	If patient improved or remained independent in bathing from the start of care assessment (within 30 days after qualifying hospital discharge) to the discharge or re-certification assessment (within 120 days after qualifying hospital discharge), then the outcome =1. The outcome is limited to eligible Model 3 HHA episodes.	Beneficiaries who: 1) maintained FFS A&B enrollment throughout the measurement period or until death; 2) had a measurement period that ended on or before March 31, 2017; 3) were discharged from the qualifying hospital in accordance with medical advice; 4) were alive at the time of qualifying hospital discharge; 5) were not discharged due to death or transfer to an inpatient hospital; 6) had a valid start of care assessment within 30 days after qualifying hospital discharge and a valid discharge or re-certification assessment within 120 days after qualifying hospital discharge. ^j	3, HHA EIs

Domain	Outcome Name	Description	Technical Definition	Eligible Sample ^a	Model(s)
Quality	Improvement in Upper Body Dressing	The proportion of HHA episodes that improve status or remain completely independent in upper body dressing (a measure of self-care function)	If patient improved or remained independent in upper body dressing from the start of care assessment (within 30 days after qualifying hospital discharge) to the discharge or re-certification assessment (within 120 days after qualifying hospital discharge), then the outcome =1. The outcome is limited to eligible Model 3 HHA episodes.	Beneficiaries who: 1) maintained FFS A&B enrollment throughout the measurement period or until death; 2) had a measurement period that ended on or before March 31, 2017; 3) were discharged from the qualifying hospital in accordance with medical advice; 4) were living at the time of qualifying hospital discharge; 5) were not discharged due to death or transfer to an inpatient hospital; 6) had a valid start of care assessment within 30 days after qualifying hospital discharge and a valid discharge or re-certification assessment within 120 days after qualifying hospital discharge. ⁱ	3, HHA EIs
Quality	Improvement in Lower Body Dressing	The proportion of HHA episodes that improve status or remain completely independent in lower body dressing (a measure of self-care function)	If patient improved or independent in lower body dressing from the start of care assessment (within 30 days after qualifying hospital discharge) to the discharge or re-certification assessment (within 120 days after qualifying hospital discharge), then the outcome =1. The outcome is limited to eligible Model 3 HHA episodes.	Beneficiaries who: 1) maintained FFS A&B enrollment throughout the measurement period or until death; 2) had a measurement period that ended on or before March 31, 2017; 3) were discharged from the qualifying hospital in accordance with medical advice; 4) were alive at the time of qualifying hospital discharge; 5) were not discharged due to death or transfer to an inpatient hospital; 6) had a valid start of care assessment within 30 days after qualifying hospital discharge and a valid discharge or re-certification assessment within 120 days after qualifying hospital discharge. ⁱ	3, HHA EIs

Domain	Outcome Name	Description	Technical Definition	Eligible Sample ^a	Model(s)
Quality	Improvement in Ambulation or Locomotion	The proportion of HHA episodes that improve status or remain completely independent in ambulation or locomotion (a measure of mobility function)	If patient improved or remained independent in ambulation or locomotion from the start of care assessment (within 30 days after qualifying hospital discharge) to the discharge or re-certification assessment (within 120 days after qualifying hospital discharge), then the outcome =1. The outcome is limited to eligible Model 3 HHA episodes.	Beneficiaries who: 1) maintained FFS A&B enrollment throughout the measurement period or until death; 2) had a measurement period that ended on or before March 31, 2017; 3) were discharged from the qualifying hospital in accordance with medical advice; 4) were alive at the time of qualifying hospital discharge; 5) were not discharged due to death or transfer to an inpatient hospital; 6) had a valid start of care assessment within 30 days after qualifying hospital discharge and a valid discharge or re-certification assessment within 120 days after qualifying hospital discharge. ^j	3, HHA EIs
Quality	Improvement in Bed Transferring	The proportion of HHA episodes that improve status or remain completely independent in bed transferring (a measure of mobility function)	If patient improved or remained independent in bed transferring from the start of care assessment (within 30 days after qualifying hospital discharge) to the discharge or re-certification assessment (within 120 days after qualifying hospital discharge), then the outcome =1. The outcome is limited to eligible Model 3 HHA episodes.	Beneficiaries who: 1) maintained FFS A&B enrollment throughout the measurement period or until death; 2) had a measurement period that ended on or before March 31, 2017; 3) are discharged from the qualifying hospital in accordance with medical advice; 4) were alive at the time of qualifying hospital discharge; 5) were not discharged due to death or transfer to an inpatient hospital; 6) had a valid start of care assessment within 30 days after qualifying hospital discharge and a valid discharge or re-certification assessment within 120 days after qualifying hospital discharge. ^j	3, HHA EIs

Notes: Payment amounts adjust for Medicare payment policies to ensure that any differences across time and providers reflect real differences in resource use rather than Medicare payment policies (e.g., teaching payments or differential payment updates). Measures for improvement in ADL function for Model 3 SNF EIs are created using the Minimum Dataset (MDS) assessments, and those for Model 3 HHA EIs are created using the Outcome and Assessment Information Set (OASIS) assessments. All other measures are created using claims data. The measurement period for the MDS outcomes is the seven-day “look-back” period preceding the assessment (i.e., the first week of the SNF stay). The measurement period for OASIS outcomes is upon assessment, except for depressive symptoms for which the measurement period covers the 14 days prior to the assessment. PDP=post-discharge period. FFS=fee for service. HHA=home health agency. IRF=inpatient rehabilitation facility. LTCH=long term care hospital. PAC=post-acute care setting. SNF=skilled nursing facility.

^a For all outcomes, the eligible sample was restricted to beneficiaries who: 1) had a complete FFS enrollment history six months prior to anchor/qualifying admission; and 2) had non-missing age & gender data.

^b Acute payments are winsorized by quarter, MS-DRG, and EI type at the 2nd and 98th or 1st and 99th for Part A and B, respectively. All other payments in this category are winsorized by quarter, clinical episode, episode length, and EI type at the 1st and 99th percentiles.

^c Total within bundle payments are winsorized by clinical episode, quarter, EI type, and episode length. All within bundle payments are winsorized at the 1st and 99th percentiles.

^d Medicare payments in this category are winsorized by quarter, clinical episode, episode length, and EI type at the 1st and 99th percentiles.

^e Medicare Part A payments are winsorized by quarter, clinical episode and EI type at the 1st and 99th percentiles.

^f Medicare Part B payments are winsorized by quarter, clinical episode and EI type at the 1st and 99th percentiles.

^g Anchor hospital length of stay is winsorized at the 99th percentile for all models by quarter, MS-DRG, and EI type of the anchor/qualifying stay.

^h This outcome is based on specifications for the National Quality Forum (NQF) all-cause unplanned readmission measure (NQF measure 1789). Planned admissions are excluded based on the Agency for Healthcare Research and Quality (AHRQ) Clinical Classification System Procedure and Diagnoses codes.

ⁱ This outcome is based on specifications for the measure, “Percentage of short-stay residents who were successfully discharged to the community”, from Nursing Home Compare. Available at <https://www.cms.gov/Medicare/Provider-Enrollment-and-Certification/CertificationandCompliance/Downloads/New-Measures-Technical-Specifications-DRAFT-04-05-16-.pdf>.

^j The final restriction resulted in the exclusion of approximately 15% of the sample.

Exhibit D.12 describes the variables used for determining the characteristics of the patient mix, including the name, definition, and data source. We categorized strata into three broad groups based on changes in the patient mix: decline in patient resource intensity, increase in patient resource intensity, and no change. Our categorization was based on statistically significant relative changes in patient characteristics associated with higher resource use as well as the direction and average magnitude of the estimates. If a Model 2 strata had three or more variables with negative DiD estimates that were statistically significant ($p < 0.10$)⁵ or if the average magnitude of the DiD estimates was -2 or below, it was considered to have a less resource intensive mix of patients. Because the count of HCC indicators is the only variable that is not expressed in percentage points, we adjusted the HCC DiD estimate when calculating the average magnitude across the eight DiD estimates for a given strata. The HCC adjustment factor is the ratio of the largest absolute value of the DiD estimates among all of the other patient characteristics to the largest absolute value DiD estimate for the average count of HCC indicators for all strata by Model and participant type. Each DiD estimate for the count of HCC indicators is multiplied by this adjustment factor. We indicated that there was an increase in patient resource intensity using the same decision rules applied to positive DiD estimates.

For Model 3, the claim- and assessment-based measures were considered separately. A strata was considered to have had indications of a less resource intensive patient mix if the claims-based measures met the criteria described above or if five or more assessment-based variables had DiD estimates indicating a decline in resource intensity that were statistically significant ($p < 0.10$) or if the average magnitude of the assessment-based DiD estimates was -2 or below. We indicated that there was an increase in patient resource intensity using the same decision rules applied to DiD estimates that indicated an increase in resource intensity. If the claim- and assessment-based measures resulted in conflicting categorizations, we considered the strata to have no change in patient mix.

Exhibit D.12: Patient Characteristic Variable Definitions

Variable Name	Definition	Model(s)	Source
Medicaid eligibility	Percent of patients who were eligible for Medicaid	2, 3	2010-2016 Medicare Enrollment Database (EDB)
Disabled, no ESRD	Percent of patients who were eligible for Medicare due to disability (not including ESRD)	2, 3	2010-2016 EDB
Age: 80+ years	Percent of patients age 80 years and above	2, 3	2010-2016 EDB
Count of HCC indicators	The average number of HCCs present during the six months prior to the anchor (Model 2) or qualifying (Model 3) inpatient stay	2, 3	2010-2016 Medicare Claims
Inpatient acute care hospital use	Percent of patients with one or more inpatient acute care hospitalizations during the six months prior to the anchor (Model 2) or qualifying (Model 3) inpatient stay	2, 3	2010-2016 Medicare Claims

⁵ We considered the “net” number of DiD estimates that were in the negative direction and statistically significant, meaning we subtracted the number of estimates that were in the positive direction and statistically significant. For example, a strata would be considered to have a less resource intensive patient mix if there were four DiD estimates that were negative and statistically significant and one estimate that was positive and statistically significant.

Variable Name	Definition	Model(s)	Source
Emergency room use without admission	Percent of patients with one or more instances of an emergency room visit without admission to the hospital during the six months prior to the anchor (Model 2) or qualifying (Model 3) inpatient stay	2, 3	2010-2016 Medicare Claims
Home health use	Percent of patients with one or more instances of home health use during the six months prior to the anchor (Model 2) or qualifying (Model 3) inpatient stay	2, 3	2010-2016 Medicare Claims
Institutional nursing facility use	Percent of patients with any days in a nursing facility regardless of payer (Medicare, Medicaid, beneficiary) during the six months prior to the anchor (Model 2) or qualifying (Model 3) inpatient stay	2, 3	2011-2016 Minimum Data Set (MDS), initial assessment
Need extensive assistance or are totally dependent moving in bed	Percent of patients who required extensive assistance moving in bed (e.g. require full staff performance at least three times), or if moving in bed occurred fewer than three times	3, SNF EIs	2011-2016 MDS, initial assessment
Need extensive assistance or are totally dependent transferring, e.g., between bed and wheelchair	Percent of patients who required extensive assistance transferring (e.g., require full staff performance at least three times), or if transferring occurred fewer than three times	3, SNF EIs	2011-2016 MDS, initial assessment
Need extensive assistance or are totally dependent walking in room	Percent of patients who required extensive assistance walking in room (e.g., require full staff performance at least three times), or if walking in room occurred fewer than three times	3, SNF EIs	2011-2016 MDS, initial assessment
Need extensive assistance or are totally dependent using the toilet	Percent of patients who required extensive assistance using the toilet, e.g., require full staff performance at least three times, or if using the toilet occurred fewer than three times	3, SNF EIs	2011-2016 MDS, initial assessment
Not currently married	Percent of patients never married, widowed, separated, or divorced	3, SNF EIs	2011-2016 MDS, initial assessment
Moderate to severe cognitive impairment	Percent of patients who scored from 0 to 12 on the Brief Interview for Mental Status (BIMS) cognitive test, e.g. moderately to severely impaired, or if resident scored 99 on the BIMS test, e.g. was unable to complete the interview	3, SNF EIs	2011-2016 MDS, initial assessment
Moderate to severe depression	Percent of patients whose Total Severity Score based on the PHQ-9 or the PHQ-9-OV exceeded 10, e.g., moderate to severe depression	3, SNF EIs	2011-2016 MDS, initial assessment
Rejected necessary evaluation or care at least once	Percent of patients who rejected care consistent with goals	3, SNF EIs	2011-2016 MDS, initial assessment
Unhealed pressure ulcer	Percent of patients with at least one unhealed pressure ulcer at stage two or higher or designated as unstageable	3, SNF EIs	2011-2016 MDS, initial assessment
Incontinence	Percent of patients who were incontinent of urine during seven or more episodes, or who were incontinent of bowel more than once	3, SNF EIs	2011-2016 MDS, initial assessment

Variable Name	Definition	Model(s)	Source
Active diagnosis of Alzheimer's	Percent of patients who had an active diagnosis of Alzheimer's	3, SNF EIs	2011-2016 MDS, initial assessment
Active diagnosis of Dementia	Percent of patients who had an active diagnosis of Dementia	3, SNF EIs	2011-2016 MDS, initial assessment
Shortness of breath	Percent of patients for whom shortness of breath or trouble breathing was present while lying flat, sitting at rest, or engaging in activity; or who avoided activity or were unable to engage in activity because of shortness of breath. Shortness of breath could be present during activity as limited as turning or moving in bed during daily care or with more strenuous activity such as transferring, walking, or bathing	3, SNF EIs	2011-2016 MDS, initial assessment
Require special treatment	Percent of patients who received special treatment, such as chemotherapy, radiation, oxygen therapy, suctioning, tracheostomy care, ventilator or respirator, BiPAP/CPAP (sleep apnea therapy), IV medications, transfusions, dialysis, hospice care, respite care, or isolation or quarantine for active infectious disease (does not include standard body/fluid precautions)	3, SNF EIs	2011-2016 MDS, initial assessment
Poor overall status	Percent of patients who were likely to remain in fragile health and have ongoing high risk(s) of serious complications and death, or who had serious progressive conditions that could lead to death within a year	3, HHA EIs	2011-2016 Outcome and Assessment Information Set (OASIS), initial assessment
Require use of bedside commode or are totally dependent in toileting	Percent of patients who were unable to get to and from the toilet but were able to use a bedside commode (with or without assistance), were unable to get to and from the toilet or bedside commode but were able to use a bedpan/urinal independently, or were totally dependent in toileting	3, HHA EIs	2011-2016 OASIS, initial assessment
Require assistance transferring or are unable to transfer, e.g. from bed to wheelchair	Percent of patients who were able to bear weight and pivot during the transfer process but were unable to transfer self, required more assistance transferring, or were bedfast	3, HHA EIs	2011-2016 OASIS, initial assessment
Require walker or more assistance ambulating	Percent of patients who required use of a two-handed device (e.g., walker or crutches) to walk alone on a level surface; required human supervision or assistance to negotiate stairs, steps, or uneven surfaces; required more assistance ambulating; or were chairfast or bedfast	3, HHA EIs	2011-2016 OASIS, initial assessment
Dependent in maintaining self-care	Percent of patients who were dependent in grooming, dressing, bathing, and toileting hygiene	3, HHA EIs	2011-2016 OASIS, initial assessment
Dependent in ambulating	Percent of patients who were dependent in ambulating	3, HHA EIs	2011-2016 OASIS, initial assessment
Dependent in transferring	Percent of patients who were dependent in transferring	3, HHA EIs	2011-2016 OASIS, initial assessment

Variable Name	Definition	Model(s)	Source
Impaired vision or hearing	Percent of patients who could not locate objects without hearing or touching them, were absent of useful hearing, or were nonresponsive	3, HHA EIs	2011-2016 OASIS, initial assessment
Impaired cognition	Percent of patients who required assistance and some direction in specific situations (e.g., on all tasks involving shifting of attention), consistently required a low stimulus environment due to distractibility, required assistance more often, or were totally dependent due to disturbances such as constant disorientation, coma, persistent vegetative state, or delirium	3, HHA EIs	2011-2016 OASIS, initial assessment
Unhealed pressure ulcer(s)	Percent of patients who had at least one unhealed pressure ulcer at stage two or higher, or designated as unstageable	3, HHA EIs	2011-2016 OASIS, initial assessment
Short of breath from moderate to no exertion	Percent of patients who were dyspneic or noticeably short of breath with moderate exertion, e.g. while dressing, using commode or bedpan, walking distances less than 20 feet, or with minimal or no exertion	3, HHA EIs	2011-2016 OASIS, initial assessment
Not likely to receive assistance in ADL	Percent of patients whose non-agency caregiver(s) was unlikely to provide assistance with activities of daily living (ADLs, e.g., transfer/ambulation, bathing, dressing, toileting, eating/feeding) or it was unclear if they would provide assistance, or no non-agency caregiver(s) was available	3, HHA EIs	2011-2016 OASIS, initial assessment
Caregiver needs training to provide supervision and safety, is unlikely to provide help, or is not present	Percent of patients whose non-agency caregiver(s) was unlikely to provide assistance with supervision and safety (e.g., due to cognitive impairment) or it was unclear if they would provide assistance, or no non-agency caregiver(s) was available	3, HHA EIs	2011-2016 OASIS, initial assessment
Incontinence	Percent of patients who were incontinent of urine or required a urinary catheter (i.e., external, indwelling, intermittent, suprapubic), or who had bowel incontinence at least once	3, HHA EIs	2011-2016 OASIS, initial assessment
Depressive symptoms	Percent of patients who were screened using the PHQ-2 scale and had little interest or pleasure in doing things more than half the days, or were feeling down, depressed, or hopeless more than half the days over the last two weeks; or who were screened with a different standardized assessment and meet criteria for further evaluation for depression	3, HHA EIs	2011-2016 OASIS, initial assessment

Note: The eligible sample for MDS and OASIS variables includes beneficiaries with a valid admission or readmission assessment. The MDS assessment is administered within 5 days (plus 3 days grace) of the start of care date, and the measurement period is the seven-day “look-back” period preceding the assessment (i.e., the first week of the SNF stay). The OASIS assessment is administered within five days of the start of care date, and the measurement period is upon assessment, except for depressive symptoms for which the measurement period covers the 14 days prior to the assessment.

2. Study populations

The quantitative analysis used a difference-in-differences (DiD) design to estimate the differential change in payment, quality, and utilization outcomes between the baseline and an intervention period for beneficiaries who received services from BPCI EIs relative to beneficiaries who received services from a comparison group of non-BPCI providers. This comparison group is designed to be similar to BPCI EIs with respect to baseline characteristics that could affect their decision to participate and could be related to their performance under BPCI. Such characteristics

include market-level and provider-specific attributes. Because providers voluntarily enrolled in BPCI, they were likely to be different than non-participants in ways that may bias our results. For example, BPCI EIs may have had less efficient care in the pre-intervention period and consequently had more room for improvement relative to non-participants.

We constructed comparison groups for 67 Model, provider type and clinical episode combinations from the universe of Medicare providers that had not entered Phase 2 of BPCI. For this report, we examined clinical episodes initiated by Model 2 hospitals, Model 2 PGP, Model 3 SNF, and Model 3 HHA BPCI EIs⁶ that were considered to have a sufficient sample size for meaningful analysis. A combination was deemed to have sufficient sample if there were at least 20 EIs with at least 1,000 clinically relevant episodes.⁷ However, a few groups with somewhat lower sample sizes were included for unique policy importance. The methods for matching treatment and comparison providers varied by BPCI provider type, which are described below.

a. BPCI study population

For hospitals, SNFs, and HHAs, the BPCI treatment group was defined as participants that had at least five discharges in both 2011 and 2012 and participated in the clinical episode for more than one quarter. We required a minimum of five discharges in order to calculate baseline payments, utilization, and quality outcomes to include in the matching algorithm.

The BPCI PGP treatment group was defined using a slightly different approach to accommodate the comparison group approach for this type of EI (see section b. Comparison Group below), because we did not have reliable data on physician affiliation for non-BPCI PGPs. First, we identified BPCI-participating PGPs that participated in the clinical episode for more than one quarter. Then, we defined the BPCI PGP treatment group as *hospitals* where BPCI-participating PGPs initiated episodes. The treatment group was limited to hospitals where BPCI-participating PGPs initiated at least one BPCI PGP episode in both the baseline (Q4 2011 through Q3 2012) and intervention (Q4 2013 through Q4 2016) periods to have a consistent group of hospitals in both time periods. We also limited the PGP treatment group to hospitals that had at least five discharges in both 2011 and 2012 in order to calculate baseline outcomes for matching.⁸

These criteria resulted in the inclusion of a portion of BPCI participants in the analysis; the share included varied by Model and participant type. Approximately 90% of hospital participants were included in the study population, while 63% of PGPs, 46% of SNFs, and 77% of HHAs were included.

The BPCI study population includes Phase 2 episodes initiated by BPCI EIs who were included in the treatment group of hospitals, SNFs, HHAs, and PGPs. For PGPs, we included the episodes at

⁶ We did not analyze Model 4 in this report due to small sample sizes; please see the Year 3 BPCI evaluation annual report for the most recent Model 4 results.

⁷ Groups were considered meaningful for the analysis if there was enough participation in BPCI, but no formal power calculation was conducted to assess minimum sample size.

⁸ When describing the creation of Model 2 PGP treatment and comparison groups, we will use the terms ‘Model 2 BPCI PGP hospitals’ and ‘Model 2 PGP comparison hospitals’. There are portions in this section when we use the term ‘BPCI participants’ to define the treatment group across all EI types; for Model 2 PGPs, the ‘BPCI participants’ refers to the hospitals where the BPCI PGPs initiated episodes, because our unit of matching for BPCI-participating PGPs was the hospital.

the treatment group of hospitals that were admitted by BPCI-participating PGPs. If an EI terminated during this period, we included the episodes that it initiated up until its withdrawal date.

b. Comparison group

Except for PGPs, we created matched comparison providers of the same type. BPCI hospitals were matched to non-BPCI hospitals, BPCI SNFs were matched to non-BPCI SNFs, and BPCI HHAs were matched to non-BPCI HHAs. For PGPs, we did not have reliable data on physician affiliation to create non-BPCI PGPs, so we instead matched hospitals where BPCI-participating PGP episodes were initiated to hospitals that had little to no admissions from BPCI-participating PGPs.

Comparison providers and episodes for all Models and participant types were selected in four steps. First, providers were selected for the comparison pool (i.e., identified as potential comparison providers) if they: (i) shared key characteristics with BPCI EIs, (ii) were eligible to participate in the BPCI initiative, (iii) were not located in markets where BPCI EIs of the same provider type accounted for over half of the discharges associated with any of the 48 BPCI clinical episodes, (iv) were not participating in BPCI, and (v) were not affiliated with BPCI participants. Second, each BPCI treatment group provider was matched with up to 15 comparison providers using statistical matching techniques to minimize the differences in the distributions of characteristics between BPCI and comparison providers. Third, episodes were constructed for beneficiaries treated by matched comparison providers based on the BPCI program rules. Finally, a sample of episodes was drawn from among those identified in the previous step to match the distribution of BPCI episodes by MS-DRG and quarter in which the episode was initiated. A detailed description of these steps is below.

Step 1: Exclude ineligible non-participating providers

Exclusions were applied for each Model, EI type, and clinical episode separately. Providers were excluded from the comparison pool if they met any of the following criteria:

- Were ineligible to participate in BPCI (e.g., in Model 2, hospitals that were not paid under Medicare's inpatient prospective payment system).
- Were owned by a BPCI-participating organization.
- Participated in any of the BPCI Models (Model 1 through Model 4).
- Were missing key matching characteristics, such as ownership status (government, non-profit, for-profit) or location (rural/urban).
- Were located in a market where BPCI participants of the same provider type accounted for over half of the discharges associated with any of the 48 BPCI clinical episodes. This exclusion avoided including providers that may be exposed to "spillover effects" of BPCI in those locations, which could cause changes in utilization for other local providers that may confound the results. Potential spillover effects include non-BPCI beneficiaries receiving care from BPCI participants, comparison providers adopting practices similar to BPCI participants, or BPCI affecting referral patterns in the market.
- Had fewer than five clinically relevant discharges during either calendar year 2011 or 2012. These providers were excluded in order to remove providers that did not have meaningful episode volume in the baseline.

A complicating factor of the hospital-level matching for PGPs was that treatment occurs at the PGP level, not the hospital level. Thus, a Model 2 BPCI PGP hospital can have both BPCI PGP and non-BPCI PGP episodes during the intervention period. In order to provide a large pool of eligible comparison hospitals for the PGPs, while also limiting the comparison pool’s exposure to BPCI, hospitals were considered eligible for the PGP comparison pool as long as they had less than one percent of their patient discharges in the same clinical community treated by physicians in BPCI PGPs. Clinical communities are a broad classification of clinical episodes defined in Exhibit D.13. They represent the clinical episodes that are most likely to experience exposure to one another in the hospital setting.

Exhibit D.13: Clinical Episode and Clinical Community Relationship

Clinical Community	Clinical Episode
<p>Surgical: Ortho Excluding Spine</p>	<ul style="list-style-type: none"> ▪ Amputation ▪ Double joint replacement of the lower extremity ▪ Hip and femur procedures except major joint ▪ Lower extremity and humerus procedure except hip, foot, femur ▪ Major joint replacement of the lower extremity ▪ Major joint replacement of the upper extremity ▪ Other knee procedures ▪ Removal of orthopedic devices ▪ Revision of the hip or knee
<p>Surgical, Non-surgical: Cardiovascular</p>	<ul style="list-style-type: none"> ▪ Acute myocardial infarction ▪ AICD generator or lead ▪ Atherosclerosis ▪ Cardiac arrhythmia ▪ Cardiac defibrillator ▪ Cardiac valve ▪ Chest pain ▪ Congestive heart failure ▪ Coronary artery bypass graft ▪ Major cardiovascular procedure ▪ Medical peripheral vascular disorders ▪ Other vascular surgery ▪ Pacemaker ▪ Pacemaker device replacement or revision ▪ Percutaneous coronary intervention ▪ Syncope & collapse
<p>Surgical: Other</p>	<ul style="list-style-type: none"> ▪ Back and neck except spinal fusion ▪ Cervical spinal fusion ▪ Combined anterior posterior spinal fusion ▪ Complex non-cervical spinal fusion ▪ Major bowel procedure ▪ Spinal fusion (non-cervical)

Clinical Community	Clinical Episode
Non-surgical Other	<ul style="list-style-type: none"> ▪ Cellulitis ▪ Chronic obstructive pulmonary disease, bronchitis, asthma ▪ Diabetes ▪ Esophagitis, gastroenteritis and other digestive disorders ▪ Fractures of the femur and hip or pelvis ▪ Gastrointestinal hemorrhage ▪ Gastrointestinal obstruction ▪ Medical non-infectious orthopedic ▪ Nutritional and metabolic disorders ▪ Other respiratory ▪ Red blood cell disorders ▪ Renal failure ▪ Sepsis ▪ Simple pneumonia and respiratory infections ▪ Stroke ▪ Transient ischemia ▪ Urinary tract infection

Step 2: Use matching algorithms to select close matches

For each strata, we assessed the performance of a Propensity Score Matching (PSM) model using key variables, and we altered the covariates in the model if the balance was undesirable (see below for more details). For one HHA strata, we used a Mahalanobis Distance Matching (MDM) model, which allowed us to better match an outlier provider (more detail on this instance is provided below). In general, PSM performed well, especially for strata with larger sample sizes.

A *propensity score* is defined as the predictive probability of receiving the “treatment” (BPCI participation), conditional on a set of characteristics. This probability was estimated using a logistic regression model that included key factors thought to influence both the participation decision and performance in BPCI. These factors included market characteristics (e.g., population size, primary care physician to population ratios), provider characteristics (e.g., ownership status, number of beds), and performance- and practice pattern-related factors (e.g., historical Part A Medicare payments, use of PAC services). The variables considered for matching Model 2 and Model 3 by provider type are displayed in Exhibit D.14. In some cases, transformations of the variables or a smaller set of variables were used to improve the matching diagnostics (as discussed below).

Exhibit D.14: Key Variables used for Matching Model 2 & Model 3 by Provider Type

Variable	Model 2 Hospitals	Model 2 PGP Hospitals	Model 3 SNF	Model 3 HHA
Ownership - Non-Profit, Government, For-Profit	X	X	X	X
Urban/Rural Location	X	X	X	X
Bed Count	X	X	X	
Number of Nurses Employed by an HHA				X
Chain Indicator	X	X	X	
SNF in Hospital			X	
Medicare Days as a Percent of Total Inpatient Days	X	X		
Resident-Bed Ratio	X	X		

Variable	Model 2 Hospitals	Model 2 PGP Hospitals	Model 3 SNF	Model 3 HHA
Number of points out of 5 in overall rating and in three areas: Quality, Survey/Health Inspections, and Staffing (from Nursing Home Compare)			X	
Disproportionate Share Percent	X	X		
Teaching Status	X	X		
Population Size of Market Area	X	X	X	X
Median Household Income	X	X	X	
Medicare Advantage Penetration	X	X	X	
Primary Care Providers per 10,000 in Market	X	X		
SNF Beds per 10,000 in Market	X	X	X	
Inpatient Rehabilitation Facility in Market	X	X	X	
Provider Market Share of the 48 potential BPCI clinical episodes	X	X	X	
Herfindahl Index of Hospital Market Shares	X	X	X	
Herfindahl Index of SNF Market Shares			X	
Percentage of total discharges in the 48 BPCI clinical episodes in 2011	X	X	X	X
Number of discharges for clinical episode in 2011	X	X	X	X
Number of SNF days per patient within 90 days after a hospital discharge by clinical episode in 2011			X	
Number of HHA days per patient within 90 days after a hospital discharge by clinical episode in 2011			X	X
Percent of patients in 2011 that went home with no post-acute care by clinical episode	X	X		
Percent of patients in 2011 that used an inpatient rehabilitation facility as first post-acute care setting by clinical episode	X	X		
Percent of patients in 2011 that used a SNF as first post-acute care setting by clinical episode	X	X		
Percent of patients in 2011 that used a long-term care hospital as first post-acute care setting by clinical episode	X	X		
Percent of patients in 2011 that went home with HHA services as first post-acute care setting by clinical episode	X	X		
Emergency department use by clinical episode in 2011	X	X	X	X
Change in emergency department use by clinical episode from 2011 to 2012	X	X	X	X
Unplanned readmission rate by clinical episode in 2011	X	X	X	X
Change in unplanned readmission rate by clinical episode from 2011 to 2012	X	X	X	X
All-cause mortality rate in 2011 by clinical episode	X	X	X	X
Change in all-cause mortality rate by clinical episode from 2011 to 2012	X	X	X	X
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	X	X	X	X
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	X	X	X	X

Note: PGP=physician group practice. SNF=skilled nursing facility. HHA=home health agency.

Using the coefficients from the logistic regression model, we constructed a propensity score as the predicted probability of participating in BPCI. Each BPCI participant was matched with up to 15 comparison providers with a propensity score absolute difference below a defined caliper. In cases where more than 15 providers fell within the caliper, the 15 closest providers were matched to the BPCI participant. Comparison providers were allowed to be used as matches for more than one participant. A caliper acts as a constraint on the “distance” between BPCI and potential comparison providers based on the difference in absolute value in their estimated propensity scores. Any comparison providers outside of the caliper of a BPCI provider would not be matched to that BPCI provider. BPCI providers with no potential matches inside the caliper were excluded from the analysis. These BPCI providers typically had outliers measured in several of the key factors used for matching, such as the number of discharges for the episode or the share of BPCI episodes in the market. Calipers were chosen based on the standard deviation of the estimated log-odds propensity score. Multiple calipers were tested for each strata to identify the specification that generated the most similar comparison group across all of the attributes considered important for matching.

The key diagnostic used to determine similarity between BPCI and comparison providers was the standardized difference in the mean of each of the matching variables between participants and non-participants. The standardized difference compares the differences in means in relation to the standard deviation pooled across BPCI and comparison providers. We typically preferred the method that yielded the lowest standardized difference of means across the largest number of covariates and that resulted in the fewest number of standardized differences greater than 0.20 for any particular variable.⁹ We prioritized minimizing the standardized differences of performance-related variables (90-day standardized Medicare Part A payment, unplanned readmission rates, mortality rates, and emergency department use rates). Standardized differences below 0.10 were targeted for these variables. In a few cases where the standardized differences were larger, we used alternative model specifications to improve matching.

In the case of M3 HHA CHF providers, it was difficult to match a participant that was much larger than the others using PSM. Due to the participant’s outlier characteristics, no comparison providers fell within its calipers, and it was important not to remove it from the analysis because the participant contributed a large share of the BPCI episodes. Using MDM, we coarsened the two outlier characteristics to yield better matches for the other characteristics. We were able to match 15 comparison providers with small mean differences in the key matching diagnostics.

Appendix S shows the calipers chosen for each PSM model as well as the standardized differences of each covariate included in the matching models between BPCI providers and matched comparison providers for each clinical episode. Our ability to construct comparison groups (and the share of BPCI providers included in the analysis) varied across clinical episodes. The standardized differences were less than 0.10 for each of the eight key performance measures for 55 of the 67 Model, EI type, clinical episode groups. However, the average of the standardized differences for the key performance measures was less than 0.10 for all clinical episodes.

⁹ Stuart, E.A. (2010). Matching methods for causal inference: A review and a look forward. *Statistical science: a review journal of the Institute of Mathematical Statistics*, 25(1), 1.

Step 3: Construct episodes for matched comparison providers

The BPCI episode algorithm rules were applied to construct simulated episodes that would have been assigned to comparison facilities if they had participated in BPCI. We constructed simulated episodes from October 2010 through December 2016. For the Model 2 PGP hospital comparison group, we excluded episodes at the comparison hospitals that were initiated by a BPCI-participating PGP in the same clinical community.

Step 4: Select random sample of comparison group episodes

We drew a random sample of comparison episodes from the episodes identified in the previous step. Each BPCI episode was randomly matched to one episode from the pool of comparison episodes in the same quarter with the same MS-DRG originating from the comparison providers that were matched to the BPCI participant. In the case of major joint replacement of the lower extremity, episodes were also randomly matched by whether the patient had a fracture or not. The matched comparison episode was then excluded from the pool of episodes eligible for future matching. In some cases, the comparison pool did not contain enough episodes resulting in unmatched participant episodes. Sensitivity analyses were performed to test the robustness of the DiD estimates using both the matched and unmatched episodes.

3. Analytical methods

The DiD approach quantifies the impact of BPCI by comparing changes in claim- and assessment-based outcomes for BPCI episodes with changes in outcomes for comparison episodes, between the baseline and intervention periods. This approach eliminates biases from time invariant differences between the BPCI and comparison episodes and controls for trends that are common between the BPCI and comparison populations.¹⁰ The risk-adjustment regression model incorporates data from two periods prior to BPCI implementation (baseline and Phase 1) as well as the intervention period. Phase 1 started when participants could begin signing up for BPCI but no participants had entered Phase 2, the risk-bearing or intervention phase. It encompasses the one year period prior to the BPCI intervention period. Because some BPCI participants may have started to implement changes during Phase 1 in preparation for Phase 2, the Phase 1 period was excluded from the DiD baseline. Including Phase I in the DiD baseline would likely underestimate the BPCI effect given that participants started to prepare for the intervention during that period. Thus, the DiD compares changes in outcomes from the baseline period to the intervention period.

- The DiD baseline period was from October 2011 through September 2012.
- Phase 1 was from October 2012 through September 2013.
- The BPCI intervention period was from October 2013 through December 2016.

¹⁰ While the DiD model controls for unobserved heterogeneity that is fixed over time, there is no guarantee that this unobserved heterogeneity is, in fact, fixed. It could be the case, for example, that providers with improving outcomes are relatively more likely to sign up for the Model, introducing correlation between BPCI participation and outcomes, which could bias the results.

Consider the following linear model to illustrate the DiD calculation in a regression framework:

$$Y_{i,k,t} = \alpha + \beta_1 BPCI_{i,k} + \beta_2 T_t + \delta BPCI_{i,k} \cdot T_t + X_{i,k,t}' \beta + u_{i,k,t}$$

Where $Y_{i,k,t}$ is the outcome of interest for individual i with provider k in quarter t , $BPCI_{i,k}$ is an indicator variable taking the value of 1 if individual i was treated by a BPCI provider, T_t indicates the period (i.e., baseline, Phase I, or intervention), and $X_{i,k,t}$ are beneficiary demographics, clinical characteristics observed before hospitalization, and provider characteristics. The vector β is a vector of regression coefficients that captures the impact of risk factors $X_{i,k,t}$ on the outcome of interest. The regression coefficient β_1 captures any inherent, time invariant differences between the control and the treatment groups, β_2 provides an estimate of the potential time trends in the outcome of interest over the period before and after the intervention that is common to both the control and treatment groups, while $u_{i,k,t}$ represents a random error term. In this linear example, the DiD estimate is the coefficient δ , which determines the differential in outcome Y experienced by beneficiaries receiving services from BPCI providers during the intervention period relative to beneficiaries receiving services from providers in the comparison group.

We used multivariate regression models to control for differences in beneficiary demographics, clinical characteristics, and prior care use before the hospitalization, along with provider characteristics that might be correlated with the outcome (see Exhibit D.15). We used a variety of empirical specifications including ordinary least squares (OLS), logistic regressions, duration models, and two-part models. Regression models were selected depending on the type and characteristics of the outcome measure. For example, logistic models were estimated for the binary quality outcomes (e.g., mortality rate). A Cox proportional hazard model was used to estimate inpatient length of stay. OLS was estimated for the total number of days measures (e.g., number of SNF days) as well as the payment measures where all individuals by default had positive expenditures, such as total payments that were covered by the bundle. Two part models were favored for payment outcomes where more than 5% of individuals had zero payments for the particular outcome. These payment outcomes included the individual Part A payments that were affected by zero-mass and skewedness.

Exhibit D.15: Predictive Risk Factors Used to Risk Adjust Claims Outcomes

Domain	Variables
Service Mix	<ul style="list-style-type: none"> ▪ Alternative specifications <ul style="list-style-type: none"> • Anchor MS-DRG • MS-DRG group: anchor MS-DRG with and without complications grouped together
Patient Demographics & Enrollment	<ul style="list-style-type: none"> ▪ Age (under 65, 65-79, 80+) ▪ Gender ▪ Medicaid status ▪ Disability status ▪ Alignment to Medicare Shared Savings Program or Pioneer ACO during BPCI episode
Prior health conditions	<ul style="list-style-type: none"> ▪ Alternative specifications <ul style="list-style-type: none"> • HCC indicators from qualifying services and diagnoses from claims and data for six months preceding the anchor admission or qualifying stay • HCC indicators aggregated to risk variable groups (RV-HCC) according to NQF measure 1789 (Exhibit D.16 shows a crosswalk from 2013 HCC indicators to RV-HCC) • HCC index, HCC indicators weighted by their relative weight in the 2013 CMS-HCC model
Utilization measures preceding the start of the anchor stay/qualifying inpatient stay	<ul style="list-style-type: none"> ▪ Alternative specifications <ul style="list-style-type: none"> • Binary indicators for utilization of ED, inpatient, SNF, nursing facility, IRF, HHA services in the six months preceding the start of the episode • Number of days of ED, inpatient, SNF, IRF, HHA service use in the one month preceding the start of the episode, and ever in a NF/SNF in the six months preceding the start of the episode • Number of days of ED, inpatient, SNF, IRF, HHA service use in the six months preceding the start of the episode, and ever in a NF/SNF in the six months preceding the start of the episode
Geography	<ul style="list-style-type: none"> ▪ Alternative specifications <ul style="list-style-type: none"> • State indicators • Census region indicators
Provider Characteristics	<ul style="list-style-type: none"> ▪ Size ▪ Ownership status ▪ Whether the hospital was in a Comprehensive Care for Joint Replacement Model market for Model 2 episodes ▪ Whether the qualifying hospital or the episode initiator (SNF/HHA) was located in a Comprehensive Care for Joint Replacement Model market for Model 3 episodes

MS-DRG=Medicare severity diagnosis related group. ACO=accountable care organization. HCC=hierarchical condition category. NQF=National Quality Forum. ED=emergency department. SNF=skilled nursing facility. IRF=inpatient rehabilitation facility. HHA=home health agency. NF/SNF=institutional nursing facility.

Exhibit D.16: Crosswalk HCC Indicators to Risk Variable Group HCC

Risk Variable Group Label	CMS-HCCs	Description
rv1	1, 5	Severe infection
	1	HIV/AIDS
	5	Opportunistic infections
rv2	111, 112	Other infectious disease & pneumonias
	111	Aspiration and specified bacterial pneumonias
	112	Pneumococcal pneumonia, emphysema, lung abscess
rv3	7	Metastatic cancer and acute leukemia

Risk Variable Group Label	CMS-HCCs	Description
rv4	8, 9	Severe cancer
	8	Lung, upper digestive tract, and other severe cancers
	9	Lymphatic, head and neck, brain, and other major cancers
rv6	10	Breast, prostate, colorectal and other cancers and tumors
rv9	15-19, 119	Diabetes mellitus
	15	Diabetes with renal or peripheral circulatory manifestation
	16	Diabetes with neurologic or other specified manifestation
	17	Diabetes with acute complications
	18	Diabetes with ophthalmologic or unspecified manifestation
	19	Diabetes without complication
	119	Proliferative diabetic retinopathy and vitreous hemorrhage
rv10	21	Protein-calorie malnutrition
rv11	25, 26	End-Stage liver disease
	25	End-Stage liver disease
	26	Cirrhosis of liver
rv12	44	Severe hematological disorders
rv14	51, 52	Drug and alcohol disorders
	51	Drug/alcohol psychosis
	52	Drug/alcohol dependence
rv15	54, 55	Psychiatric comorbidity
	54	Schizophrenia
	55	Major depressive, bipolar, and paranoid disorders
rv18	67-69, 100, 101, 177	Hemiplegia, paraplegia, paralysis, functional disability
	67	Quadriplegia, other extensive paralysis
	68	Paraplegia
	69	Spinal cord disorders/injuries
	100	Hemiplegia/hemiparesis
	101	Cerebral Palsy and other paralytic syndromes
	177	Amputation status, lower limb/amputation complications
rv19	74	Seizure disorders and convulsions
rv20	80	Congestive Heart Failure
rv21	81-83, 104, 105	Coronary atherosclerosis or angina, cerebrovascular disease
	81	Acute myocardial infarction
	82	Unstable angina and other acute ischemic heart disease
	83	Angina pectoris/old myocardial infarction
	104	Vascular disease with complications
	105	Vascular disease
rv24	92	Specified heart arrhythmias
rv26	108	Chronic obstructive pulmonary disease

Risk Variable Group Label	CMS-HCCs	Description
rv29	130	Dialysis status
rv30	148, 149	Ulcers
	148	Decubitus skin ulcer
	149	Chronic skin ulcer, except decubitus
rv31	2	Septicemia/shock
rv34	79	Cardio-respiratory failure and shock
rv39	131	Renal failure
rv40	32	Pancreatic disease
rv41	38	Rheumatoid arthritis and inflammatory connective tissue disease
rv42	77	Respirator dependence/tracheostomy status
rv43	174	Major organ transplant status
rv45	158	Hip fracture/dislocation

Note: CMS-HCC=Centers for Medicare & Medicaid Services hierarchical condition category.

Source: RV to HCC mapping based on the Hospital-wide Readmission Measure, *HWR Tech Report*, July 2012; modified to reflect the 2013 CMS HCC Factors that were applied to our sample.

Estimates from the multivariate regression models were used to construct model-predicted outcomes during the baseline and intervention periods for both BPCI-participating and comparison providers. To control for changes in service and case-mix over time, as well as differences between BPCI and comparison beneficiaries, we used the same reference population of beneficiaries to calculate predicted outcomes for BPCI and comparison group providers: all beneficiaries during the baseline and intervention period.

The DiD estimate was calculated by first taking the difference in the predicted outcomes between the baseline and intervention for both BPCI and comparison providers, and then taking the difference between the changes for BPCI and comparison providers. Taking the difference in such differentials across all BPCI beneficiaries yields the Effect of the Treatment on the Treated (ETT) analog of the DiD estimate. The ETT is the average gain from treatment for those who were actually treated. Standard errors of ETT estimation were computed using the Delta method.¹¹

We attempted to construct a comparison group of providers that closely matched BPCI providers in key characteristics but, we could not guarantee that BPCI and comparison providers would have parallel trends during the baseline period for every outcome. We tested the null hypothesis that BPCI participants and comparison providers had parallel trends during the baseline for the key claim-based outcomes for all models, participant types, and clinical episodes in this evaluation: unplanned readmissions, emergency department use, all-cause mortality, and total Medicare allowed payment amounts for the inpatient stay plus 90 days post discharge for Model 2 and total Medicare allowed payment amounts included in the bundle definition for 90-day episodes for Model 3. If we rejected the null hypothesis that there were parallel trends in the baseline (at the 10% level of significance) and the DiD estimate was statistically significant (positive or negative), we attempted to find an alternative risk-adjustment model where we failed to reject the null hypothesis of parallel trends. We also tested the null hypothesis of parallel trends in baseline for any outcome where there was visual evidence that the direction of change from baseline to intervention for BPCI differed from the change for the comparison group. In this report, we report all DiD estimates, but we note when we rejected the null hypothesis that there were parallel trends in baseline.

There are some outcomes for which we do not report the DiD estimate because of small sample sizes. We report DiD estimates for each outcome if the sample exceeds 30 BPCI episodes during the intervention period for outcomes evaluated using duration, logistic, and OLS models. In contrast, we used a minimum of 100 BPCI episodes with a positive value of the outcome during the intervention period to report DiD estimates for outcomes using two-part models. In addition, we require each outcome to have data from at least three BPCI providers. Some outcomes, including IRF and LTCH payments during the 90-day post-discharge period and payment outcomes that are stratified by bundle length, suffer from small sample sizes or few participants, and consequently, DiD estimates for these outcomes typically were not reported.

In order to test the robustness of our BPCI impact estimates to the random drawing of episodes from matched comparison providers, as described in Step 4 of the comparison group construction above, we conducted a sensitivity analysis in which we included all episodes from matched BPCI participants and comparison group providers to produce risk-adjusted DiD estimates.¹² Episodes from comparison group providers were weighted by the number of BPCI participants to which they

¹¹ The delta method expands a function of a random variable about its mean, usually with a Taylor approximation, and then takes the variance. Specifically, if $Y = f(x)$ is any function of a random variable X , we need only calculate the variance of X and the first derivative of the function to approximate the variance of Y . Let μ_x be the mean of X and $f'(x)$ be the first derivative, a Taylor expansion of $Y = f(x)$ about μ_x gives the approximation: $Y = f(x) \approx f(\mu_x) + f'(\mu_x)(x - \mu_x)$. Taking the variance of both sides yields: $\text{Var}(Y) = \text{Var}(f(X)) \approx [f'(\mu_x)]^2 \text{Var}(X)$. For example, suppose $Y = X^2$. Then $f(x) = X^2$ and $f'(x) = 2x$, so that $\text{Var}(Y) \approx (2\mu_x)^2 \text{Var}(X)$.

¹² Note that for PGP sensitivity tests, we included all BPCI PGP episodes from treated and matched PGP hospitals and all episodes from matched comparison hospitals.

matched in that quarter to account for the fact that a comparison provider may be matched to more than one participant. These weights, however, do not take into account the fact that BPCI providers had a varying number of comparison providers. We produced sensitivity results for the key claim-based outcomes for all Models, participant types, and clinical episodes in this evaluation: unplanned readmissions, emergency department use, all-cause mortality, and total Medicare allowed payment amounts for the inpatient stay plus 90 days post discharge for Model 2 and total Medicare allowed payment amounts included in the bundle definition for 90-day episodes for Model 3.

While the sensitivity analysis can help shed light on whether the BPCI impact estimate may be due to the random selection of comparison episodes that were included in the matched sample, it has three main limitations. First, it only partially accounts for the balance achieved through the PSM and MDM models used to identify comparison providers. The weights do not take into account the fact that BPCI providers are matched with different numbers of comparison providers. BPCI participants that are matched to a higher number of comparison providers are overrepresented in the comparison sample, which may create a bias if they are different from BPCI participants that are matched to a smaller number of comparison providers. Second, the comparison group is implicitly weighted more than the BPCI participant group because there are many more comparison providers than BPCI participants (due to the fact that each participant can be matched with up to 15 comparison providers). As a result, the balance on MS-DRG and quarter between BPCI and comparison episodes achieved through the one-to-one episode matching is lost in the sensitivity analysis, though we do control for MS-DRG in the risk-adjustment regression models. Third, the standard errors are inaccurate, because the standard error calculations treat the data as if the weighted episodes represent multiple independent data points when they are not. Thus we cannot determine statistical significance of the sensitivity test estimates.

We interpreted the sensitivity analyses for the outcomes that had statistically significant BPCI impact estimates as follows. In the instances where the BPCI impact estimate was statistically significant and the sensitivity DiD estimate was not statistically significant, we note that the sensitivity test suggests the statistical significance of the BPCI impact estimate may be due to the random selection of comparison episodes in the matched sample, and it may not have been statistically significant if a different sample of comparison episodes had been selected.

D. Impact of BPCI on beneficiary functional status, health status, and health care experience

The BPCI beneficiary survey explored differences in patient care experiences and functional outcomes between Medicare beneficiaries cared for by BPCI providers and similar beneficiaries whose providers did not participate in BPCI. The beneficiary survey collected information on a set of patient outcomes that were not available from other data sources (e.g., provider communication, patient education) or that are not available for patients in all care settings (e.g., functional status measures). This section describes the instrument, sampling, administration, and analysis of the beneficiary survey.

1. Beneficiary survey instrument

The survey instrument (included in **Appendix T**) was based on items adapted from validated survey instruments, such as the CARE Tool,¹³ National Health Interview Survey,¹⁴ and Short Form 36 Health Survey.¹⁵ New questions underwent cognitive testing with a small convenience sample of Medicare beneficiaries with recent hospital and PAC experience.

The beneficiary survey contained 36 multiple-choice, closed-ended questions and was designed to take an average of 25 minutes to complete. Survey questions covered a range of domains including functional status, overall mental and physical health, health care experience, overall satisfaction with recovery, and personal characteristics (Exhibit D.17). For each of seven functional areas, respondents were asked to recall their functional status before the anchor hospitalization and also to report their current functional status at the time they were completing the survey, which was at least three months after the anchor hospitalization that starts a Model 2 episode or PAC initiation that starts a Model 3 episode.

Exhibit D.17: Domain and Survey Items for Beneficiary Survey

Domain	Description
Functional Status	<ol style="list-style-type: none"> 1) Bathing/dressing/toileting/eating 2) Planning regular tasks 3) Use of a mobility device 4) Walking by self without resting 5) Walking up or down 12 stairs 6) Physical or emotional problems that interfere with social activities 7) Pain that interferes with normal activities
Overall mental & physical health status	<ol style="list-style-type: none"> 1) How often respondent bothered by little interest in doing things 2) How often the respondent was bothered by feeling down, depressed or hopeless 3) Overall physical health 4) Overall mental health
Health care experience	<ol style="list-style-type: none"> 1) Frequency of conflicting medical advice from medical staff 2) Appropriate level of services received 3) Frequency with which medical staff addressed the respondent in his/her preferred language 4) Respondent feels that she/he was discharged at the right time 5) Medical staff took patient preferences into account when arranging for health care services after discharge 6) Respondent had a good understanding of how to take care of herself or himself prior to discharge 7) Medical staff clearly explained how to take medications 8) Medical staff clearly explained needed follow-up appointments 9) Respondent and caregivers ability to manage their health care needs
Overall satisfaction with recovery	<ol style="list-style-type: none"> 1) Overall satisfaction with recovery since discharge from the hospital

¹³ Gage et al. (2012). The Development and Testing of the Continuity Assessment Record and Evaluation (CARE) Item Set.

¹⁴ Centers for Disease Control and Prevention. (2012). National Health Interview Survey.

¹⁵ Brazier et al. (1992). Validating the SF-36 health survey questionnaire: new outcome measure for primary care, *BMJ*, 305(6846), 160-164.

Domain	Description
Personal characteristics	1) Lives alone, with others, or with paid helper
	2) Gender
	3) Education level
	4) Ethnicity
	5) Race

2. Beneficiary survey sample

a. Timing of Survey Waves

This Annual Report includes results from Waves 2-11 of the BPCI beneficiary surveys, which covered beneficiaries receiving services from participating providers as indicated in Exhibit D.18. We do not include Wave 1 in this report, because we focused only on waves where we collected survey responses at the clinical episode level.¹⁶ In Waves 2 and 3, only beneficiaries with M2 Hospital major joint replacement of the lower extremity (MJRLE) episodes were surveyed at the clinical episode level.¹⁷ In Waves 4-8, we surveyed beneficiaries with episodes initiated by Model 2 hospital EIs, Model 3 HHA EIs, and Model 3 SNF EIs. Starting in Wave 9, we also surveyed beneficiaries with episodes initiated by Model 2 PGP EIs. In Wave 11, we only surveyed beneficiaries with episodes initiated by Model 2 PGP EIs, because the PGP EIs were surveyed in fewer waves than the other EI types.

Exhibit D.18: Time Period Covered by Each Survey Wave

Strata surveyed*	Survey Wave	Months in which sampled episodes were initiated	BPCI Quarter
M2 Hospital Major joint replacement of the lower extremity	2	October/November 2014	5
	3	February/March 2015	6
Model 2 Hospital, Model 3 HHA, Model 3 SNF	4	May/June 2015	7
	5	October/November 2015	9
	6	February/March 2016	10
	7	May/June 2016	11
	8	October/November 2016	13
Model 2 Hospital, Model 2 PGP, Model 3 HHA, Model 3 SNF	9	February/March 2017	14
	9C	April 2017	15
	10	May/June 2017	15
Model 2 PGP	11	August/September 2017	16

Note: *All possible clinical episodes within each model-type of episode initiator combination were surveyed, with the exception of Waves 2 and 3, where only M2 hospital major joint replacement of the lower extremity (MJRLE) was surveyed.

¹⁶ Although we focus on results pooled across clinical episodes for Model 2 with hospital or PGP EIs, the Model 2 samples from Wave 2 onward were designed to accommodate analysis of individual clinical episodes. Thus, beginning in Wave 2 we only sampled clinical episodes with sufficient volume to support episode-level analysis (which were, by definition, the highest-volume clinical episodes). The pooled Model 2 analyses were built up from these episode-level samples. Since the Wave 1 sample was not designed or weighted to support episode-level analysis, we do not include Wave 1 data in analyses for this report.

¹⁷ Most non-PGP strata were sampled at the clinical episode level beginning in Wave 4 or 5, as these were the first waves in which BPCI volume was sufficient to sample at the clinical episode level. Data for Model 2 hospital episodes of MJRLE go back to Wave 2 due to the higher volume of episodes for this stratum in early survey waves.

b. Sample frame

The beneficiary survey used a stratified random sampling method with matched BPCI and comparison group beneficiaries. For each survey wave, we created a sample frame, consisting of all BPCI and comparison episodes initiated during a two-month period. Slightly different approaches were used to create the sample frames for beneficiaries with Model 2 episodes (which include the inpatient stay) and Model 3 episodes (which begin at initiation of post-acute care services):

- **Model 2.** The sample frames for all Model 2 strata were constructed using Medicare FFS claims from two “rolling” one month samples; the beneficiaries in the two rolling one month samples received their surveys one month apart.¹⁸ For example, for the first rolling month of Wave 3, claims for February 2015 were pulled in early March 2015 and surveys were mailed in the first week of May 2015. For the second rolling month of Wave 3, claims for March 2015 were pulled in early April 2015 and surveys were mailed the first week of June 2015. This rapid sampling process was deliberately employed to reduce recall bias. This process also had the effect of limiting the sample to patients whose claims were filed quickly, within one month of discharge.¹⁹
- **Model 3.** The sample frames for Model 3 strata used two months of Medicare claims. These were drawn in a single data pull encompassing claims for PAC admissions in the prior two months. We did not use the strategy of two rolling months because PAC claims generally are submitted more slowly; allowing more time for claims submission increases the size of the sample for any period in question. Two one-month samples would be smaller than one combined two-month sample, and we would risk falling short of the sample size necessary for acceptable statistical precision.

In all waves, survey strata were defined as combinations of Model, type of EI, and clinical episode (e.g., Model 2 – hospital - major joint replacement of the lower extremity, or Model 3 - SNF - sepsis).²⁰ We included strata in the survey sample that we projected would have at least 310 BPCI responses and 310 comparison responses by the final survey wave,²¹ given expected response rates.²² Any stratum projected to reach the number of completes by the conclusion of the final survey wave

¹⁸ One month of claims was not adequate to reach the necessary sample size at the levels of clinical precision used to define the strata.

¹⁹ Although claims submitted within one month may not represent the entire Medicare population within a stratum due to provider delays in submitting claims, this issue should affect BPCI and comparison samples equally, and not bias our estimates.

²⁰ Prior to Wave 4, we sampled beneficiaries by aggregate groups of clinical episodes, with the exception of the Model 2 hospital MJRLE clinical episode, which had enough cases in a single wave to support a separate stratum.

²¹ Power analyses indicated that a combined target sample size of 620 completed surveys (310 each for the BPCI and comparison groups, per stratum per wave) would enable us to reject the hypothesis of no difference in population percentages of our outcomes of interest with 80% power when there is a true underlying difference of 10 percentage points in a binary variable with a baseline value of 50%.

²² We used estimated response rates from prior waves to determine the size of the initial sample required to yield 310 completed surveys in each group and to estimate the number of waves it would take to complete each of the strata. Beneficiaries sampled in the first two waves were used to estimate the response rates for each stratum in Wave 3, and estimates were updated after each subsequent wave. Estimated response rates used to determine the initial sample size were calculated as the actual observed response rate minus the margin of error. For example, if Model 2 hospital MJRLE respondents had a response rate of 74% through Wave 2, with a 5% margin of error, we estimated a 69% response rate for Wave 3.

was included in the sampling frame. For Model 2 hospital, Model 3 HHA, and Model 3 SNF strata, the last wave of data collection was Wave 10; for Model 2 PGP, the last wave of data collection was Wave 11.

CMMI's Comprehensive Care for Joint Replacement (CJR) program began on April 1, 2016. We therefore excluded MJRLE episodes initiated by CJR hospitals from the Model 2 comparison sample beginning in Wave 7. Because it was not possible for CJR hospitals to contribute MJRLE episodes to BPCI in Model 2 with hospital EIs, including CJR hospitals in the MJRLE comparison group in these models could introduce differential influence of CJR on the BPCI and comparison groups, potentially biasing the estimated differences between the two groups. This was not the case for PGPs in Model 2 or for SNFs or HHAs in BPCI Model 3, because these EIs cannot participate in CJR. Hospitals participating in CJR can discharge MJRLE episodes to both BPCI and comparison PAC EIs in Model 3, which means that CJR may influence outcomes in both groups. Similarly, both BPCI and comparison PGPs may treat patients at CJR hospitals. Additionally, removing Model 3 episodes discharged from CJR hospitals would substantially affect the sample size of MJRLE strata for Model 3 EIs that are already small and require multiple waves to analyze. Therefore, we did not remove CJR episodes from the sample frame and analytic sample for the Model 2 PGP, Model 3 SNF or Model 3 HHA MJRLE strata. Instead, for Model 2 PGP and Model 3, we included an additional variable indicating discharge from a CJR hospital to control for this factor.

c. Sample construction

Survey samples were constructed in three steps. First, we excluded from the sampling universe any beneficiary who had already responded to one of our BPCI surveys in a previous wave.

Second, we excluded certain BPCI and comparison group providers from the sample frame to improve the comparability of BPCI and comparison samples on the basis of key provider characteristics. We used the provider characteristics available from the Medicare claims and administrative data to compare the BPCI providers with a similar set of providers that were not participating in BPCI. These characteristics included provider type (hospital, HHA, PGP, SNF), provider size (small vs. large), academic affiliation of discharging hospital, ownership type (for-profit, non-profit and government/other) of discharging hospital, census region, and urban/rural location.²³ For Model 2 PGPs we also included whether the attending physician was a primary care physician, specialist, or “unknown” type. The combination of all provider characteristics yielded a maximum of 96 “balancing cells” for most Models, except for Model 2 PGPs which had 288. Some of these cells did not include BPCI or comparison group providers. Beneficiaries in balancing cells that included only BPCI or comparison group were dropped if a survey stratum (e.g., Model 2 hospital MJRLE) had enough beneficiaries to achieve 310 responses in a single wave. For survey strata that did not have enough episodes to achieve 310 responses in a single wave, we dropped all balancing cells with only comparison beneficiaries but did not drop balancing cells with only BPCI beneficiaries.

Third, we created “matching cells” within each of the sampling strata (i.e., combinations of Model, EI type, and clinical episode) and then matched beneficiaries within each matching cell by

²³ For hospitals, SNF, and HHA, provider size refers to the EI. In the case of PGPs, provider size refers to the size of the discharging hospital.

categories of provider and patient characteristics (i.e., coarsened exact matching of BPCI and comparison beneficiaries).²⁴ When defining the matching cells, we aimed to strike a balance that: 1) matched on factors that would most affect survey responses; and 2) had a sufficient number of episodes in each cell to support valid comparisons. In Waves 2 and 3, which only included Model 2 hospitals, matching cells were defined by age, hospital size, and hospital academic status. Starting in Wave 4, for strata that were large enough to complete in a single wave, matching cells were defined by presence or absence of a major complication or comorbidity (MCC), patient age category (<65, 65-74, 75-84, 85+), provider size category (above or below median), and anchor hospital academic affiliation. Only Model 2 strata were sufficiently large for this level of matching. For strata that did not have enough episodes to achieve 310 survey responses in a single wave, matching cells were defined by MCC, patient age category, and provider size category.²⁵

3. Administration of the beneficiary survey

We mailed each sampled beneficiary a paper survey, and several reminders and re-mailings, then followed-up by telephone with those for whom a phone number was available. The first survey was mailed to beneficiaries within about 90 days after their hospital discharge for Model 2, and within about 120 days after PAC episode initiation for Model 3.

There were 48 strata that achieved at least 310 BPCI responses and 310 comparison responses by Wave 11 (Exhibit D.19).²⁶ Twenty-five were Model 2 clinical episodes initiated by a hospital EI, 18 were Model 2 clinical episodes initiated by a PGP EI, three were Model 3 clinical episodes initiated by a SNF EI, and two were Model 3 clinical episodes initiated by a HHA EI.

²⁴ Coarsened exact matching is similar to exact matching, with the exception that categories rather than specific values are used to create matching cells (e.g., categories defined by a range of ages rather than matching on each age year).

²⁵ For hospitals, SNF, and HHA, provider size refers to the EI. In the case of PGPs, provider size refers to the size of the discharging hospital.

²⁶ Although Model 2 hospital revision of the hip or knee only achieved a 10.1 minimum detectable effect, we included it in analyses because it achieved a minimum detectable effect essentially on the cutoff.

Exhibit D.19: Survey strata sampled in each wave, sample size, and minimum detectable effect

Model	Stratum	BPCI survey responses (n)	Comparison survey responses (n)	Waves of Data	Response rate (BPCI group only)
2 Hospital	Acute myocardial infarction	772	710	4-9	46.1
	Cardiac Arrhythmia	1,209	1,223	4-10	51.6
	Cardiac Valve	713	706	5-9	67.5
	Cellulitis	693	757	4-10	42.3
	Cervical spinal fusion	372	357	5-9	70.3
	Chronic obstructive pulmonary disorder, bronchitis, asthma	2,290	2,332	4-10	46.5
	Congestive heart failure	2,493	2,513	4-10	41.7
	Coronary artery bypass graft	840	857	4-9	67.7
	Esophagitis, gastroenteritis, and other digestive disorders	739	751	4-10	46.2
	Gastrointestinal hemorrhage	729	742	4-10	49.0
	Gastrointestinal obstruction	323	316	10	50.8
	Hip & femur procedure except major joint	1,202	1,262	4-10	45.0
	Major bowel procedure	625	649	5-10	58.1
	Major joint replacement of the lower extremity	3,175	3,166	2-10	72.6
	Major joint replacement of the upper extremity	401	467	5-9	75.8
	Medical noninfectious orthopedic	1,180	1,122	4-10	46.2
	Nutritional and metabolic disorders	322	340	5-10	34.1
	Other respiratory	719	770	4-9	38.1
	Renal failure	1,090	1,157	4-10	37.4
	Revision of the hip or knee	279	332	5-10	71.2
	Sepsis	2,518	2,629	4-10	35.7
	Simple Pneumonia and respiratory infections	2,321	2,381	4-10	42.1
	Spinal fusion (non-cervical)	1,049	1,013	5-10	74.1
Stroke	2,063	2,202	4-10	41.7	
Urinary tract infection	1,076	1,159	4-10	34.4	

Model	Stratum	BPCI survey responses (n)	Comparison survey responses (n)	Waves of Data	Response rate (BPCI group only)
2 PGP	Acute myocardial infarction	531	466	9-11	41.5
	Cardiac arrhythmia	733	602	9-11	51.7
	Cellulitis	536	475	9-11	41.3
	Chronic obstructive pulmonary disorder, bronchitis, asthma	1,455	1,321	9-11	46.1
	Congestive heart failure	1,594	1,325	9-11	39.2
	Esophagitis, gastroenteritis, and other digestive disorders	630	540	9-11	47.3
	Gastrointestinal hemorrhage	459	452	9-11	45.7
	Hip & femur procedures except major joint	789	686	9-11	47.4
	Major joint replacement of the lower extremity	1,732	1,748	9-11	72.3
	Major joint replacement of the upper extremity	619	507	9-11	72.1
	Medical non-infectious orthopedic	518	457	9-11	45.8
	Other respiratory	1,025	905	9-11	38.0
	Percutaneous coronary intervention	647	666	9-11	54.1
	Renal failure	563	581	9-11	34.8
	Sepsis	2,265	1,446	9-11	37.7
	Simple Pneumonia and respiratory infections	1,447	1,278	9-11	41.3
	Stroke	704	645	9-11	43.0
Urinary tract infection	651	552	9-11	37.5	
3 SNF	Hip & femur procedure except major joint	391	475	4-9	46.5
	Major joint replacement of the lower extremity	1671	1668	4-10	62.9
	Sepsis	363	300	4-9	32.9
3 HHA	Congestive Heart Failure	373	410	4-10	35.8
	Major joint replacement of the lower extremity	1103	1189	4-10	66.2

Notes: The minimum detectable effect (MDE) is the percentage point (pp) difference from a comparison with a mean of 0.50 detectable with 80% power. The target MDE for a single wave of results is 10.0 percentage points. Some strata were not sampled in Wave 10 because they had achieved 310 completes after Wave 9 and could not achieve an additional 310 in Wave 10. In our Model 2 hospital pooled-across-episode analyses, responses from these strata through Wave 9 were weighted to represent the number of episodes that would have occurred in that stratum if we had sampled for Wave 10.

4. Outcome measures

The BPCI beneficiary survey instrument (see **Appendix T**) asked about seven measures of physical function and for each, respondents were asked to recall their status before the anchor hospitalization (question 2 through question 8), and also their current status at the time of the survey, more than three months after the anchor hospitalization or PAC episode initiation (question 11 through question 17). The seven functional status measures include: (1) bathing/dressing/toileting/eating; (2) planning regular tasks; (3) moving using a mobility device; (4) walking without resting; (5) going up or down stairs; (6) the frequency with which physical or emotional health interferes with regular social activities; and (7) the frequency with which pain interferes with normal activities. For each functional status measure, we created binary indicators for both improvement and decline to measure change from before the episode to after the episode (for a total of 14 outcome measures related to functional status). The improvement indicator takes a value of one if a patient moved to a better functional status level after the episode (e.g., from “complete help needed” before the episode to “no help needed” after the episode) or if the patient recalled having the highest functional status prior to hospitalization and remained in that status at the time of survey response (e.g., “no help needed” both before hospitalization and after the episode). The indicator is assigned a value of zero otherwise. The decline indicator takes a value of one if the patient moved to a worse functional status group after the episode or if the patient recalled having the lowest functional status prior to hospitalization and remained in that status at the time of the survey.

The BPCI survey also asked three questions regarding overall health,²⁷ nine questions regarding care experience, and one regarding overall satisfaction with recovery. Since the specification of each of these measures is more complex than the functional status questions, we provide more detail on measure specifications for these three domains in Exhibit D.20. All questions and possible responses are available in **Appendix T**.

Exhibit D.20: Definitions for binary measures of overall health status, care experience, and overall satisfaction

	Outcome measure	Response if Indicator=1
Overall health	Patient Health Questionnaire-2 Composite Depression Indicator	PHQ-2 score ≥ 3
	Self-reported physical health	Excellent/very good/good
	Self-reported mental health	Excellent/very good/good
Care Experience	How often received conflicting advice from medical staff about your treatment	Never
	Services appropriate for the level of care you needed	Always
	Medical staff spoke in preferred language	Always
	Discharged at the right time	Yes

²⁷ For measures of functional status, which include measures before and after the care episode, and measures of care experience and overall satisfaction with recovery, which pertain directly to the episode of care, we can confidently attribute estimated differences in those measures directly to the care episode. However, for measures of overall health, we cannot disentangle pre-existing differences in overall health from differences influenced by the episode. Therefore, we do not report overall health measures in the main body of the report. Risk-adjusted differences in overall health are reported in all survey results tables in Appendix I.

	Outcome measure	Response if Indicator=1
Care Experience (cont'd)	Medical staff took your preferences into account in deciding what health care services you should have after you left the hospital	Agree/strongly agree
	Good understanding of how to take care of self before going home	Agree/strongly agree
	Medical staff clearly explained how to take medications before going home	Agree/strongly agree
	Medical staff clearly explained what follow-up appointments or treatments would be needed before going home	Agree/strongly agree
	Able to manage your health needs since returning home	Agree/strongly agree
Overall Satisfaction with Recovery	Overall satisfaction with recovery since leaving hospital	Extremely satisfied/quite a bit satisfied

5. Analytic sample for Model 2 PGP

For Model 2 hospitals, Model 3 SNFs, and Model 3 HHAs, all survey responses were included in the analysis. This was not the case for Model 2 PGPs, as described below.

The assignment we followed to attribute an episode to a BPCI PGP for the patient survey sample differed slightly from CMS's BPCI episode attribution methodology. CMS defines a BPCI PGP episode as one where an NPI aligned with a BPCI-participating PGP treated the patient in the hospital, and the same BPCI-participating PGP (not necessarily the same NPI) also had at least one visit with the patient after hospital discharge. The second requirement is implemented by requiring the PGP TIN to be present on a Part B claim for the patient during their episode.

For the PGP survey sampling, we did not require that BPCI episodes had a post-discharge claim from the same PGP TIN as that of the inpatient attending physician, because this would have necessitated waiting months longer to draw survey samples, to allow time for those follow up visits to occur and claims to be submitted. If the attending physician on an inpatient claim was in a BPCI PGP, we retained the episode in our survey sample, whether or not there was a post-discharge visit to an NPI under the same PGP's TIN (identified through Part B claims review). We therefore refer to the Model 2 PGP samples as "contact" samples, because the attending NPI listed on the inpatient claim was in a BPCI PGP; however we do not know if the patient also had a post-discharge visit billed under the same PGP TIN. The survey results from the "contact" samples may therefore not reflect full BPCI PGP episodes as defined by CMS. That is, the quality of care in the hospital may have been affected by BPCI, but we do not know whether post-discharge care was provided by the same PGP. It is possible that any estimated differences between BPCI and comparison respondents for PGP EIs are muted, although we cannot measure the extent of this bias. This methodology did not apply to the comparison group as the evaluation did not define a set of comparison PGPs with corresponding comparison NPIs. Comparison episodes were defined using the same criteria as hospital comparison episodes.

We excluded BPCI patients from our PGP EI sample if the original TIN/NPI at the time of sampling was not on the updated BPCI TIN/NPI list (e.g., the best information in February was that the NPI was aligned with BPCI in February, but the updated list in August indicated that the NPI was not actually aligned to BPCI in February).

6. Analysis of the beneficiary survey

a. Analytic approach

We estimated different models for each Model and EI type, at the clinical episode level. All models used logistic regression to estimate the risk-adjusted difference in binary survey outcomes between the BPCI and comparison respondents. For Model 2 hospitals and Model 2 PGPs, we also analyzed data pooled across all available strata. We estimated “pooled-across-strata” analyses for Model 2 hospitals and Model 2 PGPs because we were able to collect survey responses for clinical episodes representing most of the episode volume since the start of BPCI. The 25 clinical episodes included in the Model 2 hospital analysis represented 94 percent of all BPCI Model 2 hospital EI volume since the start of the initiative; and the 18 clinical episodes included in the Model 2 PGP analysis represented 89 percent of all Model 2 PGP volume since the start of the initiative.

For all Model 2 hospital and Model 2 PGP survey strata, as well as for all Model 3 strata, we also estimated outcomes for each clinical episode, pooled across survey waves. These analyses allowed us to estimate average outcomes for each episode type, over the entire course of the model. In the main body of the report we only summarize the pooled-across-strata results; stratum-level results are presented in **Appendix I**.

The survey samples for Model 3 HHA and Model 3 SNF included just a few strata that represented about one third of all Model 3 SNF episode volume since the start of the initiative, and less than half of the volume for Model 3 HHA since the start of the initiative. Since the strata in Model 3 did not represent the majority of volume for a given EI type, we did not estimate models pooled across strata for the Model 3 EIs. Rather, we pooled across survey waves for each survey stratum separately.

b. Weighting

We applied sampling weights and nonresponse weights before analyzing the survey data.²⁸ The sampling weight was the inverse of the selection probability within each sampling stratum in each Wave. The nonresponse weight was calculated for all survey respondents (complete and partial responses) and reflects the inverse of the probability of response among eligible beneficiaries in the sample (with deceased respondents removed) within each of the sampling strata. The final nonresponse adjusted weight was calculated as the product of the sampling weight and the nonresponse weight.

Under perfect conditions (i.e., no decedents, no item nonresponse), use of the nonresponse adjusted weight would balance the BPCI and the matched comparison samples on the variables used to define the sampling strata. However, differential ineligibility (e.g., death rates) and nonresponse on any particular survey question can create imbalance, requiring us to control for some of the variables used to define the cells in our regression analyses.

For analyses pooled across strata, we used the weights as described above, with a few adjustments for strata that were not included in every wave. In these cases, we adjusted weights from other waves to represent the number of episodes that would have occurred in that stratum if we had

²⁸ For both BPCI and comparison respondents, the sampling weights sum to the population size of the BPCI sample.

sampled it in a given wave. This ensured that the number of episodes represented by the sum of the survey weights for each survey stratum reflected the number of episodes that actually occurred across all waves, even those in which a stratum was not sampled.

c. Controlling for differences in patient mix

We controlled for important risk factors to ensure comparability, as much as possible, between the BPCI and comparison groups. We performed regression-based risk adjustment for all survey questions, which included the factors listed in Exhibit D.21.

Exhibit D.21: Predictive risk factors used to risk adjust survey outcomes

Domain	Variables
Service Mix²⁹	<ul style="list-style-type: none"> ▪ Anchor MS-DRG ▪ Lower body fracture (MJRLE and Hip and Femur episodes only) ▪ Large vessel ischemic stroke (stroke episodes only) ▪ Intracerebral hemorrhage (stroke episodes only)
Patient Demographics and Enrollment	<ul style="list-style-type: none"> ▪ Age (under 65, 65-79, 80+) ▪ Gender ▪ Dual eligibility status ▪ Patients' language was English (only used for the analysis of whether staff always used preferred language)
Prior health conditions	<ul style="list-style-type: none"> ▪ HCC index: HCC indicators weighted by their relative weight in the CMS-HCC model ▪ Baseline functional status (for functional assessment measures) ▪ Functional status using three summary measures (for questions 9 through 31)³⁰
Prior utilization measures	<ul style="list-style-type: none"> ▪ Number of SNF and IPPS days in the 90 days prior to the anchor hospitalization ▪ Whether patients were admitted to the anchor hospital from the community
Provider Characteristics	<ul style="list-style-type: none"> ▪ Ownership status of discharging hospital ▪ Academic status of discharging hospital ▪ Provider size for hospital, HHA and SNF EIs, and size of discharging hospital for PGP EIs ▪ Discharge from a CJR hospital and provider located in a CJR market (only for Model 2 PGP, Model 3 SNF and Model 3 HHA MJRLE)
Survey Dimensions	<ul style="list-style-type: none"> ▪ Wave of Survey ▪ Proxy status (beneficiary had help from someone else in responding to the survey)

²⁹ Additional variables for MJRLE, hip & femur procedures, and stroke episodes control for clinical heterogeneity that is not accounted for by MS-DRGs, and which is easily identifiable from ICD-9 and ICD-10 codes.

³⁰ Three of the functional status questions have only three possible responses, two functional status questions have four possible responses, and two have five. For each of the outcomes with less than five possible responses, the best functional status was coded as 1, the middle status (or two statuses) was coded as 2, and the worst functional status was coded as 3. We created a variable summing the number of functional measures with 2, the number with 3, and also a binary indicator for “missing functional status.” For the two measures with five possible responses we created binary indicators for “all of the time/most of the time” and created a control variable summing the number of indicators equal to 1, as well as a binary indicator for “missing activity status.” For functional status variables with four possible responses, we considered alternative cutoffs for coding responses as 1, 2, or 3; however none of these alternative cutoffs altered the results in any meaningful way.

d. Pooled-across-waves analyses

The pooled-across-waves analyses were conducted separately for each survey stratum. We used logistic regression to calculate risk adjusted outcomes among BPCI and comparison respondents, and the difference in risk adjusted outcomes between the two groups. All regressions were weighted and risk adjusted as discussed above. Standard errors were clustered by EI, to account for unobserved similarities within providers both within and across survey waves.

e. Pooled-across-strata analyses (Model 2 Hospital and Model 2 PGP, only)

For Model 2 hospitals and, separately, for Model 2 PGPs, we estimated pooled-across-strata analyses that included all strata in each Model-EI type with at least 310 BPCI and 310 comparison responses. For these analyses, we estimated a fully interacted model, incorporating data from Waves 4-10 for the hospital sample, and Waves 9-11 for the PGP sample.³¹ The regression coefficient for every risk-adjusting variable was allowed to vary by stratum, as shown in the equation below.

$$Y_{ijkt} = \delta_k BPCI_{ij} * S_{ijk} + \beta_k X_{ij} * S_{ijk} + DRG_i + T_i + \epsilon_{ijkt}$$

Y_{ijkt} is the outcome of interest for individual i , treated at provider j , in episode k , during time t . X refers to the risk-adjustment variables (listed above), DRG indicates individual indicators for each DRG ,³² T are time (Wave) fixed effects, $BPCI$ is an indicator for a beneficiary who was treated by a BPCI participating hospital, and S is a set of indicator dummies for each of the K clinical episodes (25 for hospital, 18 for PGP). The relationship between Y and X (indicated by β_k) is unique for each clinical episode (e.g., HCC score may affect changes in functional status differently for patients with sepsis than patients with elective MJRLE). δ_k indicates the difference between BPCI and comparison respondents in episode k . The average difference between BPCI and comparison respondents across all Model 2 hospital or PGP episodes can then be calculated as:

$$\Delta_{BPCI} = \sum_{k=1}^K w_k \delta_k$$

where w_k is equal to the proportion of BPCI episodes in episode k relative to all BPCI episodes across all K episodes during the periods covered by the survey waves. That is, each clinical episode's estimate is weighted according to the volume of the clinical episode relative to the entire Model 2 hospital or PGP population covered by the survey.³³

Since the model is fully interacted, δ_k is identical to the stratum-level estimates reported individually for each Model 2 clinical episode. Moreover, the model-level estimate Δ_{BPCI} is

³¹ MJRLE was the only stratum sampled at the stratum level prior to Wave 4, so we exclude Wave 2 and 3 data from the sample for this stratum to capture a consistent time period.

³² Because DRGs are unique to a single stratum, these do not need to be interacted with the stratum indicators.

Moreover, because they are unique within strata, they function as “stratum fixed effects” without the need for separate, non-interacted stratum indicators in the equation.

³³ As a simple example, suppose there were two strata: Sepsis and MJRLE. Suppose Sepsis had 1000 episodes occur during survey waves 4-10 and MJRLE had 2000 episodes during the same time. The full BPCI population covered by the survey is then 3000. In such a case, the sepsis weight would be equal to $1000/3000 = 1/3$ and the MJRLE weight would be equal to $2000/3000 = 2/3$.

mathematically equivalent to taking the weighted average of each of the episode-level estimates for Model 2 hospital and Model 2 PGP strata.³⁴ Running a regression model pooled across clinical episodes allows us to estimate a standard error for Δ_{BPCI} , to determine whether differences between the BPCI and comparison group are statistically significant at the BPCI Model level.

E. Impact of BPCI on payment and quality among vulnerable beneficiaries

1. Study populations

We conducted an environmental scan and held discussions with members of the Lewin BPCI evaluation team to identify measurable traits of beneficiaries who may not fare as well as the typical beneficiary under the utilization changes associated with BPCI. We identified three characteristics that could potentially make patients more vulnerable to experiencing adverse health outcomes, though we acknowledge that these characteristics do not encompass all types of vulnerable conditions:

- **Dual-eligibility status:** Research from the Department of Health and Human Services (HHS) has identified dual enrollment in Medicare and Medicaid as a powerful risk factor associated with poor health quality measures.³⁵ We used Medicare-Medicaid dual beneficiary status, as identified in the Medicare Eligibility Files, as a proxy indicator for patients who were the most socioeconomically vulnerable.
- **Dementia:** Alzheimer's disease and related dementias are not included in the HCC model³⁶ used in our risk adjustment, and dementia-related (cognitive) vulnerability has been suggested as a factor associated with poor health outcomes among BPCI patients.³⁷ Patients with dementia were defined as those having ever been diagnosed (from 1999 to before the BPCI episode start date) with Alzheimer's and related diseases or dementia as according to the CCW beneficiary summary flag.
- **Recent institutional use:** Lewin team members identified that beneficiaries' baseline functional status would be strongly associated with outcomes. The team discussion concluded that patients admitted to the hospital from a nursing facility (NF), skilled nursing facility (SNF), long-term care hospital (LTCH), or inpatient rehabilitation facility (IRF) would reflect patients' baseline functional status in a parsimonious manner and would be relatively easy to identify with existing data. Patients were identified by selecting all BPCI beneficiaries for whom the Minimum Data Set (MDS) indicated treatment at an NF/SNF or for whom claims data indicated treatment at an LTCH or IRF within 5 days before their episode-initiating hospital stay.

For this analysis, each vulnerable condition was examined independently of the other vulnerabilities. Beneficiaries with more than one vulnerability were included in both categories.

³⁴ Reported results for the MJRLE stratum pooled data across Waves 2-10. The pooled-across-strata analysis only includes MJRLE responses from Waves 4-10. Therefore, this analysis isn't quite identical to simply combining all twenty-five individual point estimates from the stratum-level models.

³⁵ HHS, Office of the Assistant Secretary for Planning and Evaluation. *Social Risk Factors and Performance Under Medicare's Value Based Purchasing Programs*. Washington, DC: HHS; 2016.

³⁶ Lin PJ et al., "Risk adjustment for Medicare beneficiaries with Alzheimer's disease and related dementias." *Am J Manag Care* 2010; 16(3): 191-8.

³⁷ Hoff T, "The Battle of The Bundle: Lessons From My Mother's Partial Hip Replacement." *Health Aff* 2017; 36: 1511-1514.

We examined the impact of BPCI on these subgroups for Model 2 hospital beneficiaries in four clinical episodes: major joint replacement of the lower extremity (MJRLE), congestive heart failure (CHF), sepsis, and simple pneumonia and respiratory infections (SPRI). These four clinical episodes were selected based on high patient volume, which was necessary to ensure there was a large enough sample of patients in each vulnerable population to conduct statistical testing, and for variation in clinical characteristics (e.g., acute versus chronic, medical versus surgical).

2. Analytical Methods

a. Claim-based analysis

We evaluated the differential impact of BPCI on each of the vulnerable populations by using a difference-in-difference (DiD) approach. This model measures the differential change in outcomes from the baseline to intervention period between BPCI beneficiaries with each vulnerable condition relative to the corresponding difference among vulnerable beneficiaries in the comparison group. For each vulnerable population, we modified our standard risk-adjustment model used for the overall BPCI impact estimates to include interaction terms for that population as well as time-invariant terms to control for the incidence of the other two vulnerabilities. An example of the linear model used to obtain the DiD estimate for the payments outcome for the Medicare-Medicaid dual eligible population is shown below.

$$\begin{aligned} \text{total payments} &= \beta_0 + \beta_1 BPCI + \beta_2 \text{after} + \beta_3 BPCI \cdot \text{after} + \beta_4 \text{dual} + \beta_5 \text{dual} \cdot BPCI \\ &+ \beta_6 \text{dual} \cdot \text{after} + \delta \text{dual} \cdot BPCI \cdot \text{after} + \beta_7 \text{dementia} \\ &+ \beta_8 (\text{prior institutional use}) + \text{other covariates} \end{aligned}$$

This approach gave us a DiD estimate for a given vulnerable populations while using the full sample of episodes to calibrate other coefficient estimates. The DiD estimate for the dual eligible population in the equation above is represented by $\beta_3 + \delta$.

b. Survey-based analysis

For the survey, three separate risk-adjustment models with the standard set of covariates were used. Given that there is no pre-BPCI survey data, these models are cross-sectional estimates of the difference between BPCI and comparison respondents in each of the vulnerable populations. These models can help determine whether outcomes for vulnerable patients differed between BPCI and comparison hospitals during the BPCI initiative, but they cannot determine whether any estimated differences were pre-existing or were caused by BPCI.

F. Impact of BPCI on market dynamics

We conducted a descriptive analysis to understand whether BPCI Models 2 and 3 EIs captured a greater share of the episodes in their markets, for the clinical episodes in which they participated. We call these “BPCI eligible” discharges and hypothesize that BPCI EIs will strive to increase their market share, attracting patients who would otherwise go to competitors not participating in BPCI. If so, we would expect an increasing volume of BPCI-eligible discharges among participating EIs, relative to competitors providing the same types of services in the same markets.

We also sought to understand whether BPCI Model 2 hospital and PGP EIs changed the concentration of PAC providers to which they refer BPCI patients and if they sent patients to

higher quality PAC providers in their markets. We examined the number of PAC providers that Model 2 hospital and PGP EIs discharged their patients to, as well as the share of patients discharged from Model 2 hospital and PGP EIs who subsequently received PAC at PAC providers with high quality ratings (based on the CMS star ratings of SNFs and HHAs). We expect that, over time, Model 2 hospital and PGP EIs would enact strategies to form and strengthen relationships with preferred PAC providers.

We created the following measures to examine whether the market share or referral patterns of BPCI EIs changed over time:

1. Market share of Model 2 and 3 BPCI EIs, for BPCI-eligible discharges associated with the clinical episodes in which they participated
2. Number of PAC providers accounting for 75% of Model 2 PAC discharges
3. Percent of patients discharged from Model 2 EIs to PAC providers with high CMS star ratings

We used Medicare core-based statistical areas (CBSAs) to define BPCI EIs' markets.³⁸

Market shares and referral patterns may be considerably different for different clinical episodes (e.g., joint replacement vs. sepsis) and types of EIs. In addition, CMS allowed rolling enrollment and withdrawal by participants. New EIs joined the initiative periodically since it was implemented in Q4 2013; and existing EIs changed the clinical episodes they participated in. Recognizing these technical challenges, we stratified the market analysis by BPCI clinical episode and EI cohort. An EI cohort includes all BPCI EIs that entered Phase 2 of a clinical episode in the same quarter. Stratification by clinical episode and cohort makes it difficult, however, to discern overall trends at the Model and EI type level. To address this concern, we also calculated market dynamic measures with all selected episodes and cohorts combined.

We aligned the market dynamics analysis with the claims-based analyses included in this report by focusing on a subset of the clinical episodes for which we estimated BPCI's impact using the difference-in-differences approach. We used the following criteria to narrow the set of BPCI episodes and EI cohorts included in the market dynamics analysis:

1. Each selected BPCI episode had 30 or more EIs in any cohort of interest. This large number of EIs offers the best opportunity to detect meaningful changes in outcome measures over time.³⁹
2. Market shares and referral patterns were analyzed in six-month periods (see details in the "Analytical Approach" section). Each of the 30 or more EIs in a cohort was an active BPCI participant throughout the intervention period. Each EI had one or more discharges in each six-month period in the baseline period and also in the period after starting participation in the clinical episode. This requirement ensures that we compare the same group of EIs over time (i.e. constant cohorts over time).

³⁸ A CBSA is a U.S. geographic area defined by the Office of Management and Budget (OMB) that consists of one or more counties anchored by an urban center plus adjacent counties. Medicare CBSAs are the same as OMB CBSAs except that they split the 11 largest metropolitan OMB CBSAs into multiple Medicare CBSAs. Also, Medicare CBSAs do not include micropolitan markets.

³⁹ There were two exceptions to this requirement: hip & femur and sepsis.

Exhibit D.22 shows the BPCI episodes and cohorts in the market dynamics analysis. The sections below offer more details about the analytic approach.

Exhibit D.22: Selection of BPCI Episodes and Cohorts for Market Dynamics Analysis

Model	BPCI Episode	Cohort by Quarter of BPCI Entry For a Specific Episode			
		2014 Q1	2015 Q2	2015 Q3	2015 Q4
2 Hospital	COPD, bronchitis, asthma		X		
	Major joint replacement of lower extremity	X	X	X	
	Congestive heart failure		X		X
	Sepsis		X		
	Hip & femur other than major joint				X
	Simple pneumonia and respiratory infections		X		
2 PGP	Major joint replacement of lower extremity			X	
3 SNF ¹	Urinary tract infection			X	X
	Stroke			X	X
	COPD, bronchitis, asthma				X
	Major joint replacement of lower extremity		X	X	X
	Congestive heart failure		X	X	X
	Medical non-infectious orthopedic			X	X
	Hip & femur other than major joint		X	X	X
	Sepsis			X	X
	Simple pneumonia and respiratory infections		X	X	X
	Other respiratory				X
	Renal failure				X

Note: COPD = chronic obstructive pulmonary disease. PGP=physician group practice. SNF = skilled nursing facility.

¹ No Model 3 HHA episode/cohort met the selection criteria.

1. Outcome definitions

a. Market share of BPCI EIs for BPCI-eligible discharges in which they participate

An EI's market share was defined as the number of BPCI-eligible discharges from the EI, divided by the total number of the same type of discharges across similar providers (i.e., hospitals, SNFs, or PGPs) in the market. We calculated market share separately for each BPCI Model and EI type: Model 2 hospitals, Model 2 PGPs and Model 3 SNFs.⁴⁰ For Model 3 SNF EIs, we included SNF admissions within 30 days after a qualifying inpatient stay.

⁴⁰ No Model 3 HHA EI episode and cohort met the criteria for inclusion in the analyses of Model 3 EI market shares.

b. Number of PAC providers accounting for 75% of Model 2 EI PAC discharges

This measure reflects the size of the PAC referral network used by Model 2 hospital and PGP EIs. We calculated the share of each Model 2 EI's patients discharged to each PAC provider. We then counted the fewest number of PAC providers having a cumulative share of 75% of an EI's discharged patients. This measure was calculated and analyzed separately for discharges to SNFs and to HHAs. To identify discharges from hospitals to PAC providers, only a patient's first admission to a SNF or HHA after hospital discharge was counted, excluding SNF admissions more than five days after hospital discharge and HHA admissions more than 14 days after hospital discharge.⁴¹

c. Percent of patients discharged from Model 2 EIs to PAC providers with high CMS star ratings

Model 2 EIs may have financial incentives to work with higher quality PAC providers, to reduce the total cost of episodes resulting from fewer complications and readmissions to hospitals. This measure examines the share of patients discharged from BPCI Model 2 hospital and PGP EIs who were admitted to high-quality PAC providers after the EI joined BPCI, as defined by CMS Compare star ratings for SNFs and HHAs.

Nursing Home Compare and Home Health Compare are consumer-oriented websites that provide information on the quality of care provided in nursing homes (including SNFs) and HHAs. Both feature a five-star rating system of composite scores based on numerous setting-specific quality metrics. Nursing Home Compare was first published in November of 2002 and Home Health Compare was first published in July 2015. Both update their five-star ratings quarterly.

We used publicly available CMS Compare ratings to construct this measure. We defined high quality PAC providers differently for SNFs and HHAs because the two five-star rating systems have different measures and national distributions. Nationally, approximately one-quarter of SNFs attain a five-star rating, and one-quarter of HHAs achieve a four-star rating or higher. We therefore used these thresholds. For each Model 2 EI that discharged patients to SNFs, we calculated the percent of all SNF discharges that were to SNFs having a five-star rating as of March 2014 (the rating system release closest to the start of BPCI participation). For patients discharged to HHAs, we calculated the percent of all discharges that were to HHAs having a four-, four and a half-, or five-star rating as of July 2015.

We anchored the PAC providers' star rating to a particular point in time and used this constant measure of a provider's relative quality across all baseline and BPCI periods; we did not update their star rating for our analysis due to two limitations of using the Nursing Home and Home Health Compare star ratings to measure providers' quality. First, Home Health Compare ratings were not published until Q3 2015, so we had no quality rating for HHAs prior to Q3 2015. Second, CMS periodically revises the setting-specific quality metrics included in, or the specific weights and thresholds used in star ratings calculations. For example, in February 2015 Nursing Home Compare underwent a "rebasement" of its thresholds for computing the distribution of stars. Thus, while the overall distribution of providers' star-ratings might shift in future periods, some part of

⁴¹ These five and fourteen day restrictions for SNF and HHA referrals are consistent with the definitions in the analyses of claims- and patient assessment-based outcomes for the BPCI evaluation.

these shifts do not reflect changes in providers' levels of quality, but rather changes in the measurement systems.

Some new SNFs did not have star ratings as of March 2014 due to lack of historical data. For these SNFs, ratings were assigned based on the earliest archived data set available by October 2016. Patients admitted to SNFs that still did not have a star rating (i.e., their rating began after October 2016) were excluded from both the denominator and numerator of the measure. Likewise, HHAs that did not have star ratings between July 2015 and October 2016 were excluded from both the denominator and numerator of the measure.

The two PAC referral pattern measures – the number of PAC providers and the share of discharges to highly rated PAC providers - have an important limitation: They examine whether BPCI has influenced Model 2 EIs' discharge referral patterns, in favor of a set of preferred PAC providers in the local area. However, we cannot tell whether the discharges from a hospital to a PAC provider reflect a deliberate referral decision made by the hospital, or reflect independent beneficiary preferences and decisions since beneficiaries are free to choose among all PAC providers. For example, some beneficiaries may arrange for their PAC stay prior to a surgical procedure based on recommendations from their physician and loved ones or promotional activities by the PAC providers.

2. Market definition and selection

A market includes the geographic area from which the BPCI provider draws patients and competes to provide services. To define BPCI markets, we used a geopolitical boundary defined by the Medicare CBSAs. While the Medicare CBSA is an appropriate boundary for many markets, it may not accurately define the local health care markets in large urban areas. The very small market shares of EIs in these markets suggests that the Medicare CBSA is too large to define the local health care market, making it difficult to detect meaningful changes in market share over time.

We assessed the appropriateness of the Medicare CBSA boundary and removed two markets where the Medicare CBSA was too large to accurately define a local health care market. Specifically, we calculated two market metrics: patient outflow rate and patient inflow rate, to identify markets where the Medicare CBSA is too large a boundary. The outflow rate was defined as the percent of residents in a Medicare CBSA seeking any type of inpatient treatment at any hospital located outside the Medicare CBSA. The inflow rate was defined as the percent of discharges from all hospitals located inside a Medicare CBSA for patients who reside outside the Medicare CBSA. Unusually low inflow and outflow rates (i.e., under 10%) indicate that the market boundary may be too broad. For example, the largest possible boundaries (i.e., the entire U.S.) would have extremely low inflows and outflows. We identified two very large markets where Medicare CBSA was a poor market definition and removed them from the subsequent analysis of market shares:

1. Chicago-Naperville-Arlington Heights, IL (16974)
2. Cincinnati-Middletown, OH-KY-IN (17140)

Because the EIs located in these two large markets had small baseline market shares, due to the large size of the Medicare CBSAs, it would be difficult to detect meaningful change in their market shares over time. Including these EIs in the market share analyses would suppress the average

change in market shares for all EIs, thereby obfuscating the change observed among EIs for which the Medicare CBSA more accurately defines their local health care market.

Additionally, we excluded Medicare CBSAs where the BPCI EI had 100% market share for a clinical episode type in the baseline period (Q4 2011 through Q3 2012). Markets with only one hospital are unusual and unlike other BPCI markets because there is no competition: the usual market dynamics and competitive forces may not influence decisions about capturing market share. Finally, we excluded EIs located in micropolitan markets because Medicare CBSAs do not include micropolitan markets.⁴²

Medicare CBSAs were only excluded from the analyses of the change in Model 2 and Model 3 EIs' market shares of BPCI-eligible discharges. The other two measures focus on discharges from Model 2 EIs to PAC providers, without consideration of the PAC providers' specific geographic location.

We assigned a hospital or PAC EI to the Medicare CBSA where the EI is physically located. The market assignment for PGP EIs was more complex because PGPs (and their physicians) may have a presence in multiple markets. For PGP EIs, we calculated market measures at the PGP EI and market level, including all markets where a PGP EI had at least one inpatient discharge.

Exhibit D.23 (Model 2 hospital and PGP EIs) and Exhibit D.24 (Model 3 SNF EIs) present the number of BPCI EIs that were removed from the analyses of EIs' market shares due to market restrictions for each clinical episode and each EI cohort. The market restrictions include the removal of EIs in two large Medicare CBSAs, the removal of EIs in micropolitan markets, and the removal of EIs with 100% market share in the local market.

Exhibit D.23: Model 2 EIs Removed from Analysis due to Market Restrictions

Model	Clinical Episode	Cohort	Total Number of EIs Before Removal ¹	Two Medicare CBSAs Removed (# of Remaining EIs)	Micropolitan Markets Removed (# of Remaining EIs)	100% Market Share Removed (# of Remaining EIs)
2 Hospital	COPD, bronchitis, asthma	2015 Q2	41	39	36	36
	Major joint replacement of lower extremity	2014 Q1	43	42	39	39
	Major joint replacement of lower extremity	2015 Q2	68	63	60	58
	Major joint replacement of lower extremity	2015 Q3	86	82	78	77
	Congestive heart failure	2015 Q2	38	38	34	34
	Congestive heart failure	2015 Q4	38	37	34	33
	Hip & femur other than major joint	2015 Q4	30	27	27	27

⁴² CBSAs defined by the Office of Management and Budget (OMB) include both Metropolitan and Micropolitan Statistical Areas. A Micropolitan Statistical Area is defined as one or more adjacent counties or county equivalents that have at least one urban core area of at least 10,000 population but less than 50,000, plus adjacent territory that has a high degree of social and economic integration with the core as measured by commuting ties.

Model	Clinical Episode	Cohort	Total Number of EIs Before Removal ¹	Two Medicare CBSAs Removed (# of Remaining EIs)	Micropolitan Markets Removed (# of Remaining EIs)	100% Market Share Removed (# of Remaining EIs)
2 Hospital (con'td)	Sepsis	2015 Q2	28	27	27	27
	Simple pneumonia and respiratory infections	2015 Q2	34	33	31	31
2 PGP	Major joint replacement of lower extremity	2015Q3	47	45	45	45

Note: COPD = chronic obstructive pulmonary disease. PGP=physician group practice.

¹ Number of EIs in the constant cohort.

Source: Abt analysis of Medicare claims for discharges that began Q4 2011 through Q4 2016 and Provider of Service file.

Exhibit D.24: Model 3 SNF EIs Removed from Analysis due to Market Restrictions

Clinical Episode	Cohort	Total Number of EIs Before Removal*	Two Medicare CBSAs Removed (# of Remaining EIs)	Micropolitan Markets Removed (# of Remaining EIs)	100% Market Share Removed (# of Remaining EIs)
Urinary tract infection	2015 Q3	42	40	34	34
Urinary tract infection	2015 Q4	64	63	54	54
Stroke	2015 Q3	37	37	32	32
Stroke	2015 Q4	66	65	56	56
COPD, bronchitis, asthma	2015 Q4	35	34	33	33
Major joint replacement of lower extremity	2015 Q2	55	49	44	44
Major joint replacement of lower extremity	2015 Q3	103	100	92	92
Major joint replacement of lower extremity	2015 Q4	87	87	76	76
Congestive heart failure	2015 Q2	36	32	28	28
Congestive heart failure	2015 Q3	37	36	33	33
Congestive heart failure	2015 Q4	79	78	70	70
Medical non-infectious orthopedic	2015 Q3	37	36	33	33
Medical non-infectious orthopedic	2015 Q4	60	59	55	55
Hip & femur other than major joint	2015 Q2	36	29	28	27
Hip & femur other than major joint	2015 Q3	48	47	42	42
Hip & femur other than major joint	2015 Q4	70	69	64	64
Sepsis	2015 Q3	59	59	54	54
Sepsis	2015 Q4	86	85	77	76
Simple pneumonia and respiratory infections	2015 Q2	34	28	26	26
Simple pneumonia and respiratory infections	2015 Q3	50	49	46	45
Simple pneumonia and respiratory infections	2015 Q4	101	99	84	84
Other respiratory	2015 Q4	36	35	31	31
Renal Failure	2015 Q4	43	43	37	37

Note: COPD = chronic obstructive pulmonary disease.

¹ Number of EIs in the constant cohort.

Source: Abt analysis of Medicare claims for discharges that began Q4 2011 through Q4 2016 and Provider of Service file.

3. Data

We used 100% of Medicare Part A claims between Q4 2011 and Q4 2016 to calculate market shares for hospitals, PGPs, and SNFs⁴³ located in Medicare CBSAs where one or more BPCI EIs were located. These claims spanned the baseline and intervention periods. We linked data from Medicare claims to state and county FIPS codes found in the Provider of Service (POS) Files, and crosswalked the FIPS codes to Medicare CBSAs.

Model 2 hospital and PGP episodes start at an inpatient hospital. To identify a hospital discharge assigned to a PGP EI, we required that either the attending or the operating physician listed on the inpatient claim was associated with an active PGP BPCI participant at the time of the inpatient hospital admission.⁴⁴

To identify PAC referrals we created dyads, or provider pairs, representing any discharging inpatient hospital and the first PAC provider after hospital discharge. This file contained one row for each patient transition from an acute care hospital to a SNF or HHA. Data on star ratings for SNFs and HHAs were acquired from Data.Medicare.gov, and linked to this file using CMS Certification Numbers (i.e., CCN) for SNFs and HHAs.

4. Analytical approach

We conducted pre-post comparisons of the three market-related measures for each of the selected clinical episodes and cohorts separately, and at the BPCI EI level, tracking changes in measure rates from the baseline to intervention period to infer the impact of the BPCI initiative. Specifically, we first calculated the changes in market share and the two measures of PAC concentration from the baseline period to the intervention period at the individual EI level. We then calculated the mean, median, and 25th and 75th percentiles of the calculated changes in each measure across all EIs in the clinical episode and cohort. In the result sections, we focused on the median of each market dynamics measure to discern changes over time, instead of the mean, because the median is less sensitive to outliers. The full distribution (including mean, median, 25th percentile, and 75th percentile) of the market dynamics measures is reported in **Appendix L**.

We defined the baseline period as Q4 2011 through Q3 2012, which is one year prior to the start of the BPCI initiative. We segmented each EI's intervention periods into six-month intervals, and calculated the change in each measure from the baseline period to each six-month intervention period. For example, if a Model 2 hospital EI began Phase 2 of BPCI to participate in MJRLE in Q3 2015, we calculated the change in market share of MJRLE episodes for this EI three times: between the baseline period and the periods Q3 2015 through Q4 2015, Q1 2016 through Q2 2016, and Q3 2016 through Q4 2016. But if an EI did not begin Phase 2 BPCI to participate in MJRLE until Q4 2015, then we calculated its change in market share twice, between the baseline period and the Q4 2015 through Q1 2016 period, and again between the baseline period and the Q2 2016 through Q3 2016 period.

In addition to analyses stratified by episodes, cohorts, and six-month intervals, we also calculated aggregate measures by combining episodes, cohorts, and six-month intervals to discern the overall trends under each Model and EI type – a single rate for each measure. To calculate the aggregate

⁴³ No Model 3 HHA EI episode and cohort met the criteria for inclusion in this analysis.

⁴⁴ We used the NPI-PGP TIN crosswalk from CMS to identify physicians actively associated with a PGP.

measures, we combined the latest two six-month intervals in the intervention period (i.e. last BPCI year in the analysis) and compared them to the baseline period.⁴⁵

G. Net Savings to Medicare due to BPCI

For each Model, we calculated net Medicare savings by subtracting reconciliation payments from the total change in non-standardized payments due to BPCI. Exhibit D.25 defines the measures used in this analysis.

Exhibit D.25: Definition of measures used in the analysis of net savings to Medicare

Measure	Definition
DiD estimate of per-episode change in standardized payments	A per-episode estimate of the change in Medicare payments attributable to BPCI using the DiD regression model for the clinical episodes evaluated within the given Model. The payment outcome was the standardized Medicare paid amounts for services that were included and excluded from the bundle during the anchor stay and 90 days post-discharge. The DiD estimate was multiplied by (-1) so that a positive estimate indicates a decline in payments.
Total number of BPCI episodes	The number of intervention episodes initiated by the BPCI participants across all 48 clinical episodes according to an episode-level NPRA dataset received from the BPCI reconciliation contractor. This dataset includes clinical episodes and EI types that were not evaluated.
Total change in standardized payments	The DiD estimate of per-episode change in standardized payments multiplied by the total number of BPCI episodes.
Standardized to non-standardized conversion factor	A ratio of non-standardized to standardized Medicare paid amounts based on BPCI intervention episodes. For Model 2, the ratio included payments for services during the 90 days post-discharge period; for Model 3, the ratio included payments for services during the 90 days following the start of the episode.
Total change in non-standardized payments	The total change in standardized payments multiplied by the conversion factor. Non-standardized Medicare paid amounts reflect actual Medicare payments because they include adjustments for wages, practice expenses, and other initiatives (e.g., medical education).
Reconciliation payments	Includes performance payments to providers as well as any amounts owed to CMS (Net Payment Reconciliation Amounts) and other components. A positive value indicates that more funds have been paid than recovered. These data were extracted from CMS's HIGLAS system.
Net savings to Medicare	For a given Model, the total change in non-standardized payments less reconciliation payments. A positive value indicates savings.
Reconciliation payments (downside risk not waived)	The Medicare payouts expected if CMS had not waived downside risk for some episodes.
Net savings to Medicare (downside risk not waived)	For a given Model, the total change in non-standardized payments less reconciliation payments (downside risk not waived).

H. Impact of BPCI on Total Market Volume of MJRLE Discharges

We analyzed the impact of the BPCI initiative on the volume of MJRLE discharges in a market by testing whether markets (Medicare CBSAs) with a higher BPCI “dose” experienced larger or smaller increases in the MJRLE discharge rate (discharges per 1,000 Medicare Fee-for-Service

⁴⁵ The latest two six-month intervals in the intervention period include Q4 2015 through Q3 2016 for EIs that joined a BPCI episode in Q2 2015 or Q4 2015; and Q1 2016 through Q4 2016 for EIs that joined a BPCI episode in Q1 2014 or Q3 2015. This is consistent with the different set of six-month intervals by cohort.

(FFS) beneficiaries) than they would have otherwise. We examined volume at the market level in order to measure net increases in volume rather than volume shifts between non-BPCI providers and BPCI providers or among BPCI participants. We measured BPCI “dose” as the market share of BPCI participants prior to the start of the BPCI initiative.

We performed this analysis separately for non-fracture MJRLE discharges and fracture MJRLE discharges because of important differences between the two types of episodes. Fracture episodes are not elective, so it would be difficult to change total volume. In contrast, non-fracture episodes are elective procedures so providers may have more influence over volume. We also used the market-level estimates to calculate the percentage change in volume for BPCI providers.

1. Data sources and outcomes

We used Medicare claims and enrollment data from Q4 2007 through Q2 2017 to identify MJRLE discharges and to determine the characteristics of the FFS beneficiary population with MJRLE discharges. We used BPCI Program data to identify BPCI providers – hospitals, PGPs, SNFs, HHAs, IRFs, and LTCHs – participating in the risk-bearing phase of BPCI under Models 2, 3, or 4.

Our two outcomes of interest are the quarterly non-fracture discharge rate in a market (the number of MJRLE non-fracture discharges per 1,000 FFS beneficiaries in a market for a given quarter) and the quarterly fracture discharge rate in a market (the number of MJRLE fracture discharges per 1,000 FFS beneficiaries in a market for a given quarter).

2. Methods

a. Market definition

Markets are defined by Medicare CBSAs (MCBSAs) that are used in the hospital IPPS for geographic payment adjustment. MCBSAs are CBSAs for metropolitan areas with the largest metropolitan CBSAs split into smaller metro divisions. MCBSAs do not include micropolitan CBSAs or rural areas. There are a total of 401 MCBSAs included in this analysis.

b. Time periods

The model relies on a baseline time period and three post intervention time periods (Post 1, Post 2, and Post 3).

- The **baseline time period (Q4 2007– Q3 2012)** begins the quarter the hospital IPPS switched to MS-DRGs (the MJRLE episode is defined by MS-DRG 469 and MS-DRG 470) and ends prior to the start of the BPCI initiative.
- **Post 1 (Q4 2012 – Q3 2013)** is the intervention time period in which no MJRLE Awardees were in the risk-bearing phase of BPCI.⁴⁶
- **Post 2 (Q4 2013 – Q3 2015)** is the intervention time period in which some MJRLE Awardees were in the risk-bearing phase of BPCI, some had not yet joined BPCI, and some had terminated participation in the MJRLE clinical episode.

⁴⁶ We consider this period an early intervention time period because it reflects the time after the initiative was announced, but prior to the time when Awardees began to participate. During this time, potential applicants were analyzing their opportunity under BPCI and receiving data from CMS to evaluate that opportunity. In January 2013, CMS announced the organizations selected to participate in Phase 1 (non-risk bearing phase) of BPCI Models 2-4.

- **Post 3 (Q4 2015 – Q2 2017)** is the intervention time period in which all MJRLE Awardees were either in the risk-bearing phase of BPCI or had terminated participation in the MJRLE clinical episode.

c. Measuring BPCI “dose”

We measured BPCI “dose” as the market share of MJRLE discharges for providers (hospitals, PGPs, and PACs) who were ever in the risk-bearing phase of BPCI (i.e., the number of MJRLE discharges of BPCI providers divided by total MJRLE discharges in a market). The market share is measured over a portion of the baseline time period, from Q1 2009 – Q3 2012. We used the baseline time period because BPCI market share during the intervention is endogenous to the BPCI intervention. We used a portion of the baseline time period instead of the full baseline time period because we do not have information to identify BPCI PGP discharges prior to Q1 2009.⁴⁷

Most MCBSAs have at least some BPCI activity as measured by BPCI baseline market share. Of the 401 MCBSAs in our analysis, 349 had some BPCI baseline market share and 52 had no BPCI baseline market share. The distribution of BPCI baseline market share varied widely across MCBSAs (Exhibit D.26). The median MCBSA had a BPCI baseline market share of just 5.0%.

Exhibit D.26: Distribution of BPCI Baseline Market Shares, 401 MCBSAs (Q1 2009–Q3 2012)

Statistic	BPCI Baseline Market Share (%)
Min	0.00
10th percentile	0.00
25th percentile	0.3
50th percentile	5.0
75th percentile	41.3
90th percentile	69.3
Max	100.0
Mean	22.6
Standard deviation	29.5

⁴⁷ We identified discharges as BPCI PGP discharges if the National Provider Identifier (NPI) of the attending or operating physician is associated with a BPCI PGP (identified by the Federal Tax Identification Number (TIN)). CMS has provided us with a TIN-to-NPI crosswalk that identifies the NPIs associated with each BPCI TIN beginning in Q1 2009.

d. Statistical Model

The impact of the BPCI initiative on MJRLE volume is estimated using ordinary least squares (OLS) on the following model, which incorporates MCBSA fixed effects, time fixed effects, and MCBSA-specific linear time trends:

$$[1] V_{i,t} = b_0 + b_{1i} + b_{2t} + b_{3it} + (b_4 * Z_{it}) + (b_5 * CJR_{it}) + (b_6 * BPCImktshr_i * Post1_t) + (b_7 * BPCImktshr_i * Post2_t) + (b_8 * BPCImktshr_i * Post3_t) + \varepsilon_{it}$$

Where:

- $V_{i,t}$ is the MJRLE discharge rate (the number of MJRLE discharges per 1,000 FFS beneficiaries) in MCBSA i and quarter t ;
- b_{1i} allows for MCBSA fixed effects which control for MCBSA-specific factors that are constant across time;
- b_{2t} allows for time fixed effects (measured in quarters) which control for time-specific factors that are common across MCBSAs;
- b_{3it} allows for MCBSAs to follow different linear time trends;
- Z_{it} controls for characteristics of the FFS population residing in MCBSA i in quarter t (age, sex, dual eligibility, disabled/not ESRD), as well as the share of the Medicare beneficiary population enrolled in Medicare Advantage;
- CJR_{it} controls for CJR participation, equaling 1 during Q2 2016 through Q2 2017 for MCBSAs that are participating in CJR;
- $BPCImktshr_i$ is the market share of BPCI participants in MCBSA i measured over a portion of the baseline time period, from Q1 2009 – Q3 2012;
- $Post1_t$ equals 1 during the Post 1 intervention time period (Q4 2012 – Q3 2013) and equals 0 otherwise;
- $Post2_t$ equals 1 during the Post 2 intervention time period (Q4 2013 – Q3 2015) and equals 0 otherwise;
- $Post3_t$ equals 1 during the Post 3 intervention time period (Q4 2015 – Q2 2017) and equals 0 otherwise.

The impact of the BPCI initiative on MJRLE volume is captured by coefficients b_6 , b_7 , and b_8 measuring the average change in the MJRLE discharge rate due to the BPCI dose as measured by BPCI baseline market shares for each of the Post 1, Post 2, and Post 3 intervention time periods, respectively.

The analysis is performed separately for the non-fracture discharge rate and the fracture discharge rate.

Standard errors are clustered at the MCBSA level to account for non-independence of observations within MCBSAs. Since the dependent variable is the average discharge rate for each MCBSA and

each quarter, we weight the regression by the FFS beneficiary population in the MCBSA to estimate the population discharge rate.⁴⁸

e. Using model estimates to calculate the percent change in volume due to BPCI

Of interest to policy makers is an overall estimate of the percent change in volume due to the BPCI initiative. In addition to analyzing the individual regression estimates, b_6 , b_7 , and b_8 , which measure the impact on volume separately for the three intervention time periods, we also used the estimated regression to calculate the overall percentage change in market volume due to the BPCI initiative. We then multiplied the percentage change in market volume by the ratio of total discharges to BPCI discharges for a given MCBSA to estimate the percentage change in volume among BPCI providers.

$$[2] \text{ The percent change in volume due to BPCI} = \left[\frac{\sum_{it}(FFS_{it} * \text{Fitted volume}_{it})}{\sum_{it}(FFS_{it} * \text{Counterfactual volume}_{it})} \right] - 1$$

For all t in the intervention time periods (Post 1, Post 2, Post 3)

Where:

- **FFS_{it}** is the Medicare FFS population in *MCBSA i* and quarter *t*,
- **$\text{Fitted volume}_{it}$** is the fitted or predicted volume for *MCBSA i* in quarter *t* using the coefficients that we estimate from equation [1], and
- **$\text{Counterfactual volume}_{it}$** is the fitted or predicted volume under the counterfactual that the BPCI initiative did not occur (i.e. the terms that include b_6 , b_7 and b_8 are all set to zero).

⁴⁸ Angrist, Joshua D., and Jörn- Steffen Pischke. 2009. Mostly Harmless Econometrics: An Empiricist's Companion. Princeton: Princeton University Press.

Appendix E: Supplemental Participant Characteristics

A. Model 2

Exhibit E.1: Care Redesign and Payment Incentives Experience Prior to BPCI Participation,* Model 2

Care redesign and prior experience in payment incentives		Model 2 Hospital EIs (N=401)		Model 2 PGP EIs (N=281)	
		N	%	N	%
Prior experience in care redesign initiatives	Redesign of Care Pathways	237	59.1	85	30.2
	Enhancements in Care Delivery	232	57.9	18	6.4
	Patient Activation, Engagement, & Risk Management	206	51.4	18	6.4
	Care Coordination	234	58.4	19	6.8
	System Changes to Support Care	198	49.4	19	6.8
	Other Redesign Activities	27	6.7	9	3.2
Prior experience in payment incentives	Bundled Payments	55	13.7	10	3.6
	Pay for Performance	218	54.4	20	7.1
	Shared Savings	167	41.6	15	5.3
	Other Payment Incentives	41	10.2	18	6.4

*Prior experience in care redesign and payment incentive initiatives was reported when episode initiators first became active in Phase 2 of the initiative. Therefore, episode initiators that changed models are only included in the sample for the first model they participated in. This table only includes information about episode initiators that submitted data. Episode initiators that did not submit complete data are excluded from the counts in the table.

Source: Lewin analysis of Awardee-submitted data collected February 2015 through February 2016 for Model 2 episode initiators.

Exhibit E.2: Participation of Episode Initiators by Clinical Episode, Model 2

Clinical Episode	Episode Initiators by Participant Type (N=695)		
	Hospital (N=423)	PGP (N=272)	% of EIs
Acute myocardial infarction	97	75	25
AICD generator or lead	6	50	8
Amputation	26	45	10
Atherosclerosis	33	46	11
Back & neck except spinal fusion	24	14	5
Cardiac arrhythmia	76	63	20
Cardiac defibrillator	19	25	6
Cardiac valve	38	19	8
Cellulitis	85	89	25
Cervical spinal fusion	46	24	10
Chest pain	35	56	13
Chronic obstructive pulmonary disease, bronchitis, asthma	137	98	34
Combined anterior posterior spinal fusion	18	21	6

Clinical Episode	Episode Initiators by Participant Type (N=695)		
	Hospital (N=423)	PGP (N=272)	% of EIs
Complex non-cervical spinal fusion	19	14	5
Congestive heart failure	183	79	38
Coronary artery bypass graft	51	22	11
Diabetes	48	56	15
Double joint replacement of the lower extremity	35	21	8
Esophagitis, gastroenteritis and other digestive disorders	63	69	19
Fractures of the femur and hip or pelvis	60	67	18
Gastrointestinal hemorrhage	63	61	18
Gastrointestinal obstruction	54	60	16
Hip & femur procedures except major joint	108	86	28
Lower extremity and humerus procedure except hip, foot, femur	52	48	14
Major bowel procedure	48	33	12
Major cardiovascular procedure	35	21	8
Major joint replacement of the lower extremity	321	140	66
Major joint replacement of the upper extremity	44	40	12
Medical non-infectious orthopedic	100	69	24
Medical peripheral vascular disorders	42	58	14
Nutritional and metabolic disorders	63	70	19
Other knee procedures	18	29	7
Other respiratory	77	72	21
Other vascular surgery	43	29	10
Pacemaker	27	40	10
Pacemaker device replacement or revision	16	21	5
Percutaneous coronary intervention	53	59	16
Red blood cell disorders	42	60	15
Removal of orthopedic devices	34	20	8
Renal failure	80	73	22
Revision of the hip or knee	50	28	11
Sepsis	127	93	32
Simple pneumonia and respiratory infections	145	97	35
Spinal fusion (non-cervical)	55	38	13
Stroke	84	55	20
Syncope & collapse	40	66	15
Transient ischemia	35	54	13
Urinary tract infection	91	78	24

Source: Lewin analysis of CMS' BPCI database, February, 2018. Please note that the sum of the total EIs participating in each of the clinical episodes exceeds the total number of EIs because EIs can participate in more than one clinical episode.

Exhibit E.3: 2011 Part A Standardized Payments for Inpatient Stay Plus 90-day PDP, BPCI-participating Hospital EIs and Non-participating Hospitals, by Clinical Episode, Model 2

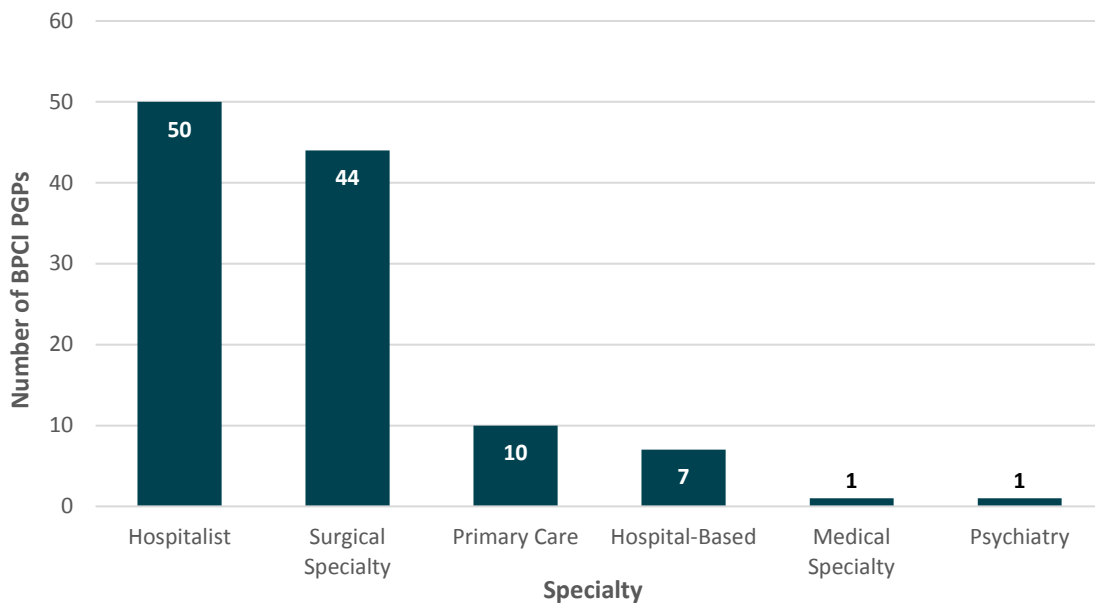
Clinical Episode	BPCI Hospital EIs		Non-participating Hospitals	
	Mean Discharges per Hospital	Mean Payment Across Hospitals	Mean Discharges per Hospital	Mean Payment Across Hospitals
Acute myocardial infarction	71	\$21,656	41	\$21,638
Cardiac arrhythmia	107	\$13,314	74	\$12,840
Cardiac valve	76	\$51,136	41	\$50,648
Cellulitis	72	\$15,637	43	\$14,404
Cervical spinal fusion	34	\$19,548	24	\$19,583
Chronic obstructive pulmonary disease, bronchitis, asthma	184	\$15,383	126	\$13,780
Congestive heart failure	204	\$19,255	117	\$18,501
Coronary artery bypass graft	57	\$38,774	47	\$36,975
Diabetes	42	\$16,190	25	\$14,907
Esophagitis, gastroenteritis and other digestive disorders	113	\$12,841	68	\$11,795
Fractures of the femur and hip or pelvis	21	\$26,535	15	\$25,496
Gastrointestinal hemorrhage	102	\$15,910	59	\$15,096
Gastrointestinal obstruction	46	\$14,326	31	\$13,583
Hip & femur procedures except major joint	61	\$37,929	42	\$36,586
Lower extremity and humerus procedure except hip, foot, femur	22	\$29,308	18	\$26,558
Major bowel procedure	48	\$30,890	36	\$28,449
Major joint replacement of the lower extremity	203	\$23,652	125	\$23,467
Major joint replacement of the upper extremity	22	\$20,397	18	\$17,631
Medical non-infectious orthopedic	78	\$22,983	48	\$21,200
Nutritional and metabolic disorders	72	\$16,374	48	\$15,192
Other respiratory	86	\$27,651	61	\$25,708
Other vascular surgery	50	\$28,279	36	\$26,268
Percutaneous coronary intervention	126	\$19,010	101	\$17,575
Renal failure	113	\$20,225	68	\$18,852
Revision of the hip or knee	39	\$32,406	20	\$29,812
Sepsis	162	\$28,328	102	\$25,286
Simple pneumonia and respiratory infections	208	\$19,011	138	\$17,617
Spinal fusion (non-cervical)	60	\$32,311	37	\$30,299
Stroke	125	\$26,249	63	\$24,065
Syncope & collapse	72	\$12,274	38	\$12,090
Transient ischemia	43	\$11,727	26	\$11,101

Clinical Episode	BPCI Hospital EIs		Non-participating Hospitals	
	Mean Discharges per Hospital	Mean Payment Across Hospitals	Mean Discharges per Hospital	Mean Payment Across Hospitals
Urinary tract infection	118	\$18,638	73	\$17,069

Note: The clinical episodes included in this table are those that had enough sample size to include in the risk-adjusted difference-in-differences analysis presented in the Results section, Model 2 Impact of BPCI.

Source: Lewin analysis of 2013 Provider of Service (POS) files and 2011 Medicare claims. Standardized payments are based on 2011 Part A claims. Non-participating hospitals are all other hospitals not participating in any BPCI initiative that reported values for all measures listed in Exhibits 1a & 1b. Both the participating and non-participating hospitals had at least 5 discharges in 2011 in the clinical episode of relevance, and are not in Maryland. Please note that BPCI-participating hospitals that received Medicare certification after 2011 are not included in this table.

Exhibit E.4: Participating PGPs by Specialty, Model 2, 2012–2016



Note: Primary care physicians with more than 90% of their Part B charges in the inpatient setting were classified as hospitalists. If more than 70% of a PGP’s physicians were identified as hospitalists in any year, the PGP was classified as a hospitalist practice. For all other specialties, we considered a PGP to be single-specialty if at least 90% of its physicians’ specialties were in one of the seven broad specialty categories.¹

Source: Lewin analysis of TIN/NPI crosswalk as of Q4 2016; Medicare Part B claims, 2012–2016.

¹ Welch WP, Cuellar AE, Stearns SC, Bindman AB. Proportion of physicians in large group practices continued to grow in 2009-11. Health Aff (Millwood). 2013; 32(9):1659-1666.

Exhibit E.5: Quarterly Discharges per BPCI-participating PGP, Model 2, 2012 – 2016

Statistic	2012	2013	2014	2015	2016
Minimum	0	0	0	0	0
25th Percentile	110	151	152	147	151
Median	277	340	360	337	347
Mean	638	720	782	812	884
75th Percentile	701	838	880	903	914
Maximum	8,017	8,561	9,047	9,316	10,156
Interquartile range	591	687	728	756	763
PGPs (N)	244	243	244	242	208

Note: Discharges are restricted to the 48 BPCI clinical episodes, regardless of whether or not the PGP participated in that given clinical episode. In addition, every discharge is counted, regardless of whether it became a BPCI episode, in order to avoid any impact from the episode attribution algorithm.

Source: Lewin analysis of TIN/NPI crosswalk as of Q4 2016; Medicare Part A claims, 2012–2016.

Exhibit E.6: Quarterly Discharges per Physician in BPCI-participating PGPs, Model 2, 2012 – 2016

Statistic	2012	2013	2014	2015	2016
Minimum	0	0	0	0	0
25th Percentile	6	6	5	5	5
Median	11	11	10	10	10
Mean	14	14	13	13	13
75th Percentile	21	20	20	19	19
Maximum	73	65	62	53	49
Interquartile range	15	14	15	14	14
PGPs (N)	244	243	244	242	208

Note: Discharges are restricted to the 48 BPCI clinical episodes, regardless of whether or not the PGP participated in that given clinical episode. In addition, every discharge is counted, regardless of whether it became a BPCI episode, in order to avoid any impact from the episode attribution algorithm.

Source: Lewin analysis of TIN/NPI crosswalk as of Q4 2016; Medicare Part A claims, 2012–2016.

Exhibit E.7: Quarterly MJRLE Discharges per Orthopedic Surgeon, Model 2 PGP, 2012 – 2016

Statistic	All Orthopedic Surgeons					Participating PGP Orthopedic Surgeons				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
Minimum	0	0	0	0	0	0	0	0	0	0
25th Percentile	1	1	1	1	1	2	2	2	2	3
Median	4	4	4	4	5	8	8	8	9	10
Mean	8	8	8	8	9	17	18	18	19	21
75th Percentile	10	10	10	10	11	22	23	24	24	27

Statistic	All Orthopedic Surgeons					Participating PGP Orthopedic Surgeons				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
Maximum	128	145	150	167	195	187	201	198	229	236
Interquartile range	9	9	9	9	10	20	21	22	22	24
PGPs (N)	*	*	*	*	*	244	243	244	242	208

Note: Discharges are restricted to those with an orthopedic surgeon as the attending or operating physician. Discharges are restricted to the two MS-DRGs that comprise the BPCI MJRLE clinical episode, regardless of whether or not the PGP participated in that given clinical episode. In addition, every discharge is counted, regardless of whether it became a BPCI episode, in order to avoid any impact from the episode attribution algorithm.

Source: Lewin analysis of TIN/NPI crosswalk as of Q4 2016; Medicare Part A and Part B claims, 2012–2016.

B. Model 3

Exhibit E.8: Care Redesign and Payment Incentives Experience Prior to BPCI Participation*, Model 3

Care redesign and prior experience in payment incentives		Model 3 SNF EIs (N=387)		Model 3 HHA EIs (N=114)		Model 3 PGP EIs (N=114)	
		N	%	N	%	N	%
Prior experience in care redesign initiatives	Redesign of Care Pathways	128	15.3	28	24.6	58	40.3
	Enhancements in Care Delivery	81	9.7	25	21.9	0	0.0
	Patient Activation, Engagement, & Risk Management	87	10.4	27	23.7	0	0.0
	Care Coordination	101	12.1	29	25.4	0	0.0
	System Changes to Support Care	94	11.2	24	21.1	0	0.0
	Other Redesign Activities	3	0.4	0	0.0	0	0.0
Prior experience in payment incentives	Bundled Payments	22	2.6	1	0.9	0	0.0
	Pay for Performance	69	8.2	16	14.0	1	0.7
	Shared Savings	35	4.2	0	0.0	0	0.0
	Other Payment Incentives	7	0.8	1	0.9	0	1.0

*Prior experience in care redesign and payment incentive initiatives was reported when episode initiators first became active in Phase 2 of the initiative. Therefore, episode initiators that changed models are only included in the sample for the first model they participated in. This table only includes information about episode initiators that submitted data. Episode initiators that did not submit complete data are excluded from the counts in the table. We also collected data from nine IRFs and one LTCH. However, due to limited sample sizes, we did not present care redesign and payment incentives for these facilities.

Source: Lewin analysis of Awardee-submitted data collected February 2015 through February 2016 for Model 2 episode initiators.

Exhibit E.9: Participation of Episode Initiators by Clinical Episode, Model 3

Clinical Episode	Episode Initiators by Participant Type (N=1,143)					
	SNF (N=873)	HHA (N=116)	IRF (N=9)	LTCH (N=1)	PGP (N=144)	% of EIs
Acute myocardial infarction	264	29	0	0	9	26
AICD generator or lead	135	3	0	0	14	13

Clinical Episode	Episode Initiators by Participant Type (N=1,143)					
	SNF (N=873)	HHA (N=116)	IRF (N=9)	LTCH (N=1)	PGP (N=144)	% of EIs
Amputation	147	3	0	0	2	13
Atherosclerosis	150	2	0	0	4	14
Back & neck except spinal fusion	150	8	1	0	0	14
Cardiac arrhythmia	240	23	0	0	11	24
Cardiac defibrillator	125	19	0	0	1	13
Cardiac valve	185	22	0	0	5	19
Cellulitis	243	9	0	0	8	23
Cervical spinal fusion	96	20	1	0	3	10
Chest pain	170	17	0	0	5	17
Chronic obstructive pulmonary disease, bronchitis, asthma	332	43	0	1	7	34
Combined anterior posterior spinal fusion	76	2	0	0	2	7
Complex non-cervical spinal fusion	122	16	0	0	0	12
Congestive heart failure	344	60	1	1	7	36
Coronary artery bypass graft	176	37	0	0	5	19
Diabetes	219	12	0	0	8	21
Double joint replacement of the lower extremity	133	16	3	0	11	14
Esophagitis, gastroenteritis and other digestive disorders	237	4	0	0	6	22
Fractures of the femur and hip or pelvis	259	12	1	0	2	24
Gastrointestinal hemorrhage	242	6	0	0	5	22
Gastrointestinal obstruction	221	3	0	0	7	20
Hip & femur procedures except major joint	296	16	1	1	10	28
Lower extremity and humerus procedure except hip, foot, femur	222	8	0	0	9	21
Major bowel procedure	246	8	0	0	4	23
Major cardiovascular procedure	145	19	0	0	2	15
Major joint replacement of the lower extremity	467	49	1	1	30	48
Major joint replacement of the upper extremity	194	9	1	0	3	18
Medical non-infectious orthopedic	272	8	0	0	5	25
Medical peripheral vascular disorders	206	20	0	0	3	20
Nutritional and metabolic disorders	240	11	0	0	9	23
Other knee procedures	185	3	0	0	1	17
Other respiratory	264	25	0	1	10	26
Other vascular surgery	197	23	0	0	8	20
Pacemaker	209	4	0	0	6	19
Pacemaker device replacement or revision	150	1	0	0	44	17
Percutaneous coronary intervention	177	23	0	0	5	18
Red blood cell disorders	184	6	0	0	8	17

Clinical Episode	Episode Initiators by Participant Type (N=1,143)					
	SNF (N=873)	HHA (N=116)	IRF (N=9)	LTCH (N=1)	PGP (N=144)	% of EIs
Removal of orthopedic devices	158	2	0	0	3	14
Renal failure	222	10	0	0	13	21
Revision of the hip or knee	215	18	1	0	2	21
Sepsis	306	11	1	1	6	28
Simple pneumonia and respiratory infections	399	47	1	1	13	40
Spinal fusion (non-cervical)	147	24	1	0	3	15
Stroke	286	24	3	0	9	28
Syncope & collapse	224	3	0	0	11	21
Transient ischemia	222	6	0	0	5	20
Urinary tract infection	300	32	0	0	11	30

Source: Lewin analysis of CMS' BPCI database, February, 2018. Please note that the sum of the total EIs participating in each of the clinical episodes exceeds the total number of EIs because EIs can participate in more than one clinical episode.

Exhibit E.10: 2011 Part A Standardized Payments for the 90 days following SNF admission, BPCI-participating SNF EIs and Non-participating SNFs, by Clinical Episode, Model 3

Clinical Episode	BPCI SNF EIs		Non-participating SNFs	
	Mean Discharges per SNF EI	Mean Payment Across SNFs	Mean Discharges per SNF	Mean Payment Across SNFs
Chronic obstructive pulmonary disease, bronchitis, asthma	10	\$26,014	9	\$24,642
Congestive heart failure	13	\$25,104	11	\$24,832
Hip & femur procedures except major joint	13	\$32,207	11	\$30,198
Major joint replacement of the lower extremity	25	\$20,147	21	\$19,284
Medical non-infectious orthopedic	13	\$28,743	11	\$26,995
Other respiratory	9	\$27,185	8	\$26,889
Renal failure	11	\$26,143	9	\$25,796
Sepsis	14	\$26,815	12	\$25,841
Simple pneumonia and respiratory infections	14	\$24,912	12	\$24,183
Stroke	9	\$30,574	9	\$28,603
Urinary tract infection	12	\$26,321	10	\$25,498

Note: The clinical episodes included in this table are those that had enough sample size to include in the risk-adjusted difference-in-differences analysis presented in the Results section, Model 3 Impact of BPCI.

Source: Lewin analysis of 2013 Provider of Service (POS) files and 2011 Medicare claims. Standardized payments are based on 2011 Part A claims. Non-participating SNFs are all other SNFs not participating in any BPCI initiative that reported values for all measures listed in Exhibits 54a & 54b. Both the participating and non-participating SNFs had at least 5 discharges in 2011 in the clinical episode of relevance. Please note that BPCI-participating SNFs that received Medicare certification after 2011 are not included in this table.

Exhibit E.11: 2011 Part A Standardized Payments for the 90 days from the start of receiving home health, BPCI-participating HHA EIs and Non-participating HHAs, by Clinical Episode, Model 3

Clinical Episode	BPCI HHA EIs		Non-participating HHAs	
	Mean Discharges per HHA EI	Mean Payment Across HHAs	Mean Discharges per HHA	Mean Payment Across HHAs
Congestive heart failure	56	\$11,407	21	\$11,578
Major joint replacement of the lower extremity	47	\$4,508	35	\$4,235
Simple pneumonia and respiratory infections	23	\$10,303	19	\$9,779

Note: The clinical episodes included in this table are those that had enough sample size to include in the risk-adjusted difference-in-differences analysis presented in the Results section, Model 3 Impact of BPCI.

Source: Lewin analysis of 2013 Provider of Service (POS) files and 2011 Medicare claims. Standardized payments are based on 2011 Part A claims. Non-participating HHAs are all other HHAs not participating in any BPCI initiative that reported values for all measures listed in Exhibits 55a & 55b. Both the participating and non-participating HHAs had at least 5 discharges in 2011 in the clinical episode of relevance. Please note that BPCI-participating HHAs that received Medicare certification after 2011 are not included in this table.

Appendix F: Groups of Model 2 Clinical Episodes Based on Shared Characteristics with Implications for Cost Saving Strategies

Exhibit F.1: Groups of Clinical Episodes Based on Shared Characteristics with Implications for Cost Saving Strategies, Model 2, Q4 2013 – Q3 2016

Group	Hospital Clinical Episodes	PGP Clinical Episodes	Hypothesis
High proportion of total baseline episode payments driven by PAC (top 10 episodes & >30%)	Fractures of the femur and hip or pelvis (61%) Hip and femur procedures except major joint (53%) Medical non-infectious orthopedic (50%) Stroke (49%) Lower extremity and humerus procedure except hip, foot, femur (47%) Urinary tract infection (39%) Major joint replacement of the lower extremity (34%) Nutritional and metabolic disorders (32%) Cellulitis (31%) Sepsis (31%)	Hip and femur procedures except major joint (53%) Stroke (49%) Medical non-infectious orthopedic (46%) Urinary tract infection (38%) Major joint replacement of the lower extremity (31%)	We might expect to see these clinical episodes exhibit the greatest reductions in PAC utilization and costs as PAC accounts for a larger proportion of costs compared to clinical episodes not within this grouping.
High proportion of total baseline episode payments driven by the anchor inpatient stay (>40%)	Cardiac valve (63%) Coronary artery bypass graft (60%) Spinal fusion (non-cervical) (58%) Percutaneous coronary intervention (53%) Major joint replacement of the upper extremity (52%) Cervical spinal fusion (50%) Revision of the hip or knee (49%) Major bowel procedure (48%) Major joint replacement of the lower extremity (44%)	Spinal fusion (non-cervical) (61%) Major joint replacement of the upper extremity (54%) Percutaneous coronary intervention (53%) Major joint replacement of the lower extremity (46%)	We might expect to see a reduction in the inpatient length of stay as a strategy to reduce costs as this accounts for a larger proportion of costs compared to clinical episodes not within this grouping.

Group	Hospital Clinical Episodes	PGP Clinical Episodes	Hypothesis
Chronic episodes	Cardiac arrhythmia Cardiac valve Congestive heart failure Chronic obstructive pulmonary disease Coronary artery bypass graft Medical non-infectious orthopedic Nutritional and metabolic disorders Other respiratory Renal failure Spinal fusion	Cardiac arrhythmia Cardiac valve Congestive heart failure Chronic obstructive pulmonary disease Coronary artery bypass graft Medical non-infectious orthopedic Nutritional and metabolic disorders Other respiratory Renal failure Spinal fusion	We might expect to see efforts to reduce readmissions and reduce duplicate tests and procedures as these are more often concerns in chronic conditions.
Planned episodes	Cardiac valve Coronary artery bypass graft (non-emergent) Hip and femur procedures except major joint Major bowel procedure Major joint replacement of the lower extremity (non-fracture) Medical non-infectious orthopedic Percutaneous coronary intervention Revision of the hip or knee Spinal fusion (non-cervical)	Cardiac valve Coronary artery bypass graft (non-emergent) Hip and femur procedures except major joint Major bowel procedure Major joint replacement of the lower extremity (non-fracture) Medical non-infectious orthopedic Percutaneous coronary intervention Revision of the hip or knee Spinal fusion (non-cervical)	We might expect to see an increase in costs during the pre-bundle period and selection of less resource intensive patients as participants have more opportunities to prepare and plan for episode of care.

Note: These groupings of clinical episodes are not mutually exclusive. Any given clinical episode may show up in any combination of groupings, and some clinical episodes are not included in any group (these include acute myocardial infarction; esophagitis, gastroenteritis, and other digestive disorders; and gastrointestinal hemorrhage). Clinical episodes are listed in decreasing order for groupings based on costs during the baseline period. For the high PAC costs in the baseline group, we arbitrarily selected 10 as the number of episodes and 30% as the proportion of costs due to PAC in the baseline to include in this group. Likewise, the cutoff of 40% for including episodes in the high proportion of costs occurring during the anchor inpatient stay grouping was arbitrary. PGP=physician group practice. PAC=post-acute care.

Appendix G: Impact of BPCI on Allowed Payment, Utilization, and Quality Measures, by Clinical Episode, Baseline to Intervention, Model 2 Hospitals

The following tables display risk-adjusted difference-in-differences results for all payment, utilization, and quality measures assessed in the Year 5 Annual Report. Results are presented by clinical episode. Please observe the following abbreviations, which are used throughout the appendix:

- DiD = difference-in-differences
- LCI = lower confidence interval at the 5% and 10% level
- UCI = upper confidence interval at the 5% and 10% level
- PDP = post-anchor hospitalization discharge period
- ADL = activities of daily living
- IP = inpatient hospitalizations
- PAC = post-acute care
- SNF = skilled nursing facility
- HHA = home health agency
- IRF = inpatient rehabilitation facility

Note that sample sizes reflect the number of episodes initiated during the intervention period that met inclusion criteria for the given outcome. Medicare payments are risk-adjusted and standardized to remove the effect of geographic differences in wages, extra amounts to account for teaching programs and other policy factors. Results reflect Lewin analysis of Medicare claims, assessment, and enrollment data for episodes that began Q4 2011 through Q3 2012 (baseline) and Q4 2013 through Q4 2016 (intervention period) for BPCI episode initiators and the matched comparison providers.

Exhibit G.1: Major Joint Replacement of the Upper Extremity Episodes, Model 2 Hospitals, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	1,527	1,524	\$23,205	\$24,623	\$24,412	\$25,223	\$607	-\$999	\$2,213	-\$741	\$1,955
Total allowed payment amount, IP through 120-day PDP	1,458	1,462	\$24,715	\$26,230	\$25,999	\$26,855	\$660	-\$1,228	\$2,547	-\$925	\$2,244
Total amount paid by Medicare, IP through 90-day PDP ¹	1,527	1,524	\$20,556	\$21,927	\$21,684	\$22,467	\$588	-\$826	\$2,002	-\$598	\$1,775
Total amount included in the bundle definition, 90-day episodes	1,485	1,482	\$22,979	\$23,991	\$23,838	\$24,870	-\$20	-\$1,521	\$1,481	-\$1,280	\$1,240
Total allowed payment amount, 30 days post-bundle	1,515	1,510	\$1,532	\$1,601	\$1,626	\$1,644	\$51	-\$463	\$564	-\$381	\$482
Readmissions standardized allowed amount, 90-day PDP	1,539	1,540	\$620	\$884	\$1,023	\$1,000	\$286	-\$178	\$750	-\$103	\$676
SNF standardized allowed amount, 90-day PDP	1,539	1,540	\$3,493	\$2,746	\$4,265	\$3,326	\$192	-\$900	\$1,285	-\$724	\$1,109
HHA standardized allowed amount, 90-day PDP	1,539	1,540	\$1,387	\$1,435	\$1,506	\$1,304	\$250	-\$74	\$574	-\$22	\$522
Part B standardized allowed amount, 90-day PDP	1,527	1,524	\$2,844	\$2,810	\$2,466	\$2,748	-\$315	-\$656	\$25	-\$602	-\$29
Anchor inpatient length of stay	1,540	1,540	3.3	2.8	3.4	2.9	0.0	-0.3	0.2	-0.2	0.2
Number of SNF days, 90-day PDP ²	308	305	29.8	25.7	31.3	29.1	-1.8	-7.4	3.8	-6.5	2.9
Number of HHA visits, 90-day PDP ²	686	541	14.1	12.9	15.3	14.2	-0.1	-2.7	2.5	-2.2	2.1
Patients discharged to PAC	1,540	1,540	49.2%	48.5%	48.8%	43.4%	4.8	-2.5	12.0	-1.3	10.8
Patients discharged to institutional PAC (of those who received PAC)	785	621	49.3%	42.7%	56.3%	48.6%	1.1	-9.8	11.9	-8.0	10.2
Emergency department use, 30-day PDP	1,540	1,538	7.7%	7.4%	6.8%	8.1%	-1.5	-4.5	1.5	-4.0	1.0
Emergency department use, 90-day PDP	1,539	1,538	14.6%	13.2%	12.6%	15.8%	-4.6	-8.4	-0.8	-7.8	-1.4

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Unplanned readmission rate, 30-day PDP	1,540	1,538	4.1%	3.3%	4.9%	3.4%	0.8	-1.6	3.3	-1.3	2.9
Unplanned readmission rate, 90-day PDP	1,539	1,538	6.8%	6.1%	8.1%	6.4%	1.0	-1.7	3.8	-1.3	3.4
All-cause mortality rate, 90-day PDP	1,539	1,536	0.6%	0.3%	1.3%	0.3%	0.6	-0.6	1.8	-0.4	1.6

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Exhibit G.2: Urinary Tract Infection Episodes, Model 2 Hospitals, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	9,009	8,998	\$22,165	\$21,913	\$22,310	\$22,994	-\$937*	-\$1,741	-\$132	-\$1,612	-\$262
Total allowed payment amount, IP through 120-day PDP	8,634	8,650	\$25,123	\$24,939	\$25,262	\$26,178	-\$1,101	-\$2,037	-\$165	-\$1,887	-\$315
Total amount paid by Medicare, IP through 90-day PDP ¹	9,001	8,995	\$19,070	\$18,865	\$19,212	\$19,729	-\$721*	-\$1,428	-\$14	-\$1,315	-\$128
Total amount included in the bundle definition, 90-day episodes	8,878	8,866	\$21,283	\$20,934	\$21,338	\$21,903	-\$913	-\$1,700	-\$126	-\$1,574	-\$252
Total allowed payment amount, 30 days post-bundle	7,920	7,987	\$3,441	\$3,430	\$3,394	\$3,628	-\$245	-\$548	\$58	-\$500	\$9
Readmissions standardized allowed amount, 90-day PDP	9,150	9,149	\$3,344	\$3,256	\$3,358	\$3,363	-\$93	-\$415	\$229	-\$363	\$177
SNF standardized allowed amount, 90-day PDP	9,150	9,149	\$6,585	\$6,258	\$6,452	\$6,998	-\$874	-\$1,436	-\$311	-\$1,346	-\$401
HHA standardized allowed amount, 90-day PDP	9,150	9,149	\$1,288	\$1,529	\$1,400	\$1,498	\$144	\$51	\$236	\$66	\$221
IRF standardized allowed amount, 90-day PDP	9,150	9,149	\$773	\$831	\$649	\$720	-\$13	-\$214	\$188	-\$182	\$156
Part B standardized allowed amount, 90-day PDP	9,009	8,998	\$3,168	\$3,277	\$3,227	\$3,438	-\$101	-\$258	\$55	-\$232	\$30
Anchor inpatient length of stay	9,192	9,192	4.7	4.5	4.6	4.4	0.0	-0.1	0.1	-0.1	0.1
Number of SNF days, 90-day PDP ²	3,499	3,305	37.4	32.4	37.4	35.1	-2.7	-4.6	-0.8	-4.3	-1.1
Number of HHA visits, 90-day PDP ²	4,164	3,941	16.6	16.8	16.9	16.5	0.6	-0.3	1.5	-0.2	1.4
Patients discharged to PAC	9,191	9,188	57.5%	58.6%	56.3%	57.0%	0.4	-1.9	2.6	-1.5	2.2
Patients discharged to institutional PAC (of those who received PAC)	5,509	5,203	60.4%	58.1%	57.2%	57.7%	-2.7	-5.7	0.2	-5.2	-0.3
Emergency department use, 30-day PDP	9,142	9,159	11.5%	12.3%	10.7%	12.2%	-0.7	-2.0	0.6	-1.8	0.4

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Emergency department use, 90-day PDP	9,100	9,116	22.4%	24.9%	23.1%	24.4%	1.2	-0.6	3.0	-0.4	2.7
Unplanned readmission rate, 30-day PDP	9,142	9,159	14.6%	12.7%	14.2%	12.7%	-0.5*	-2.0	1.0	-1.7	0.8
Unplanned readmission rate, 90-day PDP	9,100	9,116	26.7%	25.3%	27.2%	26.7%	-0.8*	-2.9	1.2	-2.6	0.9
All-cause mortality rate, 30-day PDP	9,022	9,038	5.9%	5.0%	5.3%	4.1%	0.2	-0.8	1.3	-0.6	1.1
All-cause mortality rate, 90-day PDP	8,980	8,995	12.4%	11.1%	11.1%	10.3%	-0.5	-1.9	0.9	-1.6	0.7

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Exhibit G.3: Stroke Episodes, Model 2 Hospitals, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	13,022	12,968	\$31,205	\$31,116	\$31,792	\$31,996	-\$294	-\$1,266	\$679	-\$1,110	\$523
Total allowed payment amount, IP through 120-day PDP	12,419	12,362	\$33,948	\$33,882	\$34,591	\$34,916	-\$391	-\$1,504	\$723	-\$1,325	\$544
Total amount paid by Medicare, IP through 90-day PDP ¹	13,022	12,963	\$27,782	\$27,554	\$28,360	\$28,373	-\$241	-\$1,116	\$635	-\$976	\$494
Total amount included in the bundle definition, 90-day episodes	12,524	12,465	\$30,258	\$30,050	\$31,083	\$31,123	-\$247	-\$1,205	\$711	-\$1,051	\$557
Total allowed payment amount, 30 days post-bundle	10,848	10,816	\$3,519	\$3,388	\$3,521	\$3,460	-\$70	-\$348	\$208	-\$303	\$163
Readmissions standardized allowed amount, 90-day PDP	13,109	13,125	\$2,924	\$2,682	\$2,824	\$2,736	-\$155	-\$420	\$111	-\$378	\$68
SNF standardized allowed amount, 90-day PDP	13,109	13,125	\$7,849	\$7,791	\$7,762	\$7,688	\$15	-\$565	\$595	-\$472	\$502
HHA standardized allowed amount, 90-day PDP	13,109	13,125	\$1,464	\$1,616	\$1,495	\$1,603	\$44	-\$53	\$142	-\$37	\$126
IRF standardized allowed amount, 90-day PDP	13,109	13,125	\$5,508	\$5,634	\$6,071	\$6,441	-\$244	-\$775	\$286	-\$689	\$200
LTCH standardized allowed amount, 90-day PDP	13,109	13,125	\$454	\$328	\$600	\$452	\$22	-\$197	\$241	-\$162	\$206
Part B standardized allowed amount, 90-day PDP	13,024	12,971	\$3,291	\$3,363	\$3,201	\$3,434	-\$160	-\$300	-\$20	-\$277	-\$43
Anchor inpatient length of stay	13,216	13,216	5.3	4.9	5.3	4.9	0.0	-0.2	0.2	-0.1	0.1
Number of SNF days, 90-day PDP ²	4,907	4,450	41.2	38.7	42.0	40.0	-0.5	-2.4	1.4	-2.1	1.1
Number of HHA visits, 90-day PDP ²	5,386	5,200	16.3	16.7	16.9	16.5	0.7	-0.1	1.5	0.1	1.4
Patients discharged to PAC	13,201	13,201	66.1%	64.2%	66.6%	64.7%	0.1	-2.1	2.2	-1.7	1.8
Patients discharged to institutional PAC (of those who received PAC)	8,661	8,454	77.9%	77.9%	78.4%	78.7%	-0.4	-2.4	1.7	-2.1	1.4

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Emergency department use, 30-day PDP	13,126	13,127	10.0%	10.9%	9.1%	10.3%	-0.4*	-1.7	0.9	-1.5	0.7
Emergency department use, 90-day PDP	13,022	13,041	20.6%	21.6%	18.8%	21.5%	-1.7	-3.4	0.0	-3.2	-0.3
Unplanned readmission rate, 30-day PDP	13,126	13,127	12.6%	10.7%	12.3%	10.5%	-0.2	-1.5	1.1	-1.3	0.9
Unplanned readmission rate, 90-day PDP	13,022	13,041	22.5%	19.3%	21.9%	18.9%	-0.2	-1.9	1.5	-1.6	1.2
All-cause mortality rate, 30-day PDP	13,067	13,067	11.8%	11.3%	11.5%	10.9%	0.1	-1.1	1.4	-0.9	1.2
All-cause mortality rate, 90-day PDP	12,964	12,982	17.0%	15.8%	16.6%	15.4%	-0.1	-1.5	1.4	-1.3	1.1

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Exhibit G.4: Chronic Obstructive Pulmonary Disease, Bronchitis, & Asthma Episodes, Model 2 Hospitals, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	20,857	20,916	\$18,640	\$18,670	\$18,430	\$18,798	-\$338	-\$869	\$193	-\$784	\$108
Total allowed payment amount, IP through 120-day PDP	19,785	19,868	\$21,541	\$21,691	\$21,490	\$21,864	-\$224	-\$859	\$412	-\$757	\$310
Total amount paid by Medicare, IP through 90-day PDP ¹	20,841	20,896	\$16,260	\$16,195	\$16,035	\$16,243	-\$274	-\$766	\$218	-\$687	\$139
Total amount included in the bundle definition, 30-day episodes	833	832	\$10,576	\$11,591	\$10,601	\$11,922	-\$306	-\$744	\$132	-\$673	\$61
Total amount included in the bundle definition, 90-day episodes	20,052	20,094	\$17,836	\$17,763	\$17,656	\$17,978	-\$395	-\$895	\$105	-\$814	\$25
Total allowed payment amount, 30 days post-bundle	19,127	19,366	\$3,249	\$3,277	\$3,352	\$3,319	\$60	-\$153	\$273	-\$119	\$238
Readmissions standardized allowed amount, 90-day PDP	21,228	21,271	\$4,061	\$4,179	\$4,013	\$4,100	\$31	-\$212	\$274	-\$173	\$235
SNF standardized allowed amount, 90-day PDP	21,228	21,271	\$2,608	\$2,499	\$2,602	\$2,670	-\$177	-\$391	\$37	-\$357	\$3
HHA standardized allowed amount, 90-day PDP	21,228	21,271	\$1,107	\$1,204	\$1,096	\$1,100	\$93	\$31	\$155	\$41	\$145
IRF standardized allowed amount, 90-day PDP	21,228	21,271	\$442	\$430	\$408	\$438	-\$43	-\$143	\$57	-\$127	\$41
LTCH standardized allowed amount, 90-day PDP	21,228	21,271	\$673	\$330	\$497	\$358	-\$203	-\$383	-\$24	-\$354	-\$53
Part B standardized allowed amount, 90-day PDP	20,859	20,917	\$3,184	\$3,396	\$3,194	\$3,441	-\$36	-\$153	\$81	-\$134	\$62
Anchor inpatient length of stay	21,438	21,438	4.6	4.4	4.7	4.5	0.0	-0.1	0.1	-0.1	0.1
Number of SNF days, 90-day PDP ²	4,237	3,599	30.4	26.4	30.8	28.7	-1.9	-3.5	-0.3	-3.2	-0.6
Number of HHA visits, 90-day PDP ²	8,710	7,778	15.2	15.1	15.2	14.5	0.7	0.0	1.3	0.1	1.2
Patients discharged to PAC	21,434	21,436	39.2%	40.1%	39.0%	38.5%	1.5	-0.1	3.0	0.2	2.8

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Patients discharged to institutional PAC (of those who received PAC)	9,045	7,914	36.8%	34.7%	37.4%	36.5%	-1.2	-3.8	1.4	-3.4	1.0
Emergency department use, 30-day PDP	21,156	21,183	11.5%	12.6%	11.1%	12.7%	-0.5	-1.5	0.4	-1.3	0.3
Emergency department use, 90-day PDP	20,948	21,018	24.0%	26.0%	23.9%	26.3%	-0.4	-1.7	0.8	-1.5	0.6
Unplanned readmission rate, 30-day PDP	21,156	21,183	16.9%	15.8%	16.7%	15.5%	0.1	-1.1	1.2	-0.9	1.0
Unplanned readmission rate, 90-day PDP	20,948	21,018	32.1%	31.0%	32.1%	31.2%	-0.2	-1.5	1.2	-1.3	1.0
All-cause mortality rate, 30-day PDP	21,012	21,057	3.5%	3.0%	3.3%	2.9%	-0.1	-0.6	0.4	-0.5	0.3
All-cause mortality rate, 90-day PDP	20,806	20,892	8.1%	6.9%	8.0%	6.8%	0.0	-0.8	0.8	-0.7	0.7

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Exhibit G.5: Coronary Artery Bypass Graft Episodes, Model 2 Hospitals, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	3,560	3,567	\$47,175	\$48,547	\$47,426	\$49,704	-\$907	-\$2,937	\$1,123	-\$2,611	\$797
Total allowed payment amount, IP through 120-day PDP	3,437	3,444	\$49,023	\$50,536	\$49,249	\$51,820	-\$1,058	-\$3,224	\$1,109	-\$2,876	\$761
Total amount paid by Medicare, IP through 90-day PDP ¹	3,560	3,567	\$44,032	\$45,234	\$44,257	\$46,294	-\$835	-\$2,759	\$1,088	-\$2,450	\$779
Total amount included in the bundle definition, 30-day episodes	639	639	\$40,453	\$43,340	\$40,654	\$42,493	\$1,048	-\$3,690	\$5,786	-\$2,929	\$5,024
Total amount included in the bundle definition, 90-day episodes	2,926	2,929	\$45,569	\$46,526	\$46,147	\$48,446	-\$1,342	-\$2,720	\$35	-\$2,498	-\$186
Total allowed payment amount, 30 days post-bundle	3,471	3,500	\$2,073	\$2,231	\$2,082	\$2,236	\$4	-\$434	\$442	-\$364	\$372
Readmissions standardized allowed amount, 90-day PDP	3,586	3,589	\$2,734	\$2,834	\$2,644	\$2,691	\$53	-\$560	\$666	-\$462	\$568
SNF standardized allowed amount, 90-day PDP	3,586	3,589	\$3,030	\$2,880	\$2,633	\$3,255	-\$772	-\$1,385	-\$160	-\$1,287	-\$258
HHA standardized allowed amount, 90-day PDP	3,586	3,589	\$1,754	\$1,859	\$1,824	\$1,968	-\$39	-\$210	\$131	-\$182	\$104
IRF standardized allowed amount, 90-day PDP	3,586	3,589	\$1,434	\$1,284	\$1,643	\$2,046	-\$553	-\$1,119	\$13	-\$1,028	-\$78
Part B standardized allowed amount, 90-day PDP	3,560	3,568	\$3,159	\$3,670	\$3,209	\$3,675	\$45	-\$242	\$333	-\$196	\$287
Anchor inpatient length of stay	3,622	3,622	9.5	9.2	9.3	9.2	-0.1	-0.5	0.3	-0.4	0.3
Number of SNF days, 90-day PDP ²	962	912	23.8	21.5	21.6	21.7	-2.4	-5.3	0.4	-4.8	0.0
Number of HHA visits, 90-day PDP ²	2,560	2,504	10.9	11.2	11.5	11.3	0.6	-0.2	1.4	-0.1	1.3
Patients discharged to PAC	3,622	3,619	78.9%	77.3%	78.1%	80.8%	-4.4	-9.6	0.8	-8.7	0.0
Patients discharged to institutional PAC (of those who received PAC)	2,885	2,849	40.0%	37.0%	42.9%	46.1%	-6.2	-11.6	-0.8	-10.7	-1.7

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Emergency department use, 30-day PDP	3,621	3,614	10.3%	12.6%	12.3%	14.1%	0.5	-2.1	3.2	-1.7	2.8
Emergency department use, 90-day PDP	3,585	3,582	19.3%	22.3%	21.9%	24.6%	0.3	-3.3	3.8	-2.7	3.3
Unplanned readmission rate, 30-day PDP	3,621	3,614	13.8%	11.5%	14.2%	11.2%	0.7	-2.3	3.7	-1.8	3.2
Unplanned readmission rate, 90-day PDP	3,585	3,582	20.2%	16.8%	20.8%	16.7%	0.7	-2.6	3.9	-2.0	3.4
All-cause mortality rate, 30-day PDP	3,618	3,614	0.8%	1.3%	0.8%	0.7%	0.6	0.0	1.3	0.1	1.2
All-cause mortality rate, 90-day PDP	3,582	3,582	1.8%	2.2%	2.0%	1.5%	0.9*	-0.1	1.9	0.0	1.7

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Exhibit G.6: Coronary Artery Bypass Graft Emergent Episodes, Model 2 Hospitals, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	1,889	1,894	\$51,797	\$54,840	\$52,780	\$55,081	\$742	-\$1,816	\$3,301	-\$1,405	\$2,890
Total allowed payment amount, IP through 120-day PDP	1,827	1,828	\$53,440	\$56,915	\$54,510	\$57,108	\$876	-\$1,832	\$3,583	-\$1,396	\$3,148
Total amount paid by Medicare, IP through 90-day PDP ¹	1,889	1,894	\$48,429	\$51,231	\$49,374	\$51,416	\$760	-\$1,645	\$3,166	-\$1,258	\$2,779
Total amount included in the bundle definition, 30-day episodes	403	404	\$43,692	\$47,871	\$44,490	\$46,163	\$2,506	-\$2,703	\$7,715	-\$1,866	\$6,878
Total amount included in the bundle definition, 90-day episodes	1,490	1,490	\$50,808	\$52,618	\$51,220	\$53,819	-\$789	-\$2,655	\$1,077	-\$2,355	\$778
Total allowed payment amount, 30 days post-bundle	1,835	1,858	\$1,851	\$2,395	\$1,970	\$2,264	\$250	-\$238	\$737	-\$159	\$659
Readmissions standardized allowed amount, 90-day PDP	1,899	1,905	\$2,735	\$3,054	\$2,994	\$2,897	\$416	-\$460	\$1,293	-\$319	\$1,152
SNF standardized allowed amount, 90-day PDP	1,899	1,905	\$3,598	\$3,391	\$2,919	\$3,708	-\$996	-\$1,831	-\$161	-\$1,696	-\$295
HHA standardized allowed amount, 90-day PDP	1,899	1,905	\$1,847	\$1,890	\$1,904	\$2,050	-\$102	-\$290	\$85	-\$260	\$55
IRF standardized allowed amount, 90-day PDP	1,899	1,905	\$1,606	\$1,334	\$1,967	\$2,260	-\$565	-\$1,247	\$116	-\$1,137	\$7
Part B standardized allowed amount, 90-day PDP	1,889	1,894	\$3,104	\$3,772	\$3,347	\$3,729	\$285	-\$94	\$664	-\$33	\$603
Anchor inpatient length of stay	1,925	1,925	10.8	10.7	10.6	10.3	0.3	-0.2	0.7	-0.2	0.7
Number of SNF days, 90-day PDP ²	568	533	25.3	22.3	21.0	22.5	-4.4	-8.4	-0.5	-7.8	-1.1
Number of HHA visits, 90-day PDP ²	1,373	1,361	11.2	11.3	11.8	11.4	0.5	-0.5	1.5	-0.3	1.3
Patients discharged to PAC	1,925	1,923	80.8%	78.9%	80.7%	83.2%	-4.5	-9.5	0.5	-8.7	-0.3
Patients discharged to institutional PAC (of those who received PAC)	1,571	1,557	43.1%	40.1%	47.1%	49.0%	-4.9	-10.4	0.5	-9.5	-0.4

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Emergency department use, 30-day PDP	1,924	1,920	9.9%	13.1%	12.4%	14.7%	0.8	-2.4	4.1	-1.9	3.6
Emergency department use, 90-day PDP	1,898	1,900	19.8%	23.2%	23.1%	25.4%	1.1	-3.3	5.6	-2.6	4.9
Unplanned readmission rate, 30-day PDP	1,924	1,920	15.4%	12.4%	15.2%	11.2%	1.0	-2.8	4.8	-2.2	4.2
Unplanned readmission rate, 90-day PDP	1,898	1,900	22.9%	18.3%	21.7%	16.8%	0.4	-4.2	5.0	-3.5	4.2
All-cause mortality rate, 30-day PDP	1,921	1,920	0.8%	1.6%	1.0%	0.7%	1.2	0.3	2.1	0.4	1.9
All-cause mortality rate, 90-day PDP	1,895	1,900	1.8%	2.7%	2.5%	1.6%	1.7	0.5	3.0	0.7	2.8

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Exhibit G.7: Coronary Artery Bypass Graft Non-Emergent Episodes, Model 2 Hospitals, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	1,671	1,673	\$42,155	\$41,295	\$41,524	\$43,539	-\$2,876*	-\$5,017	-\$735	-\$4,673	-\$1,079
Total allowed payment amount, IP through 120-day PDP	1,610	1,616	\$44,236	\$43,146	\$43,482	\$45,751	-\$3,360	-\$5,736	-\$984	-\$5,354	-\$1,366
Total amount paid by Medicare, IP through 90-day PDP ¹	1,671	1,673	\$39,249	\$38,314	\$38,635	\$40,423	-\$2,723*	-\$4,737	-\$710	-\$4,413	-\$1,033
Total amount included in the bundle definition, 30-day episodes	236	235	\$36,041	\$35,959	\$34,101	\$35,659	-\$1,641	-\$5,663	\$2,381	-\$5,017	\$1,734
Total amount included in the bundle definition, 90-day episodes	1,436	1,439	\$40,247	\$40,160	\$40,833	\$42,782	-\$2,036	-\$3,685	-\$387	-\$3,420	-\$652
Total allowed payment amount, 30 days post-bundle	1,636	1,642	\$2,311	\$2,037	\$2,225	\$2,210	-\$259	-\$959	\$441	-\$846	\$328
Readmissions standardized allowed amount, 90-day PDP	1,687	1,684	\$2,741	\$2,546	\$2,287	\$2,485	-\$393	-\$1,186	\$399	-\$1,058	\$272
SNF standardized allowed amount, 90-day PDP	1,687	1,684	\$2,407	\$2,323	\$2,347	\$2,663	-\$400	-\$1,054	\$255	-\$949	\$150
HHA standardized allowed amount, 90-day PDP	1,687	1,684	\$1,645	\$1,810	\$1,735	\$1,889	\$12	-\$201	\$224	-\$167	\$190
IRF standardized allowed amount, 90-day PDP	1,687	1,684	\$1,250	\$1,188	\$1,325	\$1,842	-\$580	-\$1,206	\$47	-\$1,106	-\$54
Part B standardized allowed amount, 90-day PDP	1,671	1,674	\$3,233	\$3,545	\$3,066	\$3,612	-\$234	-\$619	\$150	-\$557	\$89
Anchor inpatient length of stay	1,697	1,697	8.0	7.7	7.9	7.8	-0.3	-0.8	0.1	-0.7	0.1
Number of SNF days, 90-day PDP ²	394	379	21.7	20.6	22.4	20.5	0.8	-2.6	4.2	-2.0	3.6
Number of HHA visits, 90-day PDP ²	1,187	1,143	10.5	11.0	11.2	11.1	0.6	-0.5	1.6	-0.3	1.5
Patients discharged to PAC	1,697	1,696	76.7%	75.2%	75.5%	78.1%	-4.1	-10.9	2.7	-9.8	1.6
Patients discharged to institutional PAC (of those who received PAC)	1,314	1,292	36.7%	33.5%	37.5%	42.3%	-8.1	-15.3	-0.8	-14.1	-2.0

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Emergency department use, 30-day PDP	1,697	1,694	10.6%	12.0%	12.4%	13.5%	0.4	-3.4	4.2	-2.8	3.6
Emergency department use, 90-day PDP	1,687	1,682	18.6%	21.1%	20.7%	23.9%	-0.7	-5.4	4.1	-4.7	3.3
Unplanned readmission rate, 30-day PDP	1,697	1,694	12.1%	10.4%	13.3%	11.0%	0.5	-3.2	4.2	-2.6	3.6
Unplanned readmission rate, 90-day PDP	1,687	1,682	17.6%	15.1%	19.9%	16.5%	0.9	-3.2	5.0	-2.5	4.4
All-cause mortality rate, 30-day PDP	1,697	1,694	0.6%	1.0%	0.5%	0.8%	0.1	-0.8	1.0	-0.7	0.9
All-cause mortality rate, 90-day PDP	1,687	1,682	1.7%	1.6%	1.3%	1.4%	-0.2	-1.6	1.2	-1.4	1.0

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Exhibit G.8: Major Joint Replacement of the Lower Extremity Episodes, Model 2 Hospitals, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	108,935	108,925	\$27,536	\$26,054	\$27,089	\$26,838	-\$1,230	-\$1,557	-\$903	-\$1,505	-\$956
Total allowed payment amount, IP through 120-day PDP	105,011	104,967	\$28,842	\$27,451	\$28,389	\$28,241	-\$1,244	-\$1,588	-\$901	-\$1,532	-\$956
Total amount paid by Medicare, IP through 90-day PDP ¹	108,931	108,923	\$24,851	\$23,348	\$24,430	\$24,066	-\$1,139	-\$1,448	-\$831	-\$1,398	-\$880
Total amount included in the bundle definition, 30-day episodes	15,153	15,081	\$23,060	\$21,264	\$22,676	\$22,329	-\$1,449	-\$2,155	-\$743	-\$2,041	-\$857
Total amount included in the bundle definition, 60-day episodes	1,333	1,330	\$24,591	\$22,065	\$25,178	\$24,550	-\$1,899	-\$3,827	\$29	-\$3,517	-\$281
Total amount included in the bundle definition, 90-day episodes	92,605	92,556	\$27,251	\$25,903	\$26,838	\$26,584	-\$1,094	-\$1,428	-\$760	-\$1,374	-\$813
Total allowed payment amount, 30 days post-bundle	106,584	106,557	\$1,517	\$1,543	\$1,484	\$1,576	-\$66	-\$134	\$2	-\$123	-\$9
Readmissions standardized allowed amount, 90-day PDP	109,482	109,605	\$1,226	\$1,241	\$1,134	\$1,185	-\$36	-\$107	\$35	-\$96	\$24
SNF standardized allowed amount, 90-day PDP	109,482	109,605	\$5,433	\$4,325	\$5,334	\$4,938	-\$713	-\$979	-\$446	-\$936	-\$489
HHA standardized allowed amount, 90-day PDP	109,482	109,605	\$2,177	\$2,218	\$2,278	\$2,272	\$47	-\$55	\$150	-\$39	\$133
IRF standardized allowed amount, 90-day PDP	109,482	109,605	\$1,614	\$1,016	\$1,422	\$1,235	-\$411	-\$600	-\$222	-\$569	-\$252
LTCH standardized allowed amount, 90-day PDP	109,482	109,605	\$112	\$73	\$102	\$83	-\$20	-\$52	\$13	-\$47	\$8
Part B standardized allowed amount, 90-day PDP	108,938	108,929	\$2,557	\$2,552	\$2,479	\$2,530	-\$56	-\$109	-\$3	-\$100	-\$12
Anchor inpatient length of stay	109,786	109,786	4.4	3.7	4.4	3.9	-0.1	-0.2	0.0	-0.2	0.0
Number of SNF days, 90-day PDP ²	38,413	41,729	24.2	21.6	23.7	23.3	-2.2	-2.8	-1.6	-2.7	-1.7
Number of HHA visits, 90-day PDP ²	73,978	74,359	12.3	12.0	12.2	11.8	0.1	-0.3	0.4	-0.2	0.4

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Patients discharged to PAC	109,777	109,783	86.5%	79.5%	89.4%	85.5%	-3.1	-5.8	-0.5	-5.3	-1.0
Patients discharged to institutional PAC (of those who received PAC)	88,950	92,185	61.7%	48.4%	59.6%	51.9%	-5.5	-7.9	-3.1	-7.5	-3.5
Emergency department use, 30-day PDP	109,752	109,756	7.5%	8.2%	7.5%	8.3%	0.0	-0.4	0.5	-0.4	0.4
Emergency department use, 90-day PDP	109,451	109,579	13.6%	14.5%	13.6%	14.6%	-0.1	-0.6	0.5	-0.5	0.4
Unplanned readmission rate, 30-day PDP	109,752	109,756	6.2%	5.2%	5.9%	5.0%	-0.2	-0.5	0.2	-0.5	0.1
Unplanned readmission rate, 90-day PDP	109,451	109,579	9.9%	8.6%	9.4%	8.4%	-0.4	-0.8	0.1	-0.8	0.0
All-cause mortality rate, 30-day PDP	109,438	109,479	0.9%	0.8%	0.8%	0.8%	0.0	-0.1	0.1	-0.1	0.1
All-cause mortality rate, 90-day PDP	109,141	109,304	1.9%	1.8%	1.8%	1.8%	-0.1	-0.2	0.1	-0.2	0.1

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Exhibit G.9: Major Joint Replacement of the Lower Extremity Fracture Episodes, Model 2 Hospitals, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	14,446	14,459	\$44,715	\$43,894	\$43,567	\$44,995	-\$2,249	-\$3,040	-\$1,457	-\$2,913	-\$1,584
Total allowed payment amount, IP through 120-day PDP	13,842	13,808	\$47,457	\$46,480	\$46,105	\$47,698	-\$2,571	-\$3,485	-\$1,656	-\$3,338	-\$1,803
Total amount paid by Medicare, IP through 90-day PDP ¹	14,444	14,459	\$39,947	\$39,274	\$38,851	\$40,054	-\$1,876	-\$2,574	-\$1,178	-\$2,462	-\$1,291
Total amount included in the bundle definition, 30-day episodes	1,843	1,840	\$32,181	\$32,144	\$32,048	\$33,769	-\$1,758	-\$2,820	-\$697	-\$2,649	-\$867
Total amount included in the bundle definition, 60-day episodes	186	185	\$38,704	\$35,882	\$39,567	\$40,438	-\$3,692	-\$8,515	\$1,131	-\$7,740	\$356
Total amount included in the bundle definition, 90-day episodes	12,453	12,452	\$43,925	\$43,428	\$43,069	\$44,485	-\$1,913	-\$2,707	-\$1,118	-\$2,579	-\$1,246
Total allowed payment amount, 30 days post-bundle	12,937	12,972	\$3,730	\$3,456	\$3,455	\$3,617	-\$436	-\$704	-\$169	-\$661	-\$212
Readmissions standardized allowed amount, 90-day PDP	14,486	14,513	\$3,173	\$3,028	\$2,959	\$2,998	-\$185	-\$465	\$95	-\$420	\$50
SNF standardized allowed amount, 90-day PDP	14,486	14,513	\$15,200	\$14,600	\$14,942	\$15,667	-\$1,324	-\$1,976	-\$673	-\$1,871	-\$777
HHA standardized allowed amount, 90-day PDP	14,486	14,513	\$2,123	\$2,288	\$2,070	\$2,132	\$104	\$9	\$198	\$24	\$183
IRF standardized allowed amount, 90-day PDP	14,486	14,513	\$4,165	\$3,775	\$3,724	\$3,901	-\$567	-\$1,041	-\$92	-\$965	-\$168
LTCH standardized allowed amount, 90-day PDP	14,486	14,513	\$448	\$253	\$440	\$310	-\$64	-\$233	\$104	-\$206	\$77
Part B standardized allowed amount, 90-day PDP	14,446	14,459	\$3,340	\$3,360	\$3,151	\$3,333	-\$161	-\$288	-\$35	-\$267	-\$55
Anchor inpatient length of stay	14,600	14,600	6.1	5.8	6.3	5.9	0.0	-0.1	0.1	-0.1	0.1
Number of SNF days, 90-day PDP ²	10,923	10,765	39.9	35.0	39.6	38.0	-3.2	-4.4	-2.1	-4.2	-2.3
Number of HHA visits, 90-day PDP ²	8,812	8,462	15.6	15.7	15.5	15.4	0.1	-0.4	0.6	-0.3	0.6

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Patients discharged to PAC	14,598	14,599	94.8%	95.0%	94.5%	94.9%	-0.1	-1.1	0.8	-0.9	0.7
Patients discharged to institutional PAC (of those who received PAC)	13,896	13,831	94.0%	92.4%	93.6%	93.5%	-1.5	-2.6	-0.4	-2.5	-0.6
Emergency department use, 30-day PDP	14,593	14,596	8.5%	9.8%	8.9%	9.5%	0.7	-0.4	1.8	-0.2	1.7
Emergency department use, 90-day PDP	14,479	14,509	18.3%	20.1%	18.8%	20.0%	0.5	-1.0	2.1	-0.8	1.8
Unplanned readmission rate, 30-day PDP	14,593	14,596	13.9%	11.6%	13.1%	11.7%	-0.9	-2.1	0.4	-1.9	0.2
Unplanned readmission rate, 90-day PDP	14,479	14,509	23.6%	20.2%	21.8%	20.3%	-1.9	-3.5	-0.3	-3.2	-0.5
All-cause mortality rate, 30-day PDP	14,342	14,336	5.0%	5.1%	5.0%	4.8%	0.3*	-0.5	1.1	-0.4	1.0
All-cause mortality rate, 90-day PDP	14,232	14,251	10.9%	10.8%	10.9%	10.7%	0.1	-1.1	1.3	-0.9	1.1

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Exhibit G.10: Major Joint Replacement of the Lower Extremity Planned Episodes, Model 2 Hospitals, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	94,489	94,466	\$24,807	\$23,182	\$24,443	\$23,854	-\$1,036	-\$1,363	-\$710	-\$1,311	-\$762
Total allowed payment amount, IP through 120-day PDP	91,169	91,159	\$25,893	\$24,399	\$25,551	\$25,058	-\$1,001	-\$1,339	-\$663	-\$1,285	-\$717
Total amount paid by Medicare, IP through 90-day PDP ¹	94,487	94,464	\$22,457	\$20,790	\$22,112	\$21,436	-\$991	-\$1,301	-\$681	-\$1,251	-\$731
Total amount included in the bundle definition, 30-day episodes	13,310	13,241	\$21,736	\$19,708	\$21,288	\$20,611	-\$1,350	-\$2,062	-\$638	-\$1,948	-\$753
Total amount included in the bundle definition, 60-day episodes	1,147	1,145	\$22,126	\$19,606	\$22,689	\$21,871	-\$1,703	-\$3,577	\$172	-\$3,276	-\$129
Total amount included in the bundle definition, 90-day episodes	80,152	80,104	\$24,556	\$23,016	\$24,218	\$23,625	-\$947	-\$1,281	-\$614	-\$1,227	-\$667
Total allowed payment amount, 30 days post-bundle	93,647	93,585	\$1,198	\$1,264	\$1,196	\$1,270	-\$8	-\$72	\$57	-\$62	\$46
Readmissions standardized allowed amount, 90-day PDP	94,996	95,092	\$916	\$954	\$838	\$889	-\$13	-\$81	\$55	-\$71	\$44
SNF standardized allowed amount, 90-day PDP	94,996	95,092	\$3,852	\$2,783	\$3,783	\$3,270	-\$556	-\$806	-\$306	-\$766	-\$347
HHA standardized allowed amount, 90-day PDP	94,996	95,092	\$2,189	\$2,212	\$2,304	\$2,290	\$37	-\$75	\$149	-\$57	\$131
IRF standardized allowed amount, 90-day PDP	94,996	95,092	\$1,199	\$613	\$1,024	\$802	-\$363	-\$535	-\$191	-\$507	-\$219
LTCH standardized allowed amount, 90-day PDP	94,996	95,092	\$59	\$43	\$48	\$48	-\$16	-\$40	\$9	-\$36	\$5
Part B standardized allowed amount, 90-day PDP	94,492	94,470	\$2,433	\$2,424	\$2,370	\$2,396	-\$34	-\$89	\$21	-\$81	\$12
Anchor inpatient length of stay	95,186	95,186	4.1	3.4	4.1	3.6	-0.1	-0.2	0.0	-0.2	-0.1
Number of SNF days, 90-day PDP ²	27,490	30,964	18.8	16.9	18.2	18.0	-1.7	-2.3	-1.1	-2.2	-1.2
Number of HHA visits, 90-day PDP ²	65,166	65,897	11.8	11.5	11.7	11.3	0.1	-0.3	0.5	-0.2	0.4

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Patients discharged to PAC	95,179	95,184	85.2%	77.0%	88.6%	84.0%	-3.6	-6.6	-0.7	-6.1	-1.1
Patients discharged to institutional PAC (of those who received PAC)	75,054	78,354	55.8%	40.2%	53.4%	44.0%	-6.3	-9.1	-3.5	-8.7	-4.0
Emergency department use, 30-day PDP	95,159	95,160	7.3%	7.9%	7.3%	8.0%	-0.1	-0.6	0.4	-0.5	0.3
Emergency department use, 90-day PDP	94,972	95,070	12.8%	13.6%	12.8%	13.7%	-0.1	-0.7	0.5	-0.6	0.4
Unplanned readmission rate, 30-day PDP	95,159	95,160	4.9%	4.1%	4.7%	3.9%	0.0	-0.4	0.3	-0.3	0.3
Unplanned readmission rate, 90-day PDP	94,972	95,070	7.7%	6.7%	7.4%	6.5%	-0.1	-0.5	0.4	-0.5	0.3
All-cause mortality rate, 30-day PDP	95,096	95,143	0.2%	0.2%	0.1%	0.2%	-0.1	-0.1	0.0	-0.1	0.0
All-cause mortality rate, 90-day PDP	94,909	95,053	0.4%	0.4%	0.4%	0.4%	-0.1	-0.2	0.0	-0.2	0.0

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Exhibit G.11: Percutaneous Coronary Intervention Episodes, Model 2 Hospitals, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	5,492	5,513	\$23,993	\$26,963	\$24,383	\$26,642	\$710*	-\$204	\$1,624	-\$57	\$1,477
Total allowed payment amount, IP through 120-day PDP	5,206	5,224	\$26,192	\$29,635	\$26,514	\$28,943	\$1,013	-\$53	\$2,080	\$118	\$1,908
Total amount paid by Medicare, IP through 90-day PDP ¹	5,491	5,511	\$21,651	\$24,305	\$22,032	\$24,000	\$687*	-\$159	\$1,532	-\$23	\$1,396
Total amount included in the bundle definition, 90-day episodes	5,492	5,513	\$23,503	\$25,961	\$23,771	\$25,876	\$352	-\$509	\$1,214	-\$371	\$1,075
Total allowed payment amount, 30 days post-bundle	5,214	5,275	\$2,244	\$2,665	\$2,134	\$2,364	\$191	-\$120	\$502	-\$70	\$452
Readmissions standardized allowed amount, 90-day PDP	5,610	5,617	\$3,062	\$3,695	\$3,592	\$3,358	\$867	\$365	\$1,369	\$446	\$1,288
SNF standardized allowed amount, 90-day PDP	5,610	5,617	\$1,232	\$1,492	\$1,091	\$1,360	-\$9	-\$294	\$276	-\$248	\$230
HHA standardized allowed amount, 90-day PDP	5,610	5,617	\$633	\$696	\$592	\$600	\$56	-\$36	\$147	-\$21	\$132
IRF standardized allowed amount, 90-day PDP	5,610	5,617	\$417	\$343	\$450	\$381	-\$5	-\$172	\$162	-\$145	\$135
Part B standardized allowed amount, 90-day PDP	5,492	5,513	\$3,414	\$3,958	\$3,360	\$3,981	-\$76	-\$307	\$155	-\$269	\$118
Anchor inpatient length of stay	5,639	5,639	4.0	4.0	4.0	4.1	0.0	-0.3	0.2	-0.2	0.2
Number of SNF days, 90-day PDP ²	578	503	29.6	28.0	29.4	28.3	-0.5	-4.6	3.6	-3.9	3.0
Number of HHA visits, 90-day PDP ²	1,293	1,143	14.6	14.6	14.6	14.0	0.6	-0.5	1.8	-0.3	1.6
Patients discharged to PAC	5,637	5,639	21.6%	22.5%	18.6%	20.1%	-0.6	-3.1	2.0	-2.7	1.6
Patients discharged to institutional PAC (of those who received PAC)	1,298	1,153	38.7%	38.7%	34.9%	37.1%	-2.2	-9.4	5.1	-8.3	3.9
Emergency department use, 30-day PDP	5,610	5,622	10.6%	13.5%	11.0%	14.1%	-0.1	-2.0	1.7	-1.7	1.4

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Emergency department use, 90-day PDP	5,582	5,600	20.0%	23.5%	21.4%	25.9%	-1.0	-3.5	1.5	-3.1	1.1
Unplanned readmission rate, 30-day PDP	5,610	5,622	11.1%	11.0%	11.8%	9.6%	2.1*	0.6	3.7	0.8	3.4
Unplanned readmission rate, 90-day PDP	5,582	5,600	18.9%	18.7%	20.4%	16.8%	3.4*	1.4	5.4	1.7	5.0
All-cause mortality rate, 30-day PDP	5,597	5,618	1.8%	1.8%	1.7%	1.4%	0.3	-0.5	1.1	-0.4	1.0
All-cause mortality rate, 90-day PDP	5,569	5,596	3.2%	3.8%	3.2%	3.5%	0.2	-0.9	1.4	-0.8	1.2

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Exhibit G.12: Congestive Heart Failure Episodes, Model 2 Hospitals, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	36,793	36,783	\$24,175	\$24,488	\$23,688	\$24,231	-\$231	-\$711	\$248	-\$634	\$171
Total allowed payment amount, IP through 120-day PDP	35,021	35,008	\$27,569	\$28,015	\$27,064	\$27,823	-\$312	-\$886	\$261	-\$793	\$169
Total amount paid by Medicare, IP through 90-day PDP ¹	36,777	36,771	\$21,465	\$21,659	\$20,971	\$21,342	-\$178	-\$611	\$255	-\$542	\$185
Total amount included in the bundle definition, 30-day episodes	3,785	3,771	\$15,385	\$14,927	\$15,372	\$15,181	-\$267	-\$1,052	\$517	-\$926	\$391
Total amount included in the bundle definition, 90-day episodes	32,876	32,856	\$23,541	\$23,696	\$23,211	\$23,623	-\$258	-\$739	\$223	-\$661	\$146
Total allowed payment amount, 30 days post-bundle	30,351	30,728	\$4,361	\$4,408	\$4,238	\$4,327	-\$43	-\$254	\$169	-\$220	\$135
Readmissions standardized allowed amount, 90-day PDP	37,036	37,079	\$5,516	\$5,563	\$5,315	\$5,498	-\$136	-\$378	\$106	-\$340	\$67
SNF standardized allowed amount, 90-day PDP	37,036	37,079	\$4,121	\$4,020	\$3,844	\$4,004	-\$260	-\$499	-\$21	-\$461	-\$59
HHA standardized allowed amount, 90-day PDP	37,036	37,079	\$1,427	\$1,535	\$1,417	\$1,444	\$81	\$14	\$148	\$24	\$137
IRF standardized allowed amount, 90-day PDP	37,036	37,079	\$502	\$523	\$485	\$567	-\$62	-\$151	\$28	-\$137	\$14
LTCH standardized allowed amount, 90-day PDP	37,036	37,079	\$463	\$383	\$448	\$321	\$47	-\$64	\$157	-\$46	\$140
Part B standardized allowed amount, 90-day PDP	36,794	36,783	\$3,638	\$3,963	\$3,654	\$3,973	\$6	-\$99	\$111	-\$82	\$94
Anchor inpatient length of stay	37,330	37,330	5.2	5.0	5.3	5.0	0.0	-0.1	0.1	-0.1	0.1
Number of SNF days, 90-day PDP ²	10,620	9,532	30.8	28.0	31.0	29.2	-1.0	-2.2	0.1	-2.0	-0.1
Number of HHA visits, 90-day PDP ²	18,156	17,063	15.7	16.1	16.2	15.7	0.9	0.4	1.4	0.5	1.3
Patients discharged to PAC	37,280	37,281	53.9%	54.3%	53.2%	52.6%	1.1	-0.6	2.7	-0.3	2.5

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Patients discharged to institutional PAC (of those who received PAC)	20,757	19,219	42.8%	41.6%	41.8%	41.5%	-0.9	-2.7	0.9	-2.4	0.6
Emergency department use, 30-day PDP	36,996	37,041	10.8%	11.9%	10.4%	12.1%	-0.6	-1.4	0.2	-1.3	0.1
Emergency department use, 90-day PDP	36,706	36,792	22.1%	23.9%	21.8%	24.1%	-0.5	-1.6	0.5	-1.4	0.3
Unplanned readmission rate, 30-day PDP	36,996	37,041	20.3%	18.1%	20.2%	18.2%	-0.1	-1.0	0.8	-0.9	0.7
Unplanned readmission rate, 90-day PDP	36,706	36,792	37.3%	34.8%	37.4%	35.0%	0.0	-1.2	1.1	-1.0	1.0
All-cause mortality rate, 30-day PDP	36,491	36,719	8.7%	8.4%	8.5%	8.1%	0.1	-0.6	0.7	-0.5	0.6
All-cause mortality rate, 90-day PDP	36,207	36,471	18.0%	17.0%	18.1%	17.0%	0.2	-0.8	1.1	-0.6	1.0

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Exhibit G.13: Acute Myocardial Infarction Episodes, Model 2 Hospitals, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	6,117	6,140	\$25,970	\$26,158	\$25,571	\$26,190	-\$431	-\$1,590	\$729	-\$1,404	\$542
Total allowed payment amount, IP through 120-day PDP	5,817	5,859	\$28,384	\$28,767	\$28,047	\$28,994	-\$564	-\$1,865	\$737	-\$1,656	\$527
Total amount paid by Medicare, IP through 90-day PDP ¹	6,115	6,138	\$23,242	\$23,305	\$22,800	\$23,226	-\$363	-\$1,436	\$709	-\$1,264	\$537
Total amount included in the bundle definition, 90-day episodes	5,889	5,905	\$25,310	\$25,618	\$24,992	\$25,693	-\$394	-\$1,490	\$703	-\$1,314	\$527
Total allowed payment amount, 30 days post-bundle	5,103	5,212	\$3,031	\$3,066	\$3,020	\$3,317	-\$262	-\$652	\$127	-\$589	\$65
Readmissions standardized allowed amount, 90-day PDP	6,170	6,203	\$4,820	\$5,029	\$4,947	\$5,044	\$113	-\$479	\$704	-\$384	\$609
SNF standardized allowed amount, 90-day PDP	6,170	6,203	\$3,743	\$3,680	\$3,750	\$3,950	-\$263	-\$755	\$230	-\$676	\$151
HHA standardized allowed amount, 90-day PDP	6,170	6,203	\$1,091	\$1,157	\$1,072	\$1,088	\$51	-\$46	\$147	-\$30	\$132
IRF standardized allowed amount, 90-day PDP	6,170	6,203	\$471	\$593	\$503	\$576	\$49	-\$122	\$220	-\$94	\$193
Part B standardized allowed amount, 90-day PDP	6,117	6,140	\$3,353	\$3,724	\$3,426	\$3,728	\$69	-\$165	\$303	-\$127	\$265
Anchor inpatient length of stay	6,229	6,229	5.4	5.0	5.4	5.0	0.0	-0.2	0.2	-0.2	0.2
Number of SNF days, 90-day PDP ²	1,634	1,465	30.4	27.7	30.3	30.2	-2.6	-5.2	0.1	-4.8	-0.4
Number of HHA visits, 90-day PDP ²	2,282	2,180	15.1	15.0	14.7	14.5	0.0	-1.1	1.0	-0.9	0.8
Patients discharged to PAC	6,193	6,198	45.0%	43.4%	44.2%	43.0%	-0.4	-3.0	2.2	-2.6	1.7
Patients discharged to institutional PAC (of those who received PAC)	2,770	2,562	53.3%	52.0%	52.9%	51.7%	-0.2	-4.5	4.1	-3.8	3.4
Emergency department use, 30-day PDP	6,111	6,139	11.2%	13.0%	11.2%	13.1%	-0.1	-1.9	1.8	-1.6	1.5

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Emergency department use, 90-day PDP	6,053	6,115	21.7%	23.7%	22.0%	24.4%	-0.5	-3.0	2.0	-2.6	1.6
Unplanned readmission rate, 30-day PDP	6,111	6,139	17.6%	15.1%	18.7%	15.4%	0.8	-1.1	2.6	-0.8	2.3
Unplanned readmission rate, 90-day PDP	6,053	6,115	29.5%	26.5%	31.4%	27.1%	1.3	-1.3	4.0	-0.9	3.5
All-cause mortality rate, 30-day PDP	6,070	6,096	9.9%	9.9%	9.0%	8.7%	0.3	-1.3	1.9	-1.0	1.6
All-cause mortality rate, 90-day PDP	6,012	6,072	17.8%	16.3%	16.3%	15.2%	-0.4	-2.4	1.6	-2.1	1.2

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Exhibit G.14: Cardiac Arrhythmia Episodes, Model 2 Hospitals, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	6,678	6,637	\$16,953	\$17,625	\$16,701	\$18,026	-\$653	-\$1,370	\$63	-\$1,255	-\$52
Total allowed payment amount, IP through 120-day PDP	6,439	6,416	\$19,297	\$20,226	\$18,815	\$20,537	-\$793	-\$1,683	\$97	-\$1,540	-\$46
Total amount paid by Medicare, IP through 90-day PDP ¹	6,674	6,635	\$14,538	\$15,028	\$14,328	\$15,367	-\$549	-\$1,211	\$113	-\$1,104	\$7
Total amount included in the bundle definition, 90-day episodes	6,678	6,637	\$16,448	\$16,974	\$16,193	\$17,373	-\$654	-\$1,350	\$41	-\$1,238	-\$71
Total allowed payment amount, 30 days post-bundle	6,139	6,115	\$2,529	\$2,740	\$2,269	\$2,704	-\$224	-\$554	\$107	-\$501	\$54
Readmissions standardized allowed amount, 90-day PDP	6,733	6,728	\$3,249	\$3,474	\$3,296	\$3,727	-\$206	-\$590	\$178	-\$528	\$116
SNF standardized allowed amount, 90-day PDP	6,733	6,728	\$2,760	\$2,659	\$2,468	\$2,725	-\$358	-\$716	\$0	-\$658	-\$58
HHA standardized allowed amount, 90-day PDP	6,733	6,728	\$838	\$918	\$812	\$831	\$61	-\$18	\$140	-\$5	\$127
IRF standardized allowed amount, 90-day PDP	6,733	6,728	\$352	\$386	\$346	\$449	-\$70	-\$222	\$83	-\$197	\$58
Part B standardized allowed amount, 90-day PDP	6,678	6,637	\$3,453	\$3,997	\$3,449	\$4,101	-\$107	-\$334	\$120	-\$298	\$83
Anchor inpatient length of stay	6,757	6,757	3.9	3.8	4.0	3.8	0.0	-0.1	0.2	-0.1	0.1
Number of SNF days, 90-day PDP ²	1,281	1,058	32.7	29.1	33.0	31.7	-2.4	-5.3	0.5	-4.8	0.1
Number of HHA visits, 90-day PDP ²	2,093	1,867	14.6	14.7	15.6	14.1	1.5	0.5	2.5	0.6	2.4
Patients discharged to PAC	6,754	6,752	32.5%	32.1%	31.0%	30.8%	-0.2	-2.3	1.8	-2.0	1.5
Patients discharged to institutional PAC (of those who received PAC)	2,298	2,024	43.1%	42.8%	40.8%	41.6%	-1.1	-5.7	3.5	-4.9	2.8
Emergency department use, 30-day PDP	6,693	6,705	11.0%	11.7%	11.5%	11.9%	0.2	-1.4	1.8	-1.1	1.6

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Emergency department use, 90-day PDP	6,669	6,676	21.4%	23.3%	22.5%	23.1%	1.3	-0.9	3.4	-0.6	3.1
Unplanned readmission rate, 30-day PDP	6,693	6,705	12.3%	10.6%	12.9%	12.3%	-1.1	-2.6	0.4	-2.3	0.2
Unplanned readmission rate, 90-day PDP	6,669	6,676	22.0%	20.6%	23.2%	23.1%	-1.3	-3.3	0.7	-2.9	0.4
All-cause mortality rate, 30-day PDP	6,655	6,680	3.4%	3.3%	3.0%	3.2%	-0.3	-1.2	0.7	-1.1	0.6
All-cause mortality rate, 90-day PDP	6,631	6,651	7.1%	7.0%	7.1%	6.9%	0.0	-1.2	1.3	-1.0	1.1

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Exhibit G.15: Cardiac Valve Episodes, Model 2 Hospitals, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	4,296	4,290	\$61,754	\$60,367	\$63,458	\$62,446	-\$374	-\$2,178	\$1,431	-\$1,888	\$1,141
Total allowed payment amount, IP through 120-day PDP	4,161	4,162	\$63,847	\$62,429	\$65,663	\$65,012	-\$767	-\$2,739	\$1,205	-\$2,422	\$888
Total amount paid by Medicare, IP through 90-day PDP ¹	4,296	4,290	\$58,238	\$57,001	\$59,763	\$58,874	-\$348	-\$2,036	\$1,340	-\$1,764	\$1,068
Total amount included in the bundle definition, 30-day episodes	1,065	1,061	\$54,214	\$51,996	\$54,450	\$52,905	-\$673	-\$2,141	\$795	-\$1,905	\$559
Total amount included in the bundle definition, 90-day episodes	3,235	3,232	\$58,734	\$57,788	\$59,188	\$58,763	-\$522	-\$2,119	\$1,076	-\$1,862	\$819
Total allowed payment amount, 30 days post-bundle	4,151	4,116	\$2,607	\$2,476	\$2,865	\$2,993	-\$259	-\$761	\$242	-\$681	\$162
Readmissions standardized allowed amount, 90-day PDP	4,313	4,310	\$3,850	\$3,091	\$4,033	\$3,616	-\$342	-\$926	\$242	-\$832	\$148
SNF standardized allowed amount, 90-day PDP	4,313	4,310	\$3,734	\$3,099	\$3,984	\$3,629	-\$280	-\$996	\$435	-\$881	\$320
HHA standardized allowed amount, 90-day PDP	4,313	4,310	\$1,815	\$1,896	\$1,810	\$1,768	\$123	-\$28	\$273	-\$4	\$249
IRF standardized allowed amount, 90-day PDP	4,313	4,310	\$2,341	\$1,833	\$2,318	\$1,783	\$27	-\$922	\$975	-\$770	\$823
Part B standardized allowed amount, 90-day PDP	4,296	4,292	\$3,649	\$3,699	\$3,604	\$3,893	-\$239	-\$469	-\$9	-\$432	-\$46
Anchor inpatient length of stay	4,325	4,325	9.5	7.6	10.2	8.2	0.1	-0.5	0.6	-0.4	0.6
Number of SNF days, 90-day PDP ²	969	1,207	24.7	24.8	25.0	24.1	1.0	-1.6	3.6	-1.1	3.2
Number of HHA visits, 90-day PDP ²	2,895	2,696	13.1	12.4	12.9	12.5	-0.3	-1.1	0.6	-0.9	0.4
Patients discharged to PAC	4,324	4,321	76.1%	73.3%	77.5%	71.9%	2.8	-2.6	8.2	-1.8	7.3
Patients discharged to institutional PAC (of those who received PAC)	3,207	3,092	53.9%	38.1%	53.8%	47.5%	-9.5	-16.8	-2.2	-15.6	-3.4

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Emergency department use, 30-day PDP	4,320	4,318	11.7%	11.6%	12.6%	11.8%	0.6	-1.8	3.0	-1.4	2.6
Emergency department use, 90-day PDP	4,308	4,305	20.0%	21.2%	21.3%	21.9%	0.7	-2.5	3.8	-1.9	3.3
Unplanned readmission rate, 30-day PDP	4,320	4,318	18.0%	13.1%	18.5%	14.9%	-1.2	-4.4	1.9	-3.9	1.4
Unplanned readmission rate, 90-day PDP	4,308	4,305	26.8%	20.5%	27.5%	23.6%	-2.3	-5.7	1.0	-5.2	0.5
All-cause mortality rate, 30-day PDP	4,309	4,314	2.3%	1.8%	2.5%	1.8%	0.3	-1.1	1.6	-0.9	1.4
All-cause mortality rate, 90-day PDP	4,297	4,301	5.2%	3.4%	4.6%	3.7%	-0.8	-2.6	1.0	-2.3	0.7

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Exhibit G.16: Other Vascular Surgery Episodes, Model 2 Hospital, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	1,704	1,703	\$36,384	\$38,239	\$35,599	\$36,852	\$603	-\$2,022	\$3,228	-\$1,600	\$2,806
Total allowed payment amount, IP through 120-day PDP	1,657	1,660	\$40,178	\$42,391	\$39,218	\$40,735	\$696	-\$2,485	\$3,878	-\$1,974	\$3,367
Total amount paid by Medicare, IP through 90-day PDP ¹	1,704	1,703	\$32,794	\$34,636	\$32,180	\$33,371	\$652	-\$1,807	\$3,111	-\$1,412	\$2,716
Total amount included in the bundle definition, 90-day episodes	1,597	1,593	\$35,241	\$36,000	\$34,097	\$35,231	-\$375	-\$2,485	\$1,734	-\$2,146	\$1,395
Total allowed payment amount, 30 days post-bundle	1,567	1,574	\$4,419	\$4,446	\$4,176	\$4,371	-\$168	-\$896	\$560	-\$779	\$443
Readmissions standardized allowed amount, 90-day PDP	1,727	1,725	\$5,436	\$5,675	\$5,719	\$6,045	-\$87	-\$1,341	\$1,167	-\$1,139	\$966
SNF standardized allowed amount, 90-day PDP	1,727	1,725	\$5,039	\$5,342	\$4,038	\$4,286	\$56	-\$897	\$1,009	-\$744	\$855
HHA standardized allowed amount, 90-day PDP	1,727	1,725	\$1,462	\$1,586	\$1,433	\$1,545	\$11	-\$211	\$233	-\$175	\$197
IRF standardized allowed amount, 90-day PDP	1,727	1,725	\$1,122	\$1,394	\$1,107	\$1,166	\$213	-\$334	\$761	-\$246	\$673
Part B standardized allowed amount, 90-day PDP	1,704	1,703	\$4,501	\$4,931	\$4,303	\$4,502	\$230	-\$285	\$745	-\$202	\$662
Anchor inpatient length of stay	1,732	1,732	6.0	5.8	5.9	5.8	-0.1	-0.6	0.5	-0.5	0.4
Number of SNF days, 90-day PDP ²	546	451	35.3	32.6	32.9	32.7	-2.5	-7.3	2.2	-6.5	1.5
Number of HHA visits, 90-day PDP ²	881	815	16.7	16.5	17.9	17.6	0.1	-1.7	1.9	-1.4	1.6
Patients discharged to PAC	1,732	1,731	57.7%	56.6%	53.7%	53.5%	-0.9	-6.6	4.7	-5.7	3.8
Patients discharged to institutional PAC (of those who received PAC)	1,006	922	55.2%	53.1%	49.2%	46.4%	0.8	-6.7	8.4	-5.5	7.1
Emergency department use, 30-day PDP	1,720	1,724	11.2%	11.9%	10.6%	13.5%	-2.3	-5.5	1.0	-5.0	0.5

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Emergency department use, 90-day PDP	1,715	1,717	21.2%	22.6%	19.7%	24.5%	-3.4	-7.6	0.9	-6.9	0.2
Unplanned readmission rate, 30-day PDP	1,720	1,724	15.9%	13.7%	16.5%	13.9%	0.4*	-4.0	4.8	-3.3	4.1
Unplanned readmission rate, 90-day PDP	1,715	1,717	27.5%	25.4%	27.5%	26.1%	-0.7	-6.0	4.5	-5.1	3.6
All-cause mortality rate, 30-day PDP	1,713	1,713	4.6%	2.9%	3.9%	3.2%	-1.0	-2.9	0.9	-2.6	0.6
All-cause mortality rate, 90-day PDP	1,708	1,706	9.5%	7.5%	8.6%	7.2%	-0.6	-3.4	2.3	-3.0	1.8

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Exhibit G.17: Gastrointestinal Hemorrhage Episodes, Model 2 Hospitals, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	4,756	4,748	\$19,733	\$19,527	\$19,619	\$20,104	-\$690	-\$1,634	\$253	-\$1,483	\$102
Total allowed payment amount, IP through 120-day PDP	4,612	4,618	\$22,181	\$22,081	\$22,121	\$22,727	-\$706	-\$1,844	\$432	-\$1,661	\$249
Total amount paid by Medicare, IP through 90-day PDP ¹	4,755	4,747	\$17,143	\$16,908	\$17,059	\$17,335	-\$511	-\$1,354	\$331	-\$1,219	\$196
Total amount included in the bundle definition, 90-day episodes	4,756	4,748	\$18,760	\$18,314	\$18,617	\$19,099	-\$929	-\$1,853	-\$6	-\$1,704	-\$154
Total allowed payment amount, 30 days post-bundle	4,264	4,306	\$2,716	\$2,775	\$2,777	\$2,850	-\$14	-\$375	\$347	-\$317	\$289
Readmissions standardized allowed amount, 90-day PDP	4,795	4,796	\$3,557	\$3,720	\$3,509	\$3,550	\$122	-\$327	\$571	-\$254	\$499
SNF standardized allowed amount, 90-day PDP	4,795	4,796	\$3,277	\$2,877	\$3,169	\$3,355	-\$586	-\$1,084	-\$88	-\$1,004	-\$168
HHA standardized allowed amount, 90-day PDP	4,795	4,796	\$860	\$965	\$852	\$870	\$87	-\$19	\$192	-\$2	\$175
Part B standardized allowed amount, 90-day PDP	4,756	4,748	\$3,294	\$3,421	\$3,247	\$3,526	-\$152	-\$353	\$50	-\$321	\$18
Anchor inpatient length of stay	4,815	4,815	4.9	4.5	4.9	4.6	0.0	-0.2	0.1	-0.2	0.1
Number of SNF days, 90-day PDP ²	987	955	32.6	29.2	31.9	32.1	-3.6	-6.8	-0.4	-6.3	-0.9
Number of HHA visits, 90-day PDP ²	1,502	1,422	15.5	15.3	14.9	14.3	0.3	-0.9	1.5	-0.7	1.3
Patients discharged to PAC	4,811	4,812	36.8%	34.9%	34.8%	35.1%	-2.2	-5.1	0.6	-4.6	0.2
Patients discharged to institutional PAC (of those who received PAC)	1,733	1,698	52.4%	47.6%	50.5%	48.2%	-2.5	-7.5	2.5	-6.7	1.7
Emergency department use, 30-day PDP	4,763	4,769	8.6%	9.5%	9.0%	10.2%	-0.3*	-2.0	1.4	-1.7	1.1
Emergency department use, 90-day PDP	4,743	4,750	17.8%	19.0%	17.7%	19.6%	-0.7	-3.0	1.6	-2.7	1.2

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Unplanned readmission rate, 30-day PDP	4,763	4,769	14.6%	12.7%	13.9%	12.9%	-0.9	-3.0	1.2	-2.7	0.9
Unplanned readmission rate, 90-day PDP	4,743	4,750	25.4%	23.2%	25.0%	23.4%	-0.6	-3.2	2.1	-2.8	1.6
All-cause mortality rate, 30-day PDP	4,741	4,736	4.9%	4.5%	4.1%	3.9%	-0.1	-1.3	1.0	-1.1	0.8
All-cause mortality rate, 90-day PDP	4,721	4,717	10.1%	9.1%	9.1%	8.3%	-0.2*	-1.9	1.4	-1.7	1.2

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Exhibit G.18: Major Bowel Procedure Episodes, Model 2 Hospitals, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	3,356	3,370	\$38,127	\$36,554	\$36,401	\$36,318	-\$1,491	-\$3,064	\$83	-\$2,811	-\$170
Total allowed payment amount, IP through 120-day PDP	3,219	3,222	\$40,901	\$39,040	\$38,822	\$38,840	-\$1,879	-\$3,691	-\$67	-\$3,399	-\$358
Total amount paid by Medicare, IP through 90-day PDP ¹	3,355	3,370	\$34,590	\$33,193	\$33,119	\$32,944	-\$1,222	-\$2,661	\$216	-\$2,430	-\$15
Total amount included in the bundle definition, 90-day episodes	3,017	3,023	\$36,300	\$34,911	\$35,394	\$34,981	-\$976	-\$2,322	\$371	-\$2,106	\$154
Total allowed payment amount, 30 days post-bundle	3,144	3,170	\$3,363	\$3,030	\$2,884	\$2,842	-\$290	-\$737	\$156	-\$665	\$85
Readmissions standardized allowed amount, 90-day PDP	3,386	3,392	\$3,251	\$3,587	\$3,160	\$3,618	-\$121	-\$739	\$497	-\$640	\$397
SNF standardized allowed amount, 90-day PDP	3,386	3,392	\$4,240	\$3,674	\$3,759	\$3,770	-\$577	-\$1,238	\$85	-\$1,132	-\$22
HHA standardized allowed amount, 90-day PDP	3,386	3,392	\$1,355	\$1,548	\$1,447	\$1,380	\$260	\$112	\$407	\$136	\$383
IRF standardized allowed amount, 90-day PDP	3,386	3,392	\$787	\$884	\$795	\$889	\$3	-\$303	\$309	-\$254	\$260
LTCH standardized allowed amount, 90-day PDP	3,386	3,392	\$1,800	\$1,291	\$1,604	\$1,151	-\$56	-\$694	\$583	-\$592	\$480
Part B standardized allowed amount, 90-day PDP	3,356	3,370	\$4,061	\$3,931	\$3,728	\$3,759	-\$160	-\$479	\$158	-\$427	\$107
Anchor inpatient length of stay	3,415	3,415	9.3	8.5	9.4	8.3	0.2	-0.2	0.6	-0.1	0.5
Number of SNF days, 90-day PDP ²	905	832	31.8	27.0	28.9	27.4	-3.4	-7.1	0.3	-6.5	-0.3
Number of HHA visits, 90-day PDP ²	1,681	1,557	15.8	15.3	16.4	15.0	0.8	-0.6	2.2	-0.4	2.0
Patients discharged to PAC	3,412	3,414	56.5%	58.5%	56.0%	53.6%	4.4	0.2	8.5	0.9	7.9
Patients discharged to institutional PAC (of those who received PAC)	1,994	1,797	52.9%	49.8%	51.8%	52.7%	-4.1	-8.8	0.7	-8.0	-0.1

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Emergency department use, 30-day PDP	3,405	3,411	11.4%	10.7%	9.9%	11.0%	-1.8	-4.3	0.6	-3.9	0.3
Emergency department use, 90-day PDP	3,376	3,388	18.5%	20.3%	16.7%	19.0%	-0.6	-3.7	2.5	-3.2	2.0
Unplanned readmission rate, 30-day PDP	3,405	3,411	15.5%	14.7%	14.7%	14.5%	-0.5	-3.5	2.4	-3.0	2.0
Unplanned readmission rate, 90-day PDP	3,376	3,388	23.7%	22.8%	24.0%	22.2%	0.9*	-2.8	4.7	-2.2	4.1
All-cause mortality rate, 30-day PDP	3,396	3,400	3.5%	3.1%	3.6%	3.2%	0.0	-1.2	1.2	-1.0	1.0
All-cause mortality rate, 90-day PDP	3,367	3,378	7.0%	6.3%	6.6%	5.6%	0.3	-1.6	2.1	-1.3	1.8

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Exhibit G.19: Fractures of the Femur and Hip or Pelvis Episodes, Model 2 Hospitals, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	1,233	1,230	\$30,210	\$30,644	\$29,673	\$31,085	-\$978	-\$3,268	\$1,312	-\$2,900	\$944
Total allowed payment amount, IP through 120-day PDP	1,177	1,179	\$32,858	\$33,153	\$32,077	\$33,889	-\$1,517	-\$4,150	\$1,116	-\$3,727	\$693
Total amount paid by Medicare, IP through 90-day PDP ¹	1,233	1,229	\$25,968	\$26,521	\$25,498	\$26,840	-\$788	-\$2,787	\$1,211	-\$2,466	\$890
Total amount included in the bundle definition, 90-day episodes	1,204	1,201	\$29,354	\$29,569	\$29,285	\$30,097	-\$597	-\$2,853	\$1,658	-\$2,490	\$1,296
Total allowed payment amount, 30 days post-bundle	1,070	1,041	\$2,933	\$3,083	\$2,743	\$3,240	-\$347	-\$1,105	\$411	-\$984	\$289
Readmissions standardized allowed amount, 90-day PDP	1,240	1,241	\$2,179	\$2,656	\$2,312	\$2,521	\$269	-\$426	\$964	-\$315	\$852
SNF standardized allowed amount, 90-day PDP	1,240	1,241	\$14,618	\$13,914	\$14,293	\$14,183	-\$594	-\$2,410	\$1,222	-\$2,118	\$930
HHA standardized allowed amount, 90-day PDP	1,240	1,241	\$1,963	\$2,133	\$2,016	\$2,003	\$183	-\$89	\$454	-\$45	\$410
IRF standardized allowed amount, 90-day PDP	1,240	1,241	\$1,963	\$1,951	\$1,616	\$2,185	-\$582	-\$1,560	\$396	-\$1,402	\$239
Part B standardized allowed amount, 90-day PDP	1,233	1,230	\$2,849	\$3,023	\$2,757	\$3,147	-\$215	-\$579	\$149	-\$521	\$90
Anchor inpatient length of stay	1,245	1,245	4.6	4.6	4.6	4.4	0.1	-0.2	0.3	-0.1	0.3
Number of SNF days, 90-day PDP ²	899	906	40.1	35.3	40.3	36.1	-0.6	-4.0	2.9	-3.5	2.3
Number of HHA visits, 90-day PDP ²	771	694	14.2	15.2	14.9	14.8	1.1	-0.5	2.8	-0.2	2.5
Patients discharged to PAC	1,245	1,243	87.3%	87.2%	86.3%	86.0%	0.2	-4.1	4.5	-3.4	3.8
Patients discharged to institutional PAC (of those who received PAC)	1,098	1,058	90.1%	89.6%	85.2%	91.2%	-6.5	-10.5	-2.5	-9.9	-3.2
Emergency department use, 30-day PDP	1,244	1,241	8.2%	8.0%	7.8%	8.4%	-0.8	-4.2	2.5	-3.7	2.0

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Emergency department use, 90-day PDP	1,239	1,237	18.3%	19.7%	17.7%	19.0%	0.0	-4.4	4.5	-3.7	3.8
Unplanned readmission rate, 30-day PDP	1,244	1,241	9.2%	8.1%	12.0%	8.8%	2.2	-1.8	6.2	-1.2	5.5
Unplanned readmission rate, 90-day PDP	1,239	1,237	17.3%	18.6%	21.9%	17.2%	6.0	1.0	11.0	1.8	10.2
All-cause mortality rate, 30-day PDP	1,218	1,213	5.2%	7.6%	6.2%	7.4%	1.2	-2.2	4.6	-1.7	4.1
All-cause mortality rate, 90-day PDP	1,213	1,209	10.2%	13.4%	11.3%	14.4%	0.1	-4.3	4.5	-3.6	3.8

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Exhibit G.20: Medical Non-infectious Orthopedic Episodes, Model 2 Hospitals, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	7,341	7,321	\$27,588	\$27,751	\$25,987	\$27,839	-\$1,689	-\$2,727	-\$651	-\$2,560	-\$818
Total allowed payment amount, IP through 120-day PDP	7,046	7,030	\$30,755	\$30,838	\$28,976	\$30,944	-\$1,885	-\$3,057	-\$714	-\$2,869	-\$902
Total amount paid by Medicare, IP through 90-day PDP ¹	7,335	7,311	\$23,829	\$24,085	\$22,429	\$24,002	-\$1,317	-\$2,223	-\$411	-\$2,077	-\$557
Total amount included in the bundle definition, 90-day episodes	7,341	7,321	\$26,447	\$26,597	\$24,990	\$26,784	-\$1,644	-\$2,647	-\$641	-\$2,486	-\$802
Total allowed payment amount, 30 days post-bundle	6,781	6,694	\$3,410	\$3,314	\$3,221	\$3,340	-\$215	-\$531	\$100	-\$480	\$49
Readmissions standardized allowed amount, 90-day PDP	7,474	7,474	\$3,418	\$3,319	\$3,162	\$3,285	-\$222	-\$584	\$141	-\$526	\$83
SNF standardized allowed amount, 90-day PDP	7,474	7,474	\$10,200	\$9,700	\$9,563	\$10,428	-\$1,365	-\$2,183	-\$548	-\$2,051	-\$679
HHA standardized allowed amount, 90-day PDP	7,474	7,474	\$1,655	\$1,950	\$1,698	\$1,885	\$108	-\$2	\$219	\$16	\$201
IRF standardized allowed amount, 90-day PDP	7,474	7,474	\$1,811	\$1,893	\$1,242	\$1,539	-\$215	-\$570	\$141	-\$513	\$84
Part B standardized allowed amount, 90-day PDP	7,341	7,321	\$3,569	\$3,728	\$3,444	\$3,703	-\$101	-\$304	\$103	-\$271	\$70
Anchor inpatient length of stay	7,512	7,512	4.6	4.4	4.6	4.4	0.0	-0.2	0.1	-0.2	0.1
Number of SNF days, 90-day PDP ²	4,078	3,875	39.4	33.5	38.3	36.6	-4.2	-6.4	-2.0	-6.0	-2.4
Number of HHA visits, 90-day PDP ²	4,239	4,014	15.3	15.9	15.2	15.4	0.4	-0.4	1.2	-0.2	1.1
Patients discharged to PAC	7,507	7,509	70.2%	72.4%	68.7%	71.8%	-0.8	-3.1	1.4	-2.7	1.1
Patients discharged to institutional PAC (of those who received PAC)	5,506	5,347	75.3%	76.2%	73.3%	75.0%	-0.9	-3.8	2.0	-3.3	1.5
Emergency department use, 30-day PDP	7,445	7,456	9.2%	10.5%	10.0%	11.2%	0.1	-1.6	1.7	-1.3	1.5

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Emergency department use, 90-day PDP	7,407	7,419	20.5%	22.7%	21.3%	23.1%	0.5	-1.7	2.6	-1.3	2.3
Unplanned readmission rate, 30-day PDP	7,445	7,456	12.1%	10.9%	11.5%	10.8%	-0.4	-2.0	1.1	-1.7	0.9
Unplanned readmission rate, 90-day PDP	7,407	7,419	23.3%	21.5%	23.1%	21.3%	0.0	-2.1	2.0	-1.7	1.7
All-cause mortality rate, 30-day PDP	7,376	7,411	3.3%	3.3%	3.1%	3.1%	-0.1*	-1.0	0.8	-0.8	0.6
All-cause mortality rate, 90-day PDP	7,338	7,374	7.1%	6.8%	6.7%	7.0%	-0.6*	-1.9	0.7	-1.7	0.5

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Exhibit G.21: Revision of the Hip or Knee Episodes, Model 2 Hospitals, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	1,255	1,256	\$35,489	\$37,394	\$35,613	\$37,101	\$418	-\$1,740	\$2,576	-\$1,393	\$2,229
Total allowed payment amount, IP through 120-day PDP	1,208	1,216	\$37,672	\$39,639	\$37,903	\$39,171	\$699	-\$1,585	\$2,984	-\$1,218	\$2,616
Total amount paid by Medicare, IP through 90-day PDP ¹	1,255	1,256	\$32,364	\$34,071	\$32,415	\$33,704	\$417	-\$1,558	\$2,392	-\$1,240	\$2,074
Total amount included in the bundle definition, 90-day episodes	1,255	1,256	\$35,333	\$36,748	\$35,070	\$36,740	-\$255	-\$2,333	\$1,822	-\$1,999	\$1,488
Total allowed payment amount, 30 days post-bundle	1,222	1,236	\$2,179	\$2,336	\$2,207	\$2,057	\$307	-\$225	\$840	-\$140	\$754
Readmissions standardized allowed amount, 90-day PDP	1,258	1,258	\$2,185	\$2,627	\$2,538	\$2,173	\$807	\$18	\$1,597	\$145	\$1,470
SNF standardized allowed amount, 90-day PDP	1,258	1,258	\$6,305	\$5,894	\$6,083	\$6,458	-\$786	-\$2,122	\$550	-\$1,907	\$336
HHA standardized allowed amount, 90-day PDP	1,258	1,258	\$2,302	\$2,219	\$2,287	\$2,213	-\$9	-\$409	\$391	-\$345	\$327
Part B standardized allowed amount, 90-day PDP	1,255	1,256	\$2,950	\$3,198	\$3,018	\$3,036	\$230	-\$198	\$657	-\$129	\$588
Anchor inpatient length of stay	1,261	1,261	4.5	4.2	4.7	4.4	0.0	-0.2	0.2	-0.2	0.2
Number of SNF days, 90-day PDP ²	539	545	26.2	27.4	26.7	26.0	1.8	-2.4	6.0	-1.7	5.3
Number of HHA visits, 90-day PDP ²	872	806	13.5	13.0	13.7	12.7	0.5	-0.7	1.7	-0.5	1.5
Patients discharged to PAC	1,261	1,261	84.0%	81.3%	85.2%	83.2%	-0.7	-8.3	6.9	-7.1	5.7
Patients discharged to institutional PAC (of those who received PAC)	1,053	1,018	65.8%	53.8%	58.6%	58.4%	-11.8	-20.9	-2.7	-19.5	-4.2
Emergency department use, 30-day PDP	1,261	1,260	8.7%	11.9%	7.2%	9.2%	1.1	-3.1	5.4	-2.5	4.7
Emergency department use, 90-day PDP	1,258	1,257	16.9%	20.6%	16.6%	18.2%	2.1	-2.7	6.9	-1.9	6.1

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Unplanned readmission rate, 30-day PDP	1,261	1,260	9.5%	9.3%	10.7%	7.6%	2.9	-0.3	6.1	0.3	5.6
Unplanned readmission rate, 90-day PDP	1,258	1,257	16.3%	15.0%	18.5%	13.4%	3.7	-0.4	7.8	0.3	7.2
All-cause mortality rate, 30-day PDP	1,260	1,259	0.5%	0.5%	0.3%	0.1%	0.2	-0.5	1.0	-0.4	0.9
All-cause mortality rate, 90-day PDP	1,257	1,256	1.0%	1.7%	0.7%	1.0%	0.3	-0.7	1.3	-0.5	1.2

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Exhibit G.22: Spinal Fusion (non-cervical) Episodes, Model 2 Hospitals, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	3,822	3,837	\$40,330	\$40,551	\$39,837	\$41,555	-\$1,497	-\$3,016	\$23	-\$2,772	-\$221
Total allowed payment amount, IP through 120-day PDP	3,681	3,693	\$41,873	\$42,125	\$41,471	\$43,134	-\$1,412	-\$3,070	\$247	-\$2,804	-\$20
Total amount paid by Medicare, IP through 90-day PDP ¹	3,820	3,837	\$37,272	\$37,493	\$36,776	\$38,344	-\$1,346	-\$2,776	\$83	-\$2,546	-\$147
Total amount included in the bundle definition, 90-day episodes	3,822	3,837	\$39,480	\$40,034	\$39,314	\$40,994	-\$1,126	-\$2,647	\$396	-\$2,402	\$151
Total allowed payment amount, 30 days post-bundle	3,774	3,791	\$1,513	\$1,524	\$1,612	\$1,579	\$43	-\$281	\$368	-\$229	\$316
Readmissions standardized allowed amount, 90-day PDP	3,859	3,861	\$1,920	\$1,745	\$1,668	\$1,835	-\$342	-\$810	\$126	-\$735	\$51
SNF standardized allowed amount, 90-day PDP	3,859	3,861	\$2,854	\$2,736	\$2,616	\$2,979	-\$482	-\$1,060	\$96	-\$967	\$3
HHA standardized allowed amount, 90-day PDP	3,859	3,861	\$1,297	\$1,353	\$1,265	\$1,437	-\$116	-\$301	\$69	-\$271	\$40
IRF standardized allowed amount, 90-day PDP	3,859	3,861	\$2,919	\$2,361	\$2,519	\$2,389	-\$429	-\$1,201	\$344	-\$1,077	\$220
Part B standardized allowed amount, 90-day PDP	3,822	3,837	\$2,413	\$2,368	\$2,358	\$2,568	-\$254	-\$450	-\$59	-\$419	-\$90
Anchor inpatient length of stay	3,869	3,869	4.4	4.2	4.7	4.4	0.1	-0.1	0.3	-0.1	0.2
Number of SNF days, 90-day PDP ²	862	959	24.8	22.0	23.5	22.1	-1.5	-4.6	1.6	-4.1	1.1
Number of HHA visits, 90-day PDP ²	1,731	1,649	13.0	12.4	11.7	12.2	-1.1	-2.0	-0.3	-1.8	-0.4
Patients discharged to PAC	3,869	3,868	54.8%	52.3%	54.1%	56.2%	-4.7	-9.9	0.5	-9.0	-0.3
Patients discharged to institutional PAC (of those who received PAC)	2,091	2,110	65.1%	60.7%	64.2%	60.6%	-0.7	-7.9	6.4	-6.7	5.3
Emergency department use, 30-day PDP	3,867	3,868	11.5%	11.8%	11.1%	11.0%	0.4	-2.0	2.7	-1.6	2.4

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Emergency department use, 90-day PDP	3,857	3,860	18.0%	20.0%	17.4%	18.7%	0.7	-2.3	3.7	-1.9	3.2
Unplanned readmission rate, 30-day PDP	3,867	3,868	8.0%	7.0%	6.4%	6.6%	-1.2	-3.0	0.5	-2.7	0.2
Unplanned readmission rate, 90-day PDP	3,857	3,860	11.6%	10.6%	9.0%	9.8%	-1.9	-3.8	0.1	-3.5	-0.2
All-cause mortality rate, 30-day PDP	3,866	3,868	0.3%	0.3%	0.1%	0.3%	-0.2	-0.7	0.2	-0.6	0.1
All-cause mortality rate, 90-day PDP	3,856	3,860	0.9%	0.6%	0.4%	0.8%	-0.6	-1.3	0.0	-1.2	-0.1

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Exhibit G.23: Hip & Femur Procedures except Major Joint Episodes, Model 2 Hospitals, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	8,441	8,424	\$43,901	\$43,529	\$43,240	\$44,725	-\$1,857	-\$2,803	-\$912	-\$2,651	-\$1,064
Total allowed payment amount, IP through 120-day PDP	8,105	8,081	\$47,045	\$46,556	\$46,327	\$47,757	-\$1,919	-\$3,030	-\$808	-\$2,851	-\$987
Total amount paid by Medicare, IP through 90-day PDP ¹	8,440	8,424	\$38,525	\$38,450	\$37,968	\$39,274	-\$1,381	-\$2,181	-\$581	-\$2,053	-\$710
Total amount included in the bundle definition, 90-day episodes	8,312	8,297	\$43,238	\$42,955	\$42,747	\$44,312	-\$1,848	-\$2,787	-\$909	-\$2,636	-\$1,060
Total allowed payment amount, 30 days post-bundle	7,579	7,502	\$3,621	\$3,372	\$3,498	\$3,380	-\$130	-\$439	\$179	-\$390	\$129
Readmissions standardized allowed amount, 90-day PDP	8,466	8,452	\$2,794	\$2,703	\$2,713	\$2,650	-\$27	-\$336	\$281	-\$286	\$231
SNF standardized allowed amount, 90-day PDP	8,466	8,452	\$17,738	\$16,573	\$16,989	\$17,844	-\$2,020	-\$2,936	-\$1,104	-\$2,789	-\$1,251
HHA standardized allowed amount, 90-day PDP	8,466	8,452	\$1,964	\$2,302	\$1,936	\$2,125	\$149	\$36	\$263	\$54	\$244
IRF standardized allowed amount, 90-day PDP	8,466	8,452	\$3,383	\$3,399	\$3,654	\$3,627	\$42	-\$529	\$613	-\$437	\$522
Part B standardized allowed amount, 90-day PDP	8,441	8,424	\$3,225	\$3,330	\$3,144	\$3,255	-\$7	-\$159	\$146	-\$135	\$121
Anchor inpatient length of stay	8,514	8,514	6.0	5.7	6.1	5.8	0.0	-0.2	0.1	-0.1	0.1
Number of SNF days, 90-day PDP ²	6,592	6,385	45.5	39.1	45.2	42.6	-3.8	-5.4	-2.3	-5.2	-2.5
Number of HHA visits, 90-day PDP ²	5,167	4,814	15.7	16.6	15.5	15.6	0.7	0.0	1.5	0.1	1.4
Patients discharged to PAC	8,512	8,511	93.6%	94.2%	93.1%	94.0%	-0.3	-1.5	1.0	-1.3	0.8
Patients discharged to institutional PAC (of those who received PAC)	8,064	7,966	93.2%	92.9%	92.7%	93.0%	-0.6	-2.1	0.8	-1.8	0.6
Emergency department use, 30-day PDP	8,506	8,508	7.3%	8.1%	8.1%	8.5%	0.4	-0.9	1.7	-0.7	1.4

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Emergency department use, 90-day PDP	8,458	8,446	16.2%	18.6%	17.4%	18.5%	1.3	-0.5	3.1	-0.2	2.8
Unplanned readmission rate, 30-day PDP	8,506	8,508	12.3%	10.7%	11.4%	9.7%	0.1	-1.4	1.6	-1.2	1.4
Unplanned readmission rate, 90-day PDP	8,458	8,446	21.7%	19.8%	20.4%	18.8%	-0.3	-2.2	1.5	-1.9	1.2
All-cause mortality rate, 30-day PDP	8,370	8,354	4.8%	4.5%	4.3%	4.5%	-0.5	-1.5	0.5	-1.4	0.3
All-cause mortality rate, 90-day PDP	8,323	8,292	10.3%	9.9%	10.0%	10.3%	-0.6	-2.1	0.8	-1.8	0.6

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Exhibit G.24: Cervical Spinal Fusion Episodes, Model 2 Hospitals, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	1,330	1,335	\$28,593	\$31,089	\$29,017	\$30,647	\$866	-\$1,061	\$2,793	-\$751	\$2,483
Total allowed payment amount, IP through 120-day PDP	1,275	1,274	\$30,394	\$33,282	\$30,487	\$32,891	\$484	-\$1,712	\$2,681	-\$1,359	\$2,328
Total amount paid by Medicare, IP through 90-day PDP ¹	1,330	1,335	\$25,656	\$28,016	\$26,067	\$27,441	\$985	-\$767	\$2,738	-\$485	\$2,456
Total amount included in the bundle definition, 90-day episodes	1,330	1,335	\$28,244	\$30,476	\$28,311	\$30,181	\$363	-\$1,403	\$2,129	-\$1,120	\$1,845
Total allowed payment amount, 30 days post-bundle	1,296	1,302	\$1,780	\$1,949	\$1,528	\$2,051	-\$353	-\$916	\$210	-\$826	\$120
Readmissions standardized allowed amount, 90-day PDP	1,359	1,360	\$1,618	\$1,425	\$1,566	\$1,581	-\$208	-\$928	\$511	-\$813	\$396
SNF standardized allowed amount, 90-day PDP	1,359	1,360	\$2,246	\$2,218	\$2,454	\$2,775	-\$347	-\$1,174	\$479	-\$1,041	\$347
HHA standardized allowed amount, 90-day PDP	1,359	1,360	\$967	\$1,082	\$1,018	\$904	\$230	-\$13	\$472	\$26	\$433
IRF standardized allowed amount, 90-day PDP	1,359	1,360	\$2,133	\$2,706	\$1,722	\$1,791	\$505	-\$245	\$1,254	-\$125	\$1,134
Part B standardized allowed amount, 90-day PDP	1,330	1,335	\$2,465	\$2,529	\$2,425	\$2,502	-\$14	-\$401	\$374	-\$339	\$311
Anchor inpatient length of stay	1,364	1,364	3.4	3.3	3.6	3.3	0.1	-0.1	0.3	-0.1	0.3
Number of SNF days, 90-day PDP ²	214	213	29.7	30.9	29.0	33.3	-3.0	-9.8	3.7	-8.7	2.6
Number of HHA visits, 90-day PDP ²	485	390	13.9	13.5	13.7	12.8	0.5	-1.7	2.7	-1.4	2.4
Patients discharged to PAC	1,364	1,364	36.2%	38.0%	36.4%	35.6%	2.7	-3.1	8.5	-2.2	7.6
Patients discharged to institutional PAC (of those who received PAC)	568	499	60.9%	58.7%	60.8%	57.2%	1.5	-8.7	11.6	-7.1	10.0
Emergency department use, 30-day PDP	1,364	1,363	12.9%	11.6%	12.9%	13.1%	-1.5	-5.3	2.2	-4.7	1.6

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Emergency department use, 90-day PDP	1,359	1,359	21.4%	19.2%	21.8%	22.2%	-2.6	-7.5	2.3	-6.7	1.5
Unplanned readmission rate, 30-day PDP	1,364	1,363	6.7%	5.1%	9.0%	6.6%	0.9	-2.2	4.0	-1.7	3.5
Unplanned readmission rate, 90-day PDP	1,359	1,359	10.3%	8.6%	12.6%	9.4%	1.5	-2.3	5.3	-1.7	4.7
All-cause mortality rate, 30-day PDP	1,363	1,363	1.0%	0.7%	0.9%	0.9%	-0.3	-1.3	0.7	-1.1	0.6
All-cause mortality rate, 90-day PDP	1,358	1,359	1.5%	1.5%	1.6%	1.6%	-0.1	-1.4	1.3	-1.2	1.1

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Exhibit G.25: Lower Extremity and Humerus Procedure except Hip, Foot, and Femur Episodes, Model 2 Hospitals, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	1,218	1,215	\$35,166	\$37,289	\$34,256	\$36,829	-\$451	-\$3,127	\$2,226	-\$2,697	\$1,796
Total allowed payment amount, IP through 120-day PDP	1,165	1,160	\$38,243	\$40,515	\$36,704	\$39,729	-\$754	-\$3,744	\$2,236	-\$3,264	\$1,756
Total amount paid by Medicare, IP through 90-day PDP ¹	1,217	1,214	\$30,570	\$32,548	\$30,011	\$32,102	-\$114	-\$2,413	\$2,185	-\$2,043	\$1,816
Total amount included in the bundle definition, 90-day episodes	1,218	1,215	\$34,598	\$36,843	\$33,703	\$36,317	-\$370	-\$3,033	\$2,293	-\$2,605	\$1,865
Total allowed payment amount, 30 days post-bundle	1,167	1,159	\$3,191	\$3,033	\$2,555	\$3,046	-\$649	-\$1,373	\$75	-\$1,256	-\$42
Readmissions standardized allowed amount, 90-day PDP	1,240	1,234	\$2,265	\$2,438	\$2,524	\$2,189	\$509	-\$339	\$1,357	-\$203	\$1,221
SNF standardized allowed amount, 90-day PDP	1,240	1,234	\$13,363	\$13,871	\$12,031	\$13,061	-\$523	-\$2,540	\$1,495	-\$2,216	\$1,171
HHA standardized allowed amount, 90-day PDP	1,240	1,234	\$1,847	\$1,881	\$1,891	\$1,981	-\$57	-\$332	\$219	-\$288	\$175
IRF standardized allowed amount, 90-day PDP	1,240	1,234	\$1,287	\$1,351	\$1,936	\$1,909	\$90	-\$711	\$891	-\$582	\$762
Part B standardized allowed amount, 90-day PDP	1,218	1,215	\$3,087	\$3,440	\$3,048	\$3,305	\$96	-\$352	\$544	-\$280	\$472
Anchor inpatient length of stay	1,242	1,242	4.9	4.8	5.0	4.9	-0.1	-0.4	0.2	-0.4	0.2
Number of SNF days, 90-day PDP ²	780	665	45.3	42.4	42.5	44.0	-4.4	-9.2	0.4	-8.4	-0.4
Number of HHA visits, 90-day PDP ²	721	695	15.1	14.7	14.5	14.3	-0.1	-2.1	1.8	-1.7	1.5
Patients discharged to PAC	1,242	1,242	79.5%	78.0%	79.3%	80.8%	-2.9	-8.1	2.3	-7.2	1.5
Patients discharged to institutional PAC (of those who received PAC)	999	991	78.0%	82.0%	78.8%	74.7%	8.1	2.0	14.2	3.0	13.2
Emergency department use, 30-day PDP	1,242	1,241	9.9%	6.9%	7.5%	7.0%	-2.5*	-5.5	0.6	-5.0	0.1

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Emergency department use, 90-day PDP	1,240	1,233	17.3%	15.9%	18.4%	16.6%	0.5*	-4.2	5.2	-3.5	4.4
Unplanned readmission rate, 30-day PDP	1,242	1,241	8.8%	9.3%	9.1%	8.3%	1.2	-2.4	4.9	-1.8	4.3
Unplanned readmission rate, 90-day PDP	1,240	1,233	16.8%	17.2%	18.4%	15.4%	3.4	-1.5	8.4	-0.7	7.6
All-cause mortality rate, 30-day PDP	1,238	1,238	1.8%	1.1%	1.3%	1.5%	-1.0	-2.5	0.5	-2.3	0.3
All-cause mortality rate, 90-day PDP	1,236	1,230	4.6%	2.9%	3.3%	3.6%	-1.9	-4.4	0.6	-4.0	0.2

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Exhibit G.26: Sepsis Episodes, Model 2 Hospitals, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	29,351	29,352	\$31,539	\$30,674	\$31,702	\$31,228	-\$391	-\$1,239	\$458	-\$1,103	\$322
Total allowed payment amount, IP through 120-day PDP	28,135	28,164	\$34,637	\$33,761	\$34,756	\$34,442	-\$563	-\$1,516	\$391	-\$1,363	\$238
Total amount paid by Medicare, IP through 90-day PDP ¹	29,339	29,339	\$28,011	\$27,179	\$28,195	\$27,609	-\$246	-\$1,014	\$522	-\$890	\$399
Total amount included in the bundle definition, 30-day episodes	768	757	\$21,082	\$19,546	\$20,955	\$19,640	-\$221	-\$3,216	\$2,774	-\$2,734	\$2,293
Total amount included in the bundle definition, 90-day episodes	27,986	27,990	\$29,857	\$29,033	\$30,094	\$29,589	-\$319	-\$1,046	\$408	-\$929	\$291
Total allowed payment amount, 30 days post-bundle	23,342	23,774	\$4,044	\$3,962	\$3,981	\$4,043	-\$144	-\$392	\$104	-\$352	\$64
Readmissions standardized allowed amount, 90-day PDP	29,580	29,600	\$4,577	\$4,672	\$4,540	\$4,615	\$19	-\$263	\$301	-\$217	\$255
SNF standardized allowed amount, 90-day PDP	29,580	29,600	\$6,145	\$5,888	\$5,773	\$5,955	-\$440	-\$798	-\$82	-\$741	-\$140
HHA standardized allowed amount, 90-day PDP	29,580	29,600	\$1,041	\$1,168	\$1,074	\$1,106	\$95	\$37	\$152	\$46	\$143
IRF standardized allowed amount, 90-day PDP	29,580	29,600	\$627	\$648	\$704	\$720	\$5	-\$131	\$142	-\$109	\$120
LTCH standardized allowed amount, 90-day PDP	29,580	29,600	\$2,114	\$1,511	\$2,384	\$1,749	\$32	-\$396	\$459	-\$327	\$390
Part B standardized allowed amount, 90-day PDP	29,351	29,354	\$3,676	\$3,756	\$3,803	\$3,901	-\$18	-\$167	\$132	-\$143	\$108
Anchor inpatient length of stay	29,888	29,888	7.1	6.7	7.0	6.5	0.1	-0.1	0.3	0.0	0.3
Number of SNF days, 90-day PDP ²	10,547	9,532	35.3	32.3	35.1	33.4	-1.4	-2.7	-0.1	-2.5	-0.3
Number of HHA visits, 90-day PDP ²	10,830	10,169	15.7	15.7	15.6	15.6	0.0	-0.6	0.7	-0.5	0.6
Patients discharged to PAC	29,805	29,821	55.7%	54.1%	55.8%	53.4%	0.7	-0.9	2.3	-0.6	2.1

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Patients discharged to institutional PAC (of those who received PAC)	16,528	15,476	67.9%	63.7%	66.5%	64.4%	-2.1	-4.3	0.1	-3.9	-0.3
Emergency department use, 30-day PDP	29,569	29,633	9.4%	10.6%	9.2%	10.4%	0.0	-0.9	0.8	-0.8	0.7
Emergency department use, 90-day PDP	29,268	29,348	19.1%	20.8%	18.6%	20.6%	-0.2	-1.3	0.8	-1.1	0.7
Unplanned readmission rate, 30-day PDP	29,569	29,633	16.9%	15.5%	16.6%	15.8%	-0.5	-1.6	0.6	-1.4	0.4
Unplanned readmission rate, 90-day PDP	29,268	29,348	29.4%	27.5%	29.1%	28.1%	-0.9	-2.2	0.4	-2.0	0.2
All-cause mortality rate, 30-day PDP	29,098	29,207	14.2%	13.0%	13.6%	12.5%	-0.1	-1.1	1.0	-0.9	0.8
All-cause mortality rate, 90-day PDP	28,800	28,924	22.0%	20.2%	21.7%	19.7%	0.2	-1.0	1.3	-0.8	1.1

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Exhibit G.27: Diabetes Episodes, Model 2 Hospitals, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	1,651	1,646	\$21,693	\$21,711	\$21,564	\$20,819	\$763	-\$1,198	\$2,725	-\$883	\$2,410
Total allowed payment amount, IP through 120-day PDP	1,551	1,549	\$24,744	\$25,031	\$24,769	\$24,292	\$764	-\$1,583	\$3,111	-\$1,206	\$2,733
Total amount paid by Medicare, IP through 90-day PDP ¹	1,651	1,642	\$18,667	\$18,794	\$18,736	\$17,697	\$1,166	-\$605	\$2,937	-\$321	\$2,653
Total amount included in the bundle definition, 90-day episodes	1,651	1,647	\$20,518	\$20,605	\$20,372	\$19,989	\$470	-\$1,330	\$2,271	-\$1,041	\$1,981
Total allowed payment amount, 30 days post-bundle	1,505	1,532	\$3,464	\$3,501	\$3,506	\$3,691	-\$148	-\$838	\$543	-\$727	\$432
Readmissions standardized allowed amount, 90-day PDP	1,692	1,678	\$4,437	\$4,445	\$4,481	\$4,007	\$482	-\$348	\$1,312	-\$214	\$1,178
SNF standardized allowed amount, 90-day PDP	1,692	1,678	\$4,272	\$3,803	\$3,860	\$4,293	-\$901	-\$1,767	-\$35	-\$1,628	-\$175
HHA standardized allowed amount, 90-day PDP	1,692	1,678	\$1,192	\$1,324	\$1,182	\$1,134	\$180	-\$18	\$378	\$13	\$346
Part B standardized allowed amount, 90-day PDP	1,651	1,647	\$3,957	\$3,968	\$3,781	\$3,886	-\$94	-\$578	\$389	-\$500	\$312
Anchor inpatient length of stay	1,698	1,698	4.3	4.1	4.6	4.3	0.1	-0.2	0.4	-0.1	0.3
Number of SNF days, 90-day PDP ²	424	370	37.6	30.4	35.5	37.8	-9.4	-14.8	-4.0	-13.9	-4.9
Number of HHA visits, 90-day PDP ²	746	654	17.8	15.2	17.1	15.8	-1.4	-3.6	0.8	-3.3	0.5
Patients discharged to PAC	1,698	1,697	46.3%	47.3%	45.1%	46.8%	-0.8	-5.6	4.0	-4.8	3.2
Patients discharged to institutional PAC (of those who received PAC)	820	783	42.0%	42.2%	44.3%	41.7%	2.7	-4.4	9.8	-3.3	8.6
Emergency department use, 30-day PDP	1,643	1,661	12.8%	14.3%	14.3%	14.6%	1.2	-2.3	4.8	-1.7	4.2
Emergency department use, 90-day PDP	1,638	1,642	26.1%	28.1%	26.2%	28.5%	-0.2	-4.9	4.5	-4.2	3.7

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Unplanned readmission rate, 30-day PDP	1,643	1,661	15.4%	13.5%	14.8%	12.0%	0.9	-2.7	4.6	-2.1	4.0
Unplanned readmission rate, 90-day PDP	1,638	1,642	30.9%	26.8%	29.7%	26.1%	-0.5	-4.6	3.6	-3.9	3.0
All-cause mortality rate, 30-day PDP	1,634	1,651	4.1%	3.2%	3.0%	2.9%	-0.8	-2.8	1.2	-2.5	0.9
All-cause mortality rate, 90-day PDP	1,629	1,632	8.7%	7.6%	7.6%	5.9%	0.7	-2.2	3.5	-1.7	3.0

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Exhibit G.28: Simple Pneumonia and Respiratory Infections Episodes, Model 2 Hospitals, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	25,038	25,019	\$23,019	\$22,458	\$22,650	\$22,780	-\$689	-\$1,180	-\$199	-\$1,101	-\$278
Total allowed payment amount, IP through 120-day PDP	24,088	24,035	\$25,721	\$25,136	\$25,247	\$25,504	-\$842	-\$1,407	-\$277	-\$1,316	-\$368
Total amount paid by Medicare, IP through 90-day PDP ¹	25,025	25,008	\$20,236	\$19,668	\$19,860	\$19,848	-\$556	-\$1,002	-\$110	-\$930	-\$182
Total amount included in the bundle definition, 30-day episodes	2,225	2,226	\$14,881	\$14,577	\$14,889	\$14,748	-\$164	-\$942	\$614	-\$817	\$489
Total amount included in the bundle definition, 90-day episodes	22,855	22,815	\$22,114	\$21,380	\$21,819	\$21,919	-\$834	-\$1,308	-\$359	-\$1,232	-\$435
Total allowed payment amount, 30 days post-bundle	20,996	21,237	\$3,447	\$3,396	\$3,273	\$3,232	-\$10	-\$197	\$177	-\$167	\$147
Readmissions standardized allowed amount, 90-day PDP	25,203	25,232	\$3,737	\$3,743	\$3,628	\$3,596	\$38	-\$173	\$250	-\$139	\$216
SNF standardized allowed amount, 90-day PDP	25,203	25,232	\$4,699	\$4,421	\$4,556	\$4,749	-\$471	-\$761	-\$181	-\$714	-\$228
HHA standardized allowed amount, 90-day PDP	25,203	25,232	\$1,090	\$1,232	\$1,074	\$1,155	\$61	\$5	\$117	\$14	\$108
IRF standardized allowed amount, 90-day PDP	25,203	25,232	\$448	\$523	\$416	\$507	-\$16	-\$117	\$86	-\$101	\$70
LTCH standardized allowed amount, 90-day PDP	25,203	25,232	\$818	\$444	\$827	\$665	-\$212	-\$448	\$25	-\$410	-\$13
Part B standardized allowed amount, 90-day PDP	25,043	25,021	\$3,204	\$3,373	\$3,160	\$3,356	-\$27	-\$132	\$77	-\$115	\$61
Anchor inpatient length of stay	25,423	25,423	5.8	5.3	5.7	5.3	0.0	-0.2	0.1	-0.1	0.1
Number of SNF days, 90-day PDP ²	7,604	6,912	32.7	29.0	33.0	32.1	-2.7	-4.2	-1.3	-3.9	-1.6
Number of HHA visits, 90-day PDP ²	9,630	9,173	15.4	15.6	14.9	14.9	0.2	-0.4	0.7	-0.3	0.7
Patients discharged to PAC	25,401	25,405	49.4%	49.0%	49.3%	48.4%	0.5	-1.1	2.1	-0.8	1.9

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Patients discharged to institutional PAC (of those who received PAC)	12,858	12,139	58.4%	54.3%	57.1%	54.8%	-1.8	-3.9	0.3	-3.6	-0.1
Emergency department use, 30-day PDP	25,240	25,277	10.1%	10.9%	9.8%	10.9%	-0.4	-1.1	0.4	-1.0	0.3
Emergency department use, 90-day PDP	25,029	25,089	20.2%	21.9%	20.0%	21.6%	0.1	-0.9	1.1	-0.8	0.9
Unplanned readmission rate, 30-day PDP	25,240	25,277	14.8%	13.6%	14.7%	14.0%	-0.5	-1.5	0.4	-1.4	0.3
Unplanned readmission rate, 90-day PDP	25,029	25,089	27.0%	25.1%	26.5%	25.2%	-0.5*	-1.6	0.7	-1.4	0.5
All-cause mortality rate, 30-day PDP	24,895	25,002	10.0%	9.1%	9.5%	8.7%	-0.2	-1.0	0.5	-0.9	0.4
All-cause mortality rate, 90-day PDP	24,686	24,814	17.7%	15.8%	16.9%	15.2%	-0.2	-1.1	0.8	-1.0	0.6

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Exhibit G.29: Other Respiratory Episodes, Model 2 Hospitals, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	5,315	5,284	\$29,785	\$29,846	\$29,262	\$30,529	-\$1,207	-\$2,488	\$74	-\$2,282	-\$132
Total allowed payment amount, IP through 120-day PDP	5,081	5,073	\$33,076	\$33,154	\$32,652	\$34,021	-\$1,291	-\$2,700	\$119	-\$2,474	-\$108
Total amount paid by Medicare, IP through 90-day PDP ¹	5,315	5,281	\$26,714	\$26,647	\$26,186	\$27,215	-\$1,096	-\$2,268	\$76	-\$2,080	-\$112
Total amount included in the bundle definition, 90-day episodes	5,316	5,284	\$28,039	\$28,187	\$27,628	\$28,751	-\$974	-\$2,080	\$132	-\$1,902	-\$46
Total allowed payment amount, 30 days post-bundle	4,327	4,328	\$4,105	\$4,119	\$4,110	\$4,246	-\$121	-\$641	\$400	-\$558	\$316
Readmissions standardized allowed amount, 90-day PDP	5,362	5,353	\$5,330	\$5,393	\$5,154	\$5,390	-\$173	-\$795	\$450	-\$695	\$350
SNF standardized allowed amount, 90-day PDP	5,362	5,353	\$4,173	\$4,267	\$4,212	\$4,713	-\$407	-\$947	\$133	-\$860	\$46
HHA standardized allowed amount, 90-day PDP	5,362	5,353	\$1,177	\$1,288	\$1,149	\$1,209	\$52	-\$62	\$165	-\$43	\$147
IRF standardized allowed amount, 90-day PDP	5,362	5,353	\$851	\$607	\$601	\$717	-\$360	-\$594	-\$126	-\$557	-\$163
LTCH standardized allowed amount, 90-day PDP	5,362	5,353	\$2,499	\$1,682	\$2,073	\$1,835	-\$579	-\$1,284	\$125	-\$1,171	\$12
Part B standardized allowed amount, 90-day PDP	5,316	5,284	\$3,752	\$3,981	\$3,806	\$4,089	-\$54	-\$297	\$188	-\$258	\$149
Anchor inpatient length of stay	5,398	5,398	6.2	6.0	6.2	6.0	0.0	-0.3	0.3	-0.2	0.2
Number of SNF days, 90-day PDP ²	1,549	1,502	30.9	28.4	31.5	30.3	-1.2	-3.9	1.4	-3.4	1.0
Number of HHA visits, 90-day PDP ²	2,271	2,126	14.7	15.1	14.8	14.7	0.5	-0.4	1.4	-0.2	1.3
Patients discharged to PAC	5,363	5,371	52.0%	52.1%	49.8%	51.4%	-1.5	-4.7	1.6	-4.1	1.1
Patients discharged to institutional PAC (of those who received PAC)	2,847	2,676	56.3%	52.3%	53.8%	56.1%	-6.3	-10.4	-2.1	-9.8	-2.8

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Emergency department use, 30-day PDP	5,315	5,322	10.1%	10.8%	10.0%	12.0%	-1.3	-3.0	0.5	-2.7	0.2
Emergency department use, 90-day PDP	5,282	5,277	21.8%	22.7%	21.3%	23.6%	-1.3	-3.8	1.1	-3.4	0.7
Unplanned readmission rate, 30-day PDP	5,315	5,322	19.8%	17.2%	19.5%	18.3%	-1.3	-3.9	1.3	-3.5	0.9
Unplanned readmission rate, 90-day PDP	5,282	5,277	32.9%	32.0%	33.4%	32.9%	-0.3	-3.4	2.7	-2.9	2.2
All-cause mortality rate, 30-day PDP	5,268	5,262	11.3%	10.5%	11.3%	10.7%	-0.2*	-1.9	1.5	-1.7	1.3
All-cause mortality rate, 90-day PDP	5,235	5,217	19.6%	17.8%	19.6%	18.1%	-0.3*	-2.7	2.1	-2.3	1.7

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Exhibit G.30: Gastrointestinal Obstruction Episodes, Model 2 Hospitals, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	1,904	1,897	\$17,074	\$17,255	\$16,938	\$16,220	\$899	-\$603	\$2,401	-\$361	\$2,159
Total allowed payment amount, IP through 120-day PDP	1,847	1,832	\$19,401	\$19,455	\$19,323	\$18,650	\$727	-\$982	\$2,437	-\$707	\$2,162
Total amount paid by Medicare, IP through 90-day PDP ¹	1,904	1,897	\$14,742	\$14,769	\$14,627	\$13,778	\$875	-\$488	\$2,239	-\$269	\$2,020
Total amount included in the bundle definition, 90-day episodes	1,904	1,897	\$15,942	\$15,908	\$15,755	\$15,115	\$607	-\$727	\$1,940	-\$513	\$1,726
Total allowed payment amount, 30 days post-bundle	1,745	1,732	\$2,674	\$2,409	\$2,651	\$2,635	-\$249	-\$809	\$310	-\$719	\$220
Readmissions standardized allowed amount, 90-day PDP	1,925	1,922	\$3,689	\$3,958	\$3,650	\$3,213	\$706	-\$41	\$1,453	\$79	\$1,333
SNF standardized allowed amount, 90-day PDP	1,925	1,922	\$2,275	\$2,113	\$2,170	\$2,264	-\$256	-\$830	\$319	-\$738	\$227
HHA standardized allowed amount, 90-day PDP	1,925	1,922	\$671	\$758	\$743	\$715	\$115	-\$14	\$245	\$7	\$224
Part B standardized allowed amount, 90-day PDP	1,904	1,897	\$3,180	\$3,476	\$3,194	\$3,062	\$428	\$93	\$763	\$147	\$709
Anchor inpatient length of stay	1,936	1,936	4.7	4.5	4.8	4.7	-0.1	-0.3	0.2	-0.3	0.1
Number of SNF days, 90-day PDP ²	271	266	29.7	30.4	30.3	31.1	-0.1	-5.1	4.8	-4.3	4.0
Number of HHA visits, 90-day PDP ²	500	472	14.2	15.0	15.0	13.3	2.5	0.5	4.5	0.8	4.2
Patients discharged to PAC	1,935	1,935	26.4%	26.5%	27.1%	26.1%	1.1	-2.3	4.6	-1.8	4.0
Patients discharged to institutional PAC (of those who received PAC)	527	491	50.5%	41.4%	47.7%	42.7%	-4.1	-12.7	4.4	-11.3	3.0
Emergency department use, 30-day PDP	1,914	1,921	9.1%	10.1%	9.6%	8.4%	2.2	-0.6	5.0	-0.2	4.5
Emergency department use, 90-day PDP	1,903	1,907	19.5%	21.7%	20.1%	19.1%	3.2	-0.8	7.1	-0.1	6.5

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Unplanned readmission rate, 30-day PDP	1,914	1,921	12.2%	11.0%	14.2%	10.7%	2.4	-0.5	5.3	0.0	4.8
Unplanned readmission rate, 90-day PDP	1,903	1,907	21.6%	22.3%	25.3%	21.8%	4.3	0.6	8.0	1.2	7.4
All-cause mortality rate, 30-day PDP	1,900	1,900	5.7%	3.7%	4.7%	4.0%	-1.3	-3.3	0.7	-3.0	0.4
All-cause mortality rate, 90-day PDP	1,889	1,886	9.5%	7.7%	8.6%	7.8%	-0.9	-3.3	1.5	-2.9	1.1

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Exhibit G.31: Syncope & Collapse Episodes, Model 2 Hospitals, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	1,498	1,491	\$15,741	\$16,517	\$15,839	\$17,961	-\$1,346	-\$2,983	\$292	-\$2,720	\$29
Total allowed payment amount, IP through 120-day PDP	1,458	1,432	\$18,098	\$18,915	\$18,250	\$20,312	-\$1,245	-\$3,173	\$683	-\$2,863	\$373
Total amount paid by Medicare, IP through 90-day PDP ¹	1,497	1,490	\$13,324	\$13,966	\$13,402	\$15,193	-\$1,149	-\$2,646	\$349	-\$2,406	\$108
Total amount included in the bundle definition, 90-day episodes	1,498	1,491	\$14,946	\$15,792	\$15,188	\$17,054	-\$1,021	-\$2,628	\$587	-\$2,370	\$328
Total allowed payment amount, 30 days post-bundle	1,434	1,409	\$2,458	\$2,427	\$2,512	\$2,471	\$10	-\$499	\$518	-\$417	\$437
Readmissions standardized allowed amount, 90-day PDP	1,523	1,522	\$2,276	\$1,891	\$2,398	\$2,711	-\$698	-\$1,336	-\$60	-\$1,233	-\$163
SNF standardized allowed amount, 90-day PDP	1,523	1,522	\$3,690	\$3,780	\$3,484	\$4,214	-\$641	-\$1,601	\$319	-\$1,447	\$165
HHA standardized allowed amount, 90-day PDP	1,523	1,522	\$1,183	\$1,453	\$1,180	\$1,324	\$126	-\$113	\$365	-\$75	\$326
Part B standardized allowed amount, 90-day PDP	1,498	1,491	\$2,927	\$3,169	\$3,041	\$3,430	-\$147	-\$515	\$221	-\$456	\$162
Anchor inpatient length of stay	1,527	1,527	3.6	3.4	3.6	3.5	-0.2	-0.4	0.1	-0.4	0.0
Number of SNF days, 90-day PDP ²	386	331	35.5	29.4	34.2	34.7	-6.6	-11.7	-1.4	-10.8	-2.3
Number of HHA visits, 90-day PDP ²	647	616	16.6	16.2	16.6	15.1	1.1	-1.0	3.2	-0.7	2.8
Patients discharged to PAC	1,527	1,527	42.7%	46.2%	41.9%	43.9%	1.5	-4.2	7.2	-3.3	6.3
Patients discharged to institutional PAC (of those who received PAC)	733	653	46.7%	48.1%	41.9%	46.5%	-3.1	-11.6	5.3	-10.2	3.9
Emergency department use, 30-day PDP	1,497	1,499	10.5%	10.1%	8.8%	11.3%	-2.9	-5.5	-0.2	-5.1	-0.7
Emergency department use, 90-day PDP	1,493	1,495	21.5%	20.0%	20.5%	22.6%	-3.6*	-7.5	0.2	-6.9	-0.4

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Unplanned readmission rate, 30-day PDP	1,497	1,499	9.4%	8.1%	9.4%	8.5%	-0.4	-3.0	2.2	-2.6	1.8
Unplanned readmission rate, 90-day PDP	1,493	1,495	18.0%	16.6%	19.3%	19.1%	-1.2	-4.8	2.4	-4.3	1.8
All-cause mortality rate, 30-day PDP	1,490	1,492	2.3%	1.6%	1.4%	1.8%	-1.1	-2.4	0.1	-2.2	-0.1
All-cause mortality rate, 90-day PDP	1,486	1,488	4.9%	3.5%	4.7%	4.7%	-1.4*	-3.5	0.6	-3.1	0.3

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Exhibit G.32: Renal Failure Episodes, Model 2 Hospitals, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	8,294	8,270	\$24,571	\$23,802	\$25,004	\$25,231	-\$995	-\$1,868	-\$122	-\$1,728	-\$262
Total allowed payment amount, IP through 120-day PDP	7,984	7,979	\$27,614	\$26,860	\$28,015	\$28,457	-\$1,195	-\$2,229	-\$161	-\$2,063	-\$327
Total amount paid by Medicare, IP through 90-day PDP ¹	8,289	8,259	\$21,509	\$20,740	\$21,872	\$21,905	-\$803	-\$1,573	-\$32	-\$1,450	-\$156
Total amount included in the bundle definition, 90-day episodes	8,012	7,982	\$23,326	\$22,411	\$23,827	\$24,046	-\$1,134	-\$1,983	-\$285	-\$1,847	-\$421
Total allowed payment amount, 30 days post-bundle	6,893	6,936	\$3,833	\$3,712	\$3,703	\$3,820	-\$238	-\$586	\$109	-\$530	\$53
Readmissions standardized allowed amount, 90-day PDP	8,386	8,374	\$4,185	\$4,112	\$4,257	\$4,311	-\$126	-\$506	\$254	-\$445	\$193
SNF standardized allowed amount, 90-day PDP	8,386	8,374	\$5,757	\$5,495	\$5,762	\$5,968	-\$468	-\$1,034	\$98	-\$943	\$7
HHA standardized allowed amount, 90-day PDP	8,386	8,374	\$1,180	\$1,303	\$1,181	\$1,258	\$47	-\$51	\$144	-\$35	\$128
IRF standardized allowed amount, 90-day PDP	8,386	8,374	\$630	\$703	\$725	\$944	-\$146	-\$363	\$72	-\$328	\$37
Part B standardized allowed amount, 90-day PDP	8,295	8,271	\$3,625	\$3,761	\$3,725	\$3,904	-\$41	-\$227	\$144	-\$197	\$114
Anchor inpatient length of stay	8,422	8,422	5.2	4.8	5.2	4.8	0.0	-0.2	0.1	-0.1	0.1
Number of SNF days, 90-day PDP ²	2,911	2,558	35.9	31.4	36.8	34.9	-2.6	-5.1	-0.1	-4.7	-0.5
Number of HHA visits, 90-day PDP ²	3,407	3,178	16.0	16.1	15.5	15.6	0.1	-0.7	0.9	-0.6	0.8
Patients discharged to PAC	8,413	8,409	52.1%	51.6%	52.3%	51.6%	0.2	-1.9	2.4	-1.6	2.0
Patients discharged to institutional PAC (of those who received PAC)	4,490	4,180	58.0%	57.4%	58.1%	57.5%	0.0	-3.2	3.3	-2.7	2.8
Emergency department use, 30-day PDP	8,336	8,331	11.7%	12.2%	10.7%	12.1%	-0.9	-2.2	0.4	-2.0	0.2

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Emergency department use, 90-day PDP	8,301	8,284	22.9%	24.3%	21.4%	23.6%	-0.8	-2.7	1.0	-2.4	0.7
Unplanned readmission rate, 30-day PDP	8,336	8,331	16.0%	15.7%	17.4%	16.0%	1.1	-0.7	2.8	-0.4	2.6
Unplanned readmission rate, 90-day PDP	8,301	8,284	29.5%	28.3%	30.6%	28.8%	0.6	-1.4	2.7	-1.1	2.4
All-cause mortality rate, 30-day PDP	8,248	8,250	9.4%	8.8%	9.4%	8.2%	0.7	-0.7	2.1	-0.5	1.9
All-cause mortality rate, 90-day PDP	8,215	8,203	17.1%	16.3%	17.0%	15.6%	0.7	-1.1	2.4	-0.8	2.2

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Exhibit G.33: Nutritional and Metabolic Disorders Episodes, Model 2 Hospitals, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	2,943	2,944	\$20,109	\$21,568	\$19,979	\$21,101	\$337*	-\$879	\$1,553	-\$684	\$1,358
Total allowed payment amount, IP through 120-day PDP	2,855	2,844	\$22,717	\$24,618	\$22,696	\$23,755	\$843	-\$597	\$2,283	-\$365	\$2,051
Total amount paid by Medicare, IP through 90-day PDP ¹	2,938	2,940	\$17,289	\$18,522	\$17,161	\$18,035	\$358*	-\$718	\$1,435	-\$545	\$1,262
Total amount included in the bundle definition, 90-day episodes	2,887	2,889	\$19,030	\$20,123	\$18,902	\$19,816	\$179	-\$991	\$1,349	-\$803	\$1,161
Total allowed payment amount, 30 days post-bundle	2,507	2,520	\$3,164	\$3,568	\$3,263	\$3,223	\$444	-\$53	\$942	\$27	\$862
Readmissions standardized allowed amount, 90-day PDP	3,005	3,009	\$3,459	\$3,833	\$3,639	\$3,461	\$552	\$13	\$1,090	\$100	\$1,003
SNF standardized allowed amount, 90-day PDP	3,005	3,009	\$5,328	\$5,457	\$4,854	\$5,727	-\$744	-\$1,540	\$52	-\$1,412	-\$76
HHA standardized allowed amount, 90-day PDP	3,005	3,009	\$1,078	\$1,280	\$1,048	\$1,198	\$51	-\$78	\$179	-\$57	\$159
Part B standardized allowed amount, 90-day PDP	2,943	2,945	\$3,401	\$3,703	\$3,475	\$3,577	\$200	-\$78	\$478	-\$33	\$433
Anchor inpatient length of stay	3,022	3,022	4.3	4.2	4.3	4.2	-0.1	-0.3	0.1	-0.2	0.1
Number of SNF days, 90-day PDP ²	1,024	911	35.3	32.8	34.8	34.8	-2.5	-6.2	1.2	-5.6	0.6
Number of HHA visits, 90-day PDP ²	1,268	1,134	15.1	14.8	15.2	14.8	0.2	-1.4	1.7	-1.1	1.5
Patients discharged to PAC	3,021	3,020	47.5%	50.9%	47.1%	49.2%	1.3	-2.3	5.0	-1.7	4.4
Patients discharged to institutional PAC (of those who received PAC)	1,619	1,436	58.9%	55.7%	54.5%	55.8%	-4.6	-9.6	0.4	-8.8	-0.4
Emergency department use, 30-day PDP	2,983	2,999	11.2%	12.9%	11.0%	12.5%	0.2*	-2.0	2.3	-1.7	2.0
Emergency department use, 90-day PDP	2,967	2,987	23.0%	24.2%	22.4%	23.0%	0.5	-2.3	3.4	-1.9	3.0

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Unplanned readmission rate, 30-day PDP	2,983	2,999	13.8%	13.4%	15.1%	13.0%	1.6	-0.9	4.1	-0.5	3.7
Unplanned readmission rate, 90-day PDP	2,967	2,987	24.9%	24.7%	27.1%	24.3%	2.6	-0.5	5.7	0.0	5.2
All-cause mortality rate, 30-day PDP	2,959	2,976	8.0%	7.0%	8.6%	6.7%	1.0	-0.9	2.8	-0.6	2.5
All-cause mortality rate, 90-day PDP	2,943	2,964	15.7%	14.0%	15.1%	13.5%	-0.1	-2.6	2.3	-2.2	1.9

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Exhibit G.34: Cellulitis Episodes, Model 2 Hospitals, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	5,900	5,905	\$19,644	\$19,612	\$20,069	\$20,701	-\$664*	-\$1,630	\$303	-\$1,475	\$147
Total allowed payment amount, IP through 120-day PDP	5,722	5,736	\$22,630	\$22,464	\$23,048	\$23,816	-\$934	-\$2,040	\$172	-\$1,862	-\$6
Total amount paid by Medicare, IP through 90-day PDP ¹	5,897	5,899	\$16,984	\$16,857	\$17,364	\$17,769	-\$532	-\$1,398	\$334	-\$1,259	\$195
Total amount included in the bundle definition, 90-day episodes	5,900	5,905	\$18,454	\$18,533	\$18,991	\$19,474	-\$404	-\$1,333	\$524	-\$1,183	\$375
Total allowed payment amount, 30 days post-bundle	5,485	5,493	\$3,226	\$3,091	\$3,219	\$3,411	-\$328	-\$645	-\$11	-\$594	-\$62
Readmissions standardized allowed amount, 90-day PDP	6,001	6,017	\$3,165	\$3,214	\$3,287	\$3,455	-\$120	-\$514	\$274	-\$451	\$211
SNF standardized allowed amount, 90-day PDP	6,001	6,017	\$4,251	\$3,976	\$4,314	\$4,527	-\$488	-\$1,017	\$41	-\$932	-\$44
HHA standardized allowed amount, 90-day PDP	6,001	6,017	\$1,337	\$1,513	\$1,365	\$1,439	\$102	-\$6	\$210	\$12	\$192
IRF standardized allowed amount, 90-day PDP	6,001	6,017	\$510	\$441	\$449	\$432	-\$52	-\$238	\$134	-\$208	\$104
Part B standardized allowed amount, 90-day PDP	5,900	5,905	\$3,278	\$3,490	\$3,388	\$3,733	-\$134	-\$363	\$96	-\$327	\$59
Anchor inpatient length of stay	6,034	6,034	5.0	4.8	5.0	4.8	0.0	-0.2	0.2	-0.1	0.2
Number of SNF days, 90-day PDP ²	1,581	1,494	34.1	30.3	35.0	33.3	-2.0	-4.7	0.7	-4.2	0.2
Number of HHA visits, 90-day PDP ²	2,734	2,622	17.8	18.0	17.8	17.6	0.3	-0.8	1.4	-0.6	1.2
Patients discharged to PAC	6,033	6,034	51.2%	50.7%	50.0%	48.7%	0.8	-2.0	3.5	-1.5	3.0
Patients discharged to institutional PAC (of those who received PAC)	3,105	2,910	46.7%	44.8%	44.1%	43.4%	-1.1	-5.3	3.1	-4.7	2.4
Emergency department use, 30-day PDP	5,935	5,953	12.2%	11.7%	11.1%	12.3%	-1.7	-3.5	0.0	-3.2	-0.2

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Emergency department use, 90-day PDP	5,902	5,938	23.5%	24.3%	22.5%	24.0%	-0.7	-2.7	1.4	-2.4	1.1
Unplanned readmission rate, 30-day PDP	5,935	5,953	11.6%	10.9%	12.8%	12.6%	-0.5	-2.4	1.4	-2.1	1.1
Unplanned readmission rate, 90-day PDP	5,902	5,938	24.4%	23.4%	25.6%	25.7%	-1.2	-3.5	1.1	-3.1	0.8
All-cause mortality rate, 30-day PDP	5,904	5,921	2.4%	2.5%	2.7%	2.4%	0.4	-0.4	1.3	-0.3	1.2
All-cause mortality rate, 90-day PDP	5,871	5,906	6.2%	6.1%	6.4%	6.0%	0.2	-1.1	1.5	-0.9	1.3

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Exhibit G.35: Transient Ischemia Episodes, Model 2 Hospitals, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	1,200	1,204	\$15,039	\$15,176	\$14,435	\$16,348	-\$1,775	-\$3,338	-\$213	-\$3,087	-\$464
Total allowed payment amount, IP through 120-day PDP	1,156	1,172	\$17,113	\$17,109	\$16,579	\$18,470	-\$1,895	-\$3,848	\$59	-\$3,534	-\$255
Total amount paid by Medicare, IP through 90-day PDP ¹	1,200	1,204	\$12,750	\$12,776	\$12,178	\$13,754	-\$1,550	-\$2,951	-\$148	-\$2,725	-\$374
Total amount included in the bundle definition, 90-day episodes	1,201	1,204	\$14,063	\$14,293	\$13,736	\$15,408	-\$1,442	-\$2,754	-\$129	-\$2,544	-\$340
Total allowed payment amount, 30 days post-bundle	1,144	1,163	\$2,145	\$2,019	\$2,186	\$2,251	-\$192	-\$790	\$406	-\$694	\$310
Readmissions standardized allowed amount, 90-day PDP	1,213	1,210	\$2,107	\$1,900	\$2,025	\$2,247	-\$430	-\$1,057	\$198	-\$956	\$97
SNF standardized allowed amount, 90-day PDP	1,213	1,210	\$2,914	\$2,907	\$2,613	\$3,637	-\$1,031	-\$1,869	-\$193	-\$1,734	-\$327
HHA standardized allowed amount, 90-day PDP	1,213	1,210	\$1,036	\$1,337	\$1,076	\$1,297	\$80	-\$169	\$330	-\$129	\$290
Part B standardized allowed amount, 90-day PDP	1,201	1,204	\$2,678	\$2,910	\$2,820	\$2,951	\$100	-\$284	\$484	-\$222	\$422
Anchor inpatient length of stay	1,218	1,218	3.3	3.2	3.4	3.3	0.0	-0.2	0.2	-0.2	0.2
Number of SNF days, 90-day PDP ²	231	232	33.1	30.0	32.7	34.3	-4.8	-10.9	1.2	-9.9	0.3
Number of HHA visits, 90-day PDP ²	454	426	15.5	15.6	16.6	16.7	0.1	-2.3	2.4	-1.9	2.1
Patients discharged to PAC	1,217	1,218	35.2%	38.8%	34.0%	38.9%	-1.3	-6.5	3.9	-5.6	3.1
Patients discharged to institutional PAC (of those who received PAC)	481	468	45.2%	45.1%	38.8%	46.4%	-7.7	-16.7	1.4	-15.2	-0.1
Emergency department use, 30-day PDP	1,204	1,211	8.7%	11.0%	9.7%	10.8%	1.3	-2.5	5.0	-1.9	4.4
Emergency department use, 90-day PDP	1,200	1,203	19.6%	23.6%	20.2%	20.3%	3.9	-0.6	8.4	0.1	7.7

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Unplanned readmission rate, 30-day PDP	1,204	1,211	9.1%	8.1%	8.8%	8.4%	-0.6*	-3.4	2.2	-2.9	1.8
Unplanned readmission rate, 90-day PDP	1,200	1,203	18.1%	16.8%	17.8%	17.0%	-0.6*	-4.5	3.3	-3.8	2.7
All-cause mortality rate, 30-day PDP	1,201	1,205	0.7%	1.4%	0.4%	0.7%	0.4	-0.6	1.4	-0.4	1.2
All-cause mortality rate, 90-day PDP	1,197	1,197	3.7%	3.1%	3.2%	2.5%	0.1	-1.9	2.1	-1.6	1.8

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Exhibit G.36: Esophagitis, Gastroenteritis, and Other Digestive Disorders Episodes, Model 2 Hospitals, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	4,544	4,555	\$16,701	\$16,679	\$15,999	\$17,243	-\$1,265	-\$2,258	-\$273	-\$2,098	-\$433
Total allowed payment amount, IP through 120-day PDP	4,379	4,381	\$19,284	\$19,270	\$18,426	\$19,961	-\$1,548	-\$2,743	-\$354	-\$2,551	-\$546
Total amount paid by Medicare, IP through 90-day PDP ¹	4,540	4,548	\$14,304	\$14,216	\$13,629	\$14,639	-\$1,098	-\$1,994	-\$202	-\$1,850	-\$346
Total amount included in the bundle definition, 90-day episodes	4,544	4,555	\$15,565	\$15,590	\$14,991	\$16,030	-\$1,015	-\$1,931	-\$98	-\$1,784	-\$245
Total allowed payment amount, 30 days post-bundle	4,225	4,266	\$2,778	\$2,794	\$2,591	\$2,892	-\$285	-\$622	\$52	-\$568	-\$2
Readmissions standardized allowed amount, 90-day PDP	4,659	4,656	\$3,499	\$3,558	\$3,172	\$3,609	-\$378	-\$862	\$105	-\$784	\$27
SNF standardized allowed amount, 90-day PDP	4,659	4,656	\$2,465	\$2,118	\$2,109	\$2,460	-\$698	-\$1,083	-\$313	-\$1,021	-\$375
HHA standardized allowed amount, 90-day PDP	4,659	4,656	\$833	\$905	\$845	\$874	\$43	-\$54	\$141	-\$38	\$125
Part B standardized allowed amount, 90-day PDP	4,544	4,555	\$3,466	\$3,672	\$3,482	\$3,819	-\$131	-\$397	\$136	-\$354	\$93
Anchor inpatient length of stay	4,675	4,675	4.2	3.9	4.3	4.1	0.0	-0.2	0.1	-0.2	0.1
Number of SNF days, 90-day PDP ²	728	649	31.8	27.7	30.7	30.3	-3.8	-7.0	-0.6	-6.5	-1.1
Number of HHA visits, 90-day PDP ²	1,430	1,300	14.4	15.1	15.1	14.5	1.3	-0.1	2.7	0.1	2.5
Patients discharged to PAC	4,675	4,672	31.2%	30.4%	28.0%	27.5%	-0.3	-2.8	2.2	-2.4	1.8
Patients discharged to institutional PAC (of those who received PAC)	1,459	1,259	42.6%	37.7%	38.9%	39.4%	-5.4	-10.0	-0.7	-9.3	-1.4
Emergency department use, 30-day PDP	4,612	4,614	12.8%	14.0%	12.4%	13.8%	-0.2*	-2.1	1.8	-1.8	1.5
Emergency department use, 90-day PDP	4,596	4,595	24.3%	26.0%	24.5%	25.7%	0.5	-2.0	3.0	-1.6	2.6

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Unplanned readmission rate, 30-day PDP	4,612	4,614	12.8%	12.5%	12.6%	13.0%	-0.7	-2.7	1.3	-2.3	1.0
Unplanned readmission rate, 90-day PDP	4,596	4,595	24.7%	22.9%	23.2%	23.7%	-2.3*	-4.8	0.2	-4.4	-0.2
All-cause mortality rate, 30-day PDP	4,588	4,593	2.5%	2.5%	2.4%	2.5%	-0.1	-1.1	0.9	-0.9	0.7
All-cause mortality rate, 90-day PDP	4,572	4,574	6.1%	5.8%	5.4%	5.6%	-0.5	-2.0	1.0	-1.7	0.7

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Appendix H: Impact of BPCI and Sensitivity Results

The following exhibits display risk-adjusted difference-in-differences (DiD) results for the BPCI impact estimates and the sensitivity test to understand if the statistically significant impact estimates could be due to the random selection of comparison episodes in the matched sample of providers. We constructed DiD estimates that used all episodes from matched BPCI participants and comparison group providers, rather than those randomly matched by quarter and MS-DRG. We conducted this sensitivity test for the key claim-based total payment and quality measures for all models, participant types, and clinical episodes in the Year 5 Annual Report. Results for the BPCI impact estimate and the sensitivity test for each clinical episode are presented by model, participant type, and outcome.

Please observe the following abbreviations, which are used throughout the appendix:

- DiD = difference-in-differences
- PDP = post-anchor hospitalization discharge period
- PGP = physician group practice
- SNF = skilled nursing facility
- HHA = home health agency
- COPD = chronic obstructive pulmonary disease

Note that positive BPCI impact estimates that are statistically significant at the 5% or 10% significance level are indicated by dark and light green shaded cells, respectively. Negative BPCI impact estimates that are statistically significant at the 5% or 10% significance level are indicated by dark and light orange shaded cells, respectively. The * symbol indicates that the sensitivity test was statistically significant at the 10% level. Sample sizes reflect the number of episodes initiated during the intervention period that met inclusion criteria for the given outcome. Medicare payments are risk-adjusted and standardized to remove the effect of geographic differences in wages, extra amounts to account for teaching programs and other policy factors. Results reflect Lewin analysis of Medicare claims and enrollment data for episodes that began Q4 2011 through Q3 2012 (baseline) and Q4 2013 through Q4 2016 (intervention period) for BPCI episode initiators and the matched comparison providers.

Exhibit H.1: BPCI Impact Estimate and Sensitivity Test Results, Total Allowed Payment Amount, Inpatient Stay Through 90-day Post-discharge Period, Model 2 Hospitals, Q4 2013 – Q4 2016

Clinical episode	Result	Number of BPCI Episodes	Number of Comparison Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD
Acute myocardial infarction	BPCI impact estimate	6,117	6,140	\$25,970	\$26,158	\$25,571	\$26,190	-\$431
	Sensitivity test	6,581	46,100	\$25,431	\$25,913	\$25,217	\$25,678	\$21
Cardiac arrhythmia	BPCI impact estimate	6,678	6,637	\$16,953	\$17,625	\$16,701	\$18,026	-\$653
	Sensitivity test	6,678	64,245	\$16,775	\$17,513	\$16,477	\$17,371	-\$157
Cardiac valve	BPCI impact estimate	4,296	4,290	\$61,754	\$60,367	\$63,458	\$62,446	-\$374
	Sensitivity test	5,599	22,412	\$61,273	\$59,534	\$62,300	\$61,947	-\$1,386*
Cellulitis	BPCI impact estimate	5,900	5,905	\$19,644	\$19,612	\$20,069	\$20,701	-\$664
	Sensitivity test	5,900	45,283	\$19,526	\$19,607	\$19,446	\$20,344	-\$818*
Cervical spinal fusion	BPCI impact estimate	1,330	1,335	\$28,593	\$31,089	\$29,017	\$30,647	\$866
	Sensitivity test	1,622	10,450	\$27,610	\$30,048	\$27,714	\$29,583	\$568
Congestive heart failure	BPCI impact estimate	36,793	36,783	\$24,175	\$24,488	\$23,688	\$24,231	-\$231
	Sensitivity test	37,242	189,538	\$24,016	\$24,350	\$23,476	\$24,022	-\$212
COPD, bronchitis, asthma	BPCI impact estimate	20,857	20,916	\$18,640	\$18,670	\$18,430	\$18,798	-\$338
	Sensitivity test	20,901	135,716	\$18,429	\$18,548	\$18,026	\$18,567	-\$422*
Coronary artery bypass graft	BPCI impact estimate	3,560	3,567	\$47,175	\$48,547	\$47,426	\$49,704	-\$907
	Sensitivity test	4,608	21,135	\$47,935	\$48,638	\$47,699	\$49,805	-\$1,402
Diabetes	BPCI impact estimate	1,651	1,646	\$21,693	\$21,711	\$21,564	\$20,819	\$763
	Sensitivity test	1,670	14,713	\$21,724	\$21,803	\$20,887	\$21,074	-\$109
Esophagitis, gastroenteritis & other digestive disorders	BPCI impact estimate	4,544	4,555	\$16,701	\$16,679	\$15,999	\$17,243	-\$1,265
	Sensitivity test	4,579	43,298	\$16,624	\$16,695	\$16,141	\$17,132	-\$920*
Fractures of the femur and hip or pelvis	BPCI impact estimate	1,233	1,230	\$30,210	\$30,644	\$29,673	\$31,085	-\$978
	Sensitivity test	1,261	10,270	\$30,691	\$30,836	\$29,872	\$30,893	-\$877

Clinical episode	Result	Number of BPCI Episodes	Number of Comparison Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD
Gastrointestinal hemorrhage	BPCI impact estimate	4,756	4,748	\$19,733	\$19,527	\$19,619	\$20,104	-\$690
	Sensitivity test	4,815	41,788	\$19,562	\$19,460	\$19,347	\$19,876	-\$630*
Gastrointestinal obstruction	BPCI impact estimate	1,904	1,897	\$17,074	\$17,255	\$16,938	\$16,220	\$899
	Sensitivity test	1,904	22,352	\$16,949	\$17,014	\$16,748	\$16,496	\$318
Hip & femur procedures except major joint	BPCI impact estimate	8,441	8,424	\$43,901	\$43,529	\$43,240	\$44,725	-\$1,857
	Sensitivity test	8,453	54,902	\$44,170	\$43,847	\$43,316	\$44,992	-\$1,998*
Lower extremity and humerus procedure except hip, foot, femur	BPCI impact estimate	1,218	1,215	\$35,166	\$37,289	\$34,256	\$36,829	-\$451
	Sensitivity test	1,240	8,363	\$34,838	\$36,981	\$34,734	\$37,306	-\$430
Major bowel procedure	BPCI impact estimate	3,356	3,370	\$38,127	\$36,554	\$36,401	\$36,318	-\$1,491
	Sensitivity test	3,454	27,179	\$37,796	\$36,285	\$36,322	\$35,916	-\$1,105*
Major joint replacement of the lower extremity	BPCI impact estimate	108,935	108,925	\$27,536	\$26,054	\$27,089	\$26,838	-\$1,230
	Sensitivity test	118,875	381,057	\$27,409	\$25,848	\$26,918	\$26,676	-\$1,318*
Major joint replacement of the upper extremity	BPCI impact estimate	1,527	1,524	\$23,205	\$24,623	\$24,412	\$25,223	\$607
	Sensitivity test	1,541	9,331	\$22,893	\$24,338	\$22,850	\$24,555	-\$260
Medical non-infectious orthopedic	BPCI impact estimate	7,341	7,321	\$27,588	\$27,751	\$25,987	\$27,839	-\$1,689
	Sensitivity test	8,041	51,115	\$27,487	\$27,660	\$26,189	\$28,014	-\$1,652*
Nutritional and metabolic disorders	BPCI impact estimate	2,943	2,944	\$20,109	\$21,568	\$19,979	\$21,101	\$337
	Sensitivity test	2,954	23,926	\$19,825	\$21,140	\$19,981	\$21,074	\$222
Other respiratory	BPCI impact estimate	5,315	5,284	\$29,785	\$29,846	\$29,262	\$30,529	-\$1,207
	Sensitivity test	5,477	46,578	\$29,312	\$29,372	\$29,041	\$29,902	-\$801
Other vascular surgery	BPCI impact estimate	1,704	1,703	\$36,384	\$38,239	\$35,599	\$36,852	\$603
	Sensitivity test	1,705	14,475	\$36,069	\$37,816	\$34,745	\$36,977	-\$485
Percutaneous coronary intervention	BPCI impact estimate	5,492	5,513	\$23,993	\$26,963	\$24,383	\$26,642	\$710
	Sensitivity test	5,713	38,644	\$23,922	\$27,027	\$23,803	\$26,411	\$497

Clinical episode	Result	Number of BPCI Episodes	Number of Comparison Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD
Renal failure	BPCI impact estimate	8,294	8,270	\$24,571	\$23,802	\$25,004	\$25,231	-\$995
	Sensitivity test	8,508	58,210	\$24,241	\$23,480	\$24,534	\$24,641	-\$868*
Revision of the hip or knee	BPCI impact estimate	1,255	1,256	\$35,489	\$37,394	\$35,613	\$37,101	\$418
	Sensitivity test	1,280	10,104	\$35,320	\$37,169	\$35,186	\$37,340	-\$304
Sepsis	BPCI impact estimate	29,351	29,352	\$31,539	\$30,674	\$31,702	\$31,228	-\$391
	Sensitivity test	30,567	205,476	\$31,129	\$30,251	\$31,236	\$30,679	-\$321
Simple pneumonia & respiratory infections	BPCI impact estimate	25,038	25,019	\$23,019	\$22,458	\$22,650	\$22,780	-\$689
	Sensitivity test	25,258	169,170	\$22,888	\$22,351	\$22,539	\$22,445	-\$443*
Spinal fusion (non-cervical)	BPCI impact estimate	3,822	3,837	\$40,330	\$40,551	\$39,837	\$41,555	-\$1,497
	Sensitivity test	3,844	26,746	\$40,389	\$40,698	\$39,647	\$40,837	-\$881
Stroke	BPCI impact estimate	13,022	12,968	\$31,205	\$31,116	\$31,792	\$31,996	-\$294
	Sensitivity test	13,056	83,428	\$30,949	\$30,923	\$31,117	\$31,669	-\$578
Syncope & collapse	BPCI impact estimate	1,498	1,491	\$15,741	\$16,517	\$15,839	\$17,961	-\$1,346
	Sensitivity test	1,498	13,654	\$15,364	\$16,381	\$15,606	\$17,426	-\$802
Transient ischemia	BPCI impact estimate	1,200	1,204	\$15,039	\$15,176	\$14,435	\$16,348	-\$1,775
	Sensitivity test	1,200	12,315	\$14,811	\$15,024	\$14,080	\$15,666	-\$1,374*
Urinary tract infection	BPCI impact estimate	9,009	8,998	\$22,165	\$21,913	\$22,310	\$22,994	-\$937
	Sensitivity test	9,224	61,619	\$21,882	\$21,659	\$21,882	\$22,621	-\$962*

Note: The estimates in this table are the results of a difference-in-differences (DiD) model. Positive DiD estimates that are significant at the 5% or 10% significance level are indicated by dark and light green shaded cells, respectively. Negative DiD estimates that are significant at the 5% or 10% significance level are indicated by dark and light orange shaded cells, respectively.

* Indicates the sensitivity test was statistically significant at the 10% level.

**Exhibit H.2: BPCI Impact Estimate and Sensitivity Test Results, All-Cause Mortality Rate, Model 2 Hospitals,
Q4 2013 – Q4 2016**

Clinical episode and outcome	Result	Number of BPCI Episodes	Number of Comparison Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD
Acute myocardial infarction, 30-day PDP	BPCI impact estimate	6,070	6,096	9.9%	9.9%	9.0%	8.7%	0.3
	Sensitivity test	6,526	45,733	9.6%	9.6%	9.6%	9.1%	0.5
Acute myocardial infarction, 90-day PDP	BPCI impact estimate	6,012	6,072	17.8%	16.3%	16.3%	15.2%	-0.4
	Sensitivity test	6,466	45,435	17.1%	16.1%	16.6%	15.6%	0.0
Cardiac arrhythmia, 30-day PDP	BPCI impact estimate	6,655	6,680	3.4%	3.3%	3.0%	3.2%	-0.3
	Sensitivity test	6,656	64,499	3.3%	3.3%	3.3%	3.3%	0.0
Cardiac arrhythmia, 90-day PDP	BPCI impact estimate	6,631	6,651	7.1%	7.0%	7.1%	6.9%	0.0
	Sensitivity test	6,631	64,287	7.0%	6.8%	7.4%	6.9%	0.3
Cardiac valve, 30-day PDP	BPCI impact estimate	4,309	4,314	2.3%	1.8%	2.5%	1.8%	0.3
	Sensitivity test	5,611	22,537	2.0%	1.5%	2.2%	1.6%	0.1
Cardiac valve, 90-day PDP	BPCI impact estimate	4,297	4,301	5.1%	3.4%	4.6%	3.7%	-0.8
	Sensitivity test	5,595	22,463	4.2%	2.9%	4.4%	3.3%	-0.3
Cellulitis, 30-day PDP	BPCI impact estimate	5,904	5,921	2.4%	2.5%	2.7%	2.4%	0.4
	Sensitivity test	5,904	45,408	2.3%	2.3%	2.4%	2.2%	0.3
Cellulitis, 90-day PDP	BPCI impact estimate	5,871	5,906	6.2%	6.1%	6.4%	6.0%	0.2
	Sensitivity test	5,871	45,198	6.1%	6.0%	6.1%	5.7%	0.3
Cervical spinal fusion, 30-day PDP	BPCI impact estimate	1,363	1,363	1.0%	0.7%	0.9%	0.9%	-0.3
	Sensitivity test	1,658	10,588	0.8%	0.5%	0.8%	0.6%	0.0
Cervical spinal fusion, 90-day PDP	BPCI impact estimate	1,358	1,359	1.5%	1.5%	1.6%	1.6%	-0.1
	Sensitivity test	1,653	10,571	1.4%	1.2%	1.4%	1.0%	0.2
Congestive heart failure, 30-day PDP	BPCI impact estimate	36,491	36,719	8.7%	8.4%	8.5%	8.1%	0.1
	Sensitivity test	36,942	189,305	8.5%	8.2%	8.6%	7.9%	0.4
Congestive heart failure, 90-day PDP	BPCI impact estimate	36,207	36,471	18.0%	17.0%	18.1%	17.0%	0.2
	Sensitivity test	36,657	188,007	17.8%	16.8%	17.7%	16.4%	0.3
COPD, bronchitis, asthma, 30-day PDP	BPCI impact estimate	21,012	21,057	3.5%	3.0%	3.3%	2.9%	-0.1
	Sensitivity test	21,056	137,001	3.4%	2.9%	3.4%	2.9%	0.0

Clinical episode and outcome	Result	Number of BPCI Episodes	Number of Comparison Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD
COPD, bronchitis, asthma, 90-day PDP	BPCI impact estimate	20,806	20,892	8.1%	6.9%	8.0%	6.8%	0.0
	Sensitivity test	20,850	135,907	8.1%	6.8%	7.9%	6.8%	-0.2
Coronary artery bypass graft, 30-day PDP ¹	BPCI impact estimate	3,618	3,614	0.8%	1.3%	0.8%	0.7%	0.6
	Sensitivity test	4,675	21,470	0.7%	1.2%	0.7%	0.9%	0.4*
Coronary artery bypass graft, 90-day PDP	BPCI impact estimate	3,582	3,582	1.8%	2.2%	2.0%	1.5%	0.9
	Sensitivity test	4,630	21,270	1.8%	2.1%	1.6%	1.8%	0.2
Diabetes, 30-day PDP	BPCI impact estimate	1,634	1,651	4.1%	3.2%	3.0%	2.9%	-0.8
	Sensitivity test	1,652	14,687	4.2%	3.1%	3.2%	3.0%	-0.8
Diabetes, 90-day PDP	BPCI impact estimate	1,629	1,632	8.7%	7.6%	7.6%	5.9%	0.7
	Sensitivity test	1,647	14,607	8.4%	7.4%	7.0%	6.8%	-0.8
Esophagitis, gastroenteritis & other digestive disorders, 30-day PDP	BPCI impact estimate	4,588	4,593	2.5%	2.4%	2.4%	2.5%	-0.1
	Sensitivity test	4,625	43,702	2.5%	2.4%	2.4%	2.5%	-0.2
Esophagitis, gastroenteritis & other digestive disorders, 90-day PDP	BPCI impact estimate	4,572	4,574	6.1%	5.8%	5.4%	5.6%	-0.5
	Sensitivity test	4,609	43,516	6.2%	6.0%	5.7%	5.7%	-0.2
Fractures of the femur and hip or pelvis, 30-day PDP	BPCI impact estimate	1,218	1,213	5.2%	7.6%	6.2%	7.4%	1.2
	Sensitivity test	1,246	10,133	5.3%	7.7%	7.2%	8.2%	1.4
Fractures of the femur and hip or pelvis, 90-day PDP	BPCI impact estimate	1,213	1,209	10.2%	13.4%	11.3%	14.4%	0.1
	Sensitivity test	1,241	10,075	10.4%	13.6%	12.4%	13.9%	1.8
Gastrointestinal hemorrhage, 30-day PDP	BPCI impact estimate	4,741	4,736	4.9%	4.5%	4.1%	3.9%	-0.1
	Sensitivity test	4,800	41,628	4.8%	4.5%	4.4%	4.0%	0.1
Gastrointestinal hemorrhage, 90-day PDP	BPCI impact estimate	4,721	4,717	10.1%	9.1%	9.1%	8.3%	-0.2
	Sensitivity test	4,780	41,451	10.1%	9.3%	9.0%	8.8%	-0.6

¹ In the fourth evaluation report, we investigated the increase in mortality during the 30-day PDP for coronary artery bypass graft (CABG) episodes. We found that the volatility of the mortality rate for CABG emergent episodes during the time period prior to the implementation of BPCI caused the statistically significant increase from baseline to intervention relative to the comparison group and that there was no correlation between BPCI and mortality for CABG episodes. For further details, see the CMS Bundled Payments for Care Improvement Initiative Models 2-4: Year 4 Evaluation & Monitoring Annual Report, available for download at <https://innovation.cms.gov/initiatives/bundled-payments/>.

Clinical episode and outcome	Result	Number of BPCI Episodes	Number of Comparison Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD
Gastrointestinal obstruction, 30-day PDP	BPCI impact estimate	1,900	1,900	5.7%	3.7%	4.7%	4.0%	-1.3
	Sensitivity test	1,900	22,435	5.3%	3.7%	4.0%	3.8%	-1.4*
Gastrointestinal obstruction, 90-day PDP	BPCI impact estimate	1,889	1,886	9.5%	7.7%	8.6%	7.8%	-0.9
	Sensitivity test	1,889	22,321	9.1%	7.6%	7.5%	7.3%	-1.4
Hip & femur procedures except major joint, 30-day PDP	BPCI impact estimate	8,370	8,354	4.8%	4.5%	4.3%	4.5%	-0.5
	Sensitivity test	8,382	54,433	4.8%	4.5%	4.4%	4.7%	-0.6
Hip & femur procedures except major joint, 90-day PDP	BPCI impact estimate	8,323	8,292	10.3%	9.9%	10.0%	10.3%	-0.6
	Sensitivity test	8,335	54,038	10.1%	9.8%	10.1%	10.1%	-0.4
Lower extremity and humerus procedure except hip, foot, femur, 30-day PDP	BPCI impact estimate	1,238	1,238	1.8%	1.1%	1.3%	1.6%	-1.0
	Sensitivity test	1,261	8,552	1.8%	1.3%	1.2%	1.3%	-0.7
Lower extremity and humerus procedure except hip, foot, femur, 90-day PDP	BPCI impact estimate	1,236	1,230	4.6%	2.9%	3.3%	3.6%	-1.9
	Sensitivity test	1,258	8,507	4.8%	3.2%	3.4%	3.2%	-1.4
Major bowel procedure, 30-day PDP	BPCI impact estimate	3,396	3,400	3.5%	3.1%	3.6%	3.2%	0.0
	Sensitivity test	3,497	27,512	3.5%	3.1%	3.4%	3.0%	0.0
Major bowel procedure, 90-day PDP	BPCI impact estimate	3,367	3,378	7.0%	6.3%	6.6%	5.6%	0.3
	Sensitivity test	3,467	27,322	6.8%	6.1%	6.4%	5.9%	-0.2
Major joint replacement of the lower extremity, 30-day PDP	BPCI impact estimate	109,438	109,479	0.9%	0.8%	0.8%	0.8%	0.0
	Sensitivity test	119,405	382,666	0.9%	0.8%	0.9%	0.9%	0.0
Major joint replacement of the lower extremity, 90-day PDP	BPCI impact estimate	109,141	109,304	1.9%	1.8%	1.8%	1.8%	-0.1
	Sensitivity test	119,086	382,112	1.9%	1.8%	1.9%	1.9%	-0.1
Major joint replacement of the upper extremity, 90-day PDP	BPCI impact estimate	1,539	1,536	0.6%	0.3%	1.3%	0.3%	0.6
	Sensitivity test	1,553	9,434	0.6%	0.3%	1.0%	0.5%	0.1
Medical non-infectious orthopedic, 30-day PDP	BPCI impact estimate	7,376	7,411	3.3%	3.3%	3.1%	3.1%	-0.1
	Sensitivity test	8,064	51,740	3.4%	3.5%	3.1%	3.3%	0.0

Clinical episode and outcome	Result	Number of BPCI Episodes	Number of Comparison Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD
Medical non-infectious orthopedic, 90-day PDP	BPCI impact estimate	7,338	7,374	7.1%	6.8%	6.7%	7.0%	-0.6
	Sensitivity test	8,023	51,523	7.2%	7.1%	7.0%	7.1%	-0.3
Nutritional and metabolic disorders, 30-day PDP	BPCI impact estimate	2,959	2,976	8.0%	7.0%	8.6%	6.7%	1.0
	Sensitivity test	2,969	24,109	7.9%	7.0%	7.8%	7.1%	-0.3
Nutritional and metabolic disorders, 90-day PDP	BPCI impact estimate	2,943	2,964	15.7%	14.0%	15.1%	13.5%	-0.1
	Sensitivity test	2,953	23,985	15.8%	14.2%	14.6%	14.0%	-1.0
Other respiratory, 30-day PDP	BPCI impact estimate	5,268	5,262	11.3%	10.5%	11.3%	10.7%	-0.2
	Sensitivity test	5,429	46,375	11.2%	10.3%	10.8%	10.3%	-0.5
Other respiratory, 90-day PDP	BPCI impact estimate	5,235	5,217	19.6%	17.8%	19.6%	18.1%	-0.3
	Sensitivity test	5,395	45,941	19.2%	17.4%	19.0%	18.1%	-0.8
Other vascular surgery, 30-day PDP	BPCI impact estimate	1,713	1,713	4.6%	2.9%	3.9%	3.2%	-1.0
	Sensitivity test	1,714	14,638	4.3%	2.9%	3.2%	3.1%	-1.3*
Other vascular surgery, 90-day PDP	BPCI impact estimate	1,708	1,706	9.5%	7.5%	8.6%	7.2%	-0.6
	Sensitivity test	1,709	14,581	9.1%	7.4%	7.8%	7.1%	-0.9
Percutaneous coronary intervention, 30-day PDP	BPCI impact estimate	5,597	5,618	1.8%	1.9%	1.7%	1.4%	0.3
	Sensitivity test	5,819	39,263	1.7%	1.7%	1.7%	1.5%	0.1
Percutaneous coronary intervention, 90-day PDP	BPCI impact estimate	5,569	5,596	3.2%	3.8%	3.2%	3.5%	0.2
	Sensitivity test	5,790	39,099	3.2%	3.6%	3.3%	3.5%	0.2
Renal failure, 30-day PDP	BPCI impact estimate	8,248	8,250	9.4%	8.8%	9.4%	8.2%	0.7
	Sensitivity test	8,464	58,165	9.6%	9.0%	9.3%	8.9%	-0.2
Renal failure, 90-day PDP	BPCI impact estimate	8,215	8,203	17.1%	16.3%	17.0%	15.6%	0.7
	Sensitivity test	8,429	57,804	17.2%	16.5%	16.8%	16.0%	0.0
Revision of the hip or knee, 30-day PDP	BPCI impact estimate	1,233	1,236	0.5%	0.5%	0.3%	0.1%	0.3
	Sensitivity test	1,285	10,150	0.4%	0.6%	0.3%	0.5%	0.1
Revision of the hip or knee, 90-day PDP	BPCI impact estimate	1,257	1,256	1.0%	1.7%	0.7%	1.0%	0.3
	Sensitivity test	1,282	10,124	1.0%	1.6%	0.9%	1.1%	0.4

Clinical episode and outcome	Result	Number of BPCI Episodes	Number of Comparison Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD
Sepsis, 30-day PDP	BPCI impact estimate	29,098	29,207	14.2%	13.0%	13.6%	12.5%	-0.1
	Sensitivity test	30,317	204,400	13.8%	12.6%	13.2%	12.2%	-0.2
Sepsis, 90-day PDP	BPCI impact estimate	28,800	28,924	22.0%	20.2%	21.7%	19.7%	0.2
	Sensitivity test	29,985	202,519	21.5%	19.5%	21.1%	19.4%	-0.3
Simple pneumonia & respiratory infections, 30-day PDP	BPCI impact estimate	24,895	25,002	10.0%	9.1%	9.5%	8.7%	-0.2
	Sensitivity test	25,117	169,042	9.9%	8.9%	9.7%	8.6%	0.0
Simple pneumonia & respiratory infections, 90-day PDP	BPCI impact estimate	24,686	24,814	17.7%	15.8%	16.9%	15.2%	-0.2
	Sensitivity test	24,903	167,785	17.5%	15.6%	17.0%	15.0%	0.0
Spinal fusion (non-cervical), 30-day PDP	BPCI impact estimate	3,866	3,868	0.3%	0.3%	0.1%	0.3%	-0.2
	Sensitivity test	3,888	27,022	0.3%	0.3%	0.3%	0.3%	-0.1
Spinal fusion (non-cervical), 90-day PDP	BPCI impact estimate	3,856	3,860	0.9%	0.6%	0.4%	0.8%	-0.6
	Sensitivity test	3,878	26,958	0.9%	0.6%	0.7%	0.7%	-0.3
Stroke, 30-day PDP	BPCI impact estimate	13,067	13,067	11.8%	11.3%	11.5%	10.9%	0.1
	Sensitivity test	13,102	83,754	11.5%	11.1%	11.2%	10.6%	0.3
Stroke, 90-day PDP	BPCI impact estimate	12,964	12,982	17.0%	15.8%	16.6%	15.4%	-0.1
	Sensitivity test	12,998	83,278	16.6%	15.5%	16.2%	15.3%	-0.2
Syncope & collapse, 30-day PDP	BPCI impact estimate	1,490	1,492	2.3%	1.6%	1.4%	1.8%	-1.1
	Sensitivity test	1,490	13,670	2.3%	1.8%	1.6%	1.8%	-0.7
Syncope & collapse, 90-day PDP	BPCI impact estimate	1,486	1,488	4.9%	3.5%	4.7%	4.7%	-1.4
	Sensitivity test	1,486	13,630	4.9%	3.5%	4.3%	4.6%	-1.6*
Transient ischemia, 30-day PDP	BPCI impact estimate	1,201	1,205	0.7%	1.4%	0.4%	0.7%	0.4
	Sensitivity test	1,201	12,323	0.8%	1.5%	0.9%	1.2%	0.4
Transient ischemia, 90-day PDP	BPCI impact estimate	1,192	1,195	3.7%	3.1%	3.2%	2.5%	0.1
	Sensitivity test	1,197	12,286	3.4%	3.1%	3.0%	3.1%	-0.4
Urinary tract infection, 30-day PDP	BPCI impact estimate	9,022	9,038	5.9%	5.0%	5.3%	4.1%	0.2
	Sensitivity test	9,238	62,078	6.0%	5.1%	5.2%	4.3%	0.0

Clinical episode and outcome	Result	Number of BPCI Episodes	Number of Comparison Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD
Urinary tract infection, 90-day PDP	BPCI impact estimate	8,980	8,995	12.4%	11.1%	11.1%	10.3%	-0.5
	Sensitivity test	9,196	61,710	12.5%	11.1%	11.3%	10.2%	-0.3

Note: The estimates in this table are the results of a difference-in-differences (DiD) model. Positive DiD estimates that are significant at the 5% or 10% significance level are indicated by dark and light green shaded cells, respectively. Negative DiD estimates that are significant at the 5% or 10% significance level are indicated by dark and light orange shaded cells, respectively.

* Indicates the sensitivity test was statistically significant at the 10% level.

Exhibit H.3: BPCI Impact Estimate and Sensitivity Test Results, Emergency Department Use, Model 2 Hospitals, Q4 2013 – Q4 2016

Clinical episode and outcome	Result	Number of BPCI Episodes	Number of Comparison Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD
Acute myocardial infarction, 30-day PDP	BPCI impact estimate	6,111	6,139	11.2%	13.0%	11.2%	13.1%	-0.1
	Sensitivity test	6,569	46,025	11.1%	13.0%	11.9%	13.6%	0.2
Acute myocardial infarction, 90-day PDP	BPCI impact estimate	6,053	6,115	21.7%	23.7%	22.0%	24.4%	-0.5
	Sensitivity test	6,509	45,726	21.8%	23.9%	22.8%	25.2%	-0.4
Cardiac arrhythmia, 30-day PDP	BPCI impact estimate	6,693	6,705	11.0%	11.7%	11.5%	11.9%	0.2
	Sensitivity test	6,694	64,757	11.0%	11.8%	11.3%	12.3%	-0.3
Cardiac arrhythmia, 90-day PDP	BPCI impact estimate	6,669	6,676	21.4%	23.3%	22.5%	23.1%	1.3
	Sensitivity test	6,669	64,543	21.5%	23.5%	21.9%	23.6%	0.3
Cardiac valve, 30-day PDP	BPCI impact estimate	4,320	4,318	11.7%	11.6%	12.6%	11.8%	0.6
	Sensitivity test	5,627	22,560	11.4%	11.9%	12.0%	12.9%	-0.4
Cardiac valve, 90-day PDP	BPCI impact estimate	4,308	4,305	20.0%	21.2%	21.3%	21.9%	0.7
	Sensitivity test	5,611	22,486	20.1%	21.8%	20.8%	23.1%	-0.6
Cellulitis, 30-day PDP	BPCI impact estimate	5,935	5,953	12.2%	11.7%	11.1%	12.3%	-1.7
	Sensitivity test	5,935	45,658	12.0%	11.4%	11.2%	11.6%	-1.0
Cellulitis, 90-day PDP	BPCI impact estimate	5,902	5,938	23.5%	24.3%	22.5%	24.0%	-0.7
	Sensitivity test	5,902	45,447	23.0%	24.0%	22.4%	23.7%	-0.4
Cervical spinal fusion, 30-day PDP	BPCI impact estimate	1,364	1,363	12.9%	11.6%	12.9%	13.1%	-1.5
	Sensitivity test	1,659	10,591	12.2%	12.2%	11.7%	11.8%	-0.1
Cervical spinal fusion, 90-day PDP	BPCI impact estimate	1,359	1,359	21.4%	19.2%	21.8%	22.2%	-2.6
	Sensitivity test	1,654	10,574	20.5%	20.4%	20.1%	20.3%	-0.2
Congestive heart failure, 30-day PDP	BPCI impact estimate	36,996	37,041	10.8%	11.9%	10.4%	12.1%	-0.6
	Sensitivity test	37,448	191,029	10.8%	11.8%	10.6%	11.8%	-0.2
Congestive heart failure, 90-day PDP	BPCI impact estimate	36,706	36,792	22.1%	23.9%	21.8%	24.1%	-0.5
	Sensitivity test	37,157	189,721	22.2%	23.9%	21.7%	24.0%	-0.6
COPD, bronchitis, asthma, 30-day PDP	BPCI impact estimate	21,156	21,183	11.5%	12.6%	11.1%	12.7%	-0.5
	Sensitivity test	21,200	137,816	11.5%	12.6%	11.2%	12.6%	-0.3

Clinical episode and outcome	Result	Number of BPCI Episodes	Number of Comparison Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD
COPD, bronchitis, asthma, 90-day PDP	BPCI impact estimate	20,948	21,018	24.0%	26.0%	23.9%	26.3%	-0.4
	Sensitivity test	20,992	136,711	24.1%	26.0%	23.7%	26.0%	-0.4
Coronary artery bypass graft, 30-day PDP	BPCI impact estimate	3,621	3,614	10.3%	12.6%	12.3%	14.1%	0.5
	Sensitivity test	4,680	21,474	10.5%	13.2%	12.2%	13.1%	1.8*
Coronary artery bypass graft, 90-day PDP	BPCI impact estimate	3,585	3,582	19.3%	22.3%	21.9%	24.6%	0.3
	Sensitivity test	4,635	21,273	20.1%	23.2%	21.2%	22.6%	1.7
Diabetes, 30-day PDP	BPCI impact estimate	1,643	1,661	12.8%	14.3%	14.3%	14.6%	1.2
	Sensitivity test	1,662	14,782	13.0%	14.1%	12.9%	14.3%	-0.3
Diabetes, 90-day PDP	BPCI impact estimate	1,638	1,642	26.1%	28.1%	26.2%	28.5%	-0.2
	Sensitivity test	1,657	14,702	26.2%	28.3%	26.2%	28.3%	0.1
Esophagitis, gastroenteritis & other digestive disorders, 30-day PDP	BPCI impact estimate	4,612	4,614	12.8%	14.0%	12.4%	13.8%	-0.2
	Sensitivity test	4,649	43,902	12.7%	13.8%	12.3%	13.6%	-0.1
Esophagitis, gastroenteritis & other digestive disorders, 90-day PDP	BPCI impact estimate	4,596	4,595	24.3%	26.0%	24.5%	25.7%	0.5
	Sensitivity test	4,633	43,716	24.2%	26.0%	24.3%	26.0%	0.1
Fractures of the femur and hip or pelvis, 30-day PDP	BPCI impact estimate	1,244	1,241	8.2%	8.0%	7.8%	8.4%	-0.8
	Sensitivity test	1,272	10,412	8.3%	8.2%	6.9%	7.0%	-0.3
Fractures of the femur and hip or pelvis, 90-day PDP	BPCI impact estimate	1,239	1,237	18.3%	19.7%	17.7%	19.0%	0.0
	Sensitivity test	1,267	10,350	18.9%	20.3%	16.6%	17.3%	0.8
Gastrointestinal hemorrhage, 30-day PDP	BPCI impact estimate	4,763	4,769	8.6%	9.5%	9.0%	10.2%	-0.3
	Sensitivity test	4,822	41,931	8.3%	9.3%	8.8%	10.1%	-0.3
Gastrointestinal hemorrhage, 90-day PDP	BPCI impact estimate	4,743	4,750	17.8%	19.0%	17.7%	19.6%	-0.7
	Sensitivity test	4,802	41,753	17.4%	18.9%	17.8%	20.2%	-0.9
Gastrointestinal obstruction, 30-day PDP	BPCI impact estimate	1,914	1,921	9.1%	10.1%	9.6%	8.4%	2.2
	Sensitivity test	1,914	22,599	9.1%	10.4%	9.7%	9.9%	1.0
Gastrointestinal obstruction, 90-day PDP	BPCI impact estimate	1,903	1,907	19.5%	21.7%	20.1%	19.1%	3.2
	Sensitivity test	1,903	22,484	19.2%	21.8%	19.8%	20.6%	1.7
Hip & femur procedures except major joint, 30-day PDP	BPCI impact estimate	8,506	8,508	7.3%	8.1%	8.1%	8.5%	0.4
	Sensitivity test	8,518	55,525	7.3%	8.1%	7.7%	8.4%	0.2

Clinical episode and outcome	Result	Number of BPCI Episodes	Number of Comparison Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD
Hip & femur procedures except major joint, 90-day PDP	BPCI impact estimate	8,458	8,446	16.2%	18.6%	17.4%	18.5%	1.3
	Sensitivity test	8,470	55,128	16.2%	18.6%	17.0%	18.1%	1.3*
Lower extremity and humerus procedure except hip, foot, femur, 30-day PDP	BPCI impact estimate	1,242	1,241	9.9%	6.9%	7.5%	7.0%	-2.5
	Sensitivity test	1,265	8,581	9.6%	6.9%	8.3%	8.5%	-2.8*
Lower extremity and humerus procedure except hip, foot, femur, 90-day PDP	BPCI impact estimate	1,240	1,233	17.3%	15.9%	18.4%	16.6%	0.5
	Sensitivity test	1,262	8,535	16.9%	16.0%	16.7%	18.1%	-2.3
Major bowel procedure, 30-day PDP	BPCI impact estimate	3,405	3,411	11.4%	10.7%	9.9%	11.0%	-1.8
	Sensitivity test	3,506	27,573	11.8%	11.1%	10.7%	11.5%	-1.5
Major bowel procedure, 90-day PDP	BPCI impact estimate	3,376	3,388	18.5%	20.3%	16.7%	19.0%	-0.6
	Sensitivity test	3,476	27,381	18.8%	20.4%	18.8%	20.3%	0.1
Major joint replacement of the lower extremity, 30-day PDP	BPCI impact estimate	109,752	109,756	7.5%	8.2%	7.5%	8.3%	0.0
	Sensitivity test	119,758	383,724	7.5%	8.2%	7.6%	8.3%	0.0
Major joint replacement of the lower extremity, 90-day PDP	BPCI impact estimate	109,451	109,579	13.6%	14.5%	13.6%	14.6%	-0.1
	Sensitivity test	119,435	383,162	13.6%	14.4%	13.7%	14.6%	-0.1
Major joint replacement of the upper extremity, 30-day PDP	BPCI impact estimate	1,540	1,538	7.7%	7.4%	6.8%	8.1%	-1.5
	Sensitivity test	1,554	9,446	7.4%	7.5%	5.7%	8.0%	-2.2*
Major joint replacement of the upper extremity, 90-day PDP	BPCI impact estimate	1,539	1,538	14.6%	13.2%	12.6%	15.8%	-4.6
	Sensitivity test	1,553	9,441	14.8%	13.0%	12.2%	14.9%	-4.5*
Medical non-infectious orthopedic, 30-day PDP	BPCI impact estimate	7,445	7,456	9.2%	10.5%	10.0%	11.2%	0.1
	Sensitivity test	8,143	52,097	9.4%	10.8%	10.1%	11.0%	0.6
Medical non-infectious orthopedic, 90-day PDP	BPCI impact estimate	7,407	7,419	20.5%	22.7%	21.3%	23.1%	0.5
	Sensitivity test	8,102	51,879	20.7%	23.1%	21.6%	23.0%	1.1
Nutritional and metabolic disorders, 30-day PDP	BPCI impact estimate	2,983	2,999	11.2%	12.9%	11.0%	12.5%	0.2
	Sensitivity test	2,993	24,357	11.6%	13.7%	11.4%	12.8%	0.8
Nutritional and metabolic disorders, 90-day PDP	BPCI impact estimate	2,967	2,987	23.0%	24.2%	22.4%	23.0%	0.5
	Sensitivity test	2,977	24,232	23.3%	24.9%	22.3%	24.5%	-0.5

Clinical episode and outcome	Result	Number of BPCI Episodes	Number of Comparison Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD
Other respiratory, 30-day PDP	BPCI impact estimate	5,315	5,322	10.1%	10.8%	10.0%	12.0%	-1.3
	Sensitivity test	5,477	46,908	10.3%	11.0%	10.7%	11.9%	-0.5
Other respiratory, 90-day PDP	BPCI impact estimate	5,282	5,277	21.8%	22.7%	21.3%	23.6%	-1.3
	Sensitivity test	5,443	46,473	22.1%	23.1%	21.9%	23.8%	-1.0
Other vascular surgery, 30-day PDP	BPCI impact estimate	1,720	1,724	11.2%	11.9%	10.6%	13.5%	-2.3
	Sensitivity test	1,721	14,711	11.5%	12.0%	11.8%	12.7%	-0.4
Other vascular surgery, 90-day PDP	BPCI impact estimate	1,715	1,717	21.2%	22.6%	19.7%	24.5%	-3.4
	Sensitivity test	1,716	14,653	21.5%	22.7%	21.3%	23.5%	-0.9
Percutaneous coronary intervention, 30-day PDP	BPCI impact estimate	5,610	5,622	10.6%	13.5%	11.0%	14.1%	-0.1
	Sensitivity test	5,832	39,311	10.7%	13.4%	11.5%	13.8%	0.4
Percutaneous coronary intervention, 90-day PDP	BPCI impact estimate	5,582	5,600	20.0%	23.5%	21.4%	25.9%	-1.0
	Sensitivity test	5,803	39,147	20.1%	23.7%	21.1%	24.5%	0.2
Renal failure, 30-day PDP	BPCI impact estimate	8,336	8,331	11.7%	12.2%	10.7%	12.1%	-0.9
	Sensitivity test	8,556	58,731	12.0%	12.5%	11.1%	12.2%	-0.6
Renal failure, 90-day PDP	BPCI impact estimate	8,301	8,284	22.9%	24.3%	21.4%	23.6%	-0.8
	Sensitivity test	8,519	58,366	23.3%	24.6%	21.9%	23.7%	-0.5
Revision of the hip or knee, 30-day PDP	BPCI impact estimate	1,261	1,260	8.7%	11.9%	7.2%	9.2%	1.1
	Sensitivity test	1,286	10,163	8.8%	11.8%	8.5%	9.9%	1.5
Revision of the hip or knee, 90-day PDP	BPCI impact estimate	1,258	1,257	16.9%	20.6%	16.6%	18.2%	2.1
	Sensitivity test	1,283	10,136	16.6%	20.7%	16.8%	19.4%	1.6
Sepsis, 30-day PDP	BPCI impact estimate	29,569	29,633	9.4%	10.6%	9.2%	10.4%	0.0
	Sensitivity test	30,814	207,451	9.8%	10.9%	9.4%	10.4%	0.1
Sepsis, 90-day PDP	BPCI impact estimate	29,268	29,348	19.1%	20.8%	18.6%	20.6%	-0.2
	Sensitivity test	30,478	205,537	19.7%	21.4%	19.0%	20.5%	0.2
Simple pneumonia & respiratory infections, 30-day PDP	BPCI impact estimate	25,240	25,277	10.1%	10.9%	9.8%	10.9%	-0.4
	Sensitivity test	25,464	170,943	10.0%	10.8%	9.8%	10.6%	0.0
Simple pneumonia & respiratory infections, 90-day PDP	BPCI impact estimate	25,029	25,089	20.2%	21.9%	20.0%	21.6%	0.1
	Sensitivity test	25,248	169,680	20.1%	21.9%	19.7%	21.4%	0.0

Clinical episode and outcome	Result	Number of BPCI Episodes	Number of Comparison Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD
Spinal fusion (non-cervical), 30-day PDP	BPCI impact estimate	3,867	3,868	11.5%	11.8%	11.1%	11.0%	0.4
	Sensitivity test	3,889	27,027	12.0%	12.3%	11.3%	11.2%	0.3
Spinal fusion (non-cervical), 90-day PDP	BPCI impact estimate	3,857	3,860	18.0%	20.0%	17.4%	18.7%	0.7
	Sensitivity test	3,879	26,963	18.4%	20.4%	18.1%	18.7%	1.4
Stroke, 30-day PDP	BPCI impact estimate	13,126	13,127	10.0%	10.9%	9.1%	10.3%	-0.4
	Sensitivity test	13,161	84,219	10.2%	11.1%	9.3%	10.7%	-0.4
Stroke, 90-day PDP	BPCI impact estimate	13,022	13,041	20.6%	21.6%	18.8%	21.5%	-1.7
	Sensitivity test	13,056	83,741	21.0%	22.0%	19.3%	21.5%	-1.2*
Syncope & collapse, 30-day PDP	BPCI impact estimate	1,497	1,499	10.5%	10.1%	8.8%	11.3%	-2.9
	Sensitivity test	1,497	13,710	10.4%	10.4%	9.0%	10.3%	-1.3
Syncope & collapse, 90-day PDP	BPCI impact estimate	1,493	1,495	21.5%	20.0%	20.5%	22.6%	-3.6
	Sensitivity test	1,493	13,670	21.5%	20.7%	19.4%	22.0%	-3.5*
Transient ischemia, 30-day PDP	BPCI impact estimate	1,204	1,211	8.7%	11.0%	9.7%	10.8%	1.3
	Sensitivity test	1,204	12,368	8.6%	10.7%	9.8%	11.4%	0.5
Transient ischemia, 90-day PDP	BPCI impact estimate	1,200	1,203	19.6%	23.6%	20.2%	20.3%	3.9
	Sensitivity test	1,200	12,331	19.5%	23.3%	19.9%	22.7%	1.0
Urinary tract infection, 30-day PDP	BPCI impact estimate	9,142	9,159	11.5%	12.3%	10.7%	12.2%	-0.7
	Sensitivity test	9,361	62,920	11.6%	12.8%	11.2%	12.3%	0.0
Urinary tract infection, 90-day PDP	BPCI impact estimate	9,100	9,116	22.4%	24.9%	23.1%	24.4%	1.2
	Sensitivity test	9,319	62,547	22.5%	25.2%	23.1%	24.9%	0.9

Note: The estimates in this table are the results of a difference-in-differences (DiD) model. Positive DiD estimates that are significant at the 5% or 10% significance level are indicated by dark and light green shaded cells, respectively. Negative DiD estimates that are significant at the 5% or 10% significance level are indicated by dark and light orange shaded cells, respectively.

* Indicates the sensitivity test was statistically significant at the 10% level.

**Exhibit H.4: BPCI Impact Estimate and Sensitivity Test Results, Unplanned Readmission Rate, Model 2 Hospitals,
Q4 2013 – Q4 2016**

Clinical episode and outcome	Result	Number of BPCI Episodes	Number of Comparison Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD
Acute myocardial infarction, 30-day PDP	BPCI impact estimate	6,111	6,139	17.6%	15.1%	18.7%	15.4%	0.8
	Sensitivity test	6,569	46,025	17.3%	14.8%	17.6%	15.1%	-0.1
Acute myocardial infarction, 90-day PDP	BPCI impact estimate	6,053	6,115	29.5%	26.5%	31.4%	27.1%	1.3
	Sensitivity test	6,509	45,726	29.0%	25.7%	29.5%	26.4%	-0.2
Cardiac arrhythmia, 30-day PDP	BPCI impact estimate	6,693	6,705	12.3%	10.6%	12.9%	12.3%	-1.1
	Sensitivity test	6,694	64,757	12.1%	10.5%	12.5%	11.6%	-0.7
Cardiac arrhythmia, 90-day PDP	BPCI impact estimate	6,669	6,676	22.0%	20.6%	23.2%	23.1%	-1.3
	Sensitivity test	6,669	64,543	21.7%	20.6%	23.1%	21.9%	0.0
Cardiac valve, 30-day PDP	BPCI impact estimate	4,320	4,318	18.0%	13.1%	18.5%	14.9%	-1.2
	Sensitivity test	5,627	22,560	17.6%	12.7%	17.8%	13.7%	-0.7
Cardiac valve, 90-day PDP	BPCI impact estimate	4,308	4,305	26.8%	20.5%	27.5%	23.6%	-2.3
	Sensitivity test	5,611	22,486	25.9%	20.0%	26.0%	21.1%	-1.0
Cellulitis, 30-day PDP	BPCI impact estimate	5,935	5,953	11.6%	10.9%	12.8%	12.6%	-0.5
	Sensitivity test	5,935	45,658	11.8%	10.8%	12.2%	11.5%	-0.2
Cellulitis, 90-day PDP	BPCI impact estimate	5,902	5,938	24.4%	23.4%	25.6%	25.7%	-1.2
	Sensitivity test	5,902	45,447	24.5%	23.4%	24.7%	24.2%	-0.5
Cervical spinal fusion, 30-day PDP	BPCI impact estimate	1,364	1,363	6.7%	5.1%	9.0%	6.6%	0.9
	Sensitivity test	1,659	10,591	6.6%	5.1%	7.0%	5.8%	-0.3
Cervical spinal fusion, 90-day PDP	BPCI impact estimate	1,359	1,359	10.3%	8.6%	12.6%	9.4%	1.5
	Sensitivity test	1,654	10,574	10.5%	8.4%	10.0%	8.9%	-1.1
Congestive heart failure, 30-day PDP	BPCI impact estimate	36,996	37,041	20.3%	18.1%	20.2%	18.2%	-0.1
	Sensitivity test	37,448	191,029	20.4%	18.1%	20.0%	17.8%	-0.1
Congestive heart failure, 90-day PDP	BPCI impact estimate	36,706	36,792	37.3%	34.8%	37.4%	35.0%	0.0
	Sensitivity test	37,157	189,721	37.6%	35.0%	37.1%	34.5%	0.0
COPD, bronchitis, asthma, 30-day PDP	BPCI impact estimate	21,156	21,183	16.9%	15.8%	16.7%	15.5%	0.1
	Sensitivity test	21,200	137,816	17.0%	15.9%	16.7%	15.5%	0.2

Clinical episode and outcome	Result	Number of BPCI Episodes	Number of Comparison Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD
COPD, bronchitis, asthma, 90-day PDP	BPCI impact estimate	20,948	21,018	32.1%	31.0%	32.1%	31.2%	-0.2
	Sensitivity test	20,992	136,711	32.2%	31.3%	31.9%	30.8%	0.1
Coronary artery bypass graft, 30-day PDP	BPCI impact estimate	3,621	3,614	13.8%	11.5%	14.2%	11.2%	0.7
	Sensitivity test	4,680	21,474	14.5%	11.7%	13.0%	10.6%	-0.3
Coronary artery bypass graft, 90-day PDP	BPCI impact estimate	3,585	3,582	20.2%	16.8%	20.8%	16.7%	0.7
	Sensitivity test	4,635	21,273	20.4%	16.6%	19.2%	15.8%	-0.5
Diabetes, 30-day PDP	BPCI impact estimate	1,643	1,661	15.4%	13.5%	14.8%	12.0%	0.9
	Sensitivity test	1,662	14,782	15.3%	13.4%	14.5%	13.6%	-1.0
Diabetes, 90-day PDP	BPCI impact estimate	1,638	1,642	30.9%	26.8%	29.7%	26.1%	-0.5
	Sensitivity test	1,657	14,702	30.6%	26.2%	28.1%	27.8%	-4.1*
Esophagitis, gastroenteritis & other digestive disorders, 30-day PDP	BPCI impact estimate	4,612	4,614	12.8%	12.5%	12.6%	13.0%	-0.7
	Sensitivity test	4,649	43,902	12.9%	12.5%	13.1%	12.8%	0.0
Esophagitis, gastroenteritis & other digestive disorders, 90-day PDP	BPCI impact estimate	4,596	4,595	24.7%	22.9%	23.2%	23.7%	-2.3
	Sensitivity test	4,633	43,716	24.8%	22.9%	24.3%	23.5%	-1.1
Fractures of the femur and hip or pelvis, 30-day PDP	BPCI impact estimate	1,244	1,241	9.2%	8.1%	12.0%	8.8%	2.2
	Sensitivity test	1,272	10,412	9.4%	8.1%	10.6%	9.2%	0.1
Fractures of the femur and hip or pelvis, 90-day PDP	BPCI impact estimate	1,239	1,237	17.3%	18.6%	21.9%	17.2%	6.0
	Sensitivity test	1,267	10,350	17.8%	18.1%	19.8%	17.9%	2.2
Gastrointestinal hemorrhage, 30-day PDP	BPCI impact estimate	4,763	4,769	14.6%	12.7%	13.9%	12.9%	-0.9
	Sensitivity test	4,822	41,931	14.5%	12.9%	13.4%	13.1%	-1.4*
Gastrointestinal hemorrhage, 90-day PDP	BPCI impact estimate	4,743	4,750	25.4%	23.2%	25.0%	23.4%	-0.6
	Sensitivity test	4,802	41,753	25.0%	23.0%	24.2%	23.9%	-1.6
Gastrointestinal obstruction, 30-day PDP	BPCI impact estimate	1,914	1,921	12.2%	11.0%	14.2%	10.7%	2.4
	Sensitivity test	1,914	22,599	11.8%	10.7%	13.4%	11.8%	0.5
Gastrointestinal obstruction, 90-day PDP	BPCI impact estimate	1,903	1,907	21.6%	22.3%	25.3%	21.8%	4.3
	Sensitivity test	1,903	22,484	21.4%	21.9%	24.6%	22.3%	2.9*
Hip & femur procedures except major joint, 30-day PDP	BPCI impact estimate	8,506	8,508	12.3%	10.7%	11.4%	9.7%	0.1
	Sensitivity test	8,518	55,525	12.3%	10.6%	11.5%	10.1%	-0.3

Clinical episode and outcome	Result	Number of BPCI Episodes	Number of Comparison Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD
Hip & femur procedures except major joint, 90-day PDP	BPCI impact estimate	8,458	8,446	21.7%	19.8%	20.4%	18.8%	-0.3
	Sensitivity test	8,470	55,128	21.7%	19.7%	21.0%	19.0%	0.1
Lower extremity and humerus procedure except hip, foot, femur, 30-day PDP	BPCI impact estimate	1,242	1,241	8.8%	9.3%	9.1%	8.3%	1.2
	Sensitivity test	1,265	8,581	8.2%	9.2%	9.5%	9.6%	0.9
Lower extremity and humerus procedure except hip, foot, femur, 90-day PDP	BPCI impact estimate	1,240	1,233	16.8%	17.2%	18.4%	15.4%	3.4
	Sensitivity test	1,262	8,535	16.2%	17.1%	17.8%	17.1%	1.7
Major bowel procedure, 30-day PDP	BPCI impact estimate	3,405	3,411	15.5%	14.7%	14.7%	14.5%	-0.5
	Sensitivity test	3,506	27,573	15.4%	14.5%	14.5%	13.8%	-0.2
Major bowel procedure, 90-day PDP	BPCI impact estimate	3,376	3,388	23.7%	22.8%	24.0%	22.2%	0.9
	Sensitivity test	3,476	27,381	23.4%	22.5%	23.3%	21.8%	0.6
Major joint replacement of the lower extremity, 30-day PDP	BPCI impact estimate	109,752	109,756	6.2%	5.2%	5.9%	5.0%	-0.2
	Sensitivity test	119,758	383,724	6.1%	5.1%	5.9%	4.9%	-0.1
Major joint replacement of the lower extremity, 90-day PDP	BPCI impact estimate	109,451	109,579	9.9%	8.6%	9.4%	8.4%	-0.4
	Sensitivity test	119,435	383,162	9.8%	8.4%	9.4%	8.3%	-0.3
Major joint replacement of the upper extremity, 30-day PDP	BPCI impact estimate	1,540	1,538	4.1%	3.3%	4.9%	3.4%	0.8
	Sensitivity test	1,554	9,446	3.9%	3.1%	4.1%	3.5%	-0.2
Major joint replacement of the upper extremity, 90-day PDP	BPCI impact estimate	1,539	1,538	6.8%	6.1%	8.1%	6.4%	1.0
	Sensitivity test	1,553	9,441	6.5%	5.8%	7.6%	6.3%	0.6
Medical non-infectious orthopedic, 30-day PDP	BPCI impact estimate	7,445	7,456	12.1%	10.9%	11.5%	10.8%	-0.4
	Sensitivity test	8,143	52,097	12.4%	11.1%	11.8%	11.1%	-0.6
Medical non-infectious orthopedic, 90-day PDP	BPCI impact estimate	7,407	7,419	23.3%	21.5%	23.1%	21.3%	0.0
	Sensitivity test	8,102	51,879	23.2%	21.5%	23.2%	21.6%	-0.1
Nutritional and metabolic disorders, 30-day PDP	BPCI impact estimate	2,983	2,999	13.8%	13.4%	15.1%	13.0%	1.6
	Sensitivity test	2,993	24,357	13.9%	13.3%	14.2%	13.9%	-0.3
Nutritional and metabolic disorders, 90-day PDP	BPCI impact estimate	2,967	2,987	24.9%	24.7%	27.1%	24.3%	2.6
	Sensitivity test	2,977	24,232	25.0%	24.7%	25.8%	25.2%	0.3

Clinical episode and outcome	Result	Number of BPCI Episodes	Number of Comparison Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD
Other respiratory, 30-day PDP	BPCI impact estimate	5,315	5,322	19.8%	17.2%	19.5%	18.3%	-1.3
	Sensitivity test	5,477	46,908	19.6%	16.9%	19.0%	17.5%	-1.2
Other respiratory, 90-day PDP	BPCI impact estimate	5,282	5,277	32.9%	32.0%	33.4%	32.9%	-0.3
	Sensitivity test	5,443	46,473	32.6%	31.9%	33.4%	32.0%	0.7
Other vascular surgery, 30-day PDP	BPCI impact estimate	1,720	1,724	15.9%	13.7%	16.5%	13.9%	0.4
	Sensitivity test	1,721	14,711	15.7%	13.6%	16.1%	14.4%	-0.4
Other vascular surgery, 90-day PDP	BPCI impact estimate	1,715	1,717	27.5%	25.4%	27.5%	26.1%	-0.7
	Sensitivity test	1,716	14,653	27.3%	25.3%	28.5%	26.6%	-0.1
Percutaneous coronary intervention, 30-day PDP	BPCI impact estimate	5,610	5,622	11.1%	11.0%	11.8%	9.6%	2.1
	Sensitivity test	5,832	39,311	11.1%	11.0%	11.5%	10.0%	1.4*
Percutaneous coronary intervention, 90-day PDP	BPCI impact estimate	5,582	5,600	18.9%	18.7%	20.4%	16.8%	3.4
	Sensitivity test	5,803	39,147	18.9%	18.6%	19.7%	17.3%	2.1*
Renal failure, 30-day PDP	BPCI impact estimate	8,336	8,331	16.0%	15.7%	17.4%	16.0%	1.1
	Sensitivity test	8,556	58,731	16.0%	15.7%	17.0%	15.9%	0.9
Renal failure, 90-day PDP	BPCI impact estimate	8,301	8,284	29.5%	28.3%	30.6%	28.8%	0.6
	Sensitivity test	8,519	58,366	29.6%	28.4%	30.1%	28.7%	0.2
Revision of the hip or knee, 30-day PDP	BPCI impact estimate	1,261	1,260	9.5%	9.3%	10.7%	7.6%	2.9
	Sensitivity test	1,286	10,163	8.8%	9.1%	9.0%	7.7%	1.6
Revision of the hip or knee, 90-day PDP	BPCI impact estimate	1,258	1,257	16.3%	15.0%	18.5%	13.4%	3.7
	Sensitivity test	1,283	10,136	15.3%	15.0%	15.6%	13.8%	1.5
Sepsis, 30-day PDP	BPCI impact estimate	29,569	29,633	16.9%	15.5%	16.6%	15.8%	-0.5
	Sensitivity test	30,814	207,451	16.6%	15.2%	16.7%	15.5%	-0.2
Sepsis, 90-day PDP	BPCI impact estimate	29,268	29,348	29.4%	27.5%	29.1%	28.1%	-0.9
	Sensitivity test	30,478	205,537	29.0%	27.1%	29.0%	27.6%	-0.5
Simple pneumonia & respiratory infections, 30-day PDP	BPCI impact estimate	25,240	25,277	14.8%	13.6%	14.7%	14.0%	-0.5
	Sensitivity test	25,464	170,943	15.0%	13.6%	14.7%	13.6%	-0.2
Simple pneumonia & respiratory infections, 90-day PDP	BPCI impact estimate	25,029	25,089	27.0%	25.1%	26.5%	25.2%	-0.5
	Sensitivity test	25,248	169,680	27.1%	25.2%	26.6%	25.0%	-0.4

Clinical episode and outcome	Result	Number of BPCI Episodes	Number of Comparison Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD
Spinal fusion (non-cervical), 30-day PDP	BPCI impact estimate	3,867	3,868	8.0%	7.0%	6.4%	6.6%	-1.2
	Sensitivity test	3,889	27,027	7.9%	6.6%	7.1%	6.5%	-0.7
Spinal fusion (non-cervical), 90-day PDP	BPCI impact estimate	3,857	3,860	11.6%	10.6%	9.0%	9.8%	-1.9
	Sensitivity test	3,879	26,963	11.5%	10.2%	10.8%	9.9%	-0.4
Stroke, 30-day PDP	BPCI impact estimate	13,126	13,127	12.6%	10.7%	12.3%	10.5%	-0.2
	Sensitivity test	13,161	84,219	12.3%	10.4%	12.1%	10.6%	-0.5
Stroke, 90-day PDP	BPCI impact estimate	13,022	13,041	22.5%	19.3%	21.9%	18.9%	-0.2
	Sensitivity test	13,056	83,741	22.0%	18.8%	21.2%	18.9%	-0.9
Syncope & collapse, 30-day PDP	BPCI impact estimate	1,497	1,499	9.4%	8.1%	9.4%	8.5%	-0.4
	Sensitivity test	1,497	13,710	9.4%	8.2%	9.9%	8.6%	0.2
Syncope & collapse, 90-day PDP	BPCI impact estimate	1,493	1,495	18.0%	16.6%	19.3%	19.1%	-1.2
	Sensitivity test	1,493	13,670	17.8%	16.6%	20.1%	18.9%	0.0
Transient ischemia, 30-day PDP	BPCI impact estimate	1,204	1,211	9.1%	8.1%	8.8%	8.4%	-0.6
	Sensitivity test	1,204	12,368	9.1%	8.0%	8.5%	7.9%	-0.5
Transient ischemia, 90-day PDP	BPCI impact estimate	1,200	1,203	18.1%	16.8%	17.8%	17.0%	-0.6
	Sensitivity test	1,200	12,331	17.8%	16.4%	17.3%	16.5%	-0.7
Urinary tract infection, 30-day PDP	BPCI impact estimate	9,142	9,159	14.6%	12.7%	14.2%	12.7%	-0.5
	Sensitivity test	9,361	62,920	14.5%	12.7%	14.1%	12.8%	-0.6
Urinary tract infection, 90-day PDP	BPCI impact estimate	9,100	9,116	26.7%	25.3%	27.2%	26.7%	-0.8
	Sensitivity test	9,319	62,547	26.4%	25.2%	27.1%	26.1%	-0.1

Note: The estimates in this table are the results of a difference-in-differences (DiD) model. Positive DiD estimates that are significant at the 5% or 10% significance level are indicated by dark and light green shaded cells, respectively. Negative DiD estimates that are significant at the 5% or 10% significance level are indicated by dark and light orange shaded cells, respectively.

* Indicates the sensitivity test was statistically significant at the 10% level.

**Exhibit H.5: BPCI Impact Estimate and Sensitivity Test Results, Total Allowed Payment Amount,
Inpatient Stay Through 90-day Post-discharge Period, Model 2 PGP, Q4 2013 – Q4 2016**

Clinical episode	Result	Number of BPCI Episodes	Number of Comparison Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD
Acute myocardial infarction	BPCI impact estimate	3,741	3,717	\$25,693	\$26,091	\$25,979	\$26,535	-\$159
	Sensitivity test	3,743	28,168	\$24,649	\$25,292	\$24,708	\$25,125	\$226
Cardiac arrhythmia	BPCI impact estimate	2,948	2,929	\$16,779	\$18,657	\$17,368	\$18,098	\$1,148
	Sensitivity test	2,948	42,545	\$15,994	\$17,956	\$16,188	\$17,237	\$914*
Cellulitis	BPCI impact estimate	2,827	2,814	\$18,787	\$19,439	\$19,632	\$20,546	-\$262
	Sensitivity test	2,828	25,667	\$19,133	\$19,819	\$18,960	\$20,046	-\$400
Congestive heart failure	BPCI impact estimate	9,488	9,449	\$24,556	\$25,049	\$24,682	\$25,374	-\$200
	Sensitivity test	9,800	74,521	\$23,947	\$24,444	\$23,673	\$24,509	-\$338
COPD, bronchitis, asthma	BPCI impact estimate	9,036	8,966	\$18,280	\$19,137	\$18,518	\$19,447	-\$73
	Sensitivity test	9,222	58,712	\$17,868	\$18,758	\$17,938	\$18,745	\$84
Esophagitis, gastroenteritis & other digestive disorders	BPCI impact estimate	3,665	3,631	\$16,464	\$17,556	\$16,727	\$17,551	\$269
	Sensitivity test	3,666	32,382	\$16,021	\$17,343	\$15,978	\$17,030	\$270
Gastrointestinal hemorrhage	BPCI impact estimate	2,438	2,427	\$19,142	\$18,620	\$18,625	\$19,633	-\$1,531
	Sensitivity test	2,456	26,448	\$19,305	\$18,715	\$18,440	\$19,554	-\$1,704*
Gastrointestinal obstruction	BPCI impact estimate	1,541	1,537	\$18,690	\$16,975	\$16,786	\$17,095	-\$2,024
	Sensitivity test	1,541	15,160	\$18,159	\$16,083	\$16,604	\$16,349	-\$1,820*
Hip & femur procedures except major joint	BPCI impact estimate	6,274	6,260	\$43,579	\$44,080	\$42,677	\$44,418	-\$1,241
	Sensitivity test	6,274	39,564	\$43,816	\$44,210	\$42,569	\$44,365	-\$1,403*
Major joint replacement of the lower extremity	BPCI impact estimate	64,271	63,935	\$26,180	\$23,809	\$25,939	\$25,525	-\$1,958
	Sensitivity test	72,203	221,595	\$26,097	\$23,878	\$25,943	\$25,577	-\$1,853*
Major joint replacement of the upper extremity	BPCI impact estimate	2,473	2,457	\$22,064	\$22,483	\$21,912	\$24,396	-\$2,065
	Sensitivity test	2,886	14,208	\$21,827	\$22,174	\$22,543	\$24,272	-\$1,382*
Medical non-infectious orthopedic	BPCI impact estimate	3,376	3,366	\$27,392	\$27,765	\$26,902	\$28,748	-\$1,472
	Sensitivity test	3,458	28,436	\$26,782	\$26,967	\$26,103	\$27,807	-\$1,520*
Nutritional and metabolic disorders	BPCI impact estimate	2,634	2,598	\$19,803	\$20,172	\$19,959	\$21,208	-\$879
	Sensitivity test	2,634	20,380	\$19,605	\$19,910	\$19,689	\$20,904	-\$911

Clinical episode	Result	Number of BPCI Episodes	Number of Comparison Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD
Other respiratory	BPCI impact estimate	3,681	3,644	\$27,545	\$28,104	\$28,167	\$28,976	-\$251
	Sensitivity test	3,699	33,747	\$28,198	\$28,647	\$28,484	\$29,417	-\$485
Percutaneous coronary intervention	BPCI impact estimate	2,698	2,669	\$24,445	\$27,071	\$24,005	\$27,069	-\$438
	Sensitivity test	2,829	36,606	\$23,984	\$26,815	\$23,726	\$26,695	-\$139
Renal failure	BPCI impact estimate	5,843	5,825	\$23,926	\$24,286	\$24,785	\$24,607	\$539
	Sensitivity test	5,848	37,017	\$23,245	\$23,612	\$23,951	\$24,220	\$97
Sepsis	BPCI impact estimate	20,572	20,460	\$30,167	\$29,736	\$30,691	\$30,207	\$54
	Sensitivity test	20,574	111,790	\$30,228	\$29,702	\$30,143	\$29,946	-\$329
Simple pneumonia & respiratory infections	BPCI impact estimate	10,012	9,960	\$22,275	\$22,197	\$22,859	\$22,675	\$105
	Sensitivity test	10,058	68,720	\$22,113	\$21,932	\$22,329	\$22,210	-\$61
Spinal fusion (non-cervical)	BPCI impact estimate	2,382	2,355	\$38,633	\$38,019	\$38,689	\$40,582	-\$2,507
	Sensitivity test	2,388	24,771	\$37,413	\$37,080	\$38,133	\$39,867	-\$2,068*
Stroke	BPCI impact estimate	3,455	3,417	\$30,132	\$30,016	\$29,543	\$30,115	-\$689
	Sensitivity test	3,589	37,477	\$29,905	\$29,557	\$29,152	\$30,245	-\$1,441*
Urinary tract infection	BPCI impact estimate	6,328	6,291	\$22,270	\$23,215	\$22,080	\$23,708	-\$683
	Sensitivity test	6,390	39,906	\$21,940	\$22,792	\$22,073	\$22,968	-\$42

Note: The estimates in this table are the results of a DiD model. Positive DiD estimates that are significant at the 5% or 10% significance level are indicated by dark and light green shaded cells, respectively. Negative DiD estimates that are significant at the 5% or 10% significance level are indicated by dark and light orange shaded cells, respectively.

* Indicates the sensitivity test was statistically significant at the 10% level.

Exhibit H.6: BPCI Impact Estimate and Sensitivity Test Results, All-Cause Mortality Rate, Model 2 PGP, Q4 2013 – Q4 2016

Clinical episode and outcome	Result	Number of BPCI Episodes	Number of Comparison Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD
Acute myocardial infarction, 30-day PDP	BPCI impact estimate	3,678	3,692	10.4%	9.5%	11.8%	9.5%	1.4
	Sensitivity test	3,680	28,064	9.3%	8.8%	9.9%	9.2%	0.2
Acute myocardial infarction, 90-day PDP	BPCI impact estimate	3,654	3,667	17.7%	17.1%	18.9%	16.8%	1.5
	Sensitivity test	3,656	27,836	16.3%	16.2%	16.5%	15.9%	0.4
Cardiac arrhythmia, 30-day PDP	BPCI impact estimate	2,928	2,943	4.2%	4.7%	3.5%	3.1%	1.0
	Sensitivity test	2,928	42,840	3.6%	4.1%	3.3%	2.9%	0.8
Cardiac arrhythmia, 90-day PDP	BPCI impact estimate	2,918	2,931	7.8%	8.8%	7.8%	7.2%	1.6
	Sensitivity test	2,918	42,632	7.1%	7.7%	7.3%	6.5%	1.4*
Cellulitis, 30-day PDP	BPCI impact estimate	2,780	2,803	3.2%	2.2%	1.9%	2.0%	-1.1
	Sensitivity test	2,781	25,816	3.1%	2.3%	2.4%	2.0%	-0.5
Cellulitis, 90-day PDP	BPCI impact estimate	2,769	2,793	6.5%	5.3%	5.3%	6.3%	-2.3
	Sensitivity test	2,770	25,680	6.5%	5.3%	5.9%	6.0%	-1.3*
Congestive heart failure, 30-day PDP	BPCI impact estimate	9,396	9,439	8.7%	8.3%	7.9%	7.9%	-0.4
	Sensitivity test	9,697	74,668	8.0%	7.6%	8.4%	7.4%	0.5
Congestive heart failure, 90-day PDP	BPCI impact estimate	9,332	9,364	18.2%	16.9%	17.2%	17.1%	-1.2
	Sensitivity test	9,633	74,049	17.1%	15.9%	17.2%	16.0%	0.0
COPD, bronchitis, asthma, 30-day PDP	BPCI impact estimate	9,008	9,036	3.3%	3.0%	3.2%	2.9%	-0.1
	Sensitivity test	9,191	59,447	3.0%	2.8%	3.1%	2.8%	0.2
COPD, bronchitis, asthma, 90-day PDP	BPCI impact estimate	8,946	8,974	7.4%	7.3%	7.6%	7.3%	0.2
	Sensitivity test	9,129	58,771	6.8%	6.8%	7.6%	7.1%	0.5
Esophagitis, gastroenteritis & other digestive disorders, 30-day PDP	BPCI impact estimate	3,647	3,653	2.6%	3.0%	2.6%	2.5%	0.4
	Sensitivity test	3,648	32,753	2.8%	3.1%	2.3%	2.7%	0.0
Esophagitis, gastroenteritis & other digestive disorders, 90-day PDP	BPCI impact estimate	3,629	3,644	5.9%	6.2%	6.3%	6.4%	0.2
	Sensitivity test	3,630	32,592	6.0%	6.4%	5.9%	6.1%	0.1

Clinical episode and outcome	Result	Number of BPCI Episodes	Number of Comparison Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD
Gastrointestinal hemorrhage, 30-day PDP	BPCI impact estimate	2,408	2,422	4.4%	4.3%	4.8%	3.9%	0.8
	Sensitivity test	2,425	26,407	4.4%	4.3%	4.2%	4.1%	0.2
Gastrointestinal hemorrhage, 90-day PDP	BPCI impact estimate	2,398	2,408	9.7%	8.8%	9.3%	8.1%	0.4
	Sensitivity test	2,415	26,255	9.4%	8.5%	8.6%	8.6%	-0.9
Gastrointestinal obstruction, 30-day PDP	BPCI impact estimate	1,527	1,541	6.1%	4.6%	6.0%	4.1%	0.4
	Sensitivity test	1,527	15,224	5.8%	4.6%	4.3%	3.6%	-0.5
Gastrointestinal obstruction, 90-day PDP	BPCI impact estimate	1,517	1,533	10.9%	8.7%	9.5%	7.5%	-0.1
	Sensitivity test	1,517	15,127	9.5%	7.7%	8.3%	7.1%	-0.6
Hip & femur procedures except major joint, 30-day PDP	BPCI impact estimate	6,192	6,193	4.2%	5.2%	4.7%	4.7%	1.0
	Sensitivity test	6,192	39,232	4.0%	4.9%	4.6%	4.4%	1.1*
Hip & femur procedures except major joint, 90-day PDP	BPCI impact estimate	6,145	6,157	9.2%	10.8%	10.0%	10.0%	1.5
	Sensitivity test	6,145	38,933	9.1%	10.6%	9.9%	9.8%	1.7*
Major joint replacement of the lower extremity, 30-day PDP	BPCI impact estimate	64,201	64,217	0.9%	0.8%	0.9%	0.8%	0.0
	Sensitivity test	72,121	222,401	0.8%	0.7%	0.8%	0.8%	0.0
Major joint replacement of the lower extremity, 90-day PDP	BPCI impact estimate	64,092	64,110	1.8%	1.7%	1.8%	1.7%	-0.1
	Sensitivity test	72,001	222,092	1.7%	1.6%	1.7%	1.6%	0.0
Major joint replacement of the upper extremity, 30-day PDP	BPCI impact estimate	2,473	2,472	0.3%	0.2%	0.2%	0.4%	-0.3
	Sensitivity test	2,886	14,316	0.3%	0.2%	0.3%	0.2%	-0.1
Major joint replacement of the upper extremity, 90-day PDP	BPCI impact estimate	2,471	2,472	0.4%	0.6%	0.5%	0.7%	0.1
	Sensitivity test	2,884	14,308	0.4%	0.5%	0.7%	0.6%	0.2
Medical non-infectious orthopedic, 30-day PDP	BPCI impact estimate	3,359	3,391	4.4%	3.4%	4.0%	3.7%	-0.8
	Sensitivity test	3,438	28,767	4.2%	3.2%	3.7%	3.7%	-0.9
Medical non-infectious orthopedic, 90-day PDP	BPCI impact estimate	3,347	3,385	8.3%	7.9%	8.0%	7.9%	-0.4
	Sensitivity test	3,426	28,596	8.3%	7.6%	7.7%	7.6%	-0.5
Nutritional and metabolic disorders, 30-day PDP	BPCI impact estimate	2,606	2,622	8.2%	8.6%	7.9%	7.2%	1.1
	Sensitivity test	2,606	20,527	7.4%	7.9%	8.1%	7.5%	1.1
Nutritional and metabolic disorders, 90-day PDP	BPCI impact estimate	2,598	2,614	13.6%	15.6%	14.8%	13.6%	3.2
	Sensitivity test	2,598	20,441	12.7%	14.8%	14.7%	14.5%	2.3*

Clinical episode and outcome	Result	Number of BPCI Episodes	Number of Comparison Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD
Other respiratory, 30-day PDP	BPCI impact estimate	3,650	3,633	11.6%	10.7%	10.4%	10.4%	-0.8
	Sensitivity test	3,668	33,643	11.4%	10.3%	10.9%	10.2%	-0.5
Other respiratory, 90-day PDP	BPCI impact estimate	3,606	3,592	19.7%	17.9%	18.1%	18.1%	-1.8
	Sensitivity test	3,624	33,270	19.9%	17.6%	19.1%	17.9%	-1.0
Percutaneous coronary intervention, 30-day PDP	BPCI impact estimate	2,702	2,709	1.7%	1.9%	1.9%	1.7%	0.4
	Sensitivity test	2,833	37,218	1.6%	1.8%	1.7%	1.7%	0.3
Percutaneous coronary intervention, 90-day PDP	BPCI impact estimate	2,696	2,702	3.9%	4.5%	2.9%	3.6%	-0.1
	Sensitivity test	2,827	37,039	3.8%	4.2%	3.4%	3.8%	0.0
Renal failure, 30-day PDP	BPCI impact estimate	5,761	5,783	9.8%	9.5%	8.5%	9.0%	-0.7
	Sensitivity test	5,766	37,046	8.7%	8.6%	9.2%	8.5%	0.6
Renal failure, 90-day PDP	BPCI impact estimate	5,738	5,763	17.3%	16.5%	16.0%	16.3%	-1.2
	Sensitivity test	5,743	36,755	16.0%	15.3%	16.4%	15.4%	0.3
Sepsis, 30-day PDP	BPCI impact estimate	20,218	20,386	13.3%	12.9%	12.5%	12.2%	-0.2
	Sensitivity test	20,220	111,875	12.8%	12.3%	12.2%	12.0%	-0.3
Sepsis, 90-day PDP	BPCI impact estimate	20,039	20,203	20.9%	20.2%	20.3%	19.4%	0.3
	Sensitivity test	20,041	110,562	20.5%	19.6%	20.1%	19.1%	0.2
Simple pneumonia & respiratory infections, 30-day PDP	BPCI impact estimate	9,902	9,929	9.9%	8.6%	10.3%	8.1%	0.9
	Sensitivity test	9,948	68,789	9.5%	8.1%	9.9%	8.1%	0.4
Simple pneumonia & respiratory infections, 90-day PDP	BPCI impact estimate	9,839	9,868	17.6%	15.6%	17.5%	14.5%	1.0
	Sensitivity test	9,885	68,188	16.9%	14.9%	17.1%	14.4%	0.7
Spinal fusion (non-cervical), 90-day PDP	BPCI impact estimate	2,383	2,380	0.9%	0.3%	0.7%	0.7%	-0.5
	Sensitivity test	2,389	24,979	1.0%	0.3%	0.6%	0.7%	-0.7*
Stroke, 30-day PDP	BPCI impact estimate	3,442	3,459	12.0%	11.0%	11.8%	10.3%	0.5
	Sensitivity test	3,576	37,644	11.8%	10.6%	11.3%	10.2%	-0.1
Stroke, 90-day PDP	BPCI impact estimate	3,429	3,431	17.2%	15.5%	16.8%	14.9%	0.3
	Sensitivity test	3,563	37,388	16.9%	15.1%	16.3%	14.8%	-0.3

Clinical episode and outcome	Result	Number of BPCI Episodes	Number of Comparison Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD
Urinary tract infection, 30-day PDP	BPCI impact estimate	6,302	6,310	6.7%	5.1%	4.3%	4.8%	-2.1
	Sensitivity test	6,365	40,240	6.3%	4.7%	4.9%	4.4%	-1.1*
Urinary tract infection, 90-day PDP	BPCI impact estimate	6,280	6,292	13.3%	11.0%	10.4%	10.5%	-2.4
	Sensitivity test	6,342	40,019	12.6%	10.2%	11.2%	10.4%	-1.7*

Note: The estimates in this table are the results of a difference-in-differences (DiD) model. Positive DiD estimates that are significant at the 5% or 10% significance level are indicated by dark and light green shaded cells, respectively. Negative DiD estimates that are significant at the 5% or 10% significance level are indicated by dark and light orange shaded cells, respectively.

* Indicates the sensitivity test was statistically significant at the 10% level.

Exhibit H.7: BPCI Impact Estimate and Sensitivity Test Results, Emergency Department Use, Model 2 PGP, Q4 2013 – Q4 2016

Clinical episode and outcome	Result	Number of BPCI Episodes	Number of Comparison Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD
Acute myocardial infarction, 30-day PDP	BPCI impact estimate	3,698	3,722	12.0%	13.3%	11.2%	13.8%	-1.3
	Sensitivity test	3,700	28,232	12.3%	13.4%	12.0%	14.1%	-1.1
Acute myocardial infarction, 90-day PDP	BPCI impact estimate	3,674	3,697	22.9%	24.8%	21.2%	24.7%	-1.6
	Sensitivity test	3,676	28,003	23.4%	24.9%	22.9%	25.8%	-1.2
Cardiac arrhythmia, 30-day PDP	BPCI impact estimate	2,939	2,953	13.3%	15.1%	12.6%	13.5%	0.9
	Sensitivity test	2,939	43,026	12.2%	14.3%	12.3%	13.1%	1.2
Cardiac arrhythmia, 90-day PDP	BPCI impact estimate	2,929	2,941	23.9%	27.9%	23.5%	25.8%	1.7
	Sensitivity test	2,929	42,816	22.7%	26.9%	23.2%	24.9%	2.5*
Cellulitis, 30-day PDP	BPCI impact estimate	2,799	2,823	13.7%	14.4%	11.5%	12.6%	-0.4
	Sensitivity test	2,800	25,966	13.3%	13.7%	11.3%	11.9%	-0.1
Cellulitis, 90-day PDP	BPCI impact estimate	2,788	2,813	24.9%	27.5%	23.0%	26.2%	-0.7
	Sensitivity test	2,789	25,830	24.6%	26.6%	22.4%	24.5%	-0.1
Congestive heart failure, 30-day PDP	BPCI impact estimate	9,512	9,517	11.2%	12.6%	10.8%	11.9%	0.2
	Sensitivity test	9,818	75,326	11.1%	12.2%	10.7%	12.0%	-0.2
Congestive heart failure, 90-day PDP	BPCI impact estimate	9,446	9,442	23.1%	25.4%	21.9%	24.0%	0.2
	Sensitivity test	9,752	74,705	23.3%	25.3%	21.7%	24.3%	-0.6
COPD, bronchitis, asthma, 30-day PDP	BPCI impact estimate	9,074	9,098	13.4%	14.4%	11.7%	13.5%	-0.7
	Sensitivity test	9,261	59,852	12.8%	13.8%	11.4%	13.2%	-0.8
COPD, bronchitis, asthma, 90-day PDP	BPCI impact estimate	9,011	9,036	26.4%	29.4%	24.0%	26.7%	0.3
	Sensitivity test	9,198	59,169	25.4%	28.5%	23.7%	26.7%	0.2
Esophagitis, gastroenteritis & other digestive disorders, 30-day PDP	BPCI impact estimate	3,670	3,680	14.8%	15.9%	14.5%	14.4%	1.2
	Sensitivity test	3,671	32,904	14.0%	15.0%	13.5%	14.5%	0.0
Esophagitis, gastroenteritis & other digestive disorders, 90-day PDP	BPCI impact estimate	3,652	3,671	27.7%	29.1%	26.9%	26.9%	1.4
	Sensitivity test	3,653	32,742	26.7%	27.9%	26.1%	27.0%	0.4

Clinical episode and outcome	Result	Number of BPCI Episodes	Number of Comparison Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD
Gastrointestinal hemorrhage, 30-day PDP	BPCI impact estimate	2,428	2,443	10.6%	12.9%	9.2%	11.9%	-0.4
	Sensitivity test	2,445	26,608	9.8%	11.9%	8.8%	11.3%	-0.3
Gastrointestinal hemorrhage, 90-day PDP	BPCI impact estimate	2,418	2,429	20.2%	23.4%	19.2%	22.6%	-0.3
	Sensitivity test	2,435	26,456	19.5%	22.2%	18.1%	21.6%	-0.8
Gastrointestinal obstruction, 30-day PDP	BPCI impact estimate	1,536	1,556	9.2%	11.3%	8.2%	9.3%	0.9
	Sensitivity test	1,536	15,330	9.2%	10.6%	9.0%	9.7%	0.9
Gastrointestinal obstruction, 90-day PDP	BPCI impact estimate	1,526	1,547	19.5%	21.7%	17.6%	22.0%	-2.1
	Sensitivity test	1,526	15,230	18.6%	20.5%	18.9%	20.4%	0.3
Hip & femur procedures except major joint, 30-day PDP	BPCI impact estimate	6,325	6,324	7.6%	8.7%	7.6%	8.1%	0.6
	Sensitivity test	6,325	40,064	7.5%	8.5%	8.2%	8.4%	0.8
Hip & femur procedures except major joint, 90-day PDP	BPCI impact estimate	6,277	6,288	17.6%	18.8%	17.0%	18.6%	-0.5
	Sensitivity test	6,277	39,762	17.6%	18.8%	17.8%	18.6%	0.3
Major joint replacement of the lower extremity, 30-day PDP	BPCI impact estimate	64,381	64,381	7.7%	7.8%	7.6%	8.3%	-0.6
	Sensitivity test	72,324	222,957	7.3%	7.5%	7.5%	8.1%	-0.3
Major joint replacement of the lower extremity, 90-day PDP	BPCI impact estimate	64,270	64,270	13.6%	13.7%	13.4%	14.5%	-1.0
	Sensitivity test	72,202	222,642	13.3%	13.5%	13.2%	14.2%	-0.7*
Major joint replacement of the upper extremity, 30-day PDP	BPCI impact estimate	2,476	2,473	7.6%	7.5%	6.7%	8.0%	-1.4
	Sensitivity test	2,889	14,324	7.9%	7.5%	6.4%	7.8%	-1.8
Major joint replacement of the upper extremity, 90-day PDP	BPCI impact estimate	2,474	2,473	13.2%	15.4%	12.0%	14.6%	-0.4
	Sensitivity test	2,887	14,316	13.4%	15.1%	12.3%	14.3%	-0.3
Medical non-infectious orthopedic, 30-day PDP	BPCI impact estimate	3,399	3,415	13.2%	12.4%	11.2%	10.9%	-0.5
	Sensitivity test	3,480	28,973	12.4%	11.7%	11.5%	11.1%	-0.3
Medical non-infectious orthopedic, 90-day PDP	BPCI impact estimate	3,387	3,408	24.4%	25.6%	21.3%	23.6%	-1.1
	Sensitivity test	3,468	28,799	23.3%	24.1%	23.2%	23.3%	0.6
Nutritional and metabolic disorders, 30-day PDP	BPCI impact estimate	2,637	2,650	12.5%	13.9%	12.2%	13.3%	0.2
	Sensitivity test	2,637	20,744	12.5%	13.4%	12.4%	12.7%	0.6
Nutritional and metabolic disorders, 90-day PDP	BPCI impact estimate	2,629	2,642	22.9%	27.2%	21.8%	24.5%	1.6
	Sensitivity test	2,629	20,656	23.0%	26.7%	22.9%	24.4%	2.3

Clinical episode and outcome	Result	Number of BPCI Episodes	Number of Comparison Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD
Other respiratory, 30-day PDP	BPCI impact estimate	3,683	3,678	13.2%	13.4%	12.1%	12.8%	-0.6
	Sensitivity test	3,701	34,063	13.0%	13.5%	12.3%	12.7%	0.1
Other respiratory, 90-day PDP	BPCI impact estimate	3,638	3,637	25.6%	27.4%	22.7%	23.8%	0.6
	Sensitivity test	3,656	33,688	25.5%	27.2%	23.8%	25.0%	0.5
Percutaneous coronary intervention, 30-day PDP	BPCI impact estimate	2,710	2,712	13.1%	14.4%	11.4%	14.8%	-2.1
	Sensitivity test	2,842	37,258	12.9%	14.2%	12.9%	15.0%	-0.8
Percutaneous coronary intervention, 90-day PDP	BPCI impact estimate	2,704	2,705	23.6%	25.1%	21.5%	26.8%	-3.8
	Sensitivity test	2,836	37,079	23.3%	25.3%	22.9%	25.9%	-1.0
Renal failure, 30-day PDP	BPCI impact estimate	5,825	5,849	12.2%	13.0%	11.9%	12.4%	0.4
	Sensitivity test	5,830	37,412	12.0%	12.5%	11.1%	12.3%	-0.6
Renal failure, 90-day PDP	BPCI impact estimate	5,802	5,829	23.4%	25.4%	22.5%	24.5%	0.0
	Sensitivity test	5,807	37,117	22.9%	24.5%	21.9%	24.1%	-0.6
Sepsis, 30-day PDP	BPCI impact estimate	20,565	20,630	10.3%	11.1%	10.5%	11.2%	0.1
	Sensitivity test	20,567	113,260	10.1%	10.7%	9.7%	10.8%	-0.5
Sepsis, 90-day PDP	BPCI impact estimate	20,386	20,447	20.4%	21.7%	20.2%	21.7%	-0.2
	Sensitivity test	20,388	111,931	19.8%	20.9%	19.7%	21.0%	-0.1
Simple pneumonia & respiratory infections, 30-day PDP	BPCI impact estimate	10,022	10,053	11.3%	12.3%	10.1%	11.7%	-0.6
	Sensitivity test	10,068	69,566	10.9%	11.8%	10.0%	11.4%	-0.4
Simple pneumonia & respiratory infections, 90-day PDP	BPCI impact estimate	9,959	9,991	22.5%	24.1%	20.8%	22.5%	-0.1
	Sensitivity test	10,005	68,959	21.8%	23.4%	20.6%	22.6%	-0.4
Spinal fusion (non-cervical), 30-day PDP	BPCI impact estimate	2,390	2,390	11.7%	11.0%	9.9%	11.7%	-2.5
	Sensitivity test	2,396	25,047	11.8%	11.4%	9.6%	10.8%	-1.6
Spinal fusion (non-cervical), 90-day PDP	BPCI impact estimate	2,383	2,381	18.4%	18.5%	16.0%	18.9%	-2.7
	Sensitivity test	2,389	24,982	19.0%	19.2%	16.2%	18.0%	-1.5
Stroke, 30-day PDP	BPCI impact estimate	3,464	3,470	10.3%	11.0%	8.9%	11.6%	-2.1
	Sensitivity test	3,598	37,832	10.0%	10.8%	9.5%	11.0%	-0.8
Stroke, 90-day PDP	BPCI impact estimate	3,451	3,442	20.5%	22.4%	19.3%	22.9%	-1.6
	Sensitivity test	3,585	37,576	19.6%	21.4%	19.9%	22.2%	-0.6

Clinical episode and outcome	Result	Number of BPCI Episodes	Number of Comparison Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD
Urinary tract infection, 30-day PDP	BPCI impact estimate	6,384	6,396	12.8%	13.1%	11.2%	12.8%	-1.3
	Sensitivity test	6,447	40,785	12.8%	13.2%	11.1%	12.1%	-0.6
Urinary tract infection, 90-day PDP	BPCI impact estimate	6,361	6,378	24.5%	27.0%	23.2%	25.9%	-0.2
	Sensitivity test	6,423	40,562	24.2%	26.8%	22.9%	25.0%	0.5

Note: The estimates in this table are the results of a DiD model. Positive DiD estimates that are significant at the 5% or 10% significance level are indicated by dark and light green shaded cells, respectively. Negative DiD estimates that are significant at the 5% or 10% significance level are indicated by dark and light orange shaded cells, respectively.

* Indicates the sensitivity test was statistically significant at the 10% level.

Exhibit H.8: BPCI Impact Estimate and Sensitivity Test Results, Unplanned Readmission Rate, Model 2 PGP, Q4 2013 – Q4 2016

Clinical episode and outcome	Result	Number of BPCI Episodes	Number of Comparison Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD
Acute myocardial infarction, 30-day PDP	BPCI impact estimate	3,698	3,722	16.1%	14.3%	18.6%	15.0%	1.7
	Sensitivity test	3,700	28,232	16.1%	14.3%	17.4%	14.6%	1.0
Acute myocardial infarction, 90-day PDP	BPCI impact estimate	3,674	3,697	28.8%	25.0%	31.0%	26.6%	0.6
	Sensitivity test	3,676	28,003	28.8%	24.9%	28.9%	25.4%	-0.5
Cardiac arrhythmia, 30-day PDP	BPCI impact estimate	2,939	2,953	12.0%	11.9%	14.1%	11.2%	2.8
	Sensitivity test	2,939	43,026	11.9%	11.5%	12.9%	11.4%	1.1
Cardiac arrhythmia, 90-day PDP	BPCI impact estimate	2,929	2,941	21.4%	21.8%	24.7%	21.6%	3.5
	Sensitivity test	2,929	42,816	21.3%	21.5%	23.2%	21.5%	2.0*
Cellulitis, 30-day PDP	BPCI impact estimate	2,799	2,823	11.0%	11.7%	11.5%	10.6%	1.5
	Sensitivity test	2,800	25,966	11.1%	11.7%	11.9%	10.8%	1.6
Cellulitis, 90-day PDP	BPCI impact estimate	2,788	2,813	21.9%	23.6%	24.3%	23.5%	2.5
	Sensitivity test	2,789	25,830	22.0%	23.7%	24.6%	23.4%	2.8*
Congestive heart failure, 30-day PDP	BPCI impact estimate	9,512	9,517	20.8%	17.9%	20.9%	17.9%	0.1
	Sensitivity test	9,818	75,326	20.7%	17.7%	20.0%	17.5%	-0.4
Congestive heart failure, 90-day PDP	BPCI impact estimate	9,446	9,442	37.3%	34.9%	38.4%	35.7%	0.4
	Sensitivity test	9,752	74,705	37.7%	35.3%	37.6%	34.2%	1.0
COPD, bronchitis, asthma, 30-day PDP	BPCI impact estimate	9,074	9,098	16.6%	16.1%	17.4%	15.8%	1.0
	Sensitivity test	9,261	59,852	16.4%	15.9%	16.6%	15.2%	0.9
COPD, bronchitis, asthma, 90-day PDP	BPCI impact estimate	9,011	9,036	31.6%	31.2%	33.4%	31.1%	2.0
	Sensitivity test	9,198	59,169	31.2%	31.0%	32.2%	30.5%	1.6*
Esophagitis, gastroenteritis & other digestive disorders, 30-day PDP	BPCI impact estimate	3,670	3,680	14.0%	13.6%	14.7%	12.7%	1.7
	Sensitivity test	3,671	32,904	13.7%	13.8%	13.3%	12.4%	1.0
Esophagitis, gastroenteritis & other digestive disorders, 90-day PDP	BPCI impact estimate	3,652	3,671	24.5%	23.6%	26.3%	24.9%	0.5
	Sensitivity test	3,653	32,742	24.4%	23.9%	24.9%	23.0%	1.4

Clinical episode and outcome	Result	Number of BPCI Episodes	Number of Comparison Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD
Gastrointestinal hemorrhage, 30-day PDP	BPCI impact estimate	2,428	2,443	14.6%	11.5%	13.4%	12.2%	-1.9
	Sensitivity test	2,445	26,608	14.8%	11.5%	13.0%	12.9%	-3.2*
Gastrointestinal hemorrhage, 90-day PDP	BPCI impact estimate	2,418	2,429	24.3%	20.7%	24.3%	21.8%	-1.0
	Sensitivity test	2,435	26,456	25.0%	20.8%	23.4%	23.3%	-4.1*
Gastrointestinal obstruction, 30-day PDP	BPCI impact estimate	1,536	1,556	13.8%	10.5%	12.2%	11.2%	-2.4
	Sensitivity test	1,536	15,330	13.2%	10.2%	12.7%	11.1%	-1.4
Gastrointestinal obstruction, 90-day PDP	BPCI impact estimate	1,526	1,547	21.4%	20.7%	22.6%	22.7%	-0.7
	Sensitivity test	1,526	15,230	20.8%	19.9%	23.3%	21.5%	1.0
Hip & femur procedures except major joint, 30-day PDP	BPCI impact estimate	6,325	6,324	11.4%	10.0%	12.3%	10.2%	0.8
	Sensitivity test	6,325	40,064	11.3%	10.4%	11.4%	9.9%	0.6
Hip & femur procedures except major joint, 90-day PDP	BPCI impact estimate	6,277	6,288	20.5%	18.3%	21.7%	18.8%	0.7
	Sensitivity test	6,277	39,762	20.9%	18.7%	20.9%	18.8%	0.0
Major joint replacement of the lower extremity, 30-day PDP	BPCI impact estimate	64,381	64,381	5.7%	4.6%	5.6%	4.6%	-0.1
	Sensitivity test	72,324	222,957	5.4%	4.4%	5.6%	4.5%	0.1
Major joint replacement of the lower extremity, 90-day PDP	BPCI impact estimate	64,270	64,270	9.2%	7.5%	8.9%	7.7%	-0.5
	Sensitivity test	72,202	222,642	8.9%	7.3%	9.0%	7.6%	-0.2
Major joint replacement of the upper extremity, 30-day PDP	BPCI impact estimate	2,476	2,473	3.6%	3.4%	3.1%	3.4%	-0.5
	Sensitivity test	2,889	14,324	3.8%	3.6%	3.8%	3.4%	0.2
Major joint replacement of the upper extremity, 90-day PDP	BPCI impact estimate	2,474	2,473	6.3%	6.2%	6.6%	6.4%	0.1
	Sensitivity test	2,887	14,316	6.5%	6.2%	7.5%	6.2%	1.0
Medical non-infectious orthopedic, 30-day PDP	BPCI impact estimate	3,399	3,415	13.7%	11.9%	13.5%	10.9%	0.8
	Sensitivity test	3,480	28,973	13.7%	12.0%	12.5%	10.9%	-0.1
Medical non-infectious orthopedic, 90-day PDP	BPCI impact estimate	3,387	3,408	24.2%	21.9%	24.0%	23.2%	-1.5
	Sensitivity test	3,468	28,799	24.1%	21.9%	23.5%	22.0%	-0.7
Nutritional and metabolic disorders, 30-day PDP	BPCI impact estimate	2,637	2,650	14.1%	12.9%	14.2%	15.4%	-2.4
	Sensitivity test	2,637	20,744	14.2%	13.6%	14.7%	14.6%	-0.6
Nutritional and metabolic disorders, 90-day PDP	BPCI impact estimate	2,629	2,642	26.3%	23.6%	26.2%	26.7%	-3.3
	Sensitivity test	2,629	20,656	27.0%	24.7%	26.3%	25.3%	-1.4

Clinical episode and outcome	Result	Number of BPCI Episodes	Number of Comparison Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD
Other respiratory, 30-day PDP	BPCI impact estimate	3,683	3,678	19.3%	16.7%	18.6%	16.1%	-0.1
	Sensitivity test	3,701	34,063	19.1%	17.0%	19.0%	17.1%	-0.3
Other respiratory, 90-day PDP	BPCI impact estimate	3,638	3,637	32.3%	29.7%	33.4%	30.9%	-0.1
	Sensitivity test	3,656	33,688	31.8%	30.1%	33.5%	31.1%	0.8
Percutaneous coronary intervention, 30-day PDP	BPCI impact estimate	2,710	2,712	12.0%	10.3%	11.4%	9.5%	0.2
	Sensitivity test	2,842	37,258	11.8%	10.3%	11.4%	9.4%	0.4
Percutaneous coronary intervention, 90-day PDP	BPCI impact estimate	2,704	2,705	20.6%	18.1%	18.9%	17.9%	-1.4
	Sensitivity test	2,836	37,079	20.2%	18.0%	19.3%	16.8%	0.3
Renal failure, 30-day PDP	BPCI impact estimate	5,825	5,849	17.1%	16.1%	15.9%	14.5%	0.4
	Sensitivity test	5,830	37,412	17.2%	16.5%	16.5%	15.0%	0.9
Renal failure, 90-day PDP	BPCI impact estimate	5,802	5,829	29.5%	29.8%	29.2%	26.7%	2.7
	Sensitivity test	5,807	37,117	29.6%	30.1%	29.7%	27.8%	2.4*
Sepsis, 30-day PDP	BPCI impact estimate	20,565	20,630	16.3%	14.4%	16.5%	14.9%	-0.3
	Sensitivity test	20,567	113,260	16.5%	14.5%	16.3%	14.9%	-0.6
Sepsis, 90-day PDP	BPCI impact estimate	20,386	20,447	28.2%	25.8%	28.5%	26.8%	-0.7
	Sensitivity test	20,388	111,931	28.6%	26.0%	27.9%	26.5%	-1.2*
Simple pneumonia & respiratory infections, 30-day PDP	BPCI impact estimate	10,022	10,053	14.6%	13.4%	15.3%	14.3%	-0.3
	Sensitivity test	10,068	69,566	14.5%	13.2%	14.8%	13.5%	0.0
Simple pneumonia & respiratory infections, 90-day PDP	BPCI impact estimate	9,959	9,991	26.0%	24.5%	27.3%	26.1%	-0.4
	Sensitivity test	10,005	68,959	25.8%	24.2%	26.8%	24.8%	0.5
Spinal fusion (non-cervical), 30-day PDP	BPCI impact estimate	2,390	2,390	6.6%	5.8%	6.5%	6.9%	-1.2
	Sensitivity test	2,396	25,047	6.3%	5.9%	7.1%	6.1%	0.6
Spinal fusion (non-cervical), 90-day PDP	BPCI impact estimate	2,383	2,381	9.8%	8.9%	9.6%	10.1%	-1.4
	Sensitivity test	2,389	24,982	9.5%	9.0%	10.4%	9.4%	0.6
Stroke, 30-day PDP	BPCI impact estimate	3,464	3,470	11.4%	9.8%	12.2%	10.0%	0.7
	Sensitivity test	3,598	37,832	11.5%	10.2%	11.2%	9.9%	0.0
Stroke, 90-day PDP	BPCI impact estimate	3,451	3,442	20.9%	17.9%	20.9%	17.7%	0.2
	Sensitivity test	3,585	37,576	20.7%	17.9%	20.0%	18.1%	-0.8

Clinical episode and outcome	Result	Number of BPCI Episodes	Number of Comparison Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD
Urinary tract infection, 30-day PDP	BPCI impact estimate	6,384	6,396	14.1%	12.8%	14.3%	14.0%	-1.0
	Sensitivity test	6,447	40,785	13.8%	12.5%	13.7%	12.9%	-0.5
Urinary tract infection, 90-day PDP	BPCI impact estimate	6,361	6,378	26.4%	25.6%	27.8%	26.9%	0.1
	Sensitivity test	6,423	40,562	26.3%	25.5%	27.4%	26.5%	0.0

Note: The estimates in this table are the results of a DiD model. Positive DiD estimates that are significant at the 5% or 10% significance level are indicated by dark and light green shaded cells, respectively. Negative DiD estimates that are significant at the 5% or 10% significance level are indicated by dark and light orange shaded cells, respectively.

* Indicates the sensitivity test was statistically significant at the 10% level.

Exhibit H.9: BPCI Impact Estimate and Sensitivity Test Results, Total Amount Included in Bundle Definition, Model 3 SNF 90-day episodes, Q4 2013 – Q4 2016

Clinical episode	Result	Number of BPCI Episodes	Number of Comparison Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD
Congestive heart failure	BPCI impact estimate	2,387	2,375	\$29,130	\$28,811	\$27,693	\$28,810	-\$1,436
	Sensitivity test	2,419	20,590	\$29,184	\$29,054	\$27,246	\$28,466	-\$1,350
COPD, bronchitis, asthma	BPCI impact estimate	784	783	\$28,264	\$28,672	\$28,793	\$27,984	\$1,217
	Sensitivity test	842	7,939	\$28,591	\$29,174	\$27,173	\$27,562	\$193
Hip & femur procedures except major joint	BPCI impact estimate	1,792	1,796	\$31,134	\$28,774	\$30,622	\$31,253	-\$2,991
	Sensitivity test	1,831	16,227	\$31,140	\$28,577	\$30,307	\$31,611	-\$3,867
Major joint replacement of the lower extremity	BPCI impact estimate	4,167	4,169	\$19,868	\$18,447	\$18,465	\$18,893	-\$1,849
	Sensitivity test	4,796	39,428	\$19,067	\$17,474	\$17,712	\$18,493	-\$2,375
Medical non-infectious orthopedic	BPCI impact estimate	1,903	1,905	\$29,977	\$30,148	\$29,330	\$30,250	-\$749
	Sensitivity test	2,174	15,748	\$30,519	\$30,619	\$28,877	\$30,378	-\$1,401
Other respiratory	BPCI impact estimate	625	624	\$28,782	\$29,883	\$29,456	\$30,003	\$554
	Sensitivity test	737	6,715	\$29,565	\$30,468	\$29,109	\$30,178	-\$167
Renal failure	BPCI impact estimate	1,143	1,134	\$30,246	\$29,920	\$27,497	\$29,962	-\$2,792
	Sensitivity test	1,169	9,327	\$30,364	\$30,374	\$26,837	\$28,513	-\$1,666
Sepsis	BPCI impact estimate	3,495	3,489	\$29,429	\$28,252	\$28,915	\$30,009	-\$2,270
	Sensitivity test	3,545	33,585	\$29,699	\$28,703	\$28,469	\$29,497	-\$2,023
Simple pneumonia and respiratory infections	BPCI impact estimate	1,893	1,876	\$27,046	\$25,847	\$26,795	\$27,082	-\$1,487
	Sensitivity test	1,986	21,849	\$26,704	\$25,998	\$25,917	\$26,697	-\$1,486
Stroke	BPCI impact estimate	1,137	1,129	\$32,246	\$32,930	\$32,561	\$32,672	\$574
	Sensitivity test	1,181	11,750	\$32,484	\$33,139	\$31,227	\$31,993	-\$111
Urinary tract infection	BPCI impact estimate	1,562	1,552	\$28,892	\$28,181	\$27,599	\$29,200	-\$2,312
	Sensitivity test	1,568	14,861	\$29,015	\$28,410	\$27,203	\$28,266	-\$1,669

Note: The estimates in this table are the results of a difference-in-differences (DiD) model. Positive DiD estimates that are significant at the 5% or 10% significance level are indicated by dark and light green shaded cells, respectively. Negative DiD estimates that are significant at the 5% or 10% significance level are indicated by dark and light orange shaded cells, respectively.

* Indicates the sensitivity test was statistically significant at the 10% level.

Exhibit H.10: BPCI Impact Estimate and Sensitivity Test Results, All-Cause Mortality Rate, Model 3 SNF, Q4 2013 – Q4 2016

Clinical episode and outcome	Result	Number of BPCI Episodes	Number of Comparison Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD
Congestive heart failure, 30 days from episode start date	BPCI impact estimate	2,937	2,945	12.3%	11.0%	12.6%	11.9%	-0.6
	Sensitivity test	2,973	27,313	12.3%	11.0%	12.6%	12.2%	-1.0
Congestive heart failure, 90 days from episode start date	BPCI impact estimate	2,934	2,945	29.1%	26.3%	28.7%	26.8%	-0.9
	Sensitivity test	2,970	27,312	29.0%	26.4%	27.7%	26.8%	-1.8
COPD, bronchitis, asthma, 30 days from episode start date	BPCI impact estimate	890	893	7.3%	7.5%	8.2%	8.5%	-0.1
	Sensitivity test	954	9,041	7.0%	7.3%	7.3%	7.8%	-0.2
COPD, bronchitis, asthma, 90 days from episode start date	BPCI impact estimate	890	893	17.8%	19.7%	19.0%	16.9%	4.0
	Sensitivity test	954	9,041	17.2%	18.8%	18.1%	16.9%	2.9*
Hip & femur procedures except major joint, 30 days from episode start date	BPCI impact estimate	2,398	2,404	3.9%	4.1%	3.1%	4.1%	-0.9
	Sensitivity test	2,445	20,118	3.9%	4.2%	4.2%	3.8%	0.7
Hip & femur procedures except major joint, 90 days from episode start date	BPCI impact estimate	2,394	2,403	9.2%	9.4%	9.4%	9.3%	0.3
	Sensitivity test	2,441	20,111	9.3%	9.7%	10.4%	9.7%	1.0
Major joint replacement of the lower extremity, 30 days from episode start date	BPCI impact estimate	6,583	6,584	1.4%	1.2%	1.2%	1.4%	-0.4
	Sensitivity test	8,033	51,583	1.4%	1.1%	1.3%	1.3%	-0.2
Major joint replacement of the lower extremity, 90 days from episode start date	BPCI impact estimate	6,573	6,583	3.1%	3.0%	2.9%	3.7%	-1.0
	Sensitivity test	8,018	51,576	3.0%	2.7%	3.1%	3.3%	-0.6
Medical non-infectious orthopedic, 30 days from episode start date	BPCI impact estimate	2,233	2,231	3.7%	3.0%	3.3%	3.7%	-1.1
	Sensitivity test	2,533	19,433	3.7%	2.9%	3.5%	3.4%	-0.8
Medical non-infectious orthopedic, 90 days from episode start date	BPCI impact estimate	2,231	2,230	9.8%	8.1%	8.7%	9.2%	-2.2
	Sensitivity test	2,531	19,431	9.8%	8.2%	9.2%	9.3%	-1.7
Other respiratory, 30 days from episode start date	BPCI impact estimate	718	719	12.7%	10.3%	12.5%	12.8%	-2.7
	Sensitivity test	846	7,710	12.5%	10.1%	12.7%	12.2%	-1.9
Other respiratory, 90 days from episode start date	BPCI impact estimate	717	719	25.1%	24.5%	27.0%	24.6%	1.9
	Sensitivity test	845	7,710	25.4%	24.6%	26.5%	25.1%	0.6

Clinical episode and outcome	Result	Number of BPCI Episodes	Number of Comparison Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD
Renal failure, 30 days from episode start date	BPCI impact estimate	1,399	1,413	9.9%	10.0%	10.5%	10.7%	-0.1
	Sensitivity test	1,435	13,043	9.7%	9.7%	9.9%	10.4%	-0.5
Renal failure, 90 days from episode start date	BPCI impact estimate	1,398	1,411	23.1%	23.7%	24.2%	23.0%	1.8
	Sensitivity test	1,434	13,041	23.1%	23.5%	21.8%	22.1%	0.1
Sepsis, 30 days from episode start date	BPCI impact estimate	4,400	4,421	11.5%	10.7%	12.0%	10.6%	0.5
	Sensitivity test	4,459	43,020	11.4%	10.8%	12.0%	10.8%	0.6
Sepsis, 90 days from episode start date	BPCI impact estimate	4,394	4,421	22.6%	21.1%	23.6%	22.5%	-0.4
	Sensitivity test	4,453	43,015	22.4%	21.3%	23.5%	22.5%	-0.2
Simple pneumonia and respiratory infections, 30 days from episode start date	BPCI impact estimate	2,880	2,879	11.5%	12.7%	13.1%	10.6%	3.6
	Sensitivity test	3,019	31,671	11.4%	12.4%	12.5%	11.2%	2.3*
Simple pneumonia and respiratory infections, 90 days from episode start date	BPCI impact estimate	2,876	2,877	24.8%	24.1%	25.0%	23.4%	1.0
	Sensitivity test	3,014	31,663	24.4%	23.7%	24.6%	23.3%	0.7
Stroke, 30 days from episode start date	BPCI impact estimate	1,360	1,357	9.6%	7.1%	9.3%	8.5%	-1.6
	Sensitivity test	1,413	13,800	9.4%	7.0%	9.2%	8.0%	-1.3
Stroke, 90 days from episode start date	BPCI impact estimate	1,360	1,356	19.1%	16.2%	18.1%	16.5%	-1.4
	Sensitivity test	1,413	13,796	19.7%	16.2%	18.1%	16.6%	-1.9
Urinary tract infection, 30 days from episode start date	BPCI impact estimate	2,006	2,005	6.8%	5.4%	7.4%	5.3%	0.7
	Sensitivity test	2,015	20,253	6.4%	5.3%	6.9%	5.7%	0.1
Urinary tract infection, 90 days from episode start date	BPCI impact estimate	2,002	2,005	16.7%	15.2%	17.6%	13.8%	2.3
	Sensitivity test	2,011	20,250	16.1%	14.8%	16.5%	15.0%	0.2

Note: The estimates in this table are the results of a difference-in-differences (DiD) model. Positive DiD estimates that are significant at the 5% or 10% significance level are indicated by dark and light green shaded cells, respectively. Negative DiD estimates that are significant at the 5% or 10% significance level are indicated by dark and light orange shaded cells, respectively.

* Indicates the sensitivity test was statistically significant at the 10% level.

Exhibit H.11: BPCI Impact Estimate and Sensitivity Test Results, Emergency Department Use, Model 3 SNF, Q4 2013 – Q4 2016

Clinical episode and outcome	Result	Number of BPCI Episodes	Number of Comparison Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD
Congestive heart failure, 30 days from episode start date	BPCI impact estimate	2,961	2,964	11.0%	10.3%	11.5%	11.8%	-1.0
	Sensitivity test	2,997	27,447	11.1%	10.1%	11.5%	10.9%	-0.4
Congestive heart failure, 90 days from episode start date	BPCI impact estimate	2,958	2,964	21.7%	23.0%	23.0%	23.2%	1.2
	Sensitivity test	2,994	27,446	22.3%	22.9%	22.4%	22.7%	0.3
COPD, bronchitis, asthma, 30 days from episode start date	BPCI impact estimate	892	899	8.0%	11.2%	10.3%	10.5%	3.0
	Sensitivity test	955	9,082	8.1%	11.0%	10.9%	10.4%	3.4*
COPD, bronchitis, asthma, 90 days from episode start date	BPCI impact estimate	892	899	22.4%	26.1%	23.5%	23.2%	4.0
	Sensitivity test	955	9,082	22.3%	25.5%	23.4%	24.4%	2.2
Hip & femur procedures except major joint, 30 days from episode start date	BPCI impact estimate	2,430	2,437	7.5%	8.1%	9.1%	8.0%	1.7
	Sensitivity test	2,477	20,390	7.3%	8.0%	8.0%	7.9%	0.7
Hip & femur procedures except major joint, 90 days from episode start date	BPCI impact estimate	2,426	2,436	18.8%	18.1%	19.6%	18.3%	0.6
	Sensitivity test	2,473	20,383	18.4%	17.9%	17.9%	18.3%	-0.8
Major joint replacement of the lower extremity, 30 days from episode start date	BPCI impact estimate	6,584	6,578	7.7%	7.7%	8.1%	8.1%	0.0
	Sensitivity test	8,031	51,533	7.5%	7.5%	7.7%	7.9%	-0.2
Major joint replacement of the lower extremity, 90 days from episode start date	BPCI impact estimate	6,574	6,577	15.6%	16.0%	16.6%	16.3%	0.7
	Sensitivity test	8,016	51,526	15.1%	15.6%	15.8%	16.2%	0.1
Medical non-infectious orthopedic, 30 days from episode start date	BPCI impact estimate	2,226	2,238	8.0%	8.0%	9.5%	9.1%	0.5
	Sensitivity test	2,521	19,448	8.2%	8.4%	9.7%	9.2%	0.6
Medical non-infectious orthopedic, 90 days from episode start date	BPCI impact estimate	2,224	2,237	19.8%	20.3%	21.2%	21.5%	0.1
	Sensitivity test	2,519	19,446	19.8%	21.0%	21.4%	21.7%	0.9
Other respiratory, 30 days from episode start date	BPCI impact estimate	720	720	11.0%	12.0%	14.1%	10.5%	4.5
	Sensitivity test	849	7,747	12.1%	12.7%	12.9%	11.4%	2.1
Other respiratory, 90 days from episode start date	BPCI impact estimate	719	720	21.4%	23.7%	25.6%	23.8%	4.1
	Sensitivity test	848	7,747	22.4%	24.3%	25.0%	23.6%	3.4

Clinical episode and outcome	Result	Number of BPCI Episodes	Number of Comparison Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD
Renal failure, 30 days from episode start date	BPCI impact estimate	1,410	1,417	11.0%	10.7%	9.9%	10.7%	-1.0
	Sensitivity test	1,446	13,102	10.8%	10.9%	10.1%	10.9%	-0.6
Renal failure, 90 days from episode start date	BPCI impact estimate	1,409	1,415	23.2%	23.6%	22.6%	23.6%	-0.6
	Sensitivity test	1,445	13,100	23.0%	23.5%	22.2%	23.7%	-0.9
Sepsis, 30 days from episode start date	BPCI impact estimate	4,439	4,441	9.7%	11.5%	11.7%	11.4%	2.2
	Sensitivity test	4,498	43,305	9.6%	11.6%	10.8%	10.7%	2.1*
Sepsis, 90 days from episode start date	BPCI impact estimate	4,433	4,441	21.2%	23.3%	22.9%	22.7%	2.3
	Sensitivity test	4,492	43,300	20.7%	23.1%	21.5%	22.4%	1.5
Simple pneumonia and respiratory infections, 30 days from episode start date	BPCI impact estimate	2,902	2,906	9.5%	10.7%	9.4%	10.2%	0.5
	Sensitivity test	3,041	31,971	9.5%	10.5%	9.6%	10.6%	-0.1
Simple pneumonia and respiratory infections, 90 days from episode start date	BPCI impact estimate	2,898	2,904	20.3%	21.8%	20.7%	22.4%	-0.2
	Sensitivity test	3,036	31,963	20.2%	21.5%	20.3%	22.4%	-0.8
Stroke, 30 days from episode start date	BPCI impact estimate	1,357	1,359	11.0%	13.6%	9.8%	9.3%	3.0
	Sensitivity test	1,410	13,809	11.1%	13.5%	11.7%	11.3%	2.8*
Stroke, 90 days from episode start date	BPCI impact estimate	1,357	1,358	23.5%	26.7%	21.6%	21.5%	3.2
	Sensitivity test	1,410	13,805	24.0%	26.4%	23.9%	24.4%	1.9
Urinary tract infection, 30 days from episode start date	BPCI impact estimate	2,028	2,026	9.2%	9.7%	10.1%	11.4%	-0.9
	Sensitivity test	2,037	20,440	9.5%	9.8%	10.7%	11.0%	0.0
Urinary tract infection, 90 days from episode start date	BPCI impact estimate	2,024	2,026	21.4%	24.7%	22.8%	25.5%	0.5
	Sensitivity test	2,033	20,437	21.5%	24.6%	23.1%	24.1%	2.1

Note: The estimates in this table are the results of a difference-in-differences (DiD) model. Positive DiD estimates that are significant at the 5% or 10% significance level are indicated by dark and light green shaded cells, respectively. Negative DiD estimates that are significant at the 5% or 10% significance level are indicated by dark and light orange shaded cells, respectively.

* Indicates the sensitivity test was statistically significant at the 10% level.

Exhibit H.12: BPCI Impact Estimate and Sensitivity Test Results, Unplanned Readmission Rate, Model 3 SNF, Q4 2013 – Q4 2016

Clinical episode and outcome	Result	Number of BPCI Episodes	Number of Comparison Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD
Congestive heart failure, 30 days from episode start date	BPCI impact estimate	2,961	2,964	25.6%	22.9%	26.5%	24.7%	-1.0
	Sensitivity test	2,997	27,447	25.7%	22.9%	25.9%	23.5%	-0.4
Congestive heart failure, 90 days from episode start date	BPCI impact estimate	2,958	2,964	46.4%	43.4%	46.5%	43.7%	-0.2
	Sensitivity test	2,994	27,446	46.2%	43.5%	44.8%	43.1%	-0.9
COPD, bronchitis, asthma, 30 days from episode start date	BPCI impact estimate	892	899	23.0%	22.4%	21.9%	21.2%	0.0
	Sensitivity test	955	9,082	21.2%	21.7%	22.7%	21.2%	2.1
COPD, bronchitis, asthma, 90 days from episode start date	BPCI impact estimate	892	899	43.0%	44.5%	44.0%	41.7%	3.7
	Sensitivity test	955	9,082	42.1%	44.0%	42.7%	40.6%	4.0*
Hip & femur procedures except major joint, 30 days from episode start date	BPCI impact estimate	2,430	2,437	12.1%	10.3%	11.6%	9.7%	0.1
	Sensitivity test	2,477	20,390	11.9%	10.4%	12.1%	10.4%	0.3
Hip & femur procedures except major joint, 90 days from episode start date	BPCI impact estimate	2,426	2,436	22.1%	19.9%	23.1%	18.6%	2.3
	Sensitivity test	2,473	20,383	21.8%	20.1%	22.7%	19.6%	1.5
Major joint replacement of the lower extremity, 30 days from episode start date	BPCI impact estimate	6,584	6,578	8.6%	6.1%	8.5%	6.5%	-0.5
	Sensitivity test	8,031	51,533	8.3%	6.0%	8.0%	6.5%	-0.9
Major joint replacement of the lower extremity, 90 days from episode start date	BPCI impact estimate	6,574	6,577	13.9%	11.4%	13.6%	11.5%	-0.3
	Sensitivity test	8,016	51,526	13.4%	11.1%	13.0%	11.7%	-1.0
Medical non-infectious orthopedic, 30 days from episode start date	BPCI impact estimate	2,226	2,238	13.5%	11.7%	15.6%	11.5%	2.3
	Sensitivity test	2,521	19,448	14.1%	12.2%	14.3%	12.0%	0.4
Medical non-infectious orthopedic, 90 days from episode start date	BPCI impact estimate	2,224	2,237	26.4%	24.6%	28.4%	24.8%	1.8
	Sensitivity test	2,519	19,446	27.7%	25.7%	27.0%	25.4%	-0.4
Other respiratory, 30 days from episode start date	BPCI impact estimate	720	720	27.7%	25.7%	31.7%	25.6%	4.1
	Sensitivity test	849	7,747	27.5%	25.9%	29.0%	26.2%	1.2
Other respiratory, 90 days from episode start date	BPCI impact estimate	719	720	43.3%	43.0%	46.5%	43.1%	3.1
	Sensitivity test	848	7,747	44.9%	43.2%	45.9%	43.1%	1.1

Clinical episode and outcome	Result	Number of BPCI Episodes	Number of Comparison Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD
Renal failure, 30 days from episode start date	BPCI impact estimate	1,410	1,417	22.1%	21.4%	22.5%	23.3%	-1.5
	Sensitivity test	1,446	13,102	21.8%	21.6%	21.5%	19.6%	1.7
Renal failure, 90 days from episode start date	BPCI impact estimate	1,409	1,415	39.2%	38.7%	38.0%	40.5%	-3.1
	Sensitivity test	1,445	13,100	39.4%	39.1%	37.7%	35.8%	1.6
Sepsis, 30 days from episode start date	BPCI impact estimate	4,439	4,441	22.4%	20.2%	23.4%	23.0%	-1.8
	Sensitivity test	4,498	43,305	22.6%	20.4%	23.1%	21.3%	-0.4
Sepsis, 90 days from episode start date	BPCI impact estimate	4,433	4,441	38.9%	35.9%	38.4%	38.3%	-3.0
	Sensitivity test	4,492	43,300	39.0%	36.1%	38.8%	36.7%	-0.9
Simple pneumonia and respiratory infections, 30 days from episode start date	BPCI impact estimate	2,902	2,906	20.6%	19.5%	21.5%	17.8%	2.7
	Sensitivity test	3,041	31,971	20.1%	19.7%	21.5%	18.7%	2.5*
Simple pneumonia and respiratory infections, 90 days from episode start date	BPCI impact estimate	2,898	2,904	36.6%	33.3%	36.4%	33.4%	-0.4
	Sensitivity test	3,036	31,963	35.8%	33.1%	36.3%	33.4%	0.1
Stroke, 30 days from episode start date	BPCI impact estimate	1,357	1,359	16.9%	16.9%	16.3%	15.3%	1.1
	Sensitivity test	1,410	13,809	17.7%	17.1%	16.7%	15.8%	0.4
Stroke, 90 days from episode start date	BPCI impact estimate	1,357	1,358	28.4%	30.5%	30.3%	27.9%	4.4
	Sensitivity test	1,410	13,805	29.5%	30.7%	30.3%	28.5%	3.1
Urinary tract infection, 30 days from episode start date	BPCI impact estimate	2,028	2,026	16.8%	13.1%	17.5%	14.3%	-0.6
	Sensitivity test	2,037	20,440	16.9%	13.4%	17.6%	14.1%	0.1
Urinary tract infection, 90 days from episode start date	BPCI impact estimate	2,024	2,026	32.8%	30.7%	33.9%	29.8%	2.0
	Sensitivity test	2,033	20,437	32.8%	31.1%	33.9%	30.0%	2.2

Note: The estimates in this table are the results of a difference-in-differences (DiD) model. Positive DiD estimates that are significant at the 5% or 10% significance level are indicated by dark and light green shaded cells, respectively. Negative DiD estimates that are significant at the 5% or 10% significance level are indicated by dark and light orange shaded cells, respectively.

* Indicates the sensitivity test was statistically significant at the 10% level.

Exhibit H.13: BPCI Impact Estimate and Sensitivity Test Results, Successful Discharge to the Community, Model 3 SNF, Q4 2013 – Q4 2016

Clinical episode	Result	Number of BPCI Episodes	Number of Comparison Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD
Congestive heart failure	BPCI impact estimate	2,078	2,059	66.9%	65.6%	66.7%	66.9%	-1.5%
	Sensitivity test	2,103	19,223	66.7%	65.7%	66.9%	67.1%	-1.2%
COPD, bronchitis, asthma	BPCI impact estimate	644	693	72.7%	71.2%	68.0%	71.1%	-4.6%
	Sensitivity test	694	6,827	72.6%	71.7%	69.5%	71.5%	-2.9%
Hip & femur procedures except major joint	BPCI impact estimate	1,923	1,875	81.7%	84.8%	82.5%	83.8%	1.8%
	Sensitivity test	1,966	15,662	81.7%	84.6%	83.4%	83.4%	2.9%*
Major joint replacement of the lower extremity	BPCI impact estimate	5,850	5,834	92.1%	92.3%	91.6%	92.5%	-0.8%
	Sensitivity test	7,205	45,801	92.2%	92.6%	92.4%	92.5%	0.3%
Medical non-infectious orthopedic	BPCI impact estimate	1,782	1,789	78.9%	79.7%	77.5%	80.1%	-1.8%
	Sensitivity test	2,010	15,456	78.1%	79.2%	79.9%	80.0%	1.1%
Other respiratory	BPCI impact estimate	488	502	70.9%	69.2%	68.8%	68.0%	-0.8%
	Sensitivity test	584	5,246	70.6%	69.5%	65.9%	68.1%	-3.3%
Renal failure	BPCI impact estimate	1,005	998	70.1%	68.3%	69.4%	71.1%	-3.5%
	Sensitivity test	1,030	9,322	70.2%	68.0%	70.5%	71.4%	-3.1%
Sepsis	BPCI impact estimate	3,161	3,016	70.0%	71.3%	70.4%	70.9%	0.8%
	Sensitivity test	3,199	29,636	70.1%	71.5%	70.1%	71.3%	0.2%
Simple pneumonia and respiratory infections	BPCI impact estimate	2,089	2,100	73.1%	72.6%	73.6%	72.8%	0.2%
	Sensitivity test	2,183	22,964	73.5%	73.2%	72.8%	73.5%	-1.0%
Stroke	BPCI impact estimate	953	951	77.8%	74.5%	75.4%	78.1%	-6.0%
	Sensitivity test	991	9,884	77.5%	74.3%	76.7%	77.1%	-3.5%*
Urinary tract infection	BPCI impact estimate	1,550	1,575	74.0%	75.6%	72.1%	76.2%	-2.4%
	Sensitivity test	1,557	15,742	74.0%	75.5%	72.8%	74.8%	-0.5%

Note: The estimates in this table are the results of a difference-in-differences (DiD) model. Positive DiD estimates that are significant at the 5% or 10% significance level are indicated by dark and light green shaded cells, respectively. Negative DiD estimates that are significant at the 5% or 10% significance level are indicated by dark and light orange shaded cells, respectively.

* Indicates the sensitivity test was statistically significant at the 10% level.

Exhibit H.14: BPCI Impact Estimate and Sensitivity Test Results, Total Amount Included in Bundle Definition, Model 3 HHA 90-day episodes, Q4 2013 – Q4 2016

Clinical episode	Result	Number of BPCI Episodes	Number of Comparison Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD
Congestive heart failure	BPCI impact estimate	3,983	4,069	\$14,814	\$14,913	\$13,847	\$14,737	-\$791
	Sensitivity test	3,984	23,858	\$14,966	\$15,128	\$13,960	\$14,670	-\$548
Major joint replacement of the lower extremity	BPCI impact estimate	3,010	3,004	\$7,023	\$6,637	\$6,023	\$6,149	-\$512
	Sensitivity test	3,051	28,726	\$6,795	\$6,398	\$6,062	\$6,343	-\$678
Simple pneumonia and respiratory infections	BPCI impact estimate	1,222	1,228	\$11,911	\$12,899	\$12,129	\$12,033	\$1,085
	Sensitivity test	1,252	13,191	\$11,809	\$12,622	\$12,183	\$12,227	\$768

Note: The estimates in this table are the results of a difference-in-differences (DiD) model. Positive DiD estimates that are significant at the 5% or 10% significance level are indicated by dark and light green shaded cells, respectively. Negative DiD estimates that are significant at the 5% or 10% significance level are indicated by dark and light orange shaded cells, respectively.

* Indicates the sensitivity test was statistically significant at the 10% level.

Exhibit H.15: BPCI Impact Estimate and Sensitivity Test Results, All-Cause Mortality Rate, Model 3 HHA, Q4 2013 – Q4 2016

Clinical episode and outcome	Result	Number of BPCI Episodes	Number of Comparison Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD
Congestive heart failure, 30 days from episode start date	BPCI impact estimate	4,446	4,467	4.5%	3.8%	3.7%	4.3%	-1.3
	Sensitivity test	4,447	28,386	4.6%	3.9%	4.5%	4.5%	-0.7
Congestive heart failure, 90 days from episode start date	BPCI impact estimate	4,443	4,467	13.3%	11.9%	11.6%	12.0%	-1.8
	Sensitivity test	4,444	28,381	13.0%	11.8%	12.9%	13.2%	-1.5*
Major joint replacement of the lower extremity, 90 days from episode start date	BPCI impact estimate	3,535	3,537	0.5%	0.7%	0.4%	0.5%	0.1
	Sensitivity test	3,576	33,133	0.4%	0.6%	0.4%	0.5%	0.2
Simple pneumonia and respiratory infections, 30 days from episode start date	BPCI impact estimate	1,263	1,262	4.0%	4.3%	4.0%	3.7%	0.7
	Sensitivity test	1,293	14,173	4.2%	4.4%	4.0%	4.1%	0.1
Simple pneumonia and respiratory infections, 90 days from episode start date	BPCI impact estimate	1,262	1,262	11.8%	11.1%	10.8%	10.4%	-0.3
	Sensitivity test	1,292	14,171	12.0%	11.2%	11.1%	10.8%	-0.6

Note: The estimates in this table are the results of a difference-in-differences (DiD) model. Positive DiD estimates that are significant at the 5% or 10% significance level are indicated by dark and light green shaded cells, respectively. Negative DiD estimates that are significant at the 5% or 10% significance level are indicated by dark and light orange shaded cells, respectively.

* Indicates the sensitivity test was statistically significant at the 10% level.

Exhibit H.16: BPCI Impact Estimate and Sensitivity Test Results, Emergency Department Use, Model 3 HHA, Q4 2013 – Q4 2016

Clinical episode and outcome	Result	Number of BPCI Episodes	Number of Comparison Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD
Congestive heart failure, 30 days from episode start date	BPCI impact estimate	4,368	4,481	10.7%	11.9%	11.7%	12.1%	0.8
	Sensitivity test	4,369	28,530	12.2%	13.3%	13.0%	13.8%	0.3
Congestive heart failure, 90 days from episode start date	BPCI impact estimate	4,365	4,481	21.1%	23.2%	23.2%	23.6%	1.7
	Sensitivity test	4,366	28,525	23.9%	26.0%	26.0%	27.0%	1.1
Major joint replacement of the lower extremity, 30 days from episode start date	BPCI impact estimate	3,490	3,538	8.0%	8.5%	6.9%	7.8%	-0.4
	Sensitivity test	3,530	33,117	7.1%	8.1%	7.0%	8.1%	0.0
Major joint replacement of the lower extremity, 90 days from episode start date	BPCI impact estimate	3,487	3,538	13.6%	14.0%	12.4%	12.8%	0.0
	Sensitivity test	3,527	33,116	12.4%	13.8%	11.9%	13.4%	-0.2
Simple pneumonia and respiratory infections, 30 days from episode start date	BPCI impact estimate	1,251	1,263	14.5%	13.1%	11.8%	13.9%	-3.5
	Sensitivity test	1,281	14,211	14.0%	13.2%	13.4%	14.1%	-1.5
Simple pneumonia and respiratory infections, 90 days from episode start date	BPCI impact estimate	1,250	1,263	28.6%	25.7%	24.9%	26.9%	-4.8
	Sensitivity test	1,280	14,209	28.2%	25.8%	26.2%	27.7%	-3.9*

Note: The estimates in this table are the results of a difference-in-differences (DiD) model. Positive DiD estimates that are significant at the 5% or 10% significance level are indicated by dark and light green shaded cells, respectively. Negative DiD estimates that are significant at the 5% or 10% significance level are indicated by dark and light orange shaded cells, respectively.

* Indicates the sensitivity test was statistically significant at the 10% level.

Exhibit H.17: BPCI Impact Estimate and Sensitivity Test Results, Unplanned Readmission Rate, Model 3 HHA, Q4 2013 – Q4 2016

Clinical episode and outcome	Result	Number of BPCI Episodes	Number of Comparison Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD
Congestive heart failure, 30 days from episode start date	BPCI impact estimate	4,368	4,481	24.6%	22.5%	22.7%	20.8%	-0.2
	Sensitivity test	4,369	28,530	24.2%	22.2%	23.0%	20.7%	0.3
Congestive heart failure, 90 days from episode start date	BPCI impact estimate	4,365	4,481	44.1%	41.5%	40.8%	39.0%	-0.9
	Sensitivity test	4,366	28,525	44.0%	41.2%	40.9%	38.9%	-0.7
Major joint replacement of the lower extremity, 30 days from episode start date	BPCI impact estimate	3,490	3,538	5.1%	3.6%	2.9%	2.8%	-1.3
	Sensitivity test	3,530	33,117	4.8%	3.5%	3.3%	3.0%	-1.0*
Major joint replacement of the lower extremity, 90 days from episode start date	BPCI impact estimate	3,487	3,538	8.1%	6.1%	5.2%	4.8%	-1.6
	Sensitivity test	3,527	33,116	7.5%	6.0%	5.7%	5.2%	-1.1
Simple pneumonia and respiratory infections, 30 days from episode start date	BPCI impact estimate	1,251	1,263	17.0%	16.5%	17.8%	16.8%	0.4
	Sensitivity test	1,281	14,211	17.2%	15.9%	17.9%	16.5%	0.1
Simple pneumonia and respiratory infections, 90 days from episode start date	BPCI impact estimate	1,250	1,263	29.9%	32.0%	30.8%	29.4%	3.5
	Sensitivity test	1,280	14,209	30.0%	31.5%	32.1%	29.6%	4.1*

Note: The estimates in this table are the results of a difference-in-differences (DiD) model. Positive DiD estimates that are significant at the 5% or 10% significance level are indicated by dark and light green shaded cells, respectively. Negative DiD estimates that are significant at the 5% or 10% significance level are indicated by dark and light orange shaded cells, respectively.

* Indicates the sensitivity test was statistically significant at the 10% level.

Appendix I: Tables of Results from Beneficiary Survey

Table I.1 explains how Beneficiary Survey outcome measures were defined. Tables I.2 and I.3 show estimates pooled across all clinical episodes for Model 2 hospitals and Model 2 physician group practices (PGP). All remaining tables show results for combinations of model, EI type, and clinical episodes. The lower confidence interval (LCI) and upper confidence interval (UCI) are also displayed for the 5% and 10% level of significance. Clinical episodes for Model 2 hospitals are shown in Tables I.4 – I.28. Clinical episodes for Model 2 PGP are shown in Tables I.29 – I.46. Clinical episodes for Model 3 HHA are shown in Tables I.47 – I.48. Clinical episodes for Model 3 SNF are shown in Tables I.49 – I.51.

Exhibit I.1: Definitions for Beneficiary Survey Outcome Measures

Domain	Measures	Response if Indicator=1	Response if Indicator=0
Functional Improvement	Improvement in bathing, dressing, using the toilet, or eating	Improved functional status	Same or worse functional status
	Improvement in planning regular tasks	Improved functional status	Same or worse functional status
	Improvement in use of mobility device (less likely to use mobility device)	Improved functional status	Same or worse functional status
	Improvement in walking without rest	Improved functional status	Same or worse functional status
	Improvement in using stairs	Improved functional status	Same or worse functional status
	Improvement (less frequent) in physical/emotional problems limiting social activities	Improved functional status	Same or worse functional status
	Improvement (less frequent) in pain limiting regular activities	Improved functional status	Same or worse functional status
Functional Decline	Decline in bathing, dressing, using the toilet, or eating	Worse functional status	Same or improved functional status
	Decline in planning regular tasks	Worse functional status	Same or improved functional status
	Decline in use of mobility device (less likely to use mobility device)	Worse functional status	Same or improved functional status
	Decline in walking without rest	Worse functional status	Same or improved functional status
	Decline in using stairs	Worse functional status	Same or improved functional status
	Decline (more frequent) in physical/emotional problems limiting social activities	Worse functional status	Same or improved functional status
	Decline (more frequent) in pain limiting regular activities	Worse functional status	Same or improved functional status
Overall Health	Q9/10 - Composite Depression Indicator	PHQ-2 score \geq 3	PHQ-2 score \leq 2
	Q18 - In general, how would you rate your physical health?	Excellent/very good/good	Fair/poor
	Q19 - In general, how would you rate your mental health?	Excellent/very good/good	Fair/poor

Domain	Measures	Response if Indicator=1	Response if Indicator=0
Care Experience	Q20 - Conflicting advice from medical staff about your treatment	Never	Sometimes/usually/always
	Q21 - Services appropriate for the level of care you needed	Always	Never/sometimes/usually
	Q23 - Medical staff spoke in preferred language	Always	Never/sometimes/usually
	Q24 - Discharged at the right time	Yes	No, too early or too late
	Q25 - Medical staff took your preferences into account in deciding what health care services you should have after you left the hospital	Agree/strongly agree	Strongly disagree/disagree
	Q27 - Good understanding of how to take care of self before going home	Agree/strongly agree	Strongly disagree/disagree
	Q28 - Medical staff clearly explained how to take medications before going home	Agree/strongly agree	Strongly disagree/disagree
	Q29 - Medical staff clearly explained what follow-up appointments or treatments would be needed before going home	Agree/strongly agree	Strongly disagree/disagree
	Q30 - Able to manage your health needs since returning home	Agree/strongly agree	Strongly disagree/disagree
Overall Satisfaction	Q31 - Overall satisfaction with recovery since leaving hospital	Extremely satisfied/quite a bit satisfied	Moderately satisfied/slightly satisfied/not at all satisfied

Notes: All outcome measures were coded as binary measures.

Exhibit I.2: Beneficiary Survey Outcomes: Model 2 Hospitals, Pooled Across Episodes, Waves 4-10

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Improvement	Improvement in bathing, dressing, using the toilet, or eating	26,662	27,256	72.94	72.78	0.15	-0.75	1.06	-0.61	0.92
	Improvement in planning regular tasks	27,038	27,662	61.15	61.58	-0.43	-1.50	0.63	-1.33	0.46
	Improvement in use of mobility device (less likely to use mobility device)	27,057	27,682	49.79	50.53	-0.74	-1.83	0.35	-1.65	0.18
	Improvement in walking without rest	26,761	27,411	46.56	45.72	0.84	-0.38	2.05	-0.18	1.86
	Improvement in using stairs	26,102	26,785	45.88	45.72	0.16	-1.09	1.42	-0.89	1.22
	Improvement (less frequent) in physical/emotional problems limiting social activities	26,664	27,264	60.74	60.99	-0.24	-1.34	0.86	-1.17	0.68
	Improvement (less frequent) in pain limiting regular activities	26,814	27,378	60.41	59.86	0.55	-0.60	1.70	-0.42	1.52
Functional Decline	Decline in bathing, dressing, using the toilet, or eating	26,662	27,256	14.60	14.87	-0.27	-1.03	0.50	-0.91	0.38
	Decline in planning regular tasks	27,038	27,662	22.54	22.39	0.15	-0.72	1.02	-0.58	0.88
	Decline in use of mobility device (less likely to use mobility device)	27,057	27,682	37.09	36.20	0.89	-0.11	1.90	0.05	1.74
	Decline in walking without rest	26,761	27,411	26.56	26.85	-0.29	-1.21	0.64	-1.06	0.49
	Decline in using stairs	26,102	26,785	30.06	29.81	0.25	-0.68	1.18	-0.53	1.03
	Decline (more frequent) in physical/emotional problems limiting social activities	26,664	27,264	21.18	20.78	0.39	-0.53	1.31	-0.38	1.17
	Decline (more frequent) in pain limiting regular activities	26,814	27,378	18.08	18.41	-0.33	-1.16	0.50	-1.03	0.37
Overall Health	Q9/10 - Composite Depression Indicator	26,863	27,531	20.18	20.21	-0.03	-1.00	0.94	-0.84	0.78
	Q18 - In general, how would you rate your physical health?	27,615	28,263	61.11	60.20	0.91	-0.17	1.99	0.00	1.82
	Q19 - In general, how would you rate your mental health?	27,601	28,263	80.54	79.77	0.77	-0.09	1.63	0.04	1.49

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Care Experience	Q20 - Conflicting advice from medical staff about your treatment	27,452	28,155	72.06	74.32	-2.26	-3.40	-1.12	-3.21	-1.30
	Q21 - Services appropriate for the level of care you needed	27,561	28,259	62.31	64.30	-2.00	-3.29	-0.70	-3.09	-0.91
	Q23 - Medical staff spoke in preferred language	27,808	28,516	92.97	93.56	-0.59	-1.35	0.16	-1.23	0.04
	Q24 - Discharged at the right time	27,434	28,144	88.81	90.34	-1.53	-2.27	-0.80	-2.15	-0.92
	Q25 - Medical staff took your preferences into account in deciding what health care services you should have after you left the hospital	24,089	24,704	93.05	93.69	-0.65	-1.29	0.00	-1.19	-0.11
	Q27 - Good understanding of how to take care of self before going home	24,197	24,786	94.71	95.62	-0.91	-1.48	-0.34	-1.39	-0.43
	Q28 - Medical staff clearly explained how to take medications before going home	23,529	24,174	93.90	94.80	-0.90	-1.53	-0.26	-1.43	-0.37
	Q29 - Medical staff clearly explained what follow-up appointments or treatments would be needed before going home	23,327	23,950	94.58	95.05	-0.46	-1.07	0.15	-0.97	0.05
	Q30 - Able to manage your health needs since returning home	23,787	24,267	96.38	96.16	0.22	-0.29	0.73	-0.21	0.65
Overall Satisfaction	Q31 - Overall satisfaction with recovery since leaving hospital	26,206	26,869	70.31	72.21	-1.90	-2.98	-0.82	-2.81	-0.99

Source: Abt Associates analysis of BPCI Beneficiary Survey responses.

Notes: All responses were weighted for non-response and sampling design, and estimates were risk-adjusted for beneficiary- and hospital-level characteristics. The analysis pooled all 25 Model 2 hospital clinical episodes that were analyzed at the episode level.

Exhibit I.3: Beneficiary Survey Outcomes: Model 2 PGP, Pooled Across Episodes, Waves 9-11

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Improvement	Improvement in bathing, dressing, using the toilet, or eating	15742	13726	72.77	72.00	0.77	-0.18	1.73	-0.03	1.58
	Improvement in planning regular tasks	15969	13869	61.59	61.51	0.08	-1.05	1.21	-0.87	1.03
	Improvement in use of mobility device (less likely to use mobility device)	15955	13896	49.94	50.41	-0.48	-1.69	0.73	-1.49	0.54
	Improvement in walking without rest	15766	13741	45.27	45.01	0.26	-1.00	1.52	-0.80	1.31
	Improvement in using stairs	15376	13355	45.00	43.84	1.15	-0.16	2.47	0.05	2.26
	Improvement (less frequent) in physical/emotional problems limiting social activities	15764	13707	59.66	60.52	-0.86	-2.15	0.42	-1.94	0.22
	Improvement (less frequent) in pain limiting regular activities	15805	13754	57.26	57.31	-0.05	-1.27	1.17	-1.07	0.97
Functional Decline	Decline in bathing, dressing, using the toilet, or eating	15742	13726	14.43	14.79	-0.36	-1.17	0.46	-1.04	0.33
	Decline in planning regular tasks	15969	13869	21.92	22.05	-0.13	-1.03	0.78	-0.89	0.63
	Decline in use of mobility device (less likely to use mobility device)	15955	13896	36.60	35.56	1.03	-0.11	2.18	0.07	1.99
	Decline in walking without rest	15766	13741	27.14	27.40	-0.26	-1.29	0.78	-1.13	0.61
	Decline in using stairs	15376	13355	30.57	31.32	-0.75	-1.80	0.30	-1.63	0.13
	Decline (more frequent) in physical/emotional problems limiting social activities	15764	13707	22.33	21.61	0.72	-0.36	1.81	-0.19	1.63
	Decline (more frequent) in pain limiting regular activities	15805	13754	19.76	19.38	0.38	-0.63	1.40	-0.47	1.24
Overall Health	Q9/10 - Composite Depression Indicator	15909	13810	20.09	20.38	-0.29	-1.30	0.72	-1.14	0.56
	Q18 - In general, how would you rate your physical health?	16304	14157	59.37	58.45	0.92	-0.21	2.05	-0.03	1.87
	Q19 - In general, how would you rate your mental health?	16302	14161	79.11	79.35	-0.24	-1.20	0.71	-1.05	0.56

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Care Experience	Q20 - Conflicting advice from medical staff about your treatment	16288	14134	72.82	73.73	-0.92	-2.12	0.28	-1.93	0.09
	Q21 - Services appropriate for the level of care you needed	16348	14188	61.89	63.71	-1.82	-3.12	-0.51	-2.91	-0.72
	Q23 - Medical staff spoke in preferred language	16485	14309	93.91	93.49	0.42	-0.29	1.14	-0.18	1.02
	Q24 - Discharged at the right time	16275	14126	88.50	89.66	-1.16	-2.06	-0.26	-1.92	-0.41
	Q25 - Medical staff took your preferences into account in deciding what health care services you should have after you left the hospital	14243	12325	92.02	92.92	-0.90	-1.72	-0.09	-1.59	-0.22
	Q27 - Good understanding of how to take care of self before going home	14355	12490	94.58	94.85	-0.26	-0.96	0.43	-0.85	0.32
	Q28 - Medical staff clearly explained how to take medications before going home	13934	12165	94.10	94.23	-0.14	-0.86	0.59	-0.74	0.47
	Q29 - Medical staff clearly explained what follow-up appointments or treatments would be needed before going home	13821	12026	94.79	94.80	-0.01	-0.68	0.65	-0.57	0.54
	Q30 - Able to manage your health needs since returning home	14013	12235	95.88	96.10	-0.22	-0.82	0.37	-0.72	0.28
Overall Satisfaction	Q31 - Overall satisfaction with recovery since leaving hospital	15530	13489	70.37	71.12	-0.75	-2.04	0.54	-1.83	0.33

Source: Abt Associates analysis of BPCI Beneficiary Survey responses.

Notes: All responses were weighted for non-response and sampling design, and estimates were risk-adjusted for beneficiary- and hospital-level characteristics. The analysis pooled all 18 Model 2 PGP clinical episodes that were analyzed at the episode level.

Exhibit I.4: Beneficiary Survey Outcomes: Major Joint Replacement of the Upper Extremity, Model 2 Hospitals, Waves 5-9

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Improvement	Improvement in bathing, dressing, using the toilet, or eating	381	444	78.78	81.12	-2.34	-7.98	3.30	-7.07	2.39
	Improvement in planning regular tasks	381	455	78.77	82.27	-3.50	-8.75	1.76	-7.90	0.91
	Improvement in use of mobility device (less likely to use mobility device)	383	455	76.73	75.85	0.87	-3.12	4.86	-2.47	4.22
	Improvement in walking without rest	386	450	60.64	61.07	-0.43	-4.65	3.79	-3.97	3.11
	Improvement in using stairs	378	445	59.43	59.29	0.14	-4.22	4.49	-3.52	3.79
	Improvement (less frequent) in physical/emotional problems limiting social activities	381	446	73.21	72.85	0.36	-4.68	5.39	-3.87	4.58
	Improvement (less frequent) in pain limiting regular activities	384	454	70.67	72.52	-1.85	-7.14	3.44	-6.28	2.59
Functional Decline	Decline in bathing, dressing, using the toilet, or eating	381	444	8.24	7.66	0.58	-3.24	4.40	-2.62	3.78
	Decline in planning regular tasks	381	455	9.76	6.42	3.34	-0.71	7.38	-0.05	6.72
	Decline in use of mobility device (less likely to use mobility device)	383	455	13.85	15.62	-1.76	-5.48	1.96	-4.88	1.35
	Decline in walking without rest	386	450	12.12	11.93	0.19	-4.13	4.51	-3.43	3.81
	Decline in using stairs	378	445	14.47	12.75	1.72	-2.79	6.24	-2.06	5.51
	Decline (more frequent) in physical/emotional problems limiting social activities	381	446	16.24	14.21	2.03	-2.31	6.37	-1.61	5.67
	Decline (more frequent) in pain limiting regular activities	384	454	10.03	11.19	-1.17	-4.80	2.46	-4.21	1.87
Overall Health	Q9/10 - Composite Depression Indicator	384	452	9.45	9.72	-0.27	-3.75	3.22	-3.19	2.66
	Q18 - In general, how would you rate your physical health?	392	463	79.42	77.96	1.47	-3.42	6.36	-2.63	5.57
	Q19 - In general, how would you rate your mental health?	390	462	89.96	92.45	-2.49	-6.01	1.03	-5.44	0.46

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Care Experience	Q20 - Conflicting advice from medical staff about your treatment	391	459	84.69	83.83	0.87	-3.67	5.40	-2.93	4.67
	Q21 - Services appropriate for the level of care you needed	390	459	72.60	75.92	-3.31	-8.39	1.77	-7.57	0.95
	Q23 - Medical staff spoke in preferred language	388	460	94.37	96.47	-2.09	-4.72	0.53	-4.30	0.11
	Q24 - Discharged at the right time	390	455	93.53	95.62	-2.10	-5.44	1.25	-4.90	0.71
	Q25 - Medical staff took your preferences into account in deciding what health care services you should have after you left the hospital	356	403	94.54	96.37	-1.82	-5.10	1.45	-4.57	0.92
	Q27 - Good understanding of how to take care of self before going home	372	439	93.62	96.67	-3.05	-6.16	0.06	-5.66	-0.44
	Q28 - Medical staff clearly explained how to take medications before going home	352	423	95.83	96.90	-1.07	-3.84	1.71	-3.40	1.26
	Q29 - Medical staff clearly explained what follow-up appointments or treatments would be needed before going home	359	424	96.78	97.45	-0.67	-3.14	1.80	-2.74	1.40
	Q30 - Able to manage your health needs since returning home	359	433	98.18	98.69	-0.51	-2.51	1.50	-2.19	1.17
Overall Satisfaction	Q31 - Overall satisfaction with recovery since leaving hospital	380	435	84.97	87.68	-2.71	-7.29	1.88	-6.55	1.13

Source: Abt Associates analysis of BPCI Beneficiary Survey responses.

Notes: All responses were weighted for non-response and sampling design, and estimates were risk-adjusted for beneficiary- and hospital-level characteristics.

Exhibit I.5: Beneficiary Survey Outcomes: Urinary Tract Infection, Model 2 Hospitals, Waves 4-10

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Improvement	Improvement in bathing, dressing, using the toilet, or eating	1014	1065	46.34	46.57	-0.23	-3.99	3.53	-3.38	2.92
	Improvement in planning regular tasks	1017	1082	34.60	35.64	-1.04	-4.51	2.44	-3.95	1.88
	Improvement in use of mobility device (less likely to use mobility device)	1009	1087	29.97	29.34	0.63	-2.24	3.49	-1.78	3.03
	Improvement in walking without rest	993	1066	22.77	24.98	-2.21	-5.68	1.26	-5.12	0.70
	Improvement in using stairs	978	1043	24.83	23.26	1.57	-1.82	4.95	-1.28	4.41
	Improvement (less frequent) in physical/emotional problems limiting social activities	1004	1062	45.79	41.85	3.94	-0.70	8.57	0.05	7.82
	Improvement (less frequent) in pain limiting regular activities	1002	1055	41.24	40.68	0.56	-3.41	4.54	-2.77	3.90
Functional Decline	Decline in bathing, dressing, using the toilet, or eating	1014	1065	32.67	31.88	0.79	-3.02	4.61	-2.40	3.99
	Decline in planning regular tasks	1017	1082	45.91	43.58	2.33	-1.65	6.31	-1.01	5.67
	Decline in use of mobility device (less likely to use mobility device)	1009	1087	56.96	57.30	-0.34	-3.58	2.89	-3.05	2.37
	Decline in walking without rest	993	1066	50.06	45.86	4.20	0.50	7.91	1.09	7.31
	Decline in using stairs	978	1043	54.71	54.71	0.00	-3.54	3.53	-2.97	2.96
	Decline (more frequent) in physical/emotional problems limiting social activities	1004	1062	32.14	34.16	-2.02	-6.74	2.69	-5.98	1.93
	Decline (more frequent) in pain limiting regular activities	1002	1055	26.28	25.97	0.31	-4.14	4.75	-3.42	4.04
Overall Health	Q9/10 - Composite Depression Indicator	1015	1075	33.77	34.43	-0.65	-4.63	3.32	-3.99	2.68
	Q18 - In general, how would you rate your physical health?	1035	1112	42.30	38.59	3.72	-0.26	7.69	0.38	7.05
	Q19 - In general, how would you rate your mental health?	1036	1113	61.36	58.95	2.41	-1.60	6.43	-0.96	5.78

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Care Experience	Q20 - Conflicting advice from medical staff about your treatment	1034	1113	59.18	62.13	-2.95	-7.65	1.75	-6.89	0.99
	Q21 - Services appropriate for the level of care you needed	1036	1118	50.14	49.18	0.96	-3.54	5.47	-2.82	4.74
	Q23 - Medical staff spoke in preferred language	1048	1124	88.46	88.71	-0.24	-3.64	3.15	-3.09	2.60
	Q24 - Discharged at the right time	1034	1109	83.93	85.47	-1.54	-5.07	1.98	-4.50	1.42
	Q25 - Medical staff took your preferences into account in deciding what health care services you should have after you left the hospital	903	956	90.63	88.47	2.16	-0.89	5.21	-0.40	4.72
	Q27 - Good understanding of how to take care of self before going home	826	876	94.30	92.51	1.79	-0.91	4.49	-0.47	4.05
	Q28 - Medical staff clearly explained how to take medications before going home	784	839	90.98	91.88	-0.90	-3.87	2.08	-3.39	1.60
	Q29 - Medical staff clearly explained what follow-up appointments or treatments would be needed before going home	776	841	92.35	90.10	2.26	-0.66	5.17	-0.19	4.70
	Q30 - Able to manage your health needs since returning home	818	881	94.06	93.81	0.25	-2.51	3.01	-2.06	2.57
Overall Satisfaction	Q31 - Overall satisfaction with recovery since leaving hospital	995	1068	59.51	59.29	0.22	-4.55	4.99	-3.78	4.22

Source: Abt Associates analysis of BPCI Beneficiary Survey responses.

Notes: All responses were weighted for non-response and sampling design, and estimates were risk-adjusted for beneficiary- and hospital-level characteristics.

Exhibit I.6: Beneficiary Survey Outcomes: Stroke, Model 2 Hospitals, Waves 4-10

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Improvement	Improvement in bathing, dressing, using the toilet, or eating	1931	2046	59.37	61.19	-1.82	-4.39	0.76	-3.98	0.34
	Improvement in planning regular tasks	1947	2075	44.81	46.44	-1.64	-4.36	1.08	-3.92	0.64
	Improvement in use of mobility device (less likely to use mobility device)	1959	2087	43.55	42.07	1.48	-0.75	3.71	-0.39	3.35
	Improvement in walking without rest	1936	2049	35.27	34.17	1.10	-1.52	3.72	-1.09	3.30
	Improvement in using stairs	1882	2020	34.31	35.53	-1.22	-3.75	1.30	-3.34	0.89
	Improvement (less frequent) in physical/emotional problems limiting social activities	1930	2030	43.51	44.73	-1.21	-4.19	1.77	-3.71	1.29
	Improvement (less frequent) in pain limiting regular activities	1942	2035	46.20	44.88	1.32	-1.51	4.15	-1.06	3.70
Functional Decline	Decline in bathing, dressing, using the toilet, or eating	1931	2046	28.31	27.31	1.00	-1.69	3.70	-1.26	3.26
	Decline in planning regular tasks	1947	2075	41.74	40.61	1.13	-1.53	3.79	-1.10	3.36
	Decline in use of mobility device (less likely to use mobility device)	1959	2087	45.20	47.25	-2.06	-4.52	0.41	-4.13	0.01
	Decline in walking without rest	1936	2049	40.66	42.05	-1.39	-4.45	1.68	-3.96	1.19
	Decline in using stairs	1882	2020	44.38	44.09	0.29	-2.63	3.22	-2.16	2.75
	Decline (more frequent) in physical/emotional problems limiting social activities	1930	2030	39.78	37.90	1.88	-1.31	5.08	-0.80	4.57
	Decline (more frequent) in pain limiting regular activities	1942	2035	29.52	29.75	-0.23	-3.42	2.97	-2.91	2.45
Overall Health	Q9/10 - Composite Depression Indicator	1943	2051	26.66	29.47	-2.80	-5.72	0.11	-5.25	-0.36
	Q18 - In general, how would you rate your physical health?	1999	2117	52.59	50.80	1.79	-0.99	4.56	-0.54	4.11
	Q19 - In general, how would you rate your mental health?	1993	2119	68.16	67.70	0.46	-2.33	3.24	-1.88	2.80

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Care Experience	Q20 - Conflicting advice from medical staff about your treatment	1990	2131	67.31	68.63	-1.31	-4.53	1.91	-4.01	1.39
	Q21 - Services appropriate for the level of care you needed	1997	2127	56.40	60.81	-4.41	-7.97	-0.84	-7.40	-1.42
	Q23 - Medical staff spoke in preferred language	2011	2153	89.80	91.36	-1.56	-3.71	0.58	-3.36	0.24
	Q24 - Discharged at the right time	1975	2116	87.14	89.80	-2.66	-5.08	-0.23	-4.69	-0.62
	Q25 - Medical staff took your preferences into account in deciding what health care services you should have after you left the hospital	1786	1927	92.76	92.04	0.71	-0.88	2.30	-0.62	2.05
	Q27 - Good understanding of how to take care of self before going home	1726	1806	93.18	94.71	-1.53	-3.34	0.28	-3.05	-0.01
	Q28 - Medical staff clearly explained how to take medications before going home	1686	1767	92.73	93.32	-0.59	-2.46	1.27	-2.16	0.97
	Q29 - Medical staff clearly explained what follow-up appointments or treatments would be needed before going home	1657	1722	93.28	93.27	0.02	-2.15	2.18	-1.80	1.83
	Q30 - Able to manage your health needs since returning home	1691	1759	96.09	95.72	0.37	-1.17	1.92	-0.92	1.67
Overall Satisfaction	Q31 - Overall satisfaction with recovery since leaving hospital	1892	2009	61.93	64.08	-2.14	-4.96	0.68	-4.51	0.22

Source: Abt Associates analysis of BPCI Beneficiary Survey responses.

Notes: All responses were weighted for non-response and sampling design, and estimates were risk-adjusted for beneficiary- and hospital-level characteristics.

Exhibit I.7: Beneficiary Survey Outcomes: COPD, Bronchitis, Asthma, Model 2 Hospitals, Waves 4-10

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Improvement	Improvement in bathing, dressing, using the toilet, or eating	2144	2177	66.76	67.50	-0.74	-3.24	1.76	-2.83	1.36
	Improvement in planning regular tasks	2184	2206	50.59	52.53	-1.95	-4.61	0.72	-4.18	0.29
	Improvement in use of mobility device (less likely to use mobility device)	2176	2216	45.30	44.29	1.01	-1.28	3.30	-0.91	2.93
	Improvement in walking without rest	2164	2192	31.09	30.81	0.28	-2.64	3.20	-2.17	2.73
	Improvement in using stairs	2090	2145	28.89	29.32	-0.43	-3.35	2.48	-2.88	2.01
	Improvement (less frequent) in physical/emotional problems limiting social activities	2151	2182	48.59	48.19	0.40	-2.60	3.41	-2.12	2.93
	Improvement (less frequent) in pain limiting regular activities	2160	2185	47.87	45.94	1.93	-1.32	5.17	-0.80	4.65
Functional Decline	Decline in bathing, dressing, using the toilet, or eating	2144	2177	14.88	12.66	2.22	0.03	4.41	0.38	4.06
	Decline in planning regular tasks	2184	2206	25.62	23.72	1.90	-0.53	4.32	-0.14	3.93
	Decline in use of mobility device (less likely to use mobility device)	2176	2216	36.39	36.57	-0.18	-2.64	2.28	-2.25	1.89
	Decline in walking without rest	2164	2192	28.19	29.38	-1.19	-3.71	1.33	-3.31	0.92
	Decline in using stairs	2090	2145	38.28	37.66	0.63	-2.19	3.45	-1.74	3.00
	Decline (more frequent) in physical/emotional problems limiting social activities	2151	2182	25.48	25.56	-0.08	-2.86	2.71	-2.41	2.26
	Decline (more frequent) in pain limiting regular activities	2160	2185	22.52	25.30	-2.78	-5.67	0.11	-5.21	-0.36
Overall Health	Q9/10 - Composite Depression Indicator	2173	2222	30.24	27.21	3.02	0.42	5.63	0.84	5.21
	Q18 - In general, how would you rate your physical health?	2226	2273	36.77	36.45	0.31	-2.75	3.37	-2.26	2.88
	Q19 - In general, how would you rate your mental health?	2234	2261	72.53	70.86	1.67	-0.91	4.26	-0.49	3.84

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Care Experience	Q20 - Conflicting advice from medical staff about your treatment	2200	2242	66.23	69.38	-3.15	-6.19	-0.10	-5.70	-0.59
	Q21 - Services appropriate for the level of care you needed	2209	2257	55.81	58.24	-2.43	-5.62	0.76	-5.11	0.24
	Q23 - Medical staff spoke in preferred language	2237	2282	91.63	92.37	-0.74	-2.71	1.23	-2.39	0.91
	Q24 - Discharged at the right time	2213	2250	86.29	86.14	0.15	-2.03	2.32	-1.68	1.97
	Q25 - Medical staff took your preferences into account in deciding what health care services you should have after you left the hospital	1878	1912	91.19	91.09	0.10	-2.01	2.22	-1.67	1.88
	Q27 - Good understanding of how to take care of self before going home	1953	1992	94.99	94.54	0.45	-1.17	2.06	-0.91	1.80
	Q28 - Medical staff clearly explained how to take medications before going home	1930	1970	93.60	92.37	1.22	-0.79	3.24	-0.46	2.91
	Q29 - Medical staff clearly explained what follow-up appointments or treatments would be needed before going home	1914	1960	94.76	93.41	1.35	-0.42	3.11	-0.14	2.83
	Q30 - Able to manage your health needs since returning home	1954	1961	95.65	94.70	0.95	-0.59	2.48	-0.34	2.23
Overall Satisfaction	Q31 - Overall satisfaction with recovery since leaving hospital	2108	2140	62.24	64.39	-2.15	-5.42	1.12	-4.89	0.59

Source: Abt Associates analysis of BPCI Beneficiary Survey responses.

Notes: All responses were weighted for non-response and sampling design, and estimates were risk-adjusted for beneficiary- and hospital-level characteristics.

Exhibit I.8: Beneficiary Survey Outcomes: Major Bowel Procedure, Model 2 Hospitals, Waves 5-10

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Improvement	Improvement in bathing, dressing, using the toilet, or eating	596	621	77.82	80.85	-3.03	-7.54	1.49	-6.81	0.76
	Improvement in planning regular tasks	598	622	68.18	71.20	-3.03	-7.88	1.82	-7.09	1.04
	Improvement in use of mobility device (less likely to use mobility device)	599	625	69.34	67.40	1.94	-1.97	5.85	-1.34	5.22
	Improvement in walking without rest	597	618	55.03	56.15	-1.12	-6.58	4.34	-5.70	3.46
	Improvement in using stairs	585	605	58.36	56.20	2.15	-2.55	6.86	-1.79	6.10
	Improvement (less frequent) in physical/emotional problems limiting social activities	597	615	61.54	63.67	-2.12	-7.85	3.60	-6.93	2.68
	Improvement (less frequent) in pain limiting regular activities	601	621	62.67	59.90	2.77	-2.06	7.61	-1.28	6.82
Functional Decline	Decline in bathing, dressing, using the toilet, or eating	596	621	12.64	11.17	1.48	-3.02	5.98	-2.30	5.25
	Decline in planning regular tasks	598	622	17.37	15.44	1.93	-3.15	7.01	-2.33	6.19
	Decline in use of mobility device (less likely to use mobility device)	599	625	21.96	23.97	-2.01	-6.07	2.05	-5.41	1.39
	Decline in walking without rest	597	618	20.53	19.32	1.21	-3.80	6.22	-2.99	5.42
	Decline in using stairs	585	605	20.07	20.78	-0.71	-4.55	3.14	-3.93	2.52
	Decline (more frequent) in physical/emotional problems limiting social activities	597	615	22.21	20.61	1.60	-3.81	7.01	-2.93	6.13
	Decline (more frequent) in pain limiting regular activities	601	621	16.83	19.79	-2.96	-7.36	1.44	-6.65	0.73
Overall Health	Q9/10 - Composite Depression Indicator	601	626	16.09	16.16	-0.08	-4.45	4.30	-3.74	3.59
	Q18 - In general, how would you rate your physical health?	613	635	68.17	67.74	0.42	-4.24	5.08	-3.48	4.33
	Q19 - In general, how would you rate your mental health?	609	628	83.06	84.09	-1.03	-4.86	2.80	-4.24	2.18

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Care Experience	Q20 - Conflicting advice from medical staff about your treatment	612	630	77.04	77.11	-0.07	-5.53	5.40	-4.65	4.52
	Q21 - Services appropriate for the level of care you needed	609	632	65.62	63.40	2.23	-2.81	7.26	-2.00	6.45
	Q23 - Medical staff spoke in preferred language	617	637	93.39	95.46	-2.07	-5.42	1.29	-4.88	0.74
	Q24 - Discharged at the right time	611	630	89.03	90.05	-1.01	-4.78	2.75	-4.17	2.14
	Q25 - Medical staff took your preferences into account in deciding what health care services you should have after you left the hospital	520	511	93.94	94.64	-0.70	-4.11	2.70	-3.56	2.15
	Q27 - Good understanding of how to take care of self before going home	579	587	95.51	96.18	-0.67	-3.24	1.90	-2.83	1.48
	Q28 - Medical staff clearly explained how to take medications before going home	542	543	96.09	96.05	0.04	-2.44	2.53	-2.04	2.13
	Q29 - Medical staff clearly explained what follow-up appointments or treatments would be needed before going home	567	561	95.34	95.10	0.23	-2.40	2.86	-1.98	2.44
	Q30 - Able to manage your health needs since returning home	560	560	96.67	97.23	-0.56	-2.75	1.63	-2.40	1.27
Overall Satisfaction	Q31 - Overall satisfaction with recovery since leaving hospital	590	609	78.28	79.13	-0.85	-5.53	3.83	-4.77	3.07

Source: Abt Associates analysis of BPCI Beneficiary Survey responses.

Notes: All responses were weighted for non-response and sampling design, and estimates were risk-adjusted for beneficiary- and hospital-level characteristics.

Exhibit I.9: Beneficiary Survey Outcomes: Congestive Heart Failure, Model 2 Hospitals, Waves 4-10

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Improvement	Improvement in bathing, dressing, using the toilet, or eating	2305	2306	60.76	61.39	-0.63	-2.96	1.70	-2.58	1.33
	Improvement in planning regular tasks	2340	2362	46.19	45.17	1.02	-1.49	3.52	-1.08	3.12
	Improvement in use of mobility device (less likely to use mobility device)	2350	2358	33.35	33.34	0.01	-2.08	2.09	-1.74	1.76
	Improvement in walking without rest	2322	2339	23.94	24.62	-0.68	-3.05	1.68	-2.67	1.30
	Improvement in using stairs	2236	2264	27.66	26.68	0.98	-1.57	3.54	-1.16	3.13
	Improvement (less frequent) in physical/emotional problems limiting social activities	2301	2318	48.07	48.49	-0.42	-3.39	2.56	-2.92	2.08
	Improvement (less frequent) in pain limiting regular activities	2311	2340	47.30	46.02	1.28	-1.50	4.05	-1.05	3.60
Functional Decline	Decline in bathing, dressing, using the toilet, or eating	2305	2306	19.17	18.81	0.37	-1.86	2.60	-1.50	2.24
	Decline in planning regular tasks	2340	2362	29.96	32.53	-2.57	-5.22	0.08	-4.79	-0.35
	Decline in use of mobility device (less likely to use mobility device)	2350	2358	51.58	50.56	1.02	-1.25	3.29	-0.88	2.93
	Decline in walking without rest	2322	2339	36.34	35.54	0.80	-1.73	3.34	-1.33	2.93
	Decline in using stairs	2236	2264	44.96	46.88	-1.93	-4.32	0.47	-3.93	0.08
	Decline (more frequent) in physical/emotional problems limiting social activities	2301	2318	26.88	26.73	0.16	-2.35	2.67	-1.95	2.26
	Decline (more frequent) in pain limiting regular activities	2311	2340	23.62	23.61	0.01	-2.44	2.45	-2.04	2.06
Overall Health	Q9/10 - Composite Depression Indicator	2304	2348	27.77	26.27	1.50	-1.20	4.21	-0.76	3.77
	Q18 - In general, how would you rate your physical health?	2399	2409	35.08	35.62	-0.54	-3.34	2.26	-2.89	1.81
	Q19 - In general, how would you rate your mental health?	2399	2419	73.83	74.16	-0.33	-2.85	2.19	-2.44	1.78

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Care Experience	Q20 - Conflicting advice from medical staff about your treatment	2389	2385	62.16	63.30	-1.14	-4.07	1.79	-3.60	1.32
	Q21 - Services appropriate for the level of care you needed	2415	2400	54.47	55.56	-1.08	-3.97	1.80	-3.51	1.34
	Q23 - Medical staff spoke in preferred language	2422	2432	91.14	91.08	0.06	-1.85	1.97	-1.54	1.66
	Q24 - Discharged at the right time	2385	2394	86.16	88.26	-2.10	-4.27	0.06	-3.92	-0.28
	Q25 - Medical staff took your preferences into account in deciding what health care services you should have after you left the hospital	2099	2101	91.73	91.98	-0.25	-1.92	1.42	-1.65	1.15
	Q27 - Good understanding of how to take care of self before going home	2110	2125	94.68	95.48	-0.80	-2.13	0.53	-1.92	0.32
	Q28 - Medical staff clearly explained how to take medications before going home	2083	2099	93.59	93.52	0.06	-1.64	1.77	-1.37	1.50
	Q29 - Medical staff clearly explained what follow-up appointments or treatments would be needed before going home	2011	2025	94.33	94.56	-0.23	-1.77	1.31	-1.53	1.06
	Q30 - Able to manage your health needs since returning home	2077	2061	96.01	95.43	0.59	-0.76	1.93	-0.54	1.71
Overall Satisfaction	Q31 - Overall satisfaction with recovery since leaving hospital	2247	2280	59.15	61.41	-2.26	-5.25	0.73	-4.77	0.25

Source: Abt Associates analysis of BPCI Beneficiary Survey responses.

Notes: All responses were weighted for non-response and sampling design, and estimates were risk-adjusted for beneficiary- and hospital-level characteristics.

Exhibit I.10: Beneficiary Survey Outcomes: Acute Myocardial Infarction, Model 2 Hospitals, Waves 4-9

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Improvement	Improvement in bathing, dressing, using the toilet, or eating	724	661	65.93	69.29	-3.36	-7.70	0.98	-7.00	0.28
	Improvement in planning regular tasks	738	673	50.94	56.31	-5.37	-9.91	-0.83	-9.17	-1.56
	Improvement in use of mobility device (less likely to use mobility device)	731	661	44.87	48.67	-3.80	-7.55	-0.05	-6.94	-0.65
	Improvement in walking without rest	727	652	34.90	34.66	0.24	-4.33	4.81	-3.59	4.07
	Improvement in using stairs	693	650	37.05	33.91	3.15	-1.14	7.43	-0.45	6.74
	Improvement (less frequent) in physical/emotional problems limiting social activities	721	656	50.73	54.09	-3.36	-8.33	1.61	-7.53	0.81
	Improvement (less frequent) in pain limiting regular activities	723	664	42.68	43.92	-1.24	-6.01	3.53	-5.24	2.76
Functional Decline	Decline in bathing, dressing, using the toilet, or eating	724	661	15.84	13.35	2.50	-0.94	5.93	-0.38	5.37
	Decline in planning regular tasks	738	673	30.05	28.50	1.55	-3.15	6.25	-2.39	5.49
	Decline in use of mobility device (less likely to use mobility device)	731	661	39.82	38.23	1.58	-2.47	5.63	-1.82	4.98
	Decline in walking without rest	727	652	30.65	29.99	0.66	-3.75	5.07	-3.04	4.36
	Decline in using stairs	693	650	35.52	34.68	0.85	-3.43	5.12	-2.74	4.43
	Decline (more frequent) in physical/emotional problems limiting social activities	721	656	28.08	23.88	4.20	-0.34	8.73	0.39	8.00
	Decline (more frequent) in pain limiting regular activities	723	664	27.00	27.47	-0.47	-5.38	4.44	-4.59	3.65
Overall Health	Q9/10 - Composite Depression Indicator	720	667	25.87	24.36	1.51	-3.17	6.19	-2.42	5.43
	Q18 - In general, how would you rate your physical health?	748	688	46.59	50.58	-3.99	-9.51	1.53	-8.62	0.64
	Q19 - In general, how would you rate your mental health?	752	687	72.51	77.56	-5.05	-9.30	-0.81	-8.61	-1.49

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Care Experience	Q20 - Conflicting advice from medical staff about your treatment	741	679	63.40	67.20	-3.81	-9.85	2.23	-8.87	1.26
	Q21 - Services appropriate for the level of care you needed	739	682	54.77	55.94	-1.16	-6.54	4.21	-5.67	3.35
	Q23 - Medical staff spoke in preferred language	755	689	89.84	92.41	-2.57	-5.66	0.53	-5.16	0.03
	Q24 - Discharged at the right time	739	679	86.40	88.53	-2.12	-5.97	1.72	-5.35	1.10
	Q25 - Medical staff took your preferences into account in deciding what health care services you should have after you left the hospital	645	559	88.49	93.74	-5.24	-9.21	-1.27	-8.57	-1.91
	Q27 - Good understanding of how to take care of self before going home	647	595	92.31	94.75	-2.44	-5.33	0.44	-4.86	-0.02
	Q28 - Medical staff clearly explained how to take medications before going home	647	585	91.71	95.41	-3.70	-6.90	-0.50	-6.38	-1.02
	Q29 - Medical staff clearly explained what follow-up appointments or treatments would be needed before going home	623	582	91.45	95.90	-4.45	-7.74	-1.15	-7.21	-1.68
	Q30 - Able to manage your health needs since returning home	634	588	94.45	96.29	-1.84	-4.45	0.76	-4.03	0.34
Overall Satisfaction	Q31 - Overall satisfaction with recovery since leaving hospital	703	654	62.03	64.96	-2.92	-8.13	2.28	-7.29	1.44

Source: Abt Associates analysis of BPCI Beneficiary Survey responses.

Notes: All responses were weighted for non-response and sampling design, and estimates were risk-adjusted for beneficiary- and hospital-level characteristics.

Exhibit I.11: Beneficiary Survey Outcomes: Cardiac Arrhythmia, Model 2 Hospitals, Waves 4-10

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Improvement	Improvement in bathing, dressing, using the toilet, or eating	1139	1143	77.37	76.82	0.55	-2.22	3.32	-1.77	2.87
	Improvement in planning regular tasks	1152	1163	64.60	61.64	2.96	-0.40	6.33	0.14	5.78
	Improvement in use of mobility device (less likely to use mobility device)	1163	1168	56.88	55.35	1.52	-0.92	3.97	-0.52	3.57
	Improvement in walking without rest	1151	1174	40.56	42.35	-1.80	-4.78	1.19	-4.30	0.71
	Improvement in using stairs	1115	1136	41.04	42.21	-1.17	-4.39	2.05	-3.87	1.53
	Improvement (less frequent) in physical/emotional problems limiting social activities	1142	1149	58.16	56.48	1.68	-2.51	5.86	-1.84	5.19
	Improvement (less frequent) in pain limiting regular activities	1142	1149	53.07	46.43	6.65	2.40	10.89	3.09	10.21
Functional Decline	Decline in bathing, dressing, using the toilet, or eating	1139	1143	10.64	11.13	-0.49	-3.00	2.02	-2.60	1.62
	Decline in planning regular tasks	1152	1163	20.60	23.06	-2.46	-5.65	0.73	-5.13	0.21
	Decline in use of mobility device (less likely to use mobility device)	1163	1168	28.58	30.63	-2.06	-5.05	0.93	-4.57	0.45
	Decline in walking without rest	1151	1174	23.25	22.93	0.32	-2.80	3.43	-2.30	2.93
	Decline in using stairs	1115	1136	27.11	28.24	-1.12	-4.30	2.06	-3.79	1.55
	Decline (more frequent) in physical/emotional problems limiting social activities	1142	1149	20.12	22.99	-2.88	-6.49	0.74	-5.91	0.16
	Decline (more frequent) in pain limiting regular activities	1142	1149	18.37	23.02	-4.64	-7.86	-1.43	-7.34	-1.95
Overall Health	Q9/10 - Composite Depression Indicator	1159	1164	19.71	19.78	-0.08	-3.41	3.25	-2.87	2.72
	Q18 - In general, how would you rate your physical health?	1179	1198	57.01	54.83	2.19	-1.93	6.30	-1.26	5.63
	Q19 - In general, how would you rate your mental health?	1180	1201	79.49	81.09	-1.59	-4.41	1.23	-3.96	0.77

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Care Experience	Q20 - Conflicting advice from medical staff about your treatment	1177	1191	73.59	73.63	-0.04	-4.02	3.94	-3.38	3.30
	Q21 - Services appropriate for the level of care you needed	1178	1188	60.51	63.64	-3.13	-7.62	1.35	-6.89	0.63
	Q23 - Medical staff spoke in preferred language	1190	1200	90.21	93.06	-2.85	-5.96	0.25	-5.46	-0.25
	Q24 - Discharged at the right time	1169	1185	88.26	89.18	-0.92	-3.70	1.85	-3.25	1.41
	Q25 - Medical staff took your preferences into account in deciding what health care services you should have after you left the hospital	924	989	92.36	93.08	-0.72	-3.07	1.64	-2.69	1.26
	Q27 - Good understanding of how to take care of self before going home	1025	1048	94.44	94.87	-0.43	-2.77	1.91	-2.39	1.54
	Q28 - Medical staff clearly explained how to take medications before going home	1038	1074	93.34	94.98	-1.64	-4.04	0.77	-3.66	0.38
	Q29 - Medical staff clearly explained what follow-up appointments or treatments would be needed before going home	1019	1049	93.29	94.28	-0.99	-3.47	1.49	-3.07	1.09
	Q30 - Able to manage your health needs since returning home	1026	1036	96.15	95.96	0.19	-1.93	2.31	-1.59	1.97
Overall Satisfaction	Q31 - Overall satisfaction with recovery since leaving hospital	1124	1117	66.12	72.48	-6.36	-10.80	-1.91	-10.08	-2.63

Source: Abt Associates analysis of BPCI Beneficiary Survey responses.

Notes: All responses were weighted for non-response and sampling design, and estimates were risk-adjusted for beneficiary- and hospital-level characteristics.

Exhibit I.12: Beneficiary Survey Outcomes: Cardiac Valve, Model 2 Hospitals, Waves 5-9

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Improvement	Improvement in bathing, dressing, using the toilet, or eating	676	670	83.65	87.61	-3.95	-7.48	-0.43	-6.91	-1.00
	Improvement in planning regular tasks	682	681	68.36	72.09	-3.73	-8.07	0.60	-7.36	-0.10
	Improvement in use of mobility device (less likely to use mobility device)	679	674	68.32	68.90	-0.59	-4.58	3.41	-3.94	2.77
	Improvement in walking without rest	676	679	66.62	60.13	6.49	1.64	11.35	2.42	10.56
	Improvement in using stairs	663	657	61.58	58.47	3.11	-1.84	8.06	-1.04	7.26
	Improvement (less frequent) in physical/emotional problems limiting social activities	679	676	70.43	71.63	-1.20	-5.48	3.08	-4.78	2.39
	Improvement (less frequent) in pain limiting regular activities	681	677	65.81	66.23	-0.42	-4.63	3.79	-3.95	3.11
Functional Decline	Decline in bathing, dressing, using the toilet, or eating	676	670	10.35	7.31	3.04	0.17	5.91	0.64	5.44
	Decline in planning regular tasks	682	681	18.79	14.61	4.18	0.23	8.13	0.87	7.49
	Decline in use of mobility device (less likely to use mobility device)	679	674	22.87	21.20	1.67	-2.15	5.49	-1.53	4.87
	Decline in walking without rest	676	679	15.36	17.17	-1.81	-6.16	2.53	-5.45	1.83
	Decline in using stairs	663	657	15.81	17.20	-1.39	-5.02	2.24	-4.43	1.65
	Decline (more frequent) in physical/emotional problems limiting social activities	679	676	16.12	14.72	1.40	-2.15	4.96	-1.58	4.38
	Decline (more frequent) in pain limiting regular activities	681	677	16.71	13.24	3.47	-0.11	7.06	0.47	6.48
Overall Health	Q9/10 - Composite Depression Indicator	684	675	15.54	12.87	2.68	-1.33	6.68	-0.68	6.03
	Q18 - In general, how would you rate your physical health?	692	694	71.55	76.92	-5.37	-9.32	-1.42	-8.68	-2.06
	Q19 - In general, how would you rate your mental health?	695	690	85.46	87.37	-1.91	-5.28	1.45	-4.73	0.91

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Care Experience	Q20 - Conflicting advice from medical staff about your treatment	691	690	80.87	80.34	0.53	-3.33	4.39	-2.71	3.76
	Q21 - Services appropriate for the level of care you needed	696	693	71.50	73.58	-2.08	-6.95	2.79	-6.16	2.01
	Q23 - Medical staff spoke in preferred language	693	694	94.85	94.14	0.71	-1.99	3.41	-1.55	2.98
	Q24 - Discharged at the right time	688	686	92.94	91.00	1.94	-0.84	4.72	-0.39	4.27
	Q25 - Medical staff took your preferences into account in deciding what health care services you should have after you left the hospital	632	632	94.41	96.20	-1.79	-3.66	0.09	-3.36	-0.22
	Q27 - Good understanding of how to take care of self before going home	654	661	96.54	97.58	-1.04	-2.77	0.68	-2.49	0.41
	Q28 - Medical staff clearly explained how to take medications before going home	654	661	94.70	96.56	-1.86	-3.91	0.19	-3.58	-0.14
	Q29 - Medical staff clearly explained what follow-up appointments or treatments would be needed before going home	635	648	96.56	97.08	-0.52	-2.28	1.24	-2.00	0.96
	Q30 - Able to manage your health needs since returning home	640	649	96.03	98.51	-2.47	-4.31	-0.64	-4.01	-0.93
Overall Satisfaction	Q31 - Overall satisfaction with recovery since leaving hospital	664	664	79.94	82.50	-2.55	-6.65	1.54	-5.99	0.88

Source: Abt Associates analysis of BPCI Beneficiary Survey responses.

Notes: All responses were weighted for non-response and sampling design, and estimates were risk-adjusted for beneficiary- and hospital-level characteristics.

Exhibit I.13: Beneficiary Survey Outcomes: Gastrointestinal Hemorrhage, Model 2 Hospitals, Waves 4-10

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Improvement	Improvement in bathing, dressing, using the toilet, or eating	684	688	75.11	75.47	-0.36	-4.08	3.35	-3.48	2.76
	Improvement in planning regular tasks	689	702	60.86	62.06	-1.20	-5.37	2.96	-4.70	2.29
	Improvement in use of mobility device (less likely to use mobility device)	690	703	51.21	49.79	1.43	-1.99	4.85	-1.44	4.29
	Improvement in walking without rest	688	701	41.99	41.22	0.76	-3.77	5.30	-3.04	4.57
	Improvement in using stairs	664	685	39.74	43.87	-4.13	-8.82	0.55	-8.06	-0.21
	Improvement (less frequent) in physical/emotional problems limiting social activities	689	702	56.54	59.79	-3.25	-8.22	1.73	-7.42	0.93
	Improvement (less frequent) in pain limiting regular activities	694	698	48.40	50.44	-2.04	-7.32	3.25	-6.47	2.39
Functional Decline	Decline in bathing, dressing, using the toilet, or eating	684	688	11.50	11.85	-0.35	-3.11	2.42	-2.67	1.98
	Decline in planning regular tasks	689	702	23.61	22.88	0.73	-3.23	4.70	-2.59	4.06
	Decline in use of mobility device (less likely to use mobility device)	690	703	33.53	35.11	-1.58	-5.36	2.19	-4.75	1.58
	Decline in walking without rest	688	701	26.75	26.33	0.41	-4.14	4.96	-3.40	4.23
	Decline in using stairs	664	685	31.77	28.78	2.98	-1.64	7.60	-0.89	6.86
	Decline (more frequent) in physical/emotional problems limiting social activities	689	702	22.17	20.48	1.69	-2.57	5.94	-1.88	5.26
	Decline (more frequent) in pain limiting regular activities	694	698	23.71	22.52	1.20	-3.64	6.03	-2.86	5.25
Overall Health	Q9/10 - Composite Depression Indicator	682	698	20.44	20.21	0.23	-3.59	4.04	-2.97	3.43
	Q18 - In general, how would you rate your physical health?	715	719	57.58	55.46	2.12	-2.33	6.58	-1.61	5.86
	Q19 - In general, how would you rate your mental health?	714	720	77.88	79.44	-1.56	-5.59	2.46	-4.94	1.82

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Care Experience	Q20 - Conflicting advice from medical staff about your treatment	710	708	72.52	73.21	-0.69	-5.62	4.23	-4.83	3.44
	Q21 - Services appropriate for the level of care you needed	710	713	61.13	58.81	2.32	-3.37	8.02	-2.45	7.10
	Q23 - Medical staff spoke in preferred language	711	722	92.90	90.82	2.08	-1.01	5.17	-0.51	4.68
	Q24 - Discharged at the right time	711	706	87.58	90.67	-3.09	-6.79	0.61	-6.20	0.01
	Q25 - Medical staff took your preferences into account in deciding what health care services you should have after you left the hospital	587	583	90.24	91.90	-1.66	-5.14	1.83	-4.58	1.27
	Q27 - Good understanding of how to take care of self before going home	595	620	93.77	95.40	-1.63	-4.38	1.12	-3.94	0.68
	Q28 - Medical staff clearly explained how to take medications before going home	572	613	94.77	95.11	-0.34	-3.07	2.39	-2.63	1.95
	Q29 - Medical staff clearly explained what follow-up appointments or treatments would be needed before going home	588	604	93.08	94.50	-1.42	-4.32	1.48	-3.85	1.01
	Q30 - Able to manage your health needs since returning home	580	602	94.24	95.79	-1.55	-4.38	1.28	-3.92	0.82
Overall Satisfaction	Q31 - Overall satisfaction with recovery since leaving hospital	656	682	70.54	70.54	0.00	-5.05	5.05	-4.23	4.23

Source: Abt Associates analysis of BPCI Beneficiary Survey responses.

Notes: All responses were weighted for non-response and sampling design, and estimates were risk-adjusted for beneficiary- and hospital-level characteristics.

Exhibit I.14: Beneficiary Survey Outcomes: Major Bowel Procedure, Model 2 Hospitals, Waves 5-10

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Improvement	Improvement in bathing, dressing, using the toilet, or eating	596	621	77.82	80.85	-3.03	-7.54	1.49	-6.81	0.76
	Improvement in planning regular tasks	598	622	68.18	71.20	-3.03	-7.88	1.82	-7.09	1.04
	Improvement in use of mobility device (less likely to use mobility device)	599	625	69.34	67.40	1.94	-1.97	5.85	-1.34	5.22
	Improvement in walking without rest	597	618	55.03	56.15	-1.12	-6.58	4.34	-5.70	3.46
	Improvement in using stairs	585	605	58.36	56.20	2.15	-2.55	6.86	-1.79	6.10
	Improvement (less frequent) in physical/emotional problems limiting social activities	597	615	61.54	63.67	-2.12	-7.85	3.60	-6.93	2.68
	Improvement (less frequent) in pain limiting regular activities	601	621	62.67	59.90	2.77	-2.06	7.61	-1.28	6.82
Functional Decline	Decline in bathing, dressing, using the toilet, or eating	596	621	12.64	11.17	1.48	-3.02	5.98	-2.30	5.25
	Decline in planning regular tasks	598	622	17.37	15.44	1.93	-3.15	7.01	-2.33	6.19
	Decline in use of mobility device (less likely to use mobility device)	599	625	21.96	23.97	-2.01	-6.07	2.05	-5.41	1.39
	Decline in walking without rest	597	618	20.53	19.32	1.21	-3.80	6.22	-2.99	5.42
	Decline in using stairs	585	605	20.07	20.78	-0.71	-4.55	3.14	-3.93	2.52
	Decline (more frequent) in physical/emotional problems limiting social activities	597	615	22.21	20.61	1.60	-3.81	7.01	-2.93	6.13
	Decline (more frequent) in pain limiting regular activities	601	621	16.83	19.79	-2.96	-7.36	1.44	-6.65	0.73
Overall Health	Q9/10 - Composite Depression Indicator	601	626	16.09	16.16	-0.08	-4.45	4.30	-3.74	3.59
	Q18 - In general, how would you rate your physical health?	613	635	68.17	67.74	0.42	-4.24	5.08	-3.48	4.33
	Q19 - In general, how would you rate your mental health?	609	628	83.06	84.09	-1.03	-4.86	2.80	-4.24	2.18

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Care Experience	Q20 - Conflicting advice from medical staff about your treatment	612	630	77.04	77.11	-0.07	-5.53	5.40	-4.65	4.52
	Q21 - Services appropriate for the level of care you needed	609	632	65.62	63.40	2.23	-2.81	7.26	-2.00	6.45
	Q23 - Medical staff spoke in preferred language	617	637	93.39	95.46	-2.07	-5.42	1.29	-4.88	0.74
	Q24 - Discharged at the right time	611	630	89.03	90.05	-1.01	-4.78	2.75	-4.17	2.14
	Q25 - Medical staff took your preferences into account in deciding what health care services you should have after you left the hospital	520	511	93.94	94.64	-0.70	-4.11	2.70	-3.56	2.15
	Q27 - Good understanding of how to take care of self before going home	579	587	95.51	96.18	-0.67	-3.24	1.90	-2.83	1.48
	Q28 - Medical staff clearly explained how to take medications before going home	542	543	96.09	96.05	0.04	-2.44	2.53	-2.04	2.13
	Q29 - Medical staff clearly explained what follow-up appointments or treatments would be needed before going home	567	561	95.34	95.10	0.23	-2.40	2.86	-1.98	2.44
	Q30 - Able to manage your health needs since returning home	560	560	96.67	97.23	-0.56	-2.75	1.63	-2.40	1.27
Overall Satisfaction	Q31 - Overall satisfaction with recovery since leaving hospital	590	609	78.28	79.13	-0.85	-5.53	3.83	-4.77	3.07

Source: Abt Associates analysis of BPCI Beneficiary Survey responses.

Notes: All responses were weighted for non-response and sampling design, and estimates were risk-adjusted for beneficiary- and hospital-level characteristics.

Exhibit I.15: Beneficiary Survey Outcomes: Medical Non-infectious Orthopedic, Model 2 Hospitals, Waves 4-10

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Improvement	Improvement in bathing, dressing, using the toilet, or eating	1089	1043	55.40	52.63	2.78	-1.19	6.74	-0.55	6.10
	Improvement in planning regular tasks	1112	1052	43.47	43.52	-0.04	-4.59	4.50	-3.86	3.77
	Improvement in use of mobility device (less likely to use mobility device)	1108	1055	26.88	25.11	1.77	-1.62	5.17	-1.07	4.62
	Improvement in walking without rest	1089	1038	26.92	25.73	1.20	-2.47	4.86	-1.88	4.27
	Improvement in using stairs	1068	1002	29.21	27.57	1.64	-2.23	5.50	-1.61	4.88
	Improvement (less frequent) in physical/emotional problems limiting social activities	1083	1030	45.21	42.81	2.40	-2.55	7.34	-1.75	6.55
	Improvement (less frequent) in pain limiting regular activities	1101	1045	39.39	37.46	1.93	-2.22	6.08	-1.55	5.41
Functional Decline	Decline in bathing, dressing, using the toilet, or eating	1089	1043	25.47	27.73	-2.27	-5.80	1.26	-5.23	0.69
	Decline in planning regular tasks	1112	1052	35.43	36.15	-0.72	-4.64	3.21	-4.01	2.57
	Decline in use of mobility device (less likely to use mobility device)	1108	1055	60.69	62.71	-2.02	-6.13	2.08	-5.47	1.42
	Decline in walking without rest	1089	1038	44.77	48.41	-3.64	-7.95	0.67	-7.25	-0.03
	Decline in using stairs	1068	1002	49.10	50.91	-1.81	-6.14	2.52	-5.44	1.82
	Decline (more frequent) in physical/emotional problems limiting social activities	1083	1030	35.15	36.49	-1.33	-6.32	3.66	-5.52	2.86
	Decline (more frequent) in pain limiting regular activities	1101	1045	34.68	36.77	-2.09	-6.17	1.99	-5.52	1.33
Overall Health	Q9/10 - Composite Depression Indicator	1083	1039	27.08	30.21	-3.13	-7.81	1.56	-7.06	0.81
	Q18 - In general, how would you rate your physical health?	1137	1082	48.05	47.18	0.87	-3.75	5.50	-3.01	4.76
	Q19 - In general, how would you rate your mental health?	1141	1078	70.89	72.42	-1.53	-5.54	2.48	-4.90	1.84

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Care Experience	Q20 - Conflicting advice from medical staff about your treatment	1115	1068	59.27	60.05	-0.77	-5.39	3.85	-4.65	3.10
	Q21 - Services appropriate for the level of care you needed	1114	1078	49.07	46.80	2.27	-2.06	6.60	-1.36	5.91
	Q23 - Medical staff spoke in preferred language	1138	1090	88.25	93.07	-4.83	-7.27	-2.39	-6.87	-2.78
	Q24 - Discharged at the right time	1109	1083	84.18	85.12	-0.94	-4.87	2.99	-4.24	2.36
	Q25 - Medical staff took your preferences into account in deciding what health care services you should have after you left the hospital	998	970	87.05	91.30	-4.25	-7.18	-1.32	-6.71	-1.80
	Q27 - Good understanding of how to take care of self before going home	924	908	92.27	91.14	1.13	-1.62	3.88	-1.17	3.44
	Q28 - Medical staff clearly explained how to take medications before going home	883	836	90.40	91.81	-1.41	-4.95	2.14	-4.38	1.57
	Q29 - Medical staff clearly explained what follow-up appointments or treatments would be needed before going home	886	857	90.08	89.19	0.90	-2.62	4.41	-2.05	3.85
	Q30 - Able to manage your health needs since returning home	911	882	94.64	93.89	0.76	-1.87	3.39	-1.45	2.97
Overall Satisfaction	Q31 - Overall satisfaction with recovery since leaving hospital	1061	1023	54.00	53.98	0.02	-4.74	4.79	-3.97	4.02

Source: Abt Associates analysis of BPCI Beneficiary Survey responses.

Notes: All responses were weighted for non-response and sampling design, and estimates were risk-adjusted for beneficiary- and hospital-level characteristics.

Exhibit I.16: Beneficiary Survey Outcomes: Revision of the Hip or Knee, Model 2 Hospitals, Waves 5-10

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Improvement	Improvement in bathing, dressing, using the toilet, or eating	266	318	74.72	75.10	-0.38	-6.30	5.54	-5.34	4.58
	Improvement in planning regular tasks	272	319	68.31	68.87	-0.56	-6.87	5.74	-5.85	4.72
	Improvement in use of mobility device (less likely to use mobility device)	272	320	44.32	40.57	3.76	-3.33	10.84	-2.18	9.70
	Improvement in walking without rest	267	316	50.67	49.24	1.43	-5.66	8.52	-4.51	7.37
	Improvement in using stairs	263	320	44.85	46.86	-2.01	-8.56	4.54	-7.50	3.48
	Improvement (less frequent) in physical/emotional problems limiting social activities	264	320	64.17	64.16	0.01	-8.20	8.23	-6.87	6.89
	Improvement (less frequent) in pain limiting regular activities	271	319	64.10	61.75	2.35	-5.44	10.14	-4.18	8.88
Functional Decline	Decline in bathing, dressing, using the toilet, or eating	266	318	11.28	12.99	-1.71	-6.16	2.74	-5.44	2.02
	Decline in planning regular tasks	272	319	14.75	16.20	-1.45	-7.42	4.53	-6.45	3.56
	Decline in use of mobility device (less likely to use mobility device)	272	320	41.45	45.95	-4.50	-12.17	3.17	-10.93	1.92
	Decline in walking without rest	267	316	27.74	27.46	0.28	-6.66	7.23	-5.54	6.10
	Decline in using stairs	263	320	27.80	27.55	0.25	-5.65	6.15	-4.69	5.19
	Decline (more frequent) in physical/emotional problems limiting social activities	264	320	19.35	15.38	3.97	-1.50	9.43	-0.62	8.55
	Decline (more frequent) in pain limiting regular activities	271	319	18.66	16.80	1.86	-4.30	8.02	-3.30	7.02
Overall Health	Q9/10 - Composite Depression Indicator	269	322	20.50	19.59	0.91	-4.77	6.59	-3.85	5.67
	Q18 - In general, how would you rate your physical health?	274	323	69.95	70.07	-0.12	-6.42	6.19	-5.40	5.17
	Q19 - In general, how would you rate your mental health?	273	326	84.05	82.94	1.11	-4.82	7.04	-3.86	6.08

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Care Experience	Q20 - Conflicting advice from medical staff about your treatment	273	325	81.59	77.13	4.46	-2.97	11.88	-1.77	10.68
	Q21 - Services appropriate for the level of care you needed	275	326	63.86	67.63	-3.77	-11.18	3.64	-9.98	2.44
	Q23 - Medical staff spoke in preferred language	274	327	95.52	97.80	-2.28	-5.52	0.95	-5.00	0.43
	Q24 - Discharged at the right time	274	327	92.63	88.56	4.07	-0.46	8.60	0.27	7.87
	Q25 - Medical staff took your preferences into account in deciding what health care services you should have after you left the hospital	251	313	93.00	95.49	-2.50	-7.07	2.08	-6.33	1.34
	Q27 - Good understanding of how to take care of self before going home	253	309	95.31	96.98	-1.67	-5.70	2.36	-5.04	1.71
	Q28 - Medical staff clearly explained how to take medications before going home	242	300	92.76	96.87	-4.11	-7.53	-0.69	-6.98	-1.25
	Q29 - Medical staff clearly explained what follow-up appointments or treatments would be needed before going home	246	296	96.13	95.91	0.21	-3.22	3.65	-2.67	3.10
	Q30 - Able to manage your health needs since returning home	248	302	95.98	95.20	0.78	-2.79	4.36	-2.21	3.78
Overall Satisfaction	Q31 - Overall satisfaction with recovery since leaving hospital	263	314	59.00	71.48	-12.48	-20.73	-4.24	-19.39	-5.57

Source: Abt Associates analysis of BPCI Beneficiary Survey responses.

Notes: All responses were weighted for non-response and sampling design, and estimates were risk-adjusted for beneficiary- and hospital-level characteristics.

Exhibit I.17: Beneficiary Survey Outcomes: Non-cervical Spinal Fusion, Model 2 Hospitals, Waves 5-10

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Improvement	Improvement in bathing, dressing, using the toilet, or eating	1009	970	79.59	78.96	0.63	-3.19	4.45	-2.57	3.83
	Improvement in planning regular tasks	1018	988	68.83	72.64	-3.81	-7.30	-0.31	-6.73	-0.88
	Improvement in use of mobility device (less likely to use mobility device)	1019	982	57.12	57.42	-0.30	-4.70	4.10	-3.99	3.39
	Improvement in walking without rest	1011	983	58.16	61.15	-2.99	-6.96	0.97	-6.32	0.33
	Improvement in using stairs	1001	975	57.43	62.18	-4.75	-8.95	-0.54	-8.27	-1.22
	Improvement (less frequent) in physical/emotional problems limiting social activities	1016	980	69.64	71.01	-1.37	-5.18	2.45	-4.57	1.83
	Improvement (less frequent) in pain limiting regular activities	1020	990	74.57	75.41	-0.84	-4.16	2.48	-3.62	1.94
Functional Decline	Decline in bathing, dressing, using the toilet, or eating	1009	970	8.49	8.26	0.23	-2.57	3.02	-2.12	2.57
	Decline in planning regular tasks	1018	988	12.50	11.75	0.75	-2.05	3.55	-1.59	3.10
	Decline in use of mobility device (less likely to use mobility device)	1019	982	28.12	28.41	-0.29	-4.54	3.97	-3.86	3.28
	Decline in walking without rest	1011	983	13.89	15.80	-1.91	-5.00	1.17	-4.50	0.67
	Decline in using stairs	1001	975	14.64	12.70	1.94	-1.16	5.03	-0.66	4.53
	Decline (more frequent) in physical/emotional problems limiting social activities	1016	980	12.96	12.41	0.55	-2.01	3.10	-1.59	2.69
	Decline (more frequent) in pain limiting regular activities	1020	990	12.93	12.87	0.05	-2.55	2.66	-2.13	2.24
Overall Health	Q9/10 - Composite Depression Indicator	1027	985	20.50	16.86	3.64	0.18	7.11	0.74	6.55
	Q18 - In general, how would you rate your physical health?	1034	1003	70.72	68.63	2.09	-1.74	5.92	-1.12	5.30
	Q19 - In general, how would you rate your mental health?	1032	1001	86.69	86.15	0.54	-2.01	3.09	-1.60	2.68

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Care Experience	Q20 - Conflicting advice from medical staff about your treatment	1031	995	82.22	79.22	3.00	-0.70	6.69	-0.10	6.10
	Q21 - Services appropriate for the level of care you needed	1034	996	66.19	64.30	1.89	-3.70	7.48	-2.80	6.58
	Q23 - Medical staff spoke in preferred language	1039	1004	94.57	96.33	-1.76	-3.54	0.02	-3.25	-0.27
	Q24 - Discharged at the right time	1035	991	90.91	90.93	-0.02	-3.09	3.06	-2.60	2.56
	Q25 - Medical staff took your preferences into account in deciding what health care services you should have after you left the hospital	929	883	94.09	93.73	0.36	-1.87	2.60	-1.51	2.24
	Q27 - Good understanding of how to take care of self before going home	1001	964	93.94	95.23	-1.29	-3.88	1.30	-3.46	0.88
	Q28 - Medical staff clearly explained how to take medications before going home	962	946	94.40	94.61	-0.21	-2.23	1.81	-1.90	1.48
	Q29 - Medical staff clearly explained what follow-up appointments or treatments would be needed before going home	971	939	94.97	95.95	-0.98	-2.74	0.77	-2.46	0.49
	Q30 - Able to manage your health needs since returning home	988	954	95.31	97.08	-1.77	-3.64	0.11	-3.34	-0.19
Overall Satisfaction	Q31 - Overall satisfaction with recovery since leaving hospital	985	962	66.77	68.48	-1.71	-6.14	2.73	-5.42	2.01

Source: Abt Associates analysis of BPCI Beneficiary Survey responses.

Notes: All responses were weighted for non-response and sampling design, and estimates were risk-adjusted for beneficiary- and hospital-level characteristics.

Exhibit I.18: Beneficiary Survey Outcomes: Hip and Femur Procedures except Major Joint, Model 2 Hospitals, Waves 4-10

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Improvement	Improvement in bathing, dressing, using the toilet, or eating	1121	1189	45.20	44.52	0.68	-3.04	4.39	-2.44	3.79
	Improvement in planning regular tasks	1131	1198	35.69	35.04	0.65	-3.06	4.37	-2.46	3.77
	Improvement in use of mobility device (less likely to use mobility device)	1139	1195	11.36	11.93	-0.58	-3.03	1.87	-2.63	1.48
	Improvement in walking without rest	1114	1176	14.28	14.24	0.04	-2.88	2.96	-2.41	2.49
	Improvement in using stairs	1096	1158	19.10	15.31	3.79	0.86	6.71	1.33	6.24
	Improvement (less frequent) in physical/emotional problems limiting social activities	1118	1178	35.12	35.53	-0.41	-4.30	3.48	-3.67	2.85
	Improvement (less frequent) in pain limiting regular activities	1127	1188	27.84	29.84	-2.00	-5.84	1.84	-5.22	1.22
Functional Decline	Decline in bathing, dressing, using the toilet, or eating	1121	1189	41.23	39.42	1.80	-2.30	5.91	-1.64	5.25
	Decline in planning regular tasks	1131	1198	50.06	50.44	-0.37	-4.44	3.69	-3.79	3.04
	Decline in use of mobility device (less likely to use mobility device)	1139	1195	82.53	82.80	-0.27	-3.44	2.90	-2.93	2.39
	Decline in walking without rest	1114	1176	70.42	71.38	-0.97	-4.85	2.92	-4.23	2.29
	Decline in using stairs	1096	1158	68.23	71.83	-3.61	-7.24	0.02	-6.65	-0.56
	Decline (more frequent) in physical/emotional problems limiting social activities	1118	1178	48.71	47.83	0.88	-3.24	5.00	-2.58	4.34
	Decline (more frequent) in pain limiting regular activities	1127	1188	48.51	47.80	0.71	-3.56	4.98	-2.87	4.29
Overall Health	Q9/10 - Composite Depression Indicator	1134	1182	29.31	28.62	0.69	-3.27	4.65	-2.63	4.01
	Q18 - In general, how would you rate your physical health?	1170	1216	54.19	54.52	-0.34	-4.18	3.51	-3.56	2.89
	Q19 - In general, how would you rate your mental health?	1164	1220	69.70	69.38	0.31	-2.50	3.12	-2.04	2.67

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Care Experience	Q20 - Conflicting advice from medical staff about your treatment	1151	1226	64.95	63.52	1.43	-2.37	5.23	-1.75	4.62
	Q21 - Services appropriate for the level of care you needed	1161	1228	53.48	51.56	1.92	-2.45	6.29	-1.75	5.59
	Q23 - Medical staff spoke in preferred language	1171	1237	90.50	91.82	-1.32	-4.01	1.37	-3.58	0.94
	Q24 - Discharged at the right time	1162	1207	86.23	87.79	-1.56	-4.38	1.26	-3.93	0.81
	Q25 - Medical staff took your preferences into account in deciding what health care services you should have after you left the hospital	1080	1130	92.57	93.49	-0.92	-3.35	1.51	-2.96	1.12
	Q27 - Good understanding of how to take care of self before going home	953	985	93.54	93.44	0.10	-2.12	2.32	-1.77	1.96
	Q28 - Medical staff clearly explained how to take medications before going home	889	915	93.18	90.79	2.39	-0.12	4.89	0.28	4.49
	Q29 - Medical staff clearly explained what follow-up appointments or treatments would be needed before going home	891	945	91.56	92.78	-1.22	-3.84	1.40	-3.42	0.98
	Q30 - Able to manage your health needs since returning home	929	958	95.75	95.30	0.44	-1.78	2.66	-1.42	2.31
Overall Satisfaction	Q31 - Overall satisfaction with recovery since leaving hospital	1107	1162	59.52	58.66	0.86	-3.19	4.91	-2.53	4.25

Source: Abt Associates analysis of BPCI Beneficiary Survey responses.

Notes: All responses were weighted for non-response and sampling design, and estimates were risk-adjusted for beneficiary- and hospital-level characteristics.

Exhibit I.19: Beneficiary Survey Outcomes: Cervical Spinal Fusion, Model 2 Hospitals, Waves 5-9

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Improvement	Improvement in bathing, dressing, using the toilet, or eating	359	337	78.48	79.66	-1.18	-6.89	4.53	-5.96	3.60
	Improvement in planning regular tasks	370	345	64.78	71.00	-6.21	-12.50	0.07	-11.48	-0.94
	Improvement in use of mobility device (less likely to use mobility device)	366	351	60.46	60.03	0.42	-5.19	6.03	-4.28	5.12
	Improvement in walking without rest	365	346	54.58	55.13	-0.55	-6.47	5.36	-5.51	4.40
	Improvement in using stairs	364	337	50.91	48.95	1.96	-3.83	7.75	-2.89	6.81
	Improvement (less frequent) in physical/emotional problems limiting social activities	364	346	62.30	60.38	1.92	-5.25	9.09	-4.09	7.93
	Improvement (less frequent) in pain limiting regular activities	368	349	60.67	59.53	1.14	-5.47	7.76	-4.40	6.69
Functional Decline	Decline in bathing, dressing, using the toilet, or eating	359	337	8.39	8.11	0.27	-3.63	4.17	-3.00	3.54
	Decline in planning regular tasks	370	345	13.58	10.41	3.17	-1.87	8.21	-1.05	7.40
	Decline in use of mobility device (less likely to use mobility device)	366	351	26.12	27.40	-1.28	-6.32	3.77	-5.50	2.95
	Decline in walking without rest	365	346	15.53	16.91	-1.39	-6.53	3.76	-5.70	2.93
	Decline in using stairs	364	337	16.70	22.58	-5.88	-12.30	0.54	-11.26	-0.50
	Decline (more frequent) in physical/emotional problems limiting social activities	364	346	17.16	22.27	-5.11	-11.36	1.14	-10.34	0.13
	Decline (more frequent) in pain limiting regular activities	368	349	22.35	22.02	0.33	-5.65	6.31	-4.68	5.34
Overall Health	Q9/10 - Composite Depression Indicator	364	344	27.91	22.34	5.57	-0.17	11.32	0.76	10.39
	Q18 - In general, how would you rate your physical health?	370	355	59.13	58.40	0.73	-5.68	7.14	-4.64	6.11
	Q19 - In general, how would you rate your mental health?	369	351	77.54	75.60	1.94	-3.77	7.64	-2.85	6.72

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Care Experience	Q20 - Conflicting advice from medical staff about your treatment	369	348	78.59	76.67	1.92	-3.50	7.34	-2.62	6.46
	Q21 - Services appropriate for the level of care you needed	366	348	66.88	67.90	-1.02	-7.41	5.38	-6.38	4.34
	Q23 - Medical staff spoke in preferred language	370	356	95.86	94.64	1.22	-2.20	4.65	-1.65	4.10
	Q24 - Discharged at the right time	368	348	87.17	89.61	-2.44	-7.39	2.50	-6.59	1.70
	Q25 - Medical staff took your preferences into account in deciding what health care services you should have after you left the hospital	320	298	93.03	93.03	0.00	-4.31	4.31	-3.61	3.61
	Q27 - Good understanding of how to take care of self before going home	358	326	94.09	93.44	0.65	-3.37	4.66	-2.72	4.01
	Q28 - Medical staff clearly explained how to take medications before going home	341	321	96.65	97.59	-0.94	-4.17	2.30	-3.65	1.77
	Q29 - Medical staff clearly explained what follow-up appointments or treatments would be needed before going home	344	327	96.90	94.04	2.85	-0.77	6.47	-0.18	5.89
	Q30 - Able to manage your health needs since returning home	347	336	95.90	93.73	2.17	-1.33	5.67	-0.76	5.10
Overall Satisfaction	Q31 - Overall satisfaction with recovery since leaving hospital	358	336	65.99	69.78	-3.79	-10.77	3.18	-9.64	2.05

Source: Abt Associates analysis of BPCI Beneficiary Survey responses.

Notes: All responses were weighted for non-response and sampling design, and estimates were risk-adjusted for beneficiary- and hospital-level characteristics.

Exhibit I.20: Beneficiary Survey Outcomes: Sepsis, Model 2 Hospitals, Waves 4-10

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Improvement	Improvement in bathing, dressing, using the toilet, or eating	2313	2424	57.36	57.93	-0.56	-3.06	1.94	-2.66	1.53
	Improvement in planning regular tasks	2355	2461	47.91	46.11	1.80	-0.93	4.54	-0.49	4.10
	Improvement in use of mobility device (less likely to use mobility device)	2352	2463	39.45	39.83	-0.38	-2.44	1.68	-2.11	1.35
	Improvement in walking without rest	2290	2410	32.94	32.09	0.85	-1.47	3.17	-1.10	2.79
	Improvement in using stairs	2240	2367	32.04	31.59	0.45	-1.83	2.73	-1.47	2.36
	Improvement (less frequent) in physical/emotional problems limiting social activities	2308	2414	48.84	49.23	-0.39	-3.24	2.46	-2.78	2.00
	Improvement (less frequent) in pain limiting regular activities	2316	2414	46.14	46.06	0.08	-2.75	2.92	-2.30	2.46
Functional Decline	Decline in bathing, dressing, using the toilet, or eating	2313	2424	25.31	25.77	-0.45	-2.87	1.96	-2.48	1.57
	Decline in planning regular tasks	2355	2461	33.86	35.10	-1.24	-3.82	1.34	-3.40	0.92
	Decline in use of mobility device (less likely to use mobility device)	2352	2463	47.88	46.44	1.44	-0.83	3.72	-0.46	3.35
	Decline in walking without rest	2290	2410	38.07	38.23	-0.16	-2.55	2.23	-2.16	1.85
	Decline in using stairs	2240	2367	44.79	44.96	-0.17	-2.18	1.84	-1.86	1.52
	Decline (more frequent) in physical/emotional problems limiting social activities	2308	2414	30.77	29.34	1.43	-1.06	3.91	-0.66	3.51
	Decline (more frequent) in pain limiting regular activities	2316	2414	25.71	26.85	-1.15	-3.89	1.60	-3.45	1.16
Overall Health	Q9/10 - Composite Depression Indicator	2344	2443	28.06	28.71	-0.65	-3.30	2.00	-2.87	1.57
	Q18 - In general, how would you rate your physical health?	2405	2514	45.88	42.69	3.20	0.55	5.85	0.98	5.42
	Q19 - In general, how would you rate your mental health?	2396	2526	69.69	69.23	0.46	-2.08	3.00	-1.67	2.59

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Care Experience	Q20 - Conflicting advice from medical staff about your treatment	2405	2522	62.14	65.54	-3.40	-6.23	-0.57	-5.78	-1.03
	Q21 - Services appropriate for the level of care you needed	2415	2525	52.91	55.64	-2.73	-5.72	0.26	-5.24	-0.22
	Q23 - Medical staff spoke in preferred language	2442	2559	88.83	91.70	-2.87	-5.24	-0.50	-4.86	-0.88
	Q24 - Discharged at the right time	2397	2500	84.63	85.37	-0.74	-2.88	1.40	-2.54	1.05
	Q25 - Medical staff took your preferences into account in deciding what health care services you should have after you left the hospital	2101	2188	90.97	90.28	0.69	-1.27	2.65	-0.95	2.33
	Q27 - Good understanding of how to take care of self before going home	2018	2104	92.54	94.62	-2.08	-3.78	-0.39	-3.51	-0.66
	Q28 - Medical staff clearly explained how to take medications before going home	1964	2048	90.52	92.60	-2.08	-4.00	-0.17	-3.69	-0.47
	Q29 - Medical staff clearly explained what follow-up appointments or treatments would be needed before going home	1931	2026	91.88	91.91	-0.03	-2.07	2.01	-1.74	1.68
	Q30 - Able to manage your health needs since returning home	1972	2055	95.16	94.89	0.27	-1.20	1.73	-0.96	1.50
	Overall Satisfaction	Q31 - Overall satisfaction with recovery since leaving hospital	2302	2421	64.14	65.23	-1.09	-4.16	1.99	-3.66

Source: Abt Associates analysis of BPCI Beneficiary Survey responses.

Notes: All responses were weighted for non-response and sampling design, and estimates were risk-adjusted for beneficiary- and hospital-level characteristics.

Exhibit I.21: Beneficiary Survey Outcomes: Simple Pneumonia and Respiratory Infections, Model 2 Hospitals, Waves 4-10

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Improvement	Improvement in bathing, dressing, using the toilet, or eating	2163	2229	62.95	63.07	-0.13	-2.67	2.41	-2.26	2.00
	Improvement in planning regular tasks	2186	2235	48.36	50.91	-2.55	-5.16	0.06	-4.74	-0.36
	Improvement in use of mobility device (less likely to use mobility device)	2195	2248	42.27	41.83	0.44	-1.71	2.59	-1.36	2.25
	Improvement in walking without rest	2167	2223	35.83	33.59	2.24	-0.65	5.12	-0.18	4.66
	Improvement in using stairs	2113	2143	33.35	32.66	0.69	-2.27	3.66	-1.80	3.18
	Improvement (less frequent) in physical/emotional problems limiting social activities	2162	2190	51.44	51.87	-0.43	-3.80	2.93	-3.26	2.39
	Improvement (less frequent) in pain limiting regular activities	2158	2204	47.77	48.00	-0.23	-2.96	2.50	-2.52	2.06
Functional Decline	Decline in bathing, dressing, using the toilet, or eating	2163	2229	19.61	19.96	-0.35	-2.69	1.99	-2.31	1.61
	Decline in planning regular tasks	2186	2235	31.43	30.61	0.82	-1.58	3.22	-1.19	2.84
	Decline in use of mobility device (less likely to use mobility device)	2195	2248	43.48	42.41	1.08	-1.29	3.45	-0.91	3.07
	Decline in walking without rest	2167	2223	32.91	33.18	-0.27	-2.83	2.29	-2.42	1.88
	Decline in using stairs	2113	2143	40.37	40.20	0.17	-2.35	2.69	-1.95	2.29
	Decline (more frequent) in physical/emotional problems limiting social activities	2162	2190	26.51	26.40	0.11	-2.76	2.98	-2.30	2.52
	Decline (more frequent) in pain limiting regular activities	2158	2204	21.84	21.66	0.18	-2.44	2.81	-2.02	2.38
Overall Health	Q9/10 - Composite Depression Indicator	2169	2229	26.52	24.97	1.55	-1.12	4.21	-0.69	3.78
	Q18 - In general, how would you rate your physical health?	2247	2283	45.61	44.51	1.10	-1.88	4.08	-1.40	3.60
	Q19 - In general, how would you rate your mental health?	2244	2286	73.71	70.90	2.81	0.14	5.48	0.57	5.05

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Care Experience	Q20 - Conflicting advice from medical staff about your treatment	2239	2307	66.75	70.00	-3.25	-6.34	-0.17	-5.84	-0.67
	Q21 - Services appropriate for the level of care you needed	2254	2318	53.82	58.94	-5.12	-8.51	-1.73	-7.96	-2.27
	Q23 - Medical staff spoke in preferred language	2273	2335	90.87	92.30	-1.44	-3.62	0.74	-3.27	0.39
	Q24 - Discharged at the right time	2238	2311	85.88	87.48	-1.60	-3.88	0.68	-3.51	0.32
	Q25 - Medical staff took your preferences into account in deciding what health care services you should have after you left the hospital	1923	1967	90.27	91.57	-1.30	-3.53	0.93	-3.17	0.57
	Q27 - Good understanding of how to take care of self before going home	1913	1954	93.84	95.96	-2.13	-3.86	-0.39	-3.58	-0.67
	Q28 - Medical staff clearly explained how to take medications before going home	1862	1922	92.68	94.96	-2.28	-4.21	-0.35	-3.90	-0.66
	Q29 - Medical staff clearly explained what follow-up appointments or treatments would be needed before going home	1821	1875	91.46	94.01	-2.55	-4.72	-0.37	-4.37	-0.72
	Q30 - Able to manage your health needs since returning home	1871	1900	95.75	95.90	-0.15	-1.74	1.44	-1.49	1.18
Overall Satisfaction	Q31 - Overall satisfaction with recovery since leaving hospital	2128	2183	67.46	67.65	-0.20	-3.43	3.04	-2.91	2.52

Source: Abt Associates analysis of BPCI Beneficiary Survey responses.

Notes: All responses were weighted for non-response and sampling design, and estimates were risk-adjusted for beneficiary- and hospital-level characteristics.

Exhibit I.22: Beneficiary Survey Outcomes: Other Respiratory, Model 2 Hospitals, Waves 4-9

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Improvement	Improvement in bathing, dressing, using the toilet, or eating	660	704	60.96	65.37	-4.40	-9.11	0.30	-8.35	-0.46
	Improvement in planning regular tasks	669	720	48.15	50.51	-2.36	-6.82	2.09	-6.10	1.37
	Improvement in use of mobility device (less likely to use mobility device)	677	727	39.97	41.21	-1.25	-5.11	2.62	-4.49	2.00
	Improvement in walking without rest	666	713	27.87	26.92	0.95	-3.98	5.89	-3.18	5.09
	Improvement in using stairs	660	692	28.68	27.63	1.04	-3.51	5.59	-2.77	4.86
	Improvement (less frequent) in physical/emotional problems limiting social activities	661	718	48.00	46.78	1.23	-3.79	6.24	-2.98	5.43
	Improvement (less frequent) in pain limiting regular activities	663	711	45.31	47.73	-2.42	-7.41	2.57	-6.61	1.76
Functional Decline	Decline in bathing, dressing, using the toilet, or eating	660	704	19.69	16.76	2.93	-0.92	6.77	-0.30	6.15
	Decline in planning regular tasks	669	720	30.58	25.33	5.25	0.75	9.75	1.47	9.03
	Decline in use of mobility device (less likely to use mobility device)	677	727	44.00	40.15	3.85	-0.13	7.83	0.51	7.18
	Decline in walking without rest	666	713	34.59	33.98	0.61	-4.40	5.61	-3.59	4.81
	Decline in using stairs	660	692	41.90	42.20	-0.31	-5.01	4.39	-4.25	3.64
	Decline (more frequent) in physical/emotional problems limiting social activities	661	718	27.66	27.82	-0.15	-4.72	4.41	-3.98	3.68
	Decline (more frequent) in pain limiting regular activities	663	711	28.83	24.99	3.85	-1.08	8.77	-0.28	7.98
Overall Health	Q9/10 - Composite Depression Indicator	665	724	29.43	28.17	1.26	-3.58	6.10	-2.80	5.32
	Q18 - In general, how would you rate your physical health?	688	737	35.62	37.48	-1.86	-6.65	2.93	-5.88	2.16
	Q19 - In general, how would you rate your mental health?	686	737	70.83	73.58	-2.75	-7.44	1.93	-6.68	1.18

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Care Experience	Q20 - Conflicting advice from medical staff about your treatment	684	736	62.85	69.88	-7.03	-12.05	-2.01	-11.24	-2.82
	Q21 - Services appropriate for the level of care you needed	686	737	54.13	56.89	-2.76	-7.85	2.34	-7.03	1.52
	Q23 - Medical staff spoke in preferred language	698	746	91.23	92.54	-1.31	-4.59	1.97	-4.06	1.44
	Q24 - Discharged at the right time	676	735	83.87	85.64	-1.77	-5.50	1.96	-4.90	1.36
	Q25 - Medical staff took your preferences into account in deciding what health care services you should have after you left the hospital	596	640	91.25	90.91	0.33	-2.91	3.58	-2.39	3.05
	Q27 - Good understanding of how to take care of self before going home	609	645	93.90	95.08	-1.18	-4.15	1.78	-3.67	1.30
	Q28 - Medical staff clearly explained how to take medications before going home	580	626	91.13	95.44	-4.31	-7.23	-1.39	-6.76	-1.86
	Q29 - Medical staff clearly explained what follow-up appointments or treatments would be needed before going home	592	614	91.51	94.44	-2.93	-6.00	0.14	-5.50	-0.36
	Q30 - Able to manage your health needs since returning home	595	637	92.89	95.46	-2.57	-5.54	0.40	-5.06	-0.08
Overall Satisfaction	Q31 - Overall satisfaction with recovery since leaving hospital	656	698	58.95	65.44	-6.50	-11.48	-1.51	-10.68	-2.31

Source: Abt Associates analysis of BPCI Beneficiary Survey responses.

Notes: All responses were weighted for non-response and sampling design, and estimates were risk-adjusted for beneficiary- and hospital-level characteristics.

Exhibit I.23: Beneficiary Survey Outcomes: Gastrointestinal Obstruction, Model 2 Hospitals, Waves 5-10

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Improvement	Improvement in bathing, dressing, using the toilet, or eating	307	297	78.03	77.53	0.50	-5.09	6.08	-4.19	5.18
	Improvement in planning regular tasks	307	300	70.60	68.20	2.40	-4.02	8.83	-2.98	7.79
	Improvement in use of mobility device (less likely to use mobility device)	311	299	61.51	60.11	1.40	-4.32	7.13	-3.39	6.20
	Improvement in walking without rest	304	295	50.76	52.41	-1.66	-7.30	3.98	-6.38	3.07
	Improvement in using stairs	300	285	48.16	48.49	-0.33	-6.58	5.92	-5.57	4.91
	Improvement (less frequent) in physical/emotional problems limiting social activities	306	299	57.72	60.37	-2.65	-9.71	4.40	-8.57	3.26
	Improvement (less frequent) in pain limiting regular activities	302	296	50.28	53.98	-3.70	-11.48	4.08	-10.22	2.82
Functional Decline	Decline in bathing, dressing, using the toilet, or eating	307	297	12.93	12.38	0.55	-4.49	5.59	-3.68	4.77
	Decline in planning regular tasks	307	300	15.41	15.41	0.00	-6.11	6.12	-5.13	5.13
	Decline in use of mobility device (less likely to use mobility device)	311	299	25.49	26.42	-0.94	-7.48	5.61	-6.42	4.55
	Decline in walking without rest	304	295	18.85	18.89	-0.03	-5.52	5.45	-4.63	4.56
	Decline in using stairs	300	285	25.85	26.18	-0.33	-6.04	5.38	-5.11	4.46
	Decline (more frequent) in physical/emotional problems limiting social activities	306	299	19.78	21.73	-1.95	-8.45	4.55	-7.40	3.50
	Decline (more frequent) in pain limiting regular activities	302	296	18.57	23.68	-5.11	-11.63	1.40	-10.58	0.35
Overall Health	Q9/10 - Composite Depression Indicator	309	297	15.37	21.93	-6.57	-12.99	-0.14	-11.95	-1.18
	Q18 - In general, how would you rate your physical health?	309	311	56.32	60.30	-3.98	-10.24	2.28	-9.23	1.27
	Q19 - In general, how would you rate your mental health?	312	310	79.51	81.47	-1.96	-8.47	4.54	-7.41	3.49

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Care Experience	Q20 - Conflicting advice from medical staff about your treatment	312	304	69.91	71.99	-2.08	-9.26	5.10	-8.10	3.94
	Q21 - Services appropriate for the level of care you needed	312	307	59.31	60.51	-1.20	-9.35	6.94	-8.03	5.62
	Q23 - Medical staff spoke in preferred language	313	311	92.62	92.56	0.06	-3.69	3.82	-3.09	3.21
	Q24 - Discharged at the right time	310	302	90.09	88.84	1.26	-3.61	6.13	-2.82	5.34
	Q25 - Medical staff took your preferences into account in deciding what health care services you should have after you left the hospital	222	239	90.27	89.47	0.80	-4.25	5.85	-3.43	5.04
	Q27 - Good understanding of how to take care of self before going home	265	263	95.41	92.43	2.97	-1.62	7.56	-0.87	6.82
	Q28 - Medical staff clearly explained how to take medications before going home	234	230	95.11	92.77	2.34	-2.50	7.18	-1.72	6.40
	Q29 - Medical staff clearly explained what follow-up appointments or treatments would be needed before going home	254	258	93.53	92.73	0.80	-4.15	5.75	-3.35	4.95
	Q30 - Able to manage your health needs since returning home	262	255	97.36	94.19	3.17	-0.40	6.74	0.18	6.16
Overall Satisfaction	Q31 - Overall satisfaction with recovery since leaving hospital	288	289	69.42	75.97	-6.56	-13.37	0.26	-12.27	-0.85

Source: Abt Associates analysis of BPCI Beneficiary Survey responses.

Notes: All responses were weighted for non-response and sampling design, and estimates were risk-adjusted for beneficiary- and hospital-level characteristics.

Exhibit I.24: Beneficiary Survey Outcomes: Renal Failure, Model 2 Hospitals, Waves 4-10

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Improvement	Improvement in bathing, dressing, using the toilet, or eating	999	1055	58.92	59.10	-0.19	-4.20	3.83	-3.56	3.18
	Improvement in planning regular tasks	1021	1066	45.45	44.18	1.27	-2.12	4.66	-1.57	4.12
	Improvement in use of mobility device (less likely to use mobility device)	1019	1075	37.55	37.03	0.51	-2.50	3.53	-2.02	3.05
	Improvement in walking without rest	1018	1079	31.43	29.36	2.07	-1.43	5.57	-0.86	5.01
	Improvement in using stairs	990	1032	34.10	28.15	5.95	2.02	9.88	2.66	9.24
	Improvement (less frequent) in physical/emotional problems limiting social activities	1008	1045	49.12	47.31	1.80	-3.01	6.61	-2.23	5.84
	Improvement (less frequent) in pain limiting regular activities	1019	1056	44.59	43.76	0.83	-3.46	5.12	-2.77	4.43
Functional Decline	Decline in bathing, dressing, using the toilet, or eating	999	1055	20.27	19.85	0.42	-3.05	3.88	-2.49	3.32
	Decline in planning regular tasks	1021	1066	32.38	31.94	0.43	-3.57	4.44	-2.93	3.79
	Decline in use of mobility device (less likely to use mobility device)	1019	1075	47.97	48.89	-0.92	-4.02	2.18	-3.52	1.68
	Decline in walking without rest	1018	1079	37.51	36.77	0.75	-3.04	4.54	-2.43	3.93
	Decline in using stairs	990	1032	41.62	45.19	-3.57	-7.49	0.36	-6.86	-0.27
	Decline (more frequent) in physical/emotional problems limiting social activities	1008	1045	28.51	26.92	1.59	-3.25	6.43	-2.47	5.65
	Decline (more frequent) in pain limiting regular activities	1019	1056	26.54	26.15	0.39	-3.85	4.63	-3.17	3.95
Overall Health	Q9/10 - Composite Depression Indicator	1025	1067	31.58	29.90	1.68	-2.72	6.08	-2.01	5.37
	Q18 - In general, how would you rate your physical health?	1052	1104	40.38	38.01	2.36	-1.88	6.61	-1.20	5.92
	Q19 - In general, how would you rate your mental health?	1050	1097	69.07	68.67	0.40	-3.84	4.64	-3.16	3.96

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Care Experience	Q20 - Conflicting advice from medical staff about your treatment	1046	1112	61.18	62.04	-0.86	-5.30	3.57	-4.58	2.86
	Q21 - Services appropriate for the level of care you needed	1058	1110	49.95	52.19	-2.24	-6.86	2.38	-6.12	1.63
	Q23 - Medical staff spoke in preferred language	1069	1128	88.20	90.73	-2.53	-5.63	0.57	-5.13	0.07
	Q24 - Discharged at the right time	1044	1113	84.40	84.54	-0.15	-3.28	2.99	-2.77	2.48
	Q25 - Medical staff took your preferences into account in deciding what health care services you should have after you left the hospital	912	961	89.44	90.96	-1.52	-4.84	1.80	-4.30	1.27
	Q27 - Good understanding of how to take care of self before going home	880	949	90.79	94.13	-3.34	-5.93	-0.75	-5.51	-1.17
	Q28 - Medical staff clearly explained how to take medications before going home	845	919	90.26	93.23	-2.98	-6.25	0.29	-5.72	-0.23
	Q29 - Medical staff clearly explained what follow-up appointments or treatments would be needed before going home	858	896	91.79	93.07	-1.28	-4.36	1.80	-3.86	1.31
	Q30 - Able to manage your health needs since returning home	878	924	93.55	94.52	-0.96	-3.20	1.28	-2.84	0.92
Overall Satisfaction	Q31 - Overall satisfaction with recovery since leaving hospital	1000	1036	60.13	62.28	-2.16	-6.28	1.97	-5.62	1.31

Source: Abt Associates analysis of BPCI Beneficiary Survey responses.

Notes: All responses were weighted for non-response and sampling design, and estimates were risk-adjusted for beneficiary- and hospital-level characteristics.

Exhibit I.25: Beneficiary Survey Outcomes: Nutritional and Metabolic Disorders, Model 2 Hospitals, Waves 5-10

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Improvement	Improvement in bathing, dressing, using the toilet, or eating	291	307	52.38	60.74	-8.36	-14.58	-2.14	-13.58	-3.15
	Improvement in planning regular tasks	300	317	41.96	42.80	-0.84	-8.31	6.63	-7.10	5.42
	Improvement in use of mobility device (less likely to use mobility device)	299	317	37.58	39.97	-2.39	-8.46	3.68	-7.48	2.70
	Improvement in walking without rest	298	318	31.10	32.75	-1.66	-8.98	5.67	-7.80	4.48
	Improvement in using stairs	289	303	29.67	30.62	-0.95	-7.81	5.92	-6.70	4.81
	Improvement (less frequent) in physical/emotional problems limiting social activities	292	310	44.10	48.23	-4.13	-12.26	4.00	-10.94	2.69
	Improvement (less frequent) in pain limiting regular activities	296	307	42.85	45.80	-2.95	-10.38	4.48	-9.18	3.28
Functional Decline	Decline in bathing, dressing, using the toilet, or eating	291	307	24.46	20.73	3.73	-2.81	10.27	-1.75	9.21
	Decline in planning regular tasks	300	317	31.00	35.65	-4.64	-11.28	1.99	-10.20	0.91
	Decline in use of mobility device (less likely to use mobility device)	299	317	46.83	46.97	-0.14	-6.51	6.23	-5.48	5.20
	Decline in walking without rest	298	318	35.22	36.29	-1.08	-8.26	6.11	-7.10	4.95
	Decline in using stairs	289	303	44.47	43.30	1.17	-5.92	8.27	-4.77	7.12
	Decline (more frequent) in physical/emotional problems limiting social activities	292	310	30.04	30.04	0.00	-7.52	7.52	-6.30	6.31
	Decline (more frequent) in pain limiting regular activities	296	307	23.53	22.43	1.10	-6.35	8.56	-5.15	7.35
Overall Health	Q9/10 - Composite Depression Indicator	292	316	29.35	25.68	3.66	-4.25	11.57	-2.97	10.30
	Q18 - In general, how would you rate your physical health?	311	323	47.42	46.62	0.80	-6.56	8.16	-5.37	6.97
	Q19 - In general, how would you rate your mental health?	312	323	65.12	64.74	0.38	-7.04	7.80	-5.84	6.60

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Care Experience	Q20 - Conflicting advice from medical staff about your treatment	307	325	62.63	66.37	-3.74	-11.91	4.43	-10.59	3.11
	Q21 - Services appropriate for the level of care you needed	306	327	53.23	50.46	2.77	-5.90	11.43	-4.50	10.03
	Q23 - Medical staff spoke in preferred language	314	332	83.52	90.99	-7.47	-13.19	-1.75	-12.27	-2.68
	Q24 - Discharged at the right time	308	327	89.88	83.72	6.16	0.75	11.57	1.63	10.70
	Q25 - Medical staff took your preferences into account in deciding what health care services you should have after you left the hospital	246	286	93.43	89.55	3.89	-0.84	8.61	-0.08	7.85
	Q27 - Good understanding of how to take care of self before going home	259	272	95.70	92.85	2.86	-1.43	7.14	-0.74	6.45
	Q28 - Medical staff clearly explained how to take medications before going home	248	265	92.39	92.19	0.21	-4.79	5.21	-3.99	4.40
	Q29 - Medical staff clearly explained what follow-up appointments or treatments would be needed before going home	240	259	92.47	91.04	1.43	-3.89	6.76	-3.03	5.90
	Q30 - Able to manage your health needs since returning home	250	258	95.38	92.60	2.78	-1.78	7.34	-1.04	6.60
Overall Satisfaction	Q31 - Overall satisfaction with recovery since leaving hospital	292	303	63.64	58.06	5.58	-2.82	13.99	-1.47	12.63

Source: Abt Associates analysis of BPCI Beneficiary Survey responses.

Notes: All responses were weighted for non-response and sampling design, and estimates were risk-adjusted for beneficiary- and hospital-level characteristics.

Exhibit I.26: Beneficiary Survey Outcomes: Cellulitis, Model 2 Hospitals, Waves 4-10

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Improvement	Improvement in bathing, dressing, using the toilet, or eating	633	700	61.45	61.72	-0.27	-4.81	4.27	-4.07	3.54
	Improvement in planning regular tasks	647	718	49.50	54.52	-5.02	-9.37	-0.67	-8.67	-1.37
	Improvement in use of mobility device (less likely to use mobility device)	654	712	37.91	37.96	-0.05	-3.69	3.58	-3.10	3.00
	Improvement in walking without rest	647	709	33.60	34.00	-0.40	-4.93	4.14	-4.20	3.41
	Improvement in using stairs	628	690	32.90	32.49	0.41	-4.31	5.13	-3.55	4.37
	Improvement (less frequent) in physical/emotional problems limiting social activities	634	709	50.95	49.44	1.50	-4.21	7.22	-3.29	6.30
	Improvement (less frequent) in pain limiting regular activities	649	708	50.19	45.10	5.09	-0.93	11.11	0.04	10.14
Functional Decline	Decline in bathing, dressing, using the toilet, or eating	633	700	20.67	15.00	5.67	2.02	9.32	2.61	8.73
	Decline in planning regular tasks	647	718	26.67	20.12	6.55	2.56	10.54	3.20	9.90
	Decline in use of mobility device (less likely to use mobility device)	654	712	46.98	47.29	-0.31	-4.01	3.39	-3.42	2.79
	Decline in walking without rest	647	709	34.30	34.52	-0.22	-4.95	4.51	-4.19	3.75
	Decline in using stairs	628	690	39.13	39.65	-0.51	-5.13	4.10	-4.38	3.36
	Decline (more frequent) in physical/emotional problems limiting social activities	634	709	25.19	23.46	1.73	-2.91	6.37	-2.17	5.62
	Decline (more frequent) in pain limiting regular activities	649	708	22.26	25.03	-2.78	-7.89	2.34	-7.07	1.51
Overall Health	Q9/10 - Composite Depression Indicator	643	715	25.09	24.63	0.46	-4.63	5.55	-3.81	4.73
	Q18 - In general, how would you rate your physical health?	668	732	47.33	42.70	4.63	-0.07	9.33	0.69	8.57
	Q19 - In general, how would you rate your mental health?	671	737	73.14	74.63	-1.49	-5.93	2.94	-5.21	2.23

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Care Experience	Q20 - Conflicting advice from medical staff about your treatment	657	727	68.41	69.65	-1.24	-6.69	4.20	-5.81	3.32
	Q21 - Services appropriate for the level of care you needed	664	733	53.15	57.73	-4.58	-10.41	1.25	-9.47	0.31
	Q23 - Medical staff spoke in preferred language	664	735	89.50	91.87	-2.37	-6.15	1.41	-5.54	0.80
	Q24 - Discharged at the right time	661	731	82.82	85.55	-2.73	-6.93	1.48	-6.26	0.80
	Q25 - Medical staff took your preferences into account in deciding what health care services you should have after you left the hospital	566	619	88.39	89.77	-1.38	-5.41	2.66	-4.76	2.00
	Q27 - Good understanding of how to take care of self before going home	574	628	92.97	93.59	-0.62	-3.60	2.37	-3.12	1.89
	Q28 - Medical staff clearly explained how to take medications before going home	554	623	92.59	93.26	-0.67	-4.12	2.78	-3.56	2.22
	Q29 - Medical staff clearly explained what follow-up appointments or treatments would be needed before going home	528	613	92.88	95.15	-2.27	-5.38	0.83	-4.88	0.33
	Q30 - Able to manage your health needs since returning home	546	617	94.23	93.48	0.74	-2.36	3.85	-1.86	3.35
Overall Satisfaction	Q31 - Overall satisfaction with recovery since leaving hospital	631	695	62.29	65.87	-3.58	-9.41	2.26	-8.47	1.32

Source: Abt Associates analysis of BPCI Beneficiary Survey responses.

Notes: All responses were weighted for non-response and sampling design, and estimates were risk-adjusted for beneficiary- and hospital-level characteristics.

Exhibit I.27: Beneficiary Survey Outcomes: Esophagitis, Gastroenteritis and Other Digestive Disorders, Model 2 Hospitals, Waves 4-10

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Improvement	Improvement in bathing, dressing, using the toilet, or eating	683	698	68.53	69.86	-1.33	-6.22	3.56	-5.43	2.77
	Improvement in planning regular tasks	701	719	58.80	57.47	1.33	-3.35	6.00	-2.59	5.24
	Improvement in use of mobility device (less likely to use mobility device)	698	717	51.47	52.14	-0.67	-4.41	3.08	-3.80	2.47
	Improvement in walking without rest	691	710	42.71	43.63	-0.93	-5.64	3.79	-4.88	3.03
	Improvement in using stairs	659	689	42.06	39.46	2.60	-1.51	6.71	-0.85	6.04
	Improvement (less frequent) in physical/emotional problems limiting social activities	679	710	53.50	54.21	-0.71	-5.52	4.10	-4.75	3.32
	Improvement (less frequent) in pain limiting regular activities	686	713	51.47	51.16	0.30	-6.32	6.93	-5.25	5.86
Functional Decline	Decline in bathing, dressing, using the toilet, or eating	683	698	14.90	14.82	0.08	-4.28	4.44	-3.57	3.73
	Decline in planning regular tasks	701	719	22.88	22.48	0.40	-3.56	4.36	-2.92	3.72
	Decline in use of mobility device (less likely to use mobility device)	698	717	33.35	31.85	1.51	-2.65	5.67	-1.98	5.00
	Decline in walking without rest	691	710	24.50	24.27	0.23	-4.28	4.73	-3.55	4.00
	Decline in using stairs	659	689	28.57	31.61	-3.04	-7.25	1.18	-6.57	0.50
	Decline (more frequent) in physical/emotional problems limiting social activities	679	710	23.13	26.46	-3.33	-7.39	0.73	-6.73	0.08
	Decline (more frequent) in pain limiting regular activities	686	713	20.64	21.86	-1.23	-6.07	3.61	-5.29	2.83
Overall Health	Q9/10 - Composite Depression Indicator	681	708	23.82	22.89	0.93	-3.54	5.40	-2.82	4.68
	Q18 - In general, how would you rate your physical health?	706	737	52.69	52.40	0.28	-4.58	5.14	-3.79	4.36
	Q19 - In general, how would you rate your mental health?	708	736	74.90	76.36	-1.46	-5.93	3.01	-5.21	2.29

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Care Experience	Q20 - Conflicting advice from medical staff about your treatment	703	722	66.08	64.53	1.55	-4.41	7.52	-3.45	6.56
	Q21 - Services appropriate for the level of care you needed	712	727	54.19	54.58	-0.40	-5.51	4.71	-4.68	3.89
	Q23 - Medical staff spoke in preferred language	724	730	91.65	90.81	0.84	-2.77	4.45	-2.19	3.86
	Q24 - Discharged at the right time	714	727	83.25	84.70	-1.45	-5.67	2.77	-4.99	2.09
	Q25 - Medical staff took your preferences into account in deciding what health care services you should have after you left the hospital	566	590	86.25	91.35	-5.10	-9.53	-0.67	-8.81	-1.38
	Q27 - Good understanding of how to take care of self before going home	607	653	90.70	92.63	-1.93	-5.68	1.83	-5.08	1.23
	Q28 - Medical staff clearly explained how to take medications before going home	586	642	88.52	94.13	-5.61	-9.21	-2.00	-8.63	-2.59
	Q29 - Medical staff clearly explained what follow-up appointments or treatments would be needed before going home	605	631	87.31	93.70	-6.39	-10.06	-2.72	-9.47	-3.31
	Q30 - Able to manage your health needs since returning home	623	642	90.77	95.24	-4.47	-7.24	-1.70	-6.79	-2.15
Overall Satisfaction	Q31 - Overall satisfaction with recovery since leaving hospital	682	706	63.23	67.57	-4.34	-9.89	1.21	-9.00	0.32

Source: Abt Associates analysis of BPCI Beneficiary Survey responses.

Notes: All responses were weighted for non-response and sampling design, and estimates were risk-adjusted for beneficiary- and hospital-level characteristics.

Exhibit I.28: Beneficiary Survey Outcomes: Major Joint Replacement of the Upper Extremity, Model 2 PGP, Waves 9-11

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Improvement	Improvement in bathing, dressing, using the toilet, or eating	602	499	82.54	77.84	4.70	0.27	9.13	0.99	8.41
	Improvement in planning regular tasks	603	497	81.78	80.65	1.13	-3.20	5.46	-2.51	4.76
	Improvement in use of mobility device (less likely to use mobility device)	606	497	75.21	73.42	1.80	-0.80	4.40	-0.38	3.98
	Improvement in walking without rest	594	493	60.96	60.82	0.14	-3.74	4.02	-3.11	3.39
	Improvement in using stairs	593	488	58.92	55.86	3.05	-0.89	6.99	-0.25	6.36
	Improvement (less frequent) in physical/emotional problems limiting social activities	605	492	70.61	65.80	4.81	-0.65	10.27	0.23	9.38
	Improvement (less frequent) in pain limiting regular activities	610	495	72.89	70.46	2.43	-3.00	7.86	-2.13	6.98
Functional Decline	Decline in bathing, dressing, using the toilet, or eating	602	499	6.04	7.02	-0.98	-3.98	2.02	-3.50	1.54
	Decline in planning regular tasks	603	497	7.69	8.76	-1.08	-4.23	2.08	-3.72	1.57
	Decline in use of mobility device (less likely to use mobility device)	606	497	14.39	13.59	0.80	-1.87	3.46	-1.44	3.03
	Decline in walking without rest	594	493	11.02	11.27	-0.25	-3.57	3.07	-3.04	2.53
	Decline in using stairs	593	488	12.69	14.39	-1.71	-5.03	1.62	-4.50	1.08
	Decline (more frequent) in physical/emotional problems limiting social activities	605	492	13.77	18.04	-4.27	-9.16	0.62	-8.37	-0.17
	Decline (more frequent) in pain limiting regular activities	610	495	10.34	10.46	-0.11	-3.55	3.32	-2.99	2.76
Overall Health	Q9/10 - Composite Depression Indicator	607	495	10.93	11.00	-0.08	-3.93	3.78	-3.31	3.16
	Q18 - In general, how would you rate your physical health?	614	501	78.12	76.41	1.71	-2.75	6.18	-2.03	5.46
	Q19 - In general, how would you rate your mental health?	611	497	91.36	90.71	0.65	-2.78	4.08	-2.23	3.53

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Care Experience	Q20 - Conflicting advice from medical staff about your treatment	607	498	83.26	81.76	1.50	-2.90	5.90	-2.19	5.19
	Q21 - Services appropriate for the level of care you needed	607	496	73.88	68.62	5.26	-0.42	10.94	0.49	10.03
	Q23 - Medical staff spoke in preferred language	609	501	96.66	97.13	-0.47	-2.48	1.54	-2.15	1.21
	Q24 - Discharged at the right time	607	493	89.01	92.69	-3.68	-7.29	-0.06	-6.71	-0.64
	Q25 - Medical staff took your preferences into account in deciding what health care services you should have after you left the hospital	543	449	94.63	93.98	0.65	-2.46	3.77	-1.96	3.27
	Q27 - Good understanding of how to take care of self before going home	577	476	96.23	95.26	0.97	-1.45	3.39	-1.06	3.00
	Q28 - Medical staff clearly explained how to take medications before going home	563	454	94.34	95.20	-0.86	-3.48	1.76	-3.06	1.34
	Q29 - Medical staff clearly explained what follow-up appointments or treatments would be needed before going home	566	467	95.75	96.02	-0.28	-2.77	2.22	-2.37	1.81
	Q30 - Able to manage your health needs since returning home	567	469	97.38	97.07	0.31	-1.41	2.03	-1.13	1.75
	Overall Satisfaction	Q31 - Overall satisfaction with recovery since leaving hospital	585	481	85.31	83.36	1.95	-2.48	6.37	-1.77

Source: Abt Associates analysis of BPCI Beneficiary Survey responses.

Notes: All responses were weighted for non-response and sampling design, and estimates were risk-adjusted for beneficiary- and hospital-level characteristics.

Exhibit I.29: Beneficiary Survey Outcomes: Urinary Tract Infection, Model 2 PGP, Waves 9-11

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Improvement	Improvement in bathing, dressing, using the toilet, or eating	586	502	46.95	45.07	1.88	-2.25	6.02	-1.59	5.35
	Improvement in planning regular tasks	605	516	34.80	37.30	-2.50	-6.62	1.61	-5.95	0.95
	Improvement in use of mobility device (less likely to use mobility device)	603	520	31.78	31.58	0.20	-3.24	3.64	-2.68	3.09
	Improvement in walking without rest	592	505	24.75	26.77	-2.02	-6.16	2.12	-5.49	1.45
	Improvement in using stairs	588	492	24.88	25.42	-0.53	-4.98	3.91	-4.26	3.19
	Improvement (less frequent) in physical/emotional problems limiting social activities	597	503	41.63	43.34	-1.70	-7.20	3.79	-6.31	2.91
	Improvement (less frequent) in pain limiting regular activities	592	513	41.84	45.79	-3.95	-9.43	1.53	-8.54	0.64
Functional Decline	Decline in bathing, dressing, using the toilet, or eating	586	502	28.78	29.20	-0.42	-4.90	4.06	-4.17	3.34
	Decline in planning regular tasks	605	516	43.76	43.82	-0.06	-4.77	4.65	-4.01	3.89
	Decline in use of mobility device (less likely to use mobility device)	603	520	55.99	54.81	1.18	-2.72	5.08	-2.09	4.46
	Decline in walking without rest	592	505	42.26	39.71	2.55	-2.07	7.16	-1.32	6.42
	Decline in using stairs	588	492	51.38	51.12	0.27	-4.22	4.75	-3.49	4.03
	Decline (more frequent) in physical/emotional problems limiting social activities	597	503	33.03	31.44	1.60	-3.76	6.96	-2.90	6.09
	Decline (more frequent) in pain limiting regular activities	592	513	24.63	24.75	-0.12	-5.16	4.92	-4.35	4.11
Overall Health	Q9/10 - Composite Depression Indicator	601	500	33.76	34.74	-0.98	-6.37	4.40	-5.50	3.54
	Q18 - In general, how would you rate your physical health?	624	528	41.38	39.89	1.49	-3.84	6.83	-2.98	5.97
	Q19 - In general, how would you rate your mental health?	620	530	60.33	62.20	-1.87	-7.13	3.40	-6.28	2.55

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Care Experience	Q20 - Conflicting advice from medical staff about your treatment	622	527	65.48	62.31	3.18	-2.63	8.99	-1.70	8.05
	Q21 - Services appropriate for the level of care you needed	621	527	51.76	49.83	1.94	-4.07	7.94	-3.10	6.97
	Q23 - Medical staff spoke in preferred language	628	535	92.02	90.31	1.71	-1.73	5.15	-1.18	4.59
	Q24 - Discharged at the right time	619	522	85.83	85.85	-0.02	-4.37	4.33	-3.67	3.63
	Q25 - Medical staff took your preferences into account in deciding what health care services you should have after you left the hospital	536	462	89.63	89.46	0.17	-3.94	4.27	-3.28	3.61
	Q27 - Good understanding of how to take care of self before going home	500	439	93.61	91.45	2.16	-1.58	5.90	-0.97	5.30
	Q28 - Medical staff clearly explained how to take medications before going home	475	419	91.37	88.74	2.63	-1.36	6.61	-0.72	5.97
	Q29 - Medical staff clearly explained what follow-up appointments or treatments would be needed before going home	452	413	93.81	90.52	3.29	-0.34	6.92	0.25	6.33
	Q30 - Able to manage your health needs since returning home	474	426	95.28	92.42	2.87	-0.48	6.21	0.06	5.67
Overall Satisfaction	Q31 - Overall satisfaction with recovery since leaving hospital	589	508	55.77	58.92	-3.14	-8.92	2.64	-7.99	1.71

Source: Abt Associates analysis of BPCI Beneficiary Survey responses.

Notes: All responses were weighted for non-response and sampling design, and estimates were risk-adjusted for beneficiary- and hospital-level characteristics.

Exhibit I.30: Beneficiary Survey Outcomes: Stroke, Model 2 PGP, Waves 9-11

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Improvement	Improvement in bathing, dressing, using the toilet, or eating	650	594	60.59	57.09	3.50	-0.96	7.97	-0.24	7.25
	Improvement in planning regular tasks	659	591	46.52	47.07	-0.55	-5.36	4.26	-4.59	3.48
	Improvement in use of mobility device (less likely to use mobility device)	659	599	40.96	42.90	-1.94	-5.97	2.09	-5.32	1.44
	Improvement in walking without rest	652	599	35.56	30.42	5.15	0.75	9.55	1.46	8.84
	Improvement in using stairs	640	583	33.37	32.68	0.69	-3.32	4.70	-2.68	4.05
	Improvement (less frequent) in physical/emotional problems limiting social activities	656	595	44.31	45.76	-1.45	-6.71	3.81	-5.86	2.96
	Improvement (less frequent) in pain limiting regular activities	661	599	46.51	44.16	2.35	-2.78	7.49	-1.96	6.66
Functional Decline	Decline in bathing, dressing, using the toilet, or eating	650	594	28.14	29.48	-1.34	-5.94	3.26	-5.20	2.52
	Decline in planning regular tasks	659	591	38.33	38.69	-0.35	-5.10	4.40	-4.34	3.63
	Decline in use of mobility device (less likely to use mobility device)	659	599	48.46	46.65	1.81	-2.60	6.22	-1.89	5.51
	Decline in walking without rest	652	599	43.08	44.03	-0.95	-5.82	3.92	-5.03	3.14
	Decline in using stairs	640	583	47.01	45.71	1.30	-3.37	5.96	-2.62	5.21
	Decline (more frequent) in physical/emotional problems limiting social activities	656	595	40.15	40.03	0.12	-4.99	5.23	-4.17	4.41
	Decline (more frequent) in pain limiting regular activities	661	599	30.31	27.37	2.94	-2.07	7.95	-1.26	7.14
Overall Health	Q9/10 - Composite Depression Indicator	657	593	25.93	26.69	-0.76	-5.42	3.89	-4.67	3.14
	Q18 - In general, how would you rate your physical health?	676	614	50.02	50.43	-0.41	-5.13	4.32	-4.37	3.55
	Q19 - In general, how would you rate your mental health?	677	619	69.76	70.40	-0.64	-5.20	3.92	-4.47	3.19

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Care Experience	Q20 - Conflicting advice from medical staff about your treatment	678	621	65.63	69.21	-3.59	-9.08	1.91	-8.20	1.03
	Q21 - Services appropriate for the level of care you needed	683	630	54.60	58.23	-3.63	-8.98	1.72	-8.12	0.86
	Q23 - Medical staff spoke in preferred language	688	627	89.37	92.60	-3.22	-6.72	0.27	-6.16	-0.29
	Q24 - Discharged at the right time	676	621	88.15	89.07	-0.92	-4.48	2.64	-3.90	2.07
	Q25 - Medical staff took your preferences into account in deciding what health care services you should have after you left the hospital	603	554	92.43	94.79	-2.36	-5.24	0.53	-4.78	0.06
	Q27 - Good understanding of how to take care of self before going home	591	542	96.34	95.18	1.17	-1.05	3.38	-0.69	3.03
	Q28 - Medical staff clearly explained how to take medications before going home	584	520	93.21	94.48	-1.27	-4.17	1.64	-3.71	1.17
	Q29 - Medical staff clearly explained what follow-up appointments or treatments would be needed before going home	560	515	91.88	93.21	-1.33	-4.92	2.26	-4.34	1.68
	Q30 - Able to manage your health needs since returning home	567	533	97.34	96.01	1.33	-0.87	3.53	-0.51	3.18
	Overall Satisfaction	Q31 - Overall satisfaction with recovery since leaving hospital	652	588	60.27	64.68	-4.41	-9.60	0.79	-8.77

Source: Abt Associates analysis of BPCI Beneficiary Survey responses.

Notes: All responses were weighted for non-response and sampling design, and estimates were risk-adjusted for beneficiary- and hospital-level characteristics.

Exhibit I.31: Beneficiary Survey Outcomes: Chronic Obstructive Pulmonary Disease, Bronchitis, Asthma, Model 2 PGP, Waves 9-11

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Improvement	Improvement in bathing, dressing, using the toilet, or eating	1366	1234	68.86	68.04	0.81	-2.31	3.94	-1.81	3.44
	Improvement in planning regular tasks	1381	1254	52.10	52.16	-0.06	-3.41	3.30	-2.87	2.76
	Improvement in use of mobility device (less likely to use mobility device)	1383	1253	45.30	47.60	-2.30	-5.06	0.46	-4.62	0.01
	Improvement in walking without rest	1367	1245	30.38	29.36	1.02	-2.26	4.30	-1.73	3.78
	Improvement in using stairs	1320	1200	30.96	28.84	2.12	-1.30	5.54	-0.75	4.99
	Improvement (less frequent) in physical/emotional problems limiting social activities	1352	1239	50.77	48.90	1.87	-1.99	5.73	-1.37	5.10
	Improvement (less frequent) in pain limiting regular activities	1359	1235	46.04	45.71	0.34	-3.38	4.05	-2.78	3.45
Functional Decline	Decline in bathing, dressing, using the toilet, or eating	1366	1234	12.16	13.07	-0.91	-3.44	1.62	-3.04	1.21
	Decline in planning regular tasks	1381	1254	22.15	21.67	0.48	-2.56	3.51	-2.07	3.02
	Decline in use of mobility device (less likely to use mobility device)	1383	1253	33.84	31.79	2.05	-0.86	4.95	-0.39	4.49
	Decline in walking without rest	1367	1245	27.00	26.91	0.09	-2.93	3.12	-2.45	2.63
	Decline in using stairs	1320	1200	37.60	38.35	-0.75	-4.02	2.52	-3.50	2.00
	Decline (more frequent) in physical/emotional problems limiting social activities	1352	1239	24.33	24.17	0.16	-3.22	3.54	-2.68	3.00
	Decline (more frequent) in pain limiting regular activities	1359	1235	24.70	23.27	1.43	-1.81	4.67	-1.29	4.15
Overall Health	Q9/10 - Composite Depression Indicator	1373	1258	25.90	28.74	-2.84	-6.45	0.78	-5.87	0.20
	Q18 - In general, how would you rate your physical health?	1402	1279	35.08	35.09	-0.01	-3.31	3.29	-2.78	2.76
	Q19 - In general, how would you rate your mental health?	1405	1278	71.73	72.19	-0.46	-3.74	2.83	-3.21	2.30

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Care Experience	Q20 - Conflicting advice from medical staff about your treatment	1402	1268	66.81	70.38	-3.57	-7.25	0.10	-6.66	-0.49
	Q21 - Services appropriate for the level of care you needed	1408	1280	55.81	58.16	-2.34	-6.14	1.45	-5.53	0.84
	Q23 - Medical staff spoke in preferred language	1422	1292	93.70	91.71	1.99	-0.01	3.99	0.31	3.67
	Q24 - Discharged at the right time	1399	1282	86.09	88.29	-2.20	-4.86	0.46	-4.44	0.03
	Q25 - Medical staff took your preferences into account in deciding what health care services you should have after you left the hospital	1199	1081	90.73	91.83	-1.09	-3.46	1.27	-3.08	0.89
	Q27 - Good understanding of how to take care of self before going home	1258	1144	93.16	95.28	-2.12	-4.14	-0.10	-3.81	-0.43
	Q28 - Medical staff clearly explained how to take medications before going home	1238	1123	92.70	94.62	-1.92	-3.83	0.00	-3.53	-0.31
	Q29 - Medical staff clearly explained what follow-up appointments or treatments would be needed before going home	1236	1112	93.15	94.63	-1.48	-3.39	0.44	-3.08	0.13
	Q30 - Able to manage your health needs since returning home	1238	1126	95.48	96.61	-1.13	-2.80	0.54	-2.53	0.27
Overall Satisfaction	Q31 - Overall satisfaction with recovery since leaving hospital	1344	1217	61.88	63.61	-1.72	-5.58	2.13	-4.96	1.51

Source: Abt Associates analysis of BPCI Beneficiary Survey responses.

Notes: All responses were weighted for non-response and sampling design, and estimates were risk-adjusted for beneficiary- and hospital-level characteristics.

Exhibit I.32: Beneficiary Survey Outcomes: Major Joint Replacement of the Lower Extremity, Model 2 PGP, Waves 9-11

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Improvement	Improvement in bathing, dressing, using the toilet, or eating	1682	1690	89.17	87.61	1.56	-0.43	3.55	-0.11	3.23
	Improvement in planning regular tasks	1700	1700	82.23	80.60	1.64	-0.79	4.06	-0.40	3.67
	Improvement in use of mobility device (less likely to use mobility device)	1690	1703	65.33	64.78	0.55	-2.44	3.54	-1.96	3.05
	Improvement in walking without rest	1681	1693	67.46	66.84	0.61	-2.45	3.68	-1.96	3.18
	Improvement in using stairs	1666	1680	66.53	63.35	3.17	0.12	6.23	0.61	5.73
	Improvement (less frequent) in physical/emotional problems limiting social activities	1681	1694	77.02	78.73	-1.71	-4.47	1.06	-4.03	0.62
	Improvement (less frequent) in pain limiting regular activities	1690	1705	77.16	78.11	-0.95	-3.67	1.78	-3.24	1.34
Functional Decline	Decline in bathing, dressing, using the toilet, or eating	1682	1690	5.34	6.71	-1.38	-3.03	0.28	-2.76	0.01
	Decline in planning regular tasks	1700	1700	7.91	8.87	-0.95	-2.71	0.80	-2.43	0.52
	Decline in use of mobility device (less likely to use mobility device)	1690	1703	23.06	23.00	0.05	-2.63	2.74	-2.20	2.31
	Decline in walking without rest	1681	1693	12.92	15.14	-2.22	-4.39	-0.05	-4.04	-0.40
	Decline in using stairs	1666	1680	11.91	14.13	-2.22	-4.46	0.02	-4.10	-0.34
	Decline (more frequent) in physical/emotional problems limiting social activities	1681	1694	11.16	10.54	0.62	-1.58	2.82	-1.22	2.47
	Decline (more frequent) in pain limiting regular activities	1690	1705	9.73	8.42	1.31	-0.72	3.34	-0.39	3.01
Overall Health	Q9/10 - Composite Depression Indicator	1696	1694	9.79	9.36	0.43	-1.59	2.46	-1.27	2.14
	Q18 - In general, how would you rate your physical health?	1714	1723	86.09	84.33	1.76	-0.70	4.22	-0.30	3.82
	Q19 - In general, how would you rate your mental health?	1714	1716	91.54	92.03	-0.50	-2.34	1.34	-2.04	1.05

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Care Experience	Q20 - Conflicting advice from medical staff about your treatment	1702	1709	85.10	84.10	1.00	-1.53	3.52	-1.12	3.12
	Q21 - Services appropriate for the level of care you needed	1703	1716	74.17	75.02	-0.85	-3.76	2.05	-3.29	1.59
	Q23 - Medical staff spoke in preferred language	1710	1720	97.25	96.82	0.43	-0.92	1.78	-0.70	1.56
	Q24 - Discharged at the right time	1701	1713	92.76	93.34	-0.58	-2.47	1.31	-2.16	1.01
	Q25 - Medical staff took your preferences into account in deciding what health care services you should have after you left the hospital	1588	1608	93.47	95.56	-2.09	-3.82	-0.36	-3.54	-0.64
	Q27 - Good understanding of how to take care of self before going home	1654	1644	95.78	96.12	-0.34	-1.75	1.07	-1.52	0.84
	Q28 - Medical staff clearly explained how to take medications before going home	1607	1594	96.39	95.66	0.73	-0.70	2.17	-0.47	1.94
	Q29 - Medical staff clearly explained what follow-up appointments or treatments would be needed before going home	1609	1602	97.29	96.47	0.82	-0.50	2.14	-0.29	1.93
	Q30 - Able to manage your health needs since returning home	1609	1608	97.21	97.19	0.03	-1.18	1.23	-0.98	1.03
Overall Satisfaction	Q31 - Overall satisfaction with recovery since leaving hospital	1630	1641	82.74	82.95	-0.21	-2.92	2.49	-2.48	2.06

Source: Abt Associates analysis of BPCI Beneficiary Survey responses.

Notes: All responses were weighted for non-response and sampling design, and estimates were risk-adjusted for beneficiary- and hospital-level characteristics.

Exhibit I.33: Beneficiary Survey Outcomes: Percutaneous Coronary Intervention, Model 2 PGP, Waves 9-11

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Improvement	Improvement in bathing, dressing, using the toilet, or eating	615	639	85.01	86.83	-1.82	-5.46	1.82	-4.87	1.24
	Improvement in planning regular tasks	628	642	70.40	73.36	-2.96	-7.13	1.21	-6.46	0.54
	Improvement in use of mobility device (less likely to use mobility device)	628	641	69.26	70.10	-0.84	-4.42	2.74	-3.84	2.16
	Improvement in walking without rest	623	640	52.72	58.61	-5.89	-10.61	-1.18	-9.85	-1.94
	Improvement in using stairs	591	627	50.55	51.81	-1.26	-6.10	3.57	-5.32	2.79
	Improvement (less frequent) in physical/emotional problems limiting social activities	626	638	60.35	62.13	-1.78	-7.42	3.86	-6.51	2.95
	Improvement (less frequent) in pain limiting regular activities	622	636	54.77	56.23	-1.46	-6.80	3.88	-5.94	3.02
Functional Decline	Decline in bathing, dressing, using the toilet, or eating	615	639	8.34	7.03	1.31	-1.80	4.42	-1.29	3.92
	Decline in planning regular tasks	628	642	17.16	14.01	3.15	-0.63	6.92	-0.02	6.31
	Decline in use of mobility device (less likely to use mobility device)	628	641	18.79	17.82	0.97	-2.62	4.55	-2.04	3.97
	Decline in walking without rest	623	640	18.26	13.04	5.22	1.43	9.01	2.04	8.40
	Decline in using stairs	591	627	19.60	17.50	2.10	-1.55	5.76	-0.96	5.17
	Decline (more frequent) in physical/emotional problems limiting social activities	626	638	23.90	19.51	4.40	-0.48	9.27	0.31	8.49
	Decline (more frequent) in pain limiting regular activities	622	636	19.49	17.90	1.59	-2.87	6.05	-2.15	5.33
Overall Health	Q9/10 - Composite Depression Indicator	629	644	17.44	19.96	-2.52	-6.98	1.93	-6.26	1.21
	Q18 - In general, how would you rate your physical health?	630	650	60.22	59.54	0.68	-4.50	5.86	-3.66	5.03
	Q19 - In general, how would you rate your mental health?	635	649	83.47	81.14	2.33	-1.86	6.51	-1.19	5.84

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Care Experience	Q20 - Conflicting advice from medical staff about your treatment	631	653	77.81	76.57	1.24	-3.65	6.12	-2.86	5.33
	Q21 - Services appropriate for the level of care you needed	632	652	67.45	68.60	-1.15	-6.51	4.20	-5.64	3.34
	Q23 - Medical staff spoke in preferred language	638	657	93.76	91.80	1.96	-0.98	4.89	-0.51	4.42
	Q24 - Discharged at the right time	634	652	90.76	90.26	0.50	-2.80	3.80	-2.27	3.27
	Q25 - Medical staff took your preferences into account in deciding what health care services you should have after you left the hospital	548	542	94.21	96.37	-2.15	-5.27	0.96	-4.77	0.46
	Q27 - Good understanding of how to take care of self before going home	577	598	95.60	97.57	-1.97	-4.18	0.24	-3.82	-0.12
	Q28 - Medical staff clearly explained how to take medications before going home	594	611	93.96	96.76	-2.81	-5.35	-0.26	-4.94	-0.67
	Q29 - Medical staff clearly explained what follow-up appointments or treatments would be needed before going home	582	595	96.52	97.26	-0.74	-2.91	1.43	-2.56	1.08
	Q30 - Able to manage your health needs since returning home	564	586	97.48	96.97	0.51	-1.60	2.63	-1.26	2.29
Overall Satisfaction	Q31 - Overall satisfaction with recovery since leaving hospital	607	620	77.20	75.83	1.37	-3.14	5.89	-2.41	5.16

Source: Abt Associates analysis of BPCI Beneficiary Survey responses.

Notes: All responses were weighted for non-response and sampling design, and estimates were risk-adjusted for beneficiary- and hospital-level characteristics.

Exhibit I.34: Beneficiary Survey Outcomes: Congestive Heart Failure, Model 2 PGP, Waves 9-11

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Improvement	Improvement in bathing, dressing, using the toilet, or eating	1445	1222	59.67	60.47	-0.81	-3.89	2.28	-3.39	1.78
	Improvement in planning regular tasks	1473	1241	46.08	45.64	0.44	-2.74	3.63	-2.23	3.11
	Improvement in use of mobility device (less likely to use mobility device)	1466	1246	32.26	33.23	-0.98	-3.62	1.67	-3.20	1.25
	Improvement in walking without rest	1462	1230	25.70	25.64	0.06	-3.01	3.14	-2.52	2.65
	Improvement in using stairs	1412	1177	27.75	28.18	-0.43	-3.73	2.86	-3.20	2.33
	Improvement (less frequent) in physical/emotional problems limiting social activities	1457	1213	47.86	49.97	-2.11	-5.88	1.67	-5.28	1.06
	Improvement (less frequent) in pain limiting regular activities	1459	1229	46.18	44.17	2.02	-1.69	5.72	-1.09	5.13
Functional Decline	Decline in bathing, dressing, using the toilet, or eating	1445	1222	19.48	18.82	0.66	-2.24	3.55	-1.78	3.09
	Decline in planning regular tasks	1473	1241	29.55	29.83	-0.28	-3.33	2.77	-2.83	2.28
	Decline in use of mobility device (less likely to use mobility device)	1466	1246	51.02	48.83	2.19	-0.84	5.22	-0.35	4.74
	Decline in walking without rest	1462	1230	37.81	35.49	2.33	-0.90	5.56	-0.38	5.04
	Decline in using stairs	1412	1177	45.99	44.00	1.98	-1.17	5.14	-0.66	4.63
	Decline (more frequent) in physical/emotional problems limiting social activities	1457	1213	27.39	25.93	1.46	-1.90	4.82	-1.36	4.28
	Decline (more frequent) in pain limiting regular activities	1459	1229	21.81	23.70	-1.89	-5.06	1.27	-4.55	0.76
Overall Health	Q9/10 - Composite Depression Indicator	1460	1236	25.61	27.71	-2.10	-5.27	1.07	-4.76	0.56
	Q18 - In general, how would you rate your physical health?	1515	1272	37.29	33.68	3.61	0.20	7.02	0.75	6.47
	Q19 - In general, how would you rate your mental health?	1516	1272	74.54	72.39	2.15	-1.12	5.43	-0.59	4.90

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Care Experience	Q20 - Conflicting advice from medical staff about your treatment	1534	1266	64.89	65.79	-0.90	-4.73	2.93	-4.11	2.31
	Q21 - Services appropriate for the level of care you needed	1548	1272	53.61	56.98	-3.37	-7.35	0.60	-6.71	-0.04
	Q23 - Medical staff spoke in preferred language	1561	1289	92.74	89.98	2.76	0.43	5.09	0.81	4.71
	Q24 - Discharged at the right time	1533	1268	86.16	87.78	-1.63	-4.41	1.16	-3.96	0.71
	Q25 - Medical staff took your preferences into account in deciding what health care services you should have after you left the hospital	1350	1089	91.35	92.40	-1.05	-3.26	1.16	-2.90	0.80
	Q27 - Good understanding of how to take care of self before going home	1356	1092	94.82	95.26	-0.44	-2.28	1.40	-1.98	1.11
	Q28 - Medical staff clearly explained how to take medications before going home	1315	1084	93.52	94.21	-0.68	-2.67	1.30	-2.35	0.98
	Q29 - Medical staff clearly explained what follow-up appointments or treatments would be needed before going home	1302	1056	94.76	94.96	-0.20	-2.14	1.75	-1.83	1.44
	Q30 - Able to manage your health needs since returning home	1333	1091	94.93	96.08	-1.15	-2.91	0.61	-2.63	0.32
Overall Satisfaction	Q31 - Overall satisfaction with recovery since leaving hospital	1467	1215	60.57	60.67	-0.10	-4.09	3.89	-3.45	3.25

Source: Abt Associates analysis of BPCI Beneficiary Survey responses.

Notes: All responses were weighted for non-response and sampling design, and estimates were risk-adjusted for beneficiary- and hospital-level characteristics.

Exhibit I.35: Beneficiary Survey Outcomes: Acute Myocardial Infarction, Model 2 PGP, Waves 9-11

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Improvement	Improvement in bathing, dressing, using the toilet, or eating	484	427	69.23	66.57	2.66	-2.19	7.50	-1.41	6.72
	Improvement in planning regular tasks	487	433	57.86	51.89	5.96	0.79	11.14	1.63	10.30
	Improvement in use of mobility device (less likely to use mobility device)	489	434	47.80	46.09	1.71	-2.55	5.98	-1.86	5.29
	Improvement in walking without rest	485	428	35.45	36.36	-0.91	-5.81	3.99	-5.02	3.20
	Improvement in using stairs	470	416	38.87	33.44	5.43	0.34	10.51	1.16	9.69
	Improvement (less frequent) in physical/emotional problems limiting social activities	481	425	52.24	53.23	-0.99	-6.88	4.90	-5.93	3.95
	Improvement (less frequent) in pain limiting regular activities	477	430	44.92	45.10	-0.18	-6.14	5.77	-5.18	4.81
Functional Decline	Decline in bathing, dressing, using the toilet, or eating	484	427	15.80	20.22	-4.42	-8.80	-0.04	-8.10	-0.75
	Decline in planning regular tasks	487	433	24.78	31.58	-6.80	-11.84	-1.76	-11.02	-2.57
	Decline in use of mobility device (less likely to use mobility device)	489	434	38.15	41.44	-3.29	-8.33	1.75	-7.52	0.94
	Decline in walking without rest	485	428	30.86	32.67	-1.82	-6.61	2.98	-5.84	2.20
	Decline in using stairs	470	416	32.82	39.80	-6.97	-11.95	-1.99	-11.15	-2.80
	Decline (more frequent) in physical/emotional problems limiting social activities	481	425	24.93	25.47	-0.54	-6.12	5.03	-5.22	4.13
	Decline (more frequent) in pain limiting regular activities	477	430	24.33	22.36	1.96	-3.50	7.42	-2.62	6.54
Overall Health	Q9/10 - Composite Depression Indicator	487	436	21.77	24.41	-2.64	-7.26	1.98	-6.52	1.23
	Q18 - In general, how would you rate your physical health?	502	444	47.83	46.20	1.64	-3.78	7.05	-2.90	6.18
	Q19 - In general, how would you rate your mental health?	498	443	74.79	74.15	0.64	-4.53	5.80	-3.70	4.97

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Care Experience	Q20 - Conflicting advice from medical staff about your treatment	502	446	67.40	67.90	-0.50	-6.29	5.29	-5.36	4.36
	Q21 - Services appropriate for the level of care you needed	501	450	57.34	63.43	-6.09	-12.06	-0.12	-11.10	-1.08
	Q23 - Medical staff spoke in preferred language	510	453	92.72	92.47	0.25	-3.18	3.67	-2.63	3.12
	Q24 - Discharged at the right time	498	443	88.45	91.11	-2.66	-6.31	0.98	-5.72	0.39
	Q25 - Medical staff took your preferences into account in deciding what health care services you should have after you left the hospital	419	380	94.46	90.34	4.12	0.08	8.15	0.73	7.50
	Q27 - Good understanding of how to take care of self before going home	430	386	94.85	94.98	-0.13	-3.12	2.87	-2.64	2.39
	Q28 - Medical staff clearly explained how to take medications before going home	430	388	93.34	94.39	-1.05	-4.52	2.42	-3.96	1.86
	Q29 - Medical staff clearly explained what follow-up appointments or treatments would be needed before going home	416	371	93.64	92.46	1.17	-2.54	4.88	-1.94	4.28
	Q30 - Able to manage your health needs since returning home	424	379	95.12	96.73	-1.61	-4.40	1.18	-3.95	0.73
Overall Satisfaction	Q31 - Overall satisfaction with recovery since leaving hospital	472	415	70.05	68.27	1.78	-3.97	7.53	-3.05	6.61

Source: Abt Associates analysis of BPCI Beneficiary Survey responses.

Notes: All responses were weighted for non-response and sampling design, and estimates were risk-adjusted for beneficiary- and hospital-level characteristics.

Exhibit I.36: Beneficiary Survey Outcomes: Cardiac Arrhythmia, Model 2 PGP, Waves 9-11

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Improvement	Improvement in bathing, dressing, using the toilet, or eating	697	565	77.24	77.96	-0.72	-4.21	2.77	-3.65	2.21
	Improvement in planning regular tasks	696	566	62.99	60.00	2.99	-1.38	7.37	-0.68	6.67
	Improvement in use of mobility device (less likely to use mobility device)	697	564	53.61	53.65	-0.04	-3.60	3.53	-3.03	2.95
	Improvement in walking without rest	696	561	39.62	44.49	-4.87	-9.44	-0.30	-8.70	-1.04
	Improvement in using stairs	672	559	41.01	42.35	-1.34	-5.81	3.13	-5.09	2.41
	Improvement (less frequent) in physical/emotional problems limiting social activities	693	570	55.90	60.12	-4.22	-9.29	0.86	-8.47	0.04
	Improvement (less frequent) in pain limiting regular activities	697	567	49.15	53.73	-4.59	-9.48	0.31	-8.69	-0.48
Functional Decline	Decline in bathing, dressing, using the toilet, or eating	697	565	10.93	10.68	0.25	-2.72	3.23	-2.24	2.75
	Decline in planning regular tasks	696	566	21.53	21.13	0.40	-3.87	4.66	-3.18	3.97
	Decline in use of mobility device (less likely to use mobility device)	697	564	30.45	30.35	0.10	-3.96	4.16	-3.31	3.51
	Decline in walking without rest	696	561	25.75	21.61	4.13	-0.01	8.28	0.66	7.61
	Decline in using stairs	672	559	28.27	29.96	-1.69	-5.89	2.52	-5.22	1.84
	Decline (more frequent) in physical/emotional problems limiting social activities	693	570	22.07	21.63	0.44	-4.54	5.43	-3.73	4.62
	Decline (more frequent) in pain limiting regular activities	697	567	23.79	20.20	3.60	-0.98	8.17	-0.24	7.43
Overall Health	Q9/10 - Composite Depression Indicator	696	577	18.87	17.97	0.90	-3.28	5.08	-2.60	4.40
	Q18 - In general, how would you rate your physical health?	714	581	57.71	57.88	-0.16	-5.27	4.95	-4.45	4.12
	Q19 - In general, how would you rate your mental health?	714	583	78.82	80.99	-2.17	-6.28	1.94	-5.62	1.28

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Care Experience	Q20 - Conflicting advice from medical staff about your treatment	706	581	72.94	76.21	-3.27	-8.08	1.55	-7.31	0.77
	Q21 - Services appropriate for the level of care you needed	708	583	61.22	62.69	-1.47	-6.75	3.81	-5.90	2.96
	Q23 - Medical staff spoke in preferred language	720	589	94.28	92.53	1.75	-1.01	4.51	-0.56	4.06
	Q24 - Discharged at the right time	704	576	89.94	90.70	-0.76	-4.02	2.50	-3.50	1.98
	Q25 - Medical staff took your preferences into account in deciding what health care services you should have after you left the hospital	598	476	91.69	94.08	-2.38	-5.70	0.94	-5.17	0.40
	Q27 - Good understanding of how to take care of self before going home	621	508	94.04	95.04	-1.00	-3.72	1.71	-3.28	1.28
	Q28 - Medical staff clearly explained how to take medications before going home	621	514	94.43	95.09	-0.67	-3.48	2.15	-3.03	1.69
	Q29 - Medical staff clearly explained what follow-up appointments or treatments would be needed before going home	611	494	95.11	94.68	0.43	-2.26	3.12	-1.82	2.69
	Q30 - Able to manage your health needs since returning home	615	502	96.02	97.79	-1.77	-3.77	0.23	-3.45	-0.09
Overall Satisfaction	Q31 - Overall satisfaction with recovery since leaving hospital	677	549	70.17	67.82	2.36	-2.92	7.63	-2.07	6.78

Source: Abt Associates analysis of BPCI Beneficiary Survey responses.

Notes: All responses were weighted for non-response and sampling design, and estimates were risk-adjusted for beneficiary- and hospital-level characteristics.

Exhibit I.37: Beneficiary Survey Outcomes: Gastrointestinal Hemorrhage, Model 2 PGP, Waves 9-11

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Improvement	Improvement in bathing, dressing, using the toilet, or eating	426	418	74.67	76.38	-1.71	-6.34	2.92	-5.59	2.18
	Improvement in planning regular tasks	436	427	58.62	62.17	-3.55	-8.45	1.35	-7.66	0.56
	Improvement in use of mobility device (less likely to use mobility device)	435	427	53.44	49.17	4.28	-0.07	8.63	0.63	7.92
	Improvement in walking without rest	430	425	40.79	41.26	-0.46	-5.78	4.85	-4.92	4.00
	Improvement in using stairs	421	410	39.33	42.45	-3.12	-8.37	2.13	-7.52	1.28
	Improvement (less frequent) in physical/emotional problems limiting social activities	430	420	54.65	59.24	-4.59	-10.98	1.80	-9.95	0.77
	Improvement (less frequent) in pain limiting regular activities	429	420	49.89	48.70	1.19	-5.47	7.85	-4.40	6.78
Functional Decline	Decline in bathing, dressing, using the toilet, or eating	426	418	13.04	10.21	2.83	-0.81	6.48	-0.22	5.89
	Decline in planning regular tasks	436	427	23.43	19.06	4.36	-0.40	9.13	0.37	8.36
	Decline in use of mobility device (less likely to use mobility device)	435	427	31.90	34.54	-2.64	-7.29	2.01	-6.54	1.26
	Decline in walking without rest	430	425	22.01	21.69	0.31	-4.32	4.95	-3.57	4.20
	Decline in using stairs	421	410	30.80	27.74	3.07	-1.91	8.04	-1.11	7.24
	Decline (more frequent) in physical/emotional problems limiting social activities	430	420	23.54	17.00	6.54	1.28	11.80	2.12	10.96
	Decline (more frequent) in pain limiting regular activities	429	420	20.86	22.34	-1.49	-7.05	4.08	-6.15	3.18
Overall Health	Q9/10 - Composite Depression Indicator	434	428	20.77	22.35	-1.57	-6.89	3.74	-6.03	2.88
	Q18 - In general, how would you rate your physical health?	440	438	54.34	51.58	2.76	-3.36	8.87	-2.37	7.89
	Q19 - In general, how would you rate your mental health?	441	441	77.61	77.93	-0.33	-5.61	4.95	-4.76	4.10

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Care Experience	Q20 - Conflicting advice from medical staff about your treatment	436	442	68.07	71.17	-3.10	-10.12	3.92	-8.99	2.79
	Q21 - Services appropriate for the level of care you needed	441	447	58.04	61.08	-3.04	-10.11	4.03	-8.97	2.89
	Q23 - Medical staff spoke in preferred language	445	447	89.20	92.82	-3.62	-7.96	0.72	-7.26	0.02
	Q24 - Discharged at the right time	446	440	89.71	90.42	-0.71	-4.77	3.35	-4.12	2.70
	Q25 - Medical staff took your preferences into account in deciding what health care services you should have after you left the hospital	365	362	93.74	91.55	2.19	-2.04	6.42	-1.36	5.74
	Q27 - Good understanding of how to take care of self before going home	386	392	95.57	94.97	0.60	-2.86	4.06	-2.31	3.50
	Q28 - Medical staff clearly explained how to take medications before going home	375	376	94.11	93.51	0.59	-2.91	4.09	-2.34	3.53
	Q29 - Medical staff clearly explained what follow-up appointments or treatments would be needed before going home	373	377	94.48	94.93	-0.45	-3.98	3.08	-3.41	2.51
	Q30 - Able to manage your health needs since returning home	373	376	95.12	95.80	-0.67	-3.80	2.45	-3.30	1.95
	Overall Satisfaction	Q31 - Overall satisfaction with recovery since leaving hospital	425	424	67.39	71.34	-3.95	-10.14	2.23	-9.14

Source: Abt Associates analysis of BPCI Beneficiary Survey responses.

Notes: All responses were weighted for non-response and sampling design, and estimates were risk-adjusted for beneficiary- and hospital-level characteristics.

Exhibit I.38: Beneficiary Survey Outcomes: Medical Non-infectious Orthopedic, Model 2 PGP, Waves 9-11

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Improvement	Improvement in bathing, dressing, using the toilet, or eating	480	411	54.81	53.45	1.36	-4.07	6.80	-3.20	5.93
	Improvement in planning regular tasks	486	421	43.92	46.89	-2.96	-8.13	2.21	-7.30	1.38
	Improvement in use of mobility device (less likely to use mobility device)	482	424	28.80	26.70	2.09	-2.21	6.40	-1.52	5.70
	Improvement in walking without rest	475	423	26.66	26.35	0.32	-4.80	5.43	-3.97	4.60
	Improvement in using stairs	473	404	29.42	24.89	4.53	-0.92	9.98	-0.05	9.10
	Improvement (less frequent) in physical/emotional problems limiting social activities	479	412	46.32	39.39	6.93	1.01	12.86	1.96	11.91
	Improvement (less frequent) in pain limiting regular activities	485	423	38.45	37.68	0.77	-5.16	6.70	-4.21	5.74
Functional Decline	Decline in bathing, dressing, using the toilet, or eating	480	411	24.81	24.51	0.30	-4.91	5.51	-4.07	4.67
	Decline in planning regular tasks	486	421	34.19	34.14	0.05	-5.40	5.49	-4.53	4.62
	Decline in use of mobility device (less likely to use mobility device)	482	424	56.52	60.65	-4.14	-9.22	0.95	-8.40	0.13
	Decline in walking without rest	475	423	42.16	44.42	-2.25	-7.91	3.40	-6.99	2.49
	Decline in using stairs	473	404	50.71	54.21	-3.50	-8.95	1.95	-8.07	1.07
	Decline (more frequent) in physical/emotional problems limiting social activities	479	412	33.14	37.20	-4.06	-10.03	1.91	-9.07	0.95
	Decline (more frequent) in pain limiting regular activities	485	423	33.39	35.01	-1.62	-7.63	4.39	-6.66	3.42
Overall Health	Q9/10 - Composite Depression Indicator	487	422	30.54	30.49	0.05	-5.95	6.05	-4.98	5.08
	Q18 - In general, how would you rate your physical health?	496	436	42.87	46.02	-3.15	-9.00	2.69	-8.06	1.75
	Q19 - In general, how would you rate your mental health?	496	434	68.60	72.56	-3.96	-9.48	1.56	-8.59	0.67

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Care Experience	Q20 - Conflicting advice from medical staff about your treatment	495	436	58.67	58.30	0.37	-5.77	6.52	-4.78	5.53
	Q21 - Services appropriate for the level of care you needed	499	437	44.86	43.34	1.51	-4.68	7.71	-3.68	6.71
	Q23 - Medical staff spoke in preferred language	503	441	91.10	91.75	-0.66	-4.25	2.94	-3.67	2.36
	Q24 - Discharged at the right time	497	434	84.91	81.68	3.23	-1.81	8.26	-0.99	7.44
	Q25 - Medical staff took your preferences into account in deciding what health care services you should have after you left the hospital	436	396	90.58	83.76	6.82	2.24	11.40	2.98	10.66
	Q27 - Good understanding of how to take care of self before going home	420	361	91.76	87.29	4.47	0.03	8.91	0.74	8.19
	Q28 - Medical staff clearly explained how to take medications before going home	394	342	92.21	84.07	8.13	3.10	13.17	3.91	12.36
	Q29 - Medical staff clearly explained what follow-up appointments or treatments would be needed before going home	414	339	89.65	89.66	-0.01	-4.58	4.57	-3.85	3.83
	Q30 - Able to manage your health needs since returning home	412	362	92.85	93.17	-0.31	-3.57	2.94	-3.04	2.41
Overall Satisfaction	Q31 - Overall satisfaction with recovery since leaving hospital	470	408	55.91	52.96	2.95	-3.74	9.64	-2.66	8.56

Source: Abt Associates analysis of BPCI Beneficiary Survey responses.

Notes: All responses were weighted for non-response and sampling design, and estimates were risk-adjusted for beneficiary- and hospital-level characteristics.

Exhibit I.39: Beneficiary Survey Outcomes: Hip & Femur Procedures except Major Joint, Model 2 PGP, Waves 9-11

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Improvement	Improvement in bathing, dressing, using the toilet, or eating	731	652	51.14	44.24	6.90	2.19	11.60	2.95	10.85
	Improvement in planning regular tasks	739	646	39.38	36.13	3.25	-1.42	7.92	-0.66	7.17
	Improvement in use of mobility device (less likely to use mobility device)	746	647	10.78	11.15	-0.37	-3.39	2.65	-2.90	2.17
	Improvement in walking without rest	732	633	13.73	14.00	-0.26	-3.63	3.10	-3.09	2.56
	Improvement in using stairs	714	610	15.88	15.87	0.02	-3.70	3.73	-3.10	3.13
	Improvement (less frequent) in physical/emotional problems limiting social activities	728	640	40.34	36.42	3.92	-1.02	8.87	-0.23	8.07
	Improvement (less frequent) in pain limiting regular activities	728	640	31.02	25.45	5.57	1.22	9.92	1.92	9.22
Functional Decline	Decline in bathing, dressing, using the toilet, or eating	731	652	36.29	43.07	-6.79	-11.87	-1.70	-11.05	-2.52
	Decline in planning regular tasks	739	646	45.64	50.82	-5.18	-9.98	-0.38	-9.21	-1.16
	Decline in use of mobility device (less likely to use mobility device)	746	647	84.33	82.54	1.79	-1.92	5.49	-1.32	4.89
	Decline in walking without rest	732	633	73.22	70.21	3.00	-1.65	7.66	-0.90	6.91
	Decline in using stairs	714	610	72.69	73.30	-0.62	-5.04	3.81	-4.32	3.09
	Decline (more frequent) in physical/emotional problems limiting social activities	728	640	44.34	47.42	-3.07	-8.56	2.42	-7.68	1.53
	Decline (more frequent) in pain limiting regular activities	728	640	45.55	51.53	-5.98	-11.16	-0.80	-10.32	-1.63
Overall Health	Q9/10 - Composite Depression Indicator	732	633	25.13	26.91	-1.77	-5.75	2.21	-5.11	1.57
	Q18 - In general, how would you rate your physical health?	754	659	56.34	56.50	-0.16	-4.65	4.33	-3.93	3.60
	Q19 - In general, how would you rate your mental health?	755	661	72.39	71.30	1.09	-2.69	4.88	-2.08	4.27

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Care Experience	Q20 - Conflicting advice from medical staff about your treatment	748	664	66.16	67.79	-1.64	-6.41	3.14	-5.64	2.37
	Q21 - Services appropriate for the level of care you needed	751	665	53.78	52.88	0.89	-4.21	6.00	-3.39	5.18
	Q23 - Medical staff spoke in preferred language	759	668	93.34	93.03	0.30	-2.56	3.17	-2.10	2.71
	Q24 - Discharged at the right time	759	655	88.09	88.13	-0.04	-3.44	3.37	-2.90	2.82
	Q25 - Medical staff took your preferences into account in deciding what health care services you should have after you left the hospital	718	630	92.27	93.74	-1.46	-4.18	1.26	-3.75	0.82
	Q27 - Good understanding of how to take care of self before going home	612	556	93.14	94.93	-1.79	-4.51	0.94	-4.07	0.50
	Q28 - Medical staff clearly explained how to take medications before going home	574	512	90.88	91.82	-0.94	-4.60	2.72	-4.01	2.13
	Q29 - Medical staff clearly explained what follow-up appointments or treatments would be needed before going home	590	514	89.78	91.79	-2.01	-5.67	1.64	-5.08	1.05
	Q30 - Able to manage your health needs since returning home	596	527	95.68	95.18	0.50	-1.93	2.92	-1.54	2.53
Overall Satisfaction	Q31 - Overall satisfaction with recovery since leaving hospital	714	632	58.32	57.69	0.63	-4.23	5.50	-3.45	4.71

Source: Abt Associates analysis of BPCI Beneficiary Survey responses.

Notes: All responses were weighted for non-response and sampling design, and estimates were risk-adjusted for beneficiary- and hospital-level characteristics.

Exhibit I.40: Beneficiary Survey Outcomes: Sepsis, Model 2 PGP, Waves 9-11

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Improvement	Improvement in bathing, dressing, using the toilet, or eating	2070	1328	62.51	62.40	0.11	-2.72	2.95	-2.27	2.50
	Improvement in planning regular tasks	2114	1360	48.75	50.50	-1.75	-4.50	1.00	-4.05	0.56
	Improvement in use of mobility device (less likely to use mobility device)	2123	1360	42.30	43.98	-1.68	-4.14	0.77	-3.75	0.38
	Improvement in walking without rest	2077	1344	35.76	34.82	0.94	-1.95	3.83	-1.49	3.37
	Improvement in using stairs	2024	1294	34.67	35.15	-0.48	-3.40	2.44	-2.93	1.97
	Improvement (less frequent) in physical/emotional problems limiting social activities	2088	1324	52.52	51.34	1.19	-2.27	4.65	-1.72	4.09
	Improvement (less frequent) in pain limiting regular activities	2083	1329	46.25	45.65	0.60	-2.71	3.91	-2.17	3.38
Functional Decline	Decline in bathing, dressing, using the toilet, or eating	2070	1328	21.76	20.53	1.22	-1.22	3.67	-0.82	3.27
	Decline in planning regular tasks	2114	1360	32.11	31.04	1.07	-1.43	3.57	-1.03	3.17
	Decline in use of mobility device (less likely to use mobility device)	2123	1360	43.86	41.69	2.17	-0.49	4.83	-0.06	4.40
	Decline in walking without rest	2077	1344	37.10	35.83	1.27	-1.48	4.02	-1.04	3.58
	Decline in using stairs	2024	1294	42.18	41.08	1.10	-1.70	3.91	-1.25	3.46
	Decline (more frequent) in physical/emotional problems limiting social activities	2088	1324	29.22	27.66	1.56	-1.65	4.77	-1.14	4.25
	Decline (more frequent) in pain limiting regular activities	2083	1329	26.32	26.76	-0.44	-3.47	2.59	-2.98	2.10
Overall Health	Q9/10 - Composite Depression Indicator	2098	1345	26.58	27.10	-0.53	-3.52	2.46	-3.04	1.98
	Q18 - In general, how would you rate your physical health?	2176	1377	44.44	43.76	0.68	-2.50	3.86	-1.99	3.35
	Q19 - In general, how would you rate your mental health?	2175	1385	71.50	71.17	0.33	-2.59	3.25	-2.12	2.78

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Care Experience	Q20 - Conflicting advice from medical staff about your treatment	2156	1386	65.71	66.79	-1.08	-4.65	2.49	-4.07	1.91
	Q21 - Services appropriate for the level of care you needed	2170	1386	54.53	57.35	-2.82	-6.38	0.75	-5.81	0.17
	Q23 - Medical staff spoke in preferred language	2195	1407	91.77	91.37	0.40	-1.73	2.53	-1.38	2.19
	Q24 - Discharged at the right time	2161	1388	84.73	87.59	-2.86	-5.30	-0.41	-4.91	-0.80
	Q25 - Medical staff took your preferences into account in deciding what health care services you should have after you left the hospital	1858	1203	90.93	89.53	1.40	-0.89	3.69	-0.52	3.32
	Q27 - Good understanding of how to take care of self before going home	1834	1172	93.32	93.15	0.18	-1.98	2.34	-1.64	1.99
	Q28 - Medical staff clearly explained how to take medications before going home	1778	1144	92.44	93.40	-0.96	-3.10	1.18	-2.76	0.83
	Q29 - Medical staff clearly explained what follow-up appointments or treatments would be needed before going home	1755	1135	92.81	94.03	-1.22	-3.28	0.85	-2.95	0.51
	Q30 - Able to manage your health needs since returning home	1807	1157	94.52	94.72	-0.20	-1.95	1.55	-1.67	1.27
Overall Satisfaction	Q31 - Overall satisfaction with recovery since leaving hospital	2061	1306	63.83	67.07	-3.24	-6.76	0.28	-6.20	-0.29

Source: Abt Associates analysis of BPCI Beneficiary Survey responses.

Notes: All responses were weighted for non-response and sampling design, and estimates were risk-adjusted for beneficiary- and hospital-level characteristics.

Exhibit I.41: Beneficiary Survey Outcomes: Simple Pneumonia and Respiratory Infections, Model 2 PGP, Waves 9-11

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Improvement	Improvement in bathing, dressing, using the toilet, or eating	1332	1205	62.73	63.09	-0.37	-3.38	2.64	-2.89	2.16
	Improvement in planning regular tasks	1363	1213	47.85	50.18	-2.33	-5.47	0.81	-4.97	0.30
	Improvement in use of mobility device (less likely to use mobility device)	1356	1216	41.80	43.58	-1.77	-4.49	0.94	-4.05	0.51
	Improvement in walking without rest	1341	1192	33.11	33.63	-0.52	-3.89	2.86	-3.35	2.31
	Improvement in using stairs	1274	1152	32.28	34.07	-1.79	-5.60	2.03	-4.99	1.42
	Improvement (less frequent) in physical/emotional problems limiting social activities	1324	1199	48.80	52.17	-3.36	-7.24	0.51	-6.62	-0.11
	Improvement (less frequent) in pain limiting regular activities	1329	1185	48.36	50.28	-1.92	-6.11	2.27	-5.43	1.60
Functional Decline	Decline in bathing, dressing, using the toilet, or eating	1332	1205	20.33	19.68	0.65	-1.89	3.19	-1.48	2.78
	Decline in planning regular tasks	1363	1213	32.84	31.40	1.44	-1.53	4.42	-1.05	3.94
	Decline in use of mobility device (less likely to use mobility device)	1356	1216	45.09	42.75	2.33	-0.52	5.19	-0.06	4.73
	Decline in walking without rest	1341	1192	32.81	34.32	-1.51	-4.81	1.80	-4.28	1.27
	Decline in using stairs	1274	1152	39.06	40.91	-1.85	-4.85	1.15	-4.36	0.67
	Decline (more frequent) in physical/emotional problems limiting social activities	1324	1199	27.83	24.71	3.11	-0.40	6.62	0.17	6.05
	Decline (more frequent) in pain limiting regular activities	1329	1185	22.89	20.84	2.05	-1.38	5.48	-0.83	4.93
Overall Health	Q9/10 - Composite Depression Indicator	1341	1204	25.64	24.28	1.36	-2.08	4.79	-1.52	4.24
	Q18 - In general, how would you rate your physical health?	1387	1233	47.07	48.15	-1.08	-4.93	2.76	-4.31	2.14
	Q19 - In general, how would you rate your mental health?	1384	1233	70.47	69.60	0.86	-2.55	4.27	-2.00	3.72

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Care Experience	Q20 - Conflicting advice from medical staff about your treatment	1405	1236	67.91	69.90	-1.99	-5.92	1.95	-5.29	1.32
	Q21 - Services appropriate for the level of care you needed	1407	1237	53.87	57.89	-4.02	-8.33	0.29	-7.63	-0.41
	Q23 - Medical staff spoke in preferred language	1415	1250	90.91	91.49	-0.58	-2.92	1.77	-2.55	1.39
	Q24 - Discharged at the right time	1391	1239	87.04	87.40	-0.36	-3.10	2.39	-2.66	1.94
	Q25 - Medical staff took your preferences into account in deciding what health care services you should have after you left the hospital	1222	1061	90.71	92.92	-2.21	-4.66	0.23	-4.26	-0.16
	Q27 - Good understanding of how to take care of self before going home	1197	1071	93.94	96.12	-2.18	-4.15	-0.20	-3.83	-0.52
	Q28 - Medical staff clearly explained how to take medications before going home	1135	1027	92.19	95.49	-3.30	-5.49	-1.11	-5.14	-1.46
	Q29 - Medical staff clearly explained what follow-up appointments or treatments would be needed before going home	1115	1008	94.67	96.28	-1.61	-3.48	0.26	-3.18	-0.04
	Q30 - Able to manage your health needs since returning home	1150	1034	95.04	96.78	-1.74	-3.55	0.08	-3.26	-0.21
Overall Satisfaction	Q31 - Overall satisfaction with recovery since leaving hospital	1321	1181	66.86	68.48	-1.62	-5.54	2.31	-4.91	1.68

Source: Abt Associates analysis of BPCI Beneficiary Survey responses.

Notes: All responses were weighted for non-response and sampling design, and estimates were risk-adjusted for beneficiary- and hospital-level characteristics.

Exhibit I.42: Beneficiary Survey Outcomes: Other Respiratory, Model 2 PGP, Waves 9-11

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Improvement	Improvement in bathing, dressing, using the toilet, or eating	960	838	60.23	61.63	-1.39	-5.39	2.61	-4.75	1.96
	Improvement in planning regular tasks	958	849	47.49	48.97	-1.48	-5.31	2.35	-4.70	1.73
	Improvement in use of mobility device (less likely to use mobility device)	954	846	37.55	40.25	-2.70	-5.74	0.34	-5.25	-0.15
	Improvement in walking without rest	945	842	24.15	26.16	-2.01	-5.54	1.52	-4.97	0.96
	Improvement in using stairs	929	811	25.02	27.46	-2.44	-6.20	1.32	-5.60	0.71
	Improvement (less frequent) in physical/emotional problems limiting social activities	958	845	43.77	46.00	-2.23	-6.48	2.03	-5.79	1.34
	Improvement (less frequent) in pain limiting regular activities	960	843	42.63	43.58	-0.95	-5.48	3.57	-4.75	2.84
Functional Decline	Decline in bathing, dressing, using the toilet, or eating	960	838	19.75	16.97	2.78	-0.57	6.14	-0.03	5.60
	Decline in planning regular tasks	958	849	28.16	28.18	-0.02	-3.79	3.75	-3.18	3.14
	Decline in use of mobility device (less likely to use mobility device)	954	846	44.57	42.14	2.43	-1.03	5.90	-0.48	5.34
	Decline in walking without rest	945	842	38.30	35.18	3.11	-0.65	6.88	-0.05	6.27
	Decline in using stairs	929	811	46.72	42.90	3.82	0.09	7.55	0.69	6.95
	Decline (more frequent) in physical/emotional problems limiting social activities	958	845	30.24	30.79	-0.55	-4.47	3.36	-3.84	2.73
	Decline (more frequent) in pain limiting regular activities	960	843	27.10	26.61	0.50	-3.33	4.33	-2.72	3.71
Overall Health	Q9/10 - Composite Depression Indicator	972	851	30.14	30.25	-0.11	-4.21	3.99	-3.55	3.33
	Q18 - In general, how would you rate your physical health?	978	871	32.56	34.10	-1.54	-5.53	2.44	-4.89	1.80
	Q19 - In general, how would you rate your mental health?	982	866	70.23	72.03	-1.80	-5.67	2.07	-5.04	1.45

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Care Experience	Q20 - Conflicting advice from medical staff about your treatment	990	865	62.68	66.19	-3.50	-8.09	1.09	-7.35	0.35
	Q21 - Services appropriate for the level of care you needed	987	866	53.49	59.64	-6.15	-10.44	-1.86	-9.75	-2.55
	Q23 - Medical staff spoke in preferred language	993	876	93.18	93.24	-0.07	-2.54	2.41	-2.14	2.01
	Q24 - Discharged at the right time	981	860	84.23	86.54	-2.31	-5.58	0.96	-5.06	0.44
	Q25 - Medical staff took your preferences into account in deciding what health care services you should have after you left the hospital	844	751	90.61	92.25	-1.64	-4.50	1.22	-4.04	0.76
	Q27 - Good understanding of how to take care of self before going home	866	775	93.45	94.21	-0.76	-3.20	1.68	-2.81	1.29
	Q28 - Medical staff clearly explained how to take medications before going home	825	761	91.58	92.66	-1.08	-3.80	1.65	-3.36	1.21
	Q29 - Medical staff clearly explained what follow-up appointments or treatments would be needed before going home	829	736	92.31	93.40	-1.09	-3.77	1.60	-3.34	1.16
	Q30 - Able to manage your health needs since returning home	851	753	95.24	96.00	-0.75	-2.86	1.35	-2.52	1.01
Overall Satisfaction	Q31 - Overall satisfaction with recovery since leaving hospital	937	829	60.32	61.36	-1.04	-5.49	3.40	-4.77	2.68

Source: Abt Associates analysis of BPCI Beneficiary Survey responses.

Notes: All responses were weighted for non-response and sampling design, and estimates were risk-adjusted for beneficiary- and hospital-level characteristics.

Exhibit I.43: Beneficiary Survey Outcomes: Renal Failure, Model 2 PGP, Waves 9-11

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Improvement	Improvement in bathing, dressing, using the toilet, or eating	523	536	58.85	60.75	-1.90	-6.95	3.15	-6.14	2.33
	Improvement in planning regular tasks	530	541	45.35	46.90	-1.55	-6.59	3.50	-5.78	2.69
	Improvement in use of mobility device (less likely to use mobility device)	532	546	34.51	38.37	-3.86	-8.31	0.59	-7.59	-0.12
	Improvement in walking without rest	521	534	34.69	31.30	3.39	-1.89	8.66	-1.04	7.81
	Improvement in using stairs	515	523	31.95	28.37	3.59	-1.37	8.54	-0.57	7.74
	Improvement (less frequent) in physical/emotional problems limiting social activities	518	542	50.95	49.24	1.70	-4.41	7.82	-3.42	6.83
	Improvement (less frequent) in pain limiting regular activities	519	537	47.66	41.93	5.73	-0.02	11.49	0.91	10.56
Functional Decline	Decline in bathing, dressing, using the toilet, or eating	523	536	20.98	21.34	-0.36	-4.75	4.03	-4.05	3.32
	Decline in planning regular tasks	530	541	33.12	31.35	1.77	-3.23	6.78	-2.43	5.97
	Decline in use of mobility device (less likely to use mobility device)	532	546	51.48	47.98	3.50	-1.18	8.19	-0.43	7.43
	Decline in walking without rest	521	534	34.06	37.86	-3.80	-9.08	1.49	-8.23	0.64
	Decline in using stairs	515	523	40.22	45.07	-4.85	-9.30	-0.40	-8.59	-1.12
	Decline (more frequent) in physical/emotional problems limiting social activities	518	542	26.41	29.55	-3.15	-8.65	2.36	-7.76	1.47
	Decline (more frequent) in pain limiting regular activities	519	537	23.89	27.22	-3.32	-8.24	1.60	-7.45	0.80
Overall Health	Q9/10 - Composite Depression Indicator	530	535	30.19	28.89	1.30	-4.45	7.05	-3.52	6.12
	Q18 - In general, how would you rate your physical health?	541	555	40.39	40.84	-0.45	-5.76	4.87	-4.91	4.01
	Q19 - In general, how would you rate your mental health?	542	558	67.38	70.58	-3.21	-8.02	1.60	-7.24	0.83

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Care Experience	Q20 - Conflicting advice from medical staff about your treatment	540	555	57.61	64.39	-6.78	-13.17	-0.39	-12.14	-1.42
	Q21 - Services appropriate for the level of care you needed	549	554	55.49	55.10	0.39	-5.86	6.65	-4.85	5.64
	Q23 - Medical staff spoke in preferred language	547	564	90.39	90.72	-0.33	-4.38	3.73	-3.73	3.08
	Q24 - Discharged at the right time	546	556	83.77	85.72	-1.95	-6.52	2.62	-5.79	1.88
	Q25 - Medical staff took your preferences into account in deciding what health care services you should have after you left the hospital	471	477	89.45	90.85	-1.40	-5.72	2.92	-5.02	2.22
	Q27 - Good understanding of how to take care of self before going home	463	479	93.67	92.46	1.20	-2.57	4.97	-1.96	4.37
	Q28 - Medical staff clearly explained how to take medications before going home	449	456	92.34	92.50	-0.16	-3.83	3.51	-3.24	2.91
	Q29 - Medical staff clearly explained what follow-up appointments or treatments would be needed before going home	441	454	91.87	91.95	-0.08	-4.06	3.91	-3.42	3.27
	Q30 - Able to manage your health needs since returning home	447	463	93.46	95.17	-1.71	-4.89	1.48	-4.37	0.96
Overall Satisfaction	Q31 - Overall satisfaction with recovery since leaving hospital	513	532	60.79	60.20	0.59	-5.32	6.49	-4.37	5.54

Source: Abt Associates analysis of BPCI Beneficiary Survey responses.

Notes: All responses were weighted for non-response and sampling design, and estimates were risk-adjusted for beneficiary- and hospital-level characteristics.

Exhibit I.44: Beneficiary Survey Outcomes: Cellulitis, Model 2 PGP, Waves 9-11

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Improvement	Improvement in bathing, dressing, using the toilet, or eating	506	448	62.80	64.49	-1.69	-6.92	3.55	-6.08	2.70
	Improvement in planning regular tasks	511	452	53.17	57.14	-3.97	-8.97	1.04	-8.17	0.23
	Improvement in use of mobility device (less likely to use mobility device)	508	453	38.40	39.54	-1.14	-5.30	3.02	-4.63	2.34
	Improvement in walking without rest	499	440	31.90	34.09	-2.18	-7.30	2.93	-6.47	2.11
	Improvement in using stairs	498	428	32.11	32.21	-0.10	-5.04	4.84	-4.24	4.04
	Improvement (less frequent) in physical/emotional problems limiting social activities	506	445	49.38	52.72	-3.34	-9.22	2.54	-8.27	1.59
	Improvement (less frequent) in pain limiting regular activities	513	449	45.52	44.29	1.23	-4.82	7.29	-3.85	6.32
Functional Decline	Decline in bathing, dressing, using the toilet, or eating	506	448	17.29	14.85	2.44	-1.76	6.63	-1.08	5.96
	Decline in planning regular tasks	511	452	23.34	20.31	3.03	-1.76	7.82	-0.99	7.04
	Decline in use of mobility device (less likely to use mobility device)	508	453	47.39	42.63	4.76	0.37	9.15	1.08	8.44
	Decline in walking without rest	499	440	34.04	29.99	4.05	-1.03	9.12	-0.21	8.30
	Decline in using stairs	498	428	40.68	39.46	1.21	-3.19	5.62	-2.48	4.91
	Decline (more frequent) in physical/emotional problems limiting social activities	506	445	27.98	27.06	0.92	-4.77	6.61	-3.85	5.69
	Decline (more frequent) in pain limiting regular activities	513	449	24.52	24.88	-0.36	-5.60	4.88	-4.75	4.04
Overall Health	Q9/10 - Composite Depression Indicator	515	444	26.35	24.62	1.73	-3.48	6.94	-2.64	6.10
	Q18 - In general, how would you rate your physical health?	526	464	47.37	44.38	2.99	-2.48	8.46	-1.60	7.58
	Q19 - In general, how would you rate your mental health?	522	466	75.30	74.23	1.07	-4.20	6.34	-3.35	5.49

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Care Experience	Q20 - Conflicting advice from medical staff about your treatment	519	455	64.49	72.50	-8.00	-14.01	-2.00	-13.04	-2.97
	Q21 - Services appropriate for the level of care you needed	519	462	53.00	55.90	-2.89	-9.25	3.46	-8.23	2.44
	Q23 - Medical staff spoke in preferred language	522	462	93.04	92.33	0.71	-2.98	4.40	-2.38	3.81
	Q24 - Discharged at the right time	517	458	85.33	88.24	-2.91	-7.39	1.57	-6.67	0.84
	Q25 - Medical staff took your preferences into account in deciding what health care services you should have after you left the hospital	447	384	89.63	91.07	-1.45	-5.65	2.76	-4.97	2.08
	Q27 - Good understanding of how to take care of self before going home	462	387	92.53	91.26	1.27	-2.70	5.25	-2.06	4.61
	Q28 - Medical staff clearly explained how to take medications before going home	451	378	92.25	92.17	0.08	-3.90	4.06	-3.26	3.42
	Q29 - Medical staff clearly explained what follow-up appointments or treatments would be needed before going home	447	379	91.25	91.13	0.12	-4.04	4.29	-3.37	3.62
	Q30 - Able to manage your health needs since returning home	453	390	95.56	92.66	2.90	-0.49	6.29	0.05	5.74
Overall Satisfaction	Q31 - Overall satisfaction with recovery since leaving hospital	498	438	63.47	61.27	2.20	-4.10	8.50	-3.08	7.49

Source: Abt Associates analysis of BPCI Beneficiary Survey responses.

Notes: All responses were weighted for non-response and sampling design, and estimates were risk-adjusted for beneficiary- and hospital-level characteristics.

Exhibit I.45: Beneficiary Survey Outcomes: Esophagitis, Gastroenteritis and Other Digestive Disorders, Model 2 PGP, Waves 9-11

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Improvement	Improvement in bathing, dressing, using the toilet, or eating	587	518	74.19	72.66	1.53	-2.79	5.86	-2.09	5.16
	Improvement in planning regular tasks	600	520	61.97	59.57	2.40	-2.26	7.05	-1.51	6.30
	Improvement in use of mobility device (less likely to use mobility device)	598	520	56.23	54.11	2.13	-1.79	6.04	-1.16	5.41
	Improvement in walking without rest	594	514	45.96	42.82	3.13	-1.66	7.93	-0.89	7.15
	Improvement in using stairs	576	501	42.97	41.83	1.14	-4.11	6.40	-3.26	5.55
	Improvement (less frequent) in physical/emotional problems limiting social activities	585	511	53.19	53.73	-0.55	-6.31	5.22	-5.38	4.29
	Improvement (less frequent) in pain limiting regular activities	592	519	48.60	46.80	1.79	-4.25	7.83	-3.27	6.86
Functional Decline	Decline in bathing, dressing, using the toilet, or eating	587	518	10.95	10.12	0.83	-2.33	3.98	-1.82	3.48
	Decline in planning regular tasks	600	520	19.28	20.56	-1.28	-5.25	2.68	-4.61	2.04
	Decline in use of mobility device (less likely to use mobility device)	598	520	29.43	29.53	-0.10	-3.97	3.77	-3.35	3.14
	Decline in walking without rest	594	514	21.50	23.81	-2.31	-6.54	1.91	-5.86	1.23
	Decline in using stairs	576	501	27.04	27.25	-0.21	-4.59	4.18	-3.88	3.47
	Decline (more frequent) in physical/emotional problems limiting social activities	585	511	25.53	22.74	2.79	-2.59	8.16	-1.72	7.30
	Decline (more frequent) in pain limiting regular activities	592	519	22.71	25.76	-3.06	-8.16	2.05	-7.33	1.22
Overall Health	Q9/10 - Composite Depression Indicator	594	515	23.43	24.41	-0.97	-6.17	4.23	-5.33	3.39
	Q18 - In general, how would you rate your physical health?	615	532	51.91	52.30	-0.39	-5.81	5.02	-4.94	4.15
	Q19 - In general, how would you rate your mental health?	615	530	75.27	74.01	1.26	-3.76	6.28	-2.95	5.47

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Care Experience	Q20 - Conflicting advice from medical staff about your treatment	615	526	67.24	66.33	0.92	-4.83	6.67	-3.90	5.74
	Q21 - Services appropriate for the level of care you needed	614	528	54.63	56.83	-2.20	-8.14	3.74	-7.18	2.78
	Q23 - Medical staff spoke in preferred language	620	531	90.74	90.93	-0.19	-4.09	3.72	-3.46	3.09
	Q24 - Discharged at the right time	606	526	82.79	82.56	0.23	-4.47	4.92	-3.71	4.16
	Q25 - Medical staff took your preferences into account in deciding what health care services you should have after you left the hospital	498	420	87.83	86.57	1.25	-3.46	5.96	-2.70	5.21
	Q27 - Good understanding of how to take care of self before going home	551	468	92.09	90.02	2.07	-1.88	6.02	-1.24	5.39
	Q28 - Medical staff clearly explained how to take medications before going home	526	462	93.62	89.35	4.27	0.68	7.86	1.26	7.28
	Q29 - Medical staff clearly explained what follow-up appointments or treatments would be needed before going home	523	459	93.56	88.59	4.97	1.05	8.89	1.68	8.26
	Q30 - Able to manage your health needs since returning home	533	453	91.40	92.22	-0.82	-4.67	3.03	-4.05	2.41
Overall Satisfaction	Q31 - Overall satisfaction with recovery since leaving hospital	568	505	63.03	61.05	1.99	-3.60	7.57	-2.70	6.67

Source: Abt Associates analysis of BPCI Beneficiary Survey responses.

Notes: All responses were weighted for non-response and sampling design, and estimates were risk-adjusted for beneficiary- and hospital-level characteristics.

Exhibit I.46: Beneficiary Survey Outcomes: Esophagitis, Gastroenteritis and Other Digestive Disorders, Model 2 PGP, Waves 9-11

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Improvement	Improvement in bathing, dressing, using the toilet, or eating	587	518	74.19	72.66	1.53	-2.79	5.86	-2.09	5.16
	Improvement in planning regular tasks	600	520	61.97	59.57	2.40	-2.26	7.05	-1.51	6.30
	Improvement in use of mobility device (less likely to use mobility device)	598	520	56.23	54.11	2.13	-1.79	6.04	-1.16	5.41
	Improvement in walking without rest	594	514	45.96	42.82	3.13	-1.66	7.93	-0.89	7.15
	Improvement in using stairs	576	501	42.97	41.83	1.14	-4.11	6.40	-3.26	5.55
	Improvement (less frequent) in physical/emotional problems limiting social activities	585	511	53.19	53.73	-0.55	-6.31	5.22	-5.38	4.29
	Improvement (less frequent) in pain limiting regular activities	592	519	48.60	46.80	1.79	-4.25	7.83	-3.27	6.86
Functional Decline	Decline in bathing, dressing, using the toilet, or eating	587	518	10.95	10.12	0.83	-2.33	3.98	-1.82	3.48
	Decline in planning regular tasks	600	520	19.28	20.56	-1.28	-5.25	2.68	-4.61	2.04
	Decline in use of mobility device (less likely to use mobility device)	598	520	29.43	29.53	-0.10	-3.97	3.77	-3.35	3.14
	Decline in walking without rest	594	514	21.50	23.81	-2.31	-6.54	1.91	-5.86	1.23
	Decline in using stairs	576	501	27.04	27.25	-0.21	-4.59	4.18	-3.88	3.47
	Decline (more frequent) in physical/emotional problems limiting social activities	585	511	25.53	22.74	2.79	-2.59	8.16	-1.72	7.30
	Decline (more frequent) in pain limiting regular activities	592	519	22.71	25.76	-3.06	-8.16	2.05	-7.33	1.22
Overall Health	Q9/10 - Composite Depression Indicator	594	515	23.43	24.41	-0.97	-6.17	4.23	-5.33	3.39
	Q18 - In general, how would you rate your physical health?	615	532	51.91	52.30	-0.39	-5.81	5.02	-4.94	4.15
	Q19 - In general, how would you rate your mental health?	615	530	75.27	74.01	1.26	-3.76	6.28	-2.95	5.47

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Care Experience	Q20 - Conflicting advice from medical staff about your treatment	615	526	67.24	66.33	0.92	-4.83	6.67	-3.90	5.74
	Q21 - Services appropriate for the level of care you needed	614	528	54.63	56.83	-2.20	-8.14	3.74	-7.18	2.78
	Q23 - Medical staff spoke in preferred language	620	531	90.74	90.93	-0.19	-4.09	3.72	-3.46	3.09
	Q24 - Discharged at the right time	606	526	82.79	82.56	0.23	-4.47	4.92	-3.71	4.16
	Q25 - Medical staff took your preferences into account in deciding what health care services you should have after you left the hospital	498	420	87.83	86.57	1.25	-3.46	5.96	-2.70	5.21
	Q27 - Good understanding of how to take care of self before going home	551	468	92.09	90.02	2.07	-1.88	6.02	-1.24	5.39
	Q28 - Medical staff clearly explained how to take medications before going home	526	462	93.62	89.35	4.27	0.68	7.86	1.26	7.28
	Q29 - Medical staff clearly explained what follow-up appointments or treatments would be needed before going home	523	459	93.56	88.59	4.97	1.05	8.89	1.68	8.26
	Q30 - Able to manage your health needs since returning home	533	453	91.40	92.22	-0.82	-4.67	3.03	-4.05	2.41
Overall Satisfaction	Q31 - Overall satisfaction with recovery since leaving hospital	568	505	63.03	61.05	1.99	-3.60	7.57	-2.70	6.67

Source: Abt Associates analysis of BPCI Beneficiary Survey responses.

Notes: All responses were weighted for non-response and sampling design, and estimates were risk-adjusted for beneficiary- and hospital-level characteristics.

Exhibit I.47: Beneficiary Survey Outcomes: Major Joint Replacement of the Lower Extremity, Model 3 Home Health Agency (HHA), Waves 4-10

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Improvement	Improvement in bathing, dressing, using the toilet, or eating	1059	1135	89.89	88.73	1.17	-1.49	3.83	-1.06	3.40
	Improvement in planning regular tasks	1076	1153	80.44	84.39	-3.95	-7.01	-0.89	-6.51	-1.38
	Improvement in use of mobility device (less likely to use mobility device)	1074	1161	64.20	68.13	-3.94	-8.20	0.33	-7.51	-0.36
	Improvement in walking without rest	1065	1140	67.58	69.77	-2.19	-6.35	1.96	-5.68	1.29
	Improvement in using stairs	1046	1132	63.20	65.81	-2.61	-6.95	1.73	-6.25	1.03
	Improvement (less frequent) in physical/emotional problems limiting social activities	1060	1148	77.28	78.62	-1.34	-5.04	2.36	-4.45	1.77
	Improvement (less frequent) in pain limiting regular activities	1071	1159	79.11	79.78	-0.67	-4.15	2.82	-3.59	2.26
Functional Decline	Decline in bathing, dressing, using the toilet, or eating	1059	1135	5.14	5.37	-0.22	-2.19	1.74	-1.87	1.42
	Decline in planning regular tasks	1076	1153	8.44	7.01	1.43	-0.92	3.79	-0.54	3.41
	Decline in use of mobility device (less likely to use mobility device)	1074	1161	23.92	20.78	3.13	-0.46	6.73	0.12	6.15
	Decline in walking without rest	1065	1140	12.29	12.65	-0.36	-3.09	2.37	-2.65	1.93
	Decline in using stairs	1046	1132	15.42	13.39	2.03	-0.83	4.88	-0.37	4.42
	Decline (more frequent) in physical/emotional problems limiting social activities	1060	1148	11.88	10.15	1.74	-1.00	4.48	-0.56	4.03
	Decline (more frequent) in pain limiting regular activities	1071	1159	9.50	8.83	0.67	-1.84	3.18	-1.43	2.77
Overall Health	Q9/10 - Composite Depression Indicator	1066	1158	11.26	10.09	1.16	-1.60	3.93	-1.16	3.48
	Q18 - In general, how would you rate your physical health?	1084	1168	80.73	84.32	-3.59	-6.77	-0.40	-6.26	-0.91
	Q19 - In general, how would you rate your mental health?	1083	1172	91.10	90.57	0.53	-1.97	3.04	-1.57	2.64

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Care Experience	Q20 - Conflicting advice from medical staff about your treatment	1075	1171	82.44	86.76	-4.32	-7.76	-0.87	-7.21	-1.43
	Q21 - Services appropriate for the level of care you needed	1081	1166	70.41	76.65	-6.24	-10.47	-2.00	-9.79	-2.69
	Q23 - Medical staff spoke in preferred language	1084	1174	95.99	95.23	0.76	-1.00	2.52	-0.71	2.23
	Q24 - Discharged at the right time	1073	1163	92.91	92.85	0.06	-2.38	2.51	-1.99	2.11
	Q25 - Medical staff took your preferences into account in deciding what health care services you should have after you left the hospital	1012	1083	94.81	96.05	-1.24	-3.19	0.71	-2.88	0.40
	Q27 - Good understanding of how to take care of self before going home	1053	1124	95.78	96.97	-1.19	-2.96	0.58	-2.68	0.30
	Q28 - Medical staff clearly explained how to take medications before going home	998	1078	95.31	96.09	-0.77	-2.44	0.90	-2.17	0.63
	Q29 - Medical staff clearly explained what follow-up appointments or treatments would be needed before going home	1001	1086	96.33	96.47	-0.14	-1.85	1.58	-1.58	1.31
	Q30 - Able to manage your health needs since returning home	1012	1096	97.22	97.32	-0.10	-1.54	1.33	-1.31	1.10
Overall Satisfaction	Q31 - Overall satisfaction with recovery since leaving hospital	1031	1112	82.60	82.11	0.49	-3.06	4.04	-2.49	3.47

Source: Abt Associates analysis of BPCI Beneficiary Survey responses.

Notes: All responses were weighted for non-response and sampling design, and estimates were risk-adjusted for beneficiary- and hospital-level characteristics.

Exhibit I.48: Beneficiary Survey Outcomes: Congestive Heart Failure, Model 3 Home Health Agency (HHA), Waves 4-10

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Improvement	Improvement in bathing, dressing, using the toilet, or eating	340	374	46.28	48.15	-1.88	-8.90	5.15	-7.77	4.02
	Improvement in planning regular tasks	349	380	32.99	37.85	-4.86	-11.22	1.50	-10.19	0.47
	Improvement in use of mobility device (less likely to use mobility device)	348	380	19.90	23.22	-3.32	-9.13	2.49	-8.20	1.56
	Improvement in walking without rest	343	376	18.07	20.34	-2.27	-8.34	3.79	-7.36	2.81
	Improvement in using stairs	328	346	23.72	20.04	3.68	-2.76	10.11	-1.72	9.08
	Improvement (less frequent) in physical/emotional problems limiting social activities	334	375	45.36	40.48	4.88	-3.33	13.09	-2.00	11.77
	Improvement (less frequent) in pain limiting regular activities	345	374	38.48	42.93	-4.46	-12.06	3.15	-10.83	1.92
Functional Decline	Decline in bathing, dressing, using the toilet, or eating	340	374	29.55	25.81	3.74	-2.89	10.37	-1.82	9.30
	Decline in planning regular tasks	349	380	40.60	34.68	5.92	-1.18	13.03	-0.04	11.88
	Decline in use of mobility device (less likely to use mobility device)	348	380	62.60	62.78	-0.19	-7.08	6.70	-5.97	5.59
	Decline in walking without rest	343	376	47.73	40.50	7.24	0.47	14.00	1.57	12.91
	Decline in using stairs	328	346	56.64	57.15	-0.51	-6.67	5.64	-5.67	4.65
	Decline (more frequent) in physical/emotional problems limiting social activities	334	375	34.37	32.36	2.01	-5.88	9.90	-4.60	8.63
	Decline (more frequent) in pain limiting regular activities	345	374	29.69	24.46	5.23	-1.84	12.30	-0.70	11.16
Overall Health	Q9/10 - Composite Depression Indicator	343	378	32.95	34.34	-1.39	-9.41	6.63	-8.12	5.33
	Q18 - In general, how would you rate your physical health?	357	388	29.41	30.92	-1.50	-8.56	5.55	-7.42	4.41
	Q19 - In general, how would you rate your mental health?	358	385	62.55	69.14	-6.59	-14.33	1.16	-13.08	-0.09

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Care Experience	Q20 - Conflicting advice from medical staff about your treatment	355	390	62.44	63.49	-1.05	-9.36	7.26	-8.02	5.92
	Q21 - Services appropriate for the level of care you needed	354	392	51.45	55.61	-4.16	-12.08	3.76	-10.80	2.48
	Q23 - Medical staff spoke in preferred language	360	398	82.70	90.87	-8.17	-13.54	-2.80	-12.68	-3.67
	Q24 - Discharged at the right time	358	392	89.41	83.95	5.46	0.03	10.89	0.91	10.01
	Q25 - Medical staff took your preferences into account in deciding what health care services you should have after you left the hospital	306	351	90.87	90.43	0.44	-4.53	5.41	-3.73	4.61
	Q27 - Good understanding of how to take care of self before going home	323	336	95.16	93.32	1.84	-2.51	6.19	-1.81	5.49
	Q28 - Medical staff clearly explained how to take medications before going home	313	338	93.30	92.91	0.39	-4.29	5.07	-3.53	4.31
	Q29 - Medical staff clearly explained what follow-up appointments or treatments would be needed before going home	306	323	92.47	94.01	-1.54	-6.26	3.18	-5.50	2.42
	Q30 - Able to manage your health needs since returning home	321	338	95.64	94.43	1.21	-3.14	5.56	-2.44	4.86
Overall Satisfaction	Q31 - Overall satisfaction with recovery since leaving hospital	340	367	53.22	57.23	-4.01	-11.94	3.92	-10.66	2.64

Source: Abt Associates analysis of BPCI Beneficiary Survey responses.

Notes: All responses were weighted for non-response and sampling design, and estimates were risk-adjusted for beneficiary- and hospital-level characteristics.

Exhibit I.49: Beneficiary Survey Outcomes: Major Joint Replacement of the Lower Extremity, Model 3 Skilled Nursing Facility (SNF), Waves 4-10

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Improvement	Improvement in bathing, dressing, using the toilet, or eating	1584	1587	78.39	77.24	1.14	-1.49	3.78	-1.07	3.36
	Improvement in planning regular tasks	1608	1600	68.73	66.88	1.84	-0.93	4.62	-0.48	4.17
	Improvement in use of mobility device (less likely to use mobility device)	1603	1580	47.84	44.86	2.98	-0.52	6.49	0.04	5.92
	Improvement in walking without rest	1582	1571	51.48	50.16	1.32	-2.15	4.79	-1.60	4.23
	Improvement in using stairs	1549	1535	53.43	51.35	2.08	-1.14	5.29	-0.62	4.78
	Improvement (less frequent) in physical/emotional problems limiting social activities	1584	1586	67.65	67.10	0.55	-2.75	3.85	-2.22	3.32
	Improvement (less frequent) in pain limiting regular activities	1591	1594	70.77	70.33	0.45	-2.59	3.49	-2.10	3.00
Functional Decline	Decline in bathing, dressing, using the toilet, or eating	1584	1587	11.36	12.62	-1.25	-3.51	1.00	-3.15	0.64
	Decline in planning regular tasks	1608	1600	17.04	18.08	-1.05	-3.47	1.38	-3.08	0.99
	Decline in use of mobility device (less likely to use mobility device)	1603	1580	39.75	41.32	-1.57	-4.72	1.58	-4.21	1.07
	Decline in walking without rest	1582	1571	24.66	28.49	-3.83	-6.74	-0.91	-6.27	-1.38
	Decline in using stairs	1549	1535	26.13	27.78	-1.65	-4.30	1.00	-3.88	0.57
	Decline (more frequent) in physical/emotional problems limiting social activities	1584	1586	16.45	17.24	-0.78	-3.49	1.92	-3.05	1.48
	Decline (more frequent) in pain limiting regular activities	1591	1594	12.90	14.10	-1.19	-3.60	1.22	-3.21	0.83
Overall Health	Q9/10 - Composite Depression Indicator	1589	1603	14.30	18.27	-3.96	-6.74	-1.19	-6.29	-1.64
	Q18 - In general, how would you rate your physical health?	1631	1628	73.10	72.03	1.07	-1.89	4.04	-1.42	3.56
	Q19 - In general, how would you rate your mental health?	1635	1618	85.24	83.56	1.69	-0.72	4.10	-0.34	3.71

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Care Experience	Q20 - Conflicting advice from medical staff about your treatment	1599	1617	69.72	70.74	-1.02	-4.33	2.28	-3.80	1.75
	Q21 - Services appropriate for the level of care you needed	1618	1626	54.19	55.25	-1.06	-4.71	2.59	-4.12	2.00
	Q23 - Medical staff spoke in preferred language	1632	1635	92.83	93.54	-0.70	-2.58	1.17	-2.28	0.87
	Q24 - Discharged at the right time	1615	1609	88.75	89.90	-1.15	-3.54	1.24	-3.15	0.85
	Q25 - Medical staff took your preferences into account in deciding what health care services you should have after you left the hospital	1492	1475	90.73	92.08	-1.34	-3.53	0.85	-3.18	0.49
	Q27 - Good understanding of how to take care of self before going home	1514	1491	94.40	94.79	-0.39	-2.23	1.46	-1.93	1.16
	Q28 - Medical staff clearly explained how to take medications before going home	1421	1381	90.07	92.09	-2.03	-4.22	0.17	-3.87	-0.18
	Q29 - Medical staff clearly explained what follow-up appointments or treatments would be needed before going home	1406	1373	91.03	93.59	-2.56	-4.59	-0.54	-4.27	-0.86
	Q30 - Able to manage your health needs since returning home	1463	1392	96.79	96.81	-0.02	-1.40	1.36	-1.18	1.14
Overall Satisfaction	Q31 - Overall satisfaction with recovery since leaving hospital	1551	1552	71.97	70.61	1.36	-1.84	4.56	-1.32	4.04

Source: Abt Associates analysis of BPCI Beneficiary Survey responses.

Notes: All responses were weighted for non-response and sampling design, and estimates were risk-adjusted for beneficiary- and hospital-level characteristics.

**Exhibit I.50: Beneficiary Survey Outcomes: Hip & Femur Procedures Except Major Joint,
Model 3 Skilled Nursing Facility (SNF), Waves 4-9**

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Improvement	Improvement in bathing, dressing, using the toilet, or eating	343	435	47.72	42.73	4.98	-1.45	11.42	-0.41	10.38
	Improvement in planning regular tasks	359	439	36.27	36.51	-0.24	-6.49	6.01	-5.49	5.00
	Improvement in use of mobility device (less likely to use mobility device)	357	436	12.85	9.29	3.55	-1.23	8.33	-0.46	7.56
	Improvement in walking without rest	354	424	15.26	12.64	2.61	-2.65	7.88	-1.80	7.03
	Improvement in using stairs	346	420	18.01	15.17	2.84	-2.27	7.96	-1.45	7.13
	Improvement (less frequent) in physical/emotional problems limiting social activities	352	426	38.23	34.52	3.71	-3.40	10.81	-2.25	9.67
	Improvement (less frequent) in pain limiting regular activities	359	432	30.07	30.25	-0.18	-6.51	6.15	-5.49	5.13
Functional Decline	Decline in bathing, dressing, using the toilet, or eating	343	435	36.54	41.07	-4.54	-11.14	2.07	-10.08	1.01
	Decline in planning regular tasks	359	439	48.02	48.86	-0.84	-7.12	5.44	-6.11	4.43
	Decline in use of mobility device (less likely to use mobility device)	357	436	82.48	86.14	-3.66	-9.12	1.79	-8.24	0.91
	Decline in walking without rest	354	424	66.23	73.51	-7.28	-14.07	-0.48	-12.98	-1.58
	Decline in using stairs	346	420	71.51	74.77	-3.26	-9.80	3.28	-8.74	2.22
	Decline (more frequent) in physical/emotional problems limiting social activities	352	426	48.42	47.82	0.60	-6.67	7.87	-5.50	6.69
	Decline (more frequent) in pain limiting regular activities	359	432	44.14	46.64	-2.49	-9.73	4.74	-8.56	3.57
Overall Health	Q9/10 - Composite Depression Indicator	362	429	24.98	32.37	-7.38	-13.44	-1.33	-12.46	-2.31
	Q18 - In general, how would you rate your physical health?	370	450	57.77	49.55	8.22	1.32	15.13	2.43	14.02
	Q19 - In general, how would you rate your mental health?	368	446	71.34	66.61	4.73	-1.31	10.77	-0.34	9.79

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Care Experience	Q20 - Conflicting advice from medical staff about your treatment	377	454	67.04	60.94	6.10	-0.51	12.71	0.55	11.65
	Q21 - Services appropriate for the level of care you needed	373	456	50.72	45.54	5.18	-2.48	12.83	-1.24	11.60
	Q23 - Medical staff spoke in preferred language	379	459	93.47	91.88	1.59	-1.96	5.13	-1.39	4.56
	Q24 - Discharged at the right time	363	444	86.77	82.16	4.61	-1.02	10.23	-0.11	9.33
	Q25 - Medical staff took your preferences into account in deciding what health care services you should have after you left the hospital	330	394	88.83	87.88	0.95	-4.39	6.29	-3.53	5.43
	Q27 - Good understanding of how to take care of self before going home	321	353	93.83	90.96	2.87	-1.55	7.30	-0.84	6.58
	Q28 - Medical staff clearly explained how to take medications before going home	283	325	90.76	89.73	1.03	-3.83	5.88	-3.04	5.10
	Q29 - Medical staff clearly explained what follow-up appointments or treatments would be needed before going home	281	321	91.48	88.22	3.27	-1.52	8.05	-0.75	7.28
	Q30 - Able to manage your health needs since returning home	308	343	96.60	94.71	1.89	-1.62	5.40	-1.05	4.83
Overall Satisfaction	Q31 - Overall satisfaction with recovery since leaving hospital	349	429	55.03	55.65	-0.63	-7.92	6.67	-6.74	5.49

Source: Abt Associates analysis of BPCI Beneficiary Survey responses.

Notes: All responses were weighted for non-response and sampling design, and estimates were risk-adjusted for beneficiary- and hospital-level characteristics.

Exhibit I.51: Beneficiary Survey Outcomes: Sepsis, Model 3 Skilled Nursing Facility (SNF), Waves 4-9

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Improvement	Improvement in bathing, dressing, using the toilet, or eating	334	271	41.33	41.41	-0.08	-7.47	7.31	-6.28	6.12
	Improvement in planning regular tasks	332	271	36.53	32.82	3.72	-3.39	10.82	-2.24	9.68
	Improvement in use of mobility device (less likely to use mobility device)	336	272	19.89	16.16	3.72	-1.89	9.34	-0.99	8.44
	Improvement in walking without rest	333	263	21.22	17.37	3.85	-2.44	10.14	-1.42	9.13
	Improvement in using stairs	324	259	22.27	16.13	6.14	-0.15	12.44	0.87	11.42
	Improvement (less frequent) in physical/emotional problems limiting social activities	333	269	41.62	42.28	-0.66	-8.47	7.14	-7.21	5.88
	Improvement (less frequent) in pain limiting regular activities	324	266	45.96	41.87	4.09	-3.71	11.89	-2.45	10.63
Functional Decline	Decline in bathing, dressing, using the toilet, or eating	334	271	35.58	34.41	1.17	-6.12	8.45	-4.94	7.28
	Decline in planning regular tasks	332	271	42.76	46.43	-3.67	-11.12	3.78	-9.92	2.58
	Decline in use of mobility device (less likely to use mobility device)	336	272	69.29	69.68	-0.39	-7.39	6.61	-6.26	5.48
	Decline in walking without rest	333	263	55.98	57.67	-1.69	-9.24	5.85	-8.02	4.64
	Decline in using stairs	324	259	58.78	62.41	-3.63	-10.70	3.43	-9.56	2.29
	Decline (more frequent) in physical/emotional problems limiting social activities	333	269	37.28	32.81	4.46	-2.68	11.60	-1.53	10.45
	Decline (more frequent) in pain limiting regular activities	324	266	26.23	27.26	-1.03	-7.78	5.72	-6.69	4.63
Overall Health	Q9/10 - Composite Depression Indicator	338	269	29.82	30.95	-1.13	-8.56	6.30	-7.36	5.10
	Q18 - In general, how would you rate your physical health?	348	279	36.99	35.43	1.57	-5.73	8.87	-4.55	7.69
	Q19 - In general, how would you rate your mental health?	349	280	64.13	67.03	-2.90	-9.91	4.11	-8.78	2.98

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Care Experience	Q20 - Conflicting advice from medical staff about your treatment	353	286	51.81	51.18	0.63	-7.68	8.93	-6.34	7.59
	Q21 - Services appropriate for the level of care you needed	355	288	42.21	42.28	-0.07	-8.45	8.30	-7.09	6.95
	Q23 - Medical staff spoke in preferred language	357	287	92.42	91.65	0.78	-3.59	5.14	-2.88	4.43
	Q24 - Discharged at the right time	344	280	81.44	83.85	-2.41	-9.07	4.25	-7.99	3.18
	Q25 - Medical staff took your preferences into account in deciding what health care services you should have after you left the hospital	309	251	82.04	88.73	-6.70	-12.73	-0.67	-11.75	-1.64
	Q27 - Good understanding of how to take care of self before going home	258	209	87.98	91.54	-3.56	-9.31	2.18	-8.38	1.25
	Q28 - Medical staff clearly explained how to take medications before going home	239	201	88.43	85.85	2.58	-3.50	8.66	-2.52	7.68
	Q29 - Medical staff clearly explained what follow-up appointments or treatments would be needed before going home	229	197	82.10	86.91	-4.81	-11.70	2.07	-10.59	0.96
	Q30 - Able to manage your health needs since returning home	246	213	91.93	92.36	-0.43	-6.47	5.62	-5.49	4.64
Overall Satisfaction	Q31 - Overall satisfaction with recovery since leaving hospital	332	270	56.97	56.13	0.84	-7.31	8.99	-6.00	7.68

Source: Abt Associates analysis of BPCI Beneficiary Survey responses.

Notes: All responses were weighted for non-response and sampling design, and estimates were risk-adjusted for beneficiary- and hospital-level characteristics.

Appendix J: Vulnerable Populations Results

A. Sample Size

To better understand the sample used for the claims analysis, we present some basic statistics by clinical episode among BPCI and the comparison group in Exhibit J.1. The share of BPCI beneficiaries with a vulnerable condition ranged from 2% to 40% of all episodes within a clinical episode. Similarly, the prevalence of vulnerable conditions among comparison group beneficiaries accounted for 2% to 38% of episodes within a clinical episode. Across clinical episodes, the share of beneficiaries who had a recent institutional stay within five days of the anchor hospitalization was smallest of the three vulnerabilities among BPCI and comparison group beneficiaries. Prevalence of vulnerable conditions for BPCI and the comparison group was higher among CHF, sepsis, and SPRI clinical episodes, than MJRLE.

Dementia was the most common vulnerability across beneficiaries within each clinical episode. Literature has shown that the prevalence of dementia increases with age.^{1,2} To examine whether the rates of dementia within BPCI clinical episodes were similar to the literature and all Medicare beneficiaries in the Chronic Conditions Warehouse (CCW), we calculated the rate of dementia for five age cohorts (under 65, 65-69, 70-79, 80-89, and 90+) within each clinical episode. Consistent with the literature, the prevalence of dementia increased as age increased across all BPCI clinical episodes (Exhibit J.2). While dementia prevalence for the BPCI MJRLE sample was lower than the CCW and literature samples, the BPCI CHF, sepsis, and SPRI samples exhibited higher prevalence rates.

Less than 10% of the total patient episodes had a completed beneficiary survey across clinical episodes, though the share of survey respondents with vulnerable conditions was similar to the share among all patient episodes. As shown in Exhibit J.3, the share of survey respondents identified as having a vulnerable condition ranged from 6 to 26% for BPCI, and 4 to 24% for the comparison group. Similar to overall prevalence of vulnerable conditions, across clinical episodes the share of survey respondents who had a recent institutional stay was smallest among BPCI and comparison group beneficiaries. Due to insufficient sample size, we were unable to examine MJRLE survey respondents with recent institutional use.

¹ Alzheimer's Association, "2017 Alzheimer's Disease Facts and Figures." *Alzheimers Dement* 2017; 13: 325-373.

² Plassman B.L. et al. "Prevalence of Dementia in the United States: The Aging, Demographics, and Memory Study." *Neuroepidemiology* 2007; 29: 125-132.

Exhibit J.1: Prevalence of Vulnerable Conditions among Model 2 Hospital Clinical Episodes, Q4 2013 – Q4 2016

Clinical Episode	Vulnerable Condition	Number of BPCI Episodes with Vulnerable Condition	Share of BPCI episodes with Vulnerable Condition	Number of Comparison Episodes with Vulnerable Condition	Share of Comparison Episodes with Vulnerable Condition
Major joint replacement of the lower extremity	Total Model 2 hospital patient episodes	109,786	100%	109,786	100%
	Dual-eligible	11,445	10%	12,101	11%
	Dementia	10,913	10%	11,092	10%
	Recent institutional use	2,177	2%	1,998	2%
Congestive heart failure	Total Model 2 hospital patient episodes	37,330	100%	37,330	100%
	Dual-eligible	7,926	21%	8,278	22%
	Dementia	10,459	28%	10,229	27%
	Recent institutional use	3,748	10%	3,034	8%
Sepsis	Total Model 2 hospital patient episodes	29,888	100%	29,888	100%
	Dual-eligible	9,554	32%	8,906	30%
	Dementia	11,949	40%	11,347	38%
	Recent institutional use	6,692	22%	5,877	20%

MJRLE=major joint replacement of the lower extremity. CHF=congestive heart failure. SPRI=simple pneumonia and respiratory infection.
Source: Lewin analysis of Medicare claims and enrollment data for episodes that began Q4 2013 through Q4 2016 for BPCI providers.

Exhibit J.2: Prevalence of Dementia by Age Cohort, Model 2 Hospital Beneficiaries

Age	BPCI MJRLE Sample	BPCI CHF Sample	BPCI Sepsis Sample	BPCI SPRI Sample	All Medicare Beneficiaries ¹	Literature ²
Under 65	5%	11%	21%	18%	6%	N/A
65-69	2%	11%	22%	18%	4%	N/A
70-79	7%	19%	33%	27%	12%	5%
80-89	20%	34%	53%	45%	34%	24%
90+	43%	44%	66%	60%	52%	37%
Total	10%	28%	40%	37%	19%	14%

MJRLE=major joint replacement of the lower extremity. CHF=congestive heart failure. SPRI=simple pneumonia and respiratory infection.

¹All Medicare beneficiaries in the Chronic Conditions Warehouse (CCW) beneficiary summary files during 1999-2017

²This study looked at the national prevalence of dementia for beneficiaries who were over the age of 70 and had completed their most recent Health and Retirement Study (HRS) interview in 2000 or 2002. We are unable to compare prevalence for beneficiaries under the age of 70.²

Exhibit J.3: Number of Survey Respondents with Vulnerable Conditions among Model 2 Hospital Clinical Episodes

Clinical Episode	Vulnerable Condition	Number of BPCI Respondents with Vulnerable Condition	Share of BPCI Respondents with Vulnerable Condition	Number of Comparison Group Respondents with Vulnerable Condition	Share of Comparison Group Respondents with Vulnerable Condition
Major joint replacement of the lower extremity	Total Model 2 hospital survey responses	3,175	100%	3,166	100%
	Dual-eligible	216	7%	265	8%
	Dementia	186	6%	190	6%
	Recent institutional use				
Congestive heart failure	Total Model 2 hospital survey responses	2,493	100%	2,513	100%
	Dual-eligible	428	17%	461	18%
	Dementia	511	20%	526	21%
	Recent institutional use	155	6%	94	4%
Sepsis	Total Model 2 hospital survey responses	2,518	100%	2,629	100%
	Dual-eligible	551	22%	547	21%
	Dementia	650	26%	641	24%
	Recent institutional use	246	10%	224	9%
Simple pneumonia and respiratory infections	Total Model 2 hospital survey responses	2,321	100%	2,381	100%
	Dual-eligible	397	17%	372	16%
	Dementia	607	26%	575	24%
	Recent institutional use	141	6%	131	6%

Note: A blank cell indicates the vulnerable population was excluded from the analysis due to insufficient sample size.

Source: Abt Associates analysis of BPCI beneficiary survey data for MJRLE episodes that began in October 2014 through June 2017 and for CHF, sepsis, and SPRI episodes that began in May 2015 through June 2017.

B. Claim-based Results

The following exhibits display risk-adjusted difference-in-differences results for all claim-based payment and quality measures assessed in the vulnerable population analysis in the Year 5 Annual report. Results are presented by clinical episode and vulnerable population. Please observe the following abbreviations, which are used throughout the appendix:

- DiD = difference-in-differences
- LCI = lower confidence interval at the 5% and 10% level
- UCI = upper confidence interval at the 5% and 10% level
- PDP = post-anchor hospitalization discharge period
- IP = inpatient hospitalizations

Note that sample sizes reflect the number of episodes initiated during the intervention period that met inclusion criteria for the given outcome. Medicare payments are risk-adjusted and standardized to remove the effect of geographic differences in wages, extra amounts to account for teaching programs and other policy factors. Results reflect Lewin analysis of Medicare claims data for episodes that began Q4 2011 through Q3 2012 (baseline) and Q4 2013 through Q4 2016 (intervention period) for BPCI episode initiators and the matched comparison providers.

Exhibit J.4: Major Joint Replacement of the Lower Extremity Episodes, Dual-eligible Population, Model 2 Hospitals, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	11,371	12,041	\$30,983	\$30,022	\$30,958	\$31,174	-\$1,178	-\$1,907	-\$449	-\$1,790	-\$566
Emergency department use, 90-day PDP	11,380	12,062	21.1%	22.4%	20.3%	23.2%	-1.6	-3.4	0.2	-3.1	-0.1
Unplanned readmission rate, 90-day PDP	11,380	12,062	13.8%	12.6%	12.8%	12.4%	-0.7	-2.1	0.6	-1.9	0.4
All-cause mortality rate, 90-day PDP	11,333	12,020	2.6%	2.4%	2.4%	2.4%	-0.3	-0.9	0.3	-0.8	0.2

Exhibit J.5: Major Joint Replacement of the Lower Extremity Episodes, Dementia Population, Model 2 Hospitals, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	10,839	11,031	\$40,057	\$38,902	\$39,211	\$40,077	-\$2,021	-\$2,879	-\$1,162	-\$2,741	-\$1,300
Emergency department use, 90-day PDP	10,844	11,041	20.8%	23.0%	21.6%	21.8%	2.0	0.1	3.9	0.4	3.6
Unplanned readmission rate, 90-day PDP	10,844	11,041	21.8%	18.6%	19.2%	18.5%	-2.4	-4.2	-0.6	-3.9	-0.9
All-cause mortality rate, 90-day PDP	10,652	10,860	9.3%	9.3%	9.4%	9.7%	-0.2	-1.5	1.0	-1.3	0.8

Exhibit J.6: Major Joint Replacement of the Lower Extremity Episodes, Recent Institutional Use Population, Model 2 Hospitals, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	2,155	1,982	\$46,233	\$46,431	\$45,151	\$47,351	-\$2,002	-\$4,179	\$174	-\$3,829	-\$176
Emergency department use, 90-day PDP	2,158	1,985	21.7%	21.8%	21.6%	21.8%	-0.1	-4.2	4.0	-3.5	3.4
Unplanned readmission rate, 90-day PDP	2,158	1,985	26.7%	22.9%	22.7%	22.9%	-4.0	-8.0	0.1	-7.4	-0.6
All-cause mortality rate, 90-day PDP	2,107	1,924	16.5%	14.5%	15.3%	16.2%	-2.9	-6.4	0.7	-5.9	0.2

Exhibit J.7: Congestive Heart Failure Episodes, Dual-eligible Population, Model 2 Hospitals, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	7,822	8,170	\$25,723	\$25,649	\$25,132	\$25,515	-\$458	-\$1,482	\$566	-\$1,318	\$402
Emergency department use, 90-day PDP	7,730	8,082	27.8%	29.9%	26.7%	29.5%	-0.7	-2.9	1.5	-2.6	1.2
Unplanned readmission rate, 90-day PDP	7,730	8,082	42.6%	39.7%	42.7%	40.3%	-0.5	-3.0	2.1	-2.6	1.7
All-cause mortality rate, 90-day PDP	7,589	8,001	15.3%	14.1%	14.7%	14.4%	-0.9	-2.6	0.8	-2.3	0.6

Exhibit J.8: Congestive Heart Failure Episodes, Dementia Population, Model 2 Hospitals, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	10,326	10,102	\$26,385	\$26,179	\$26,311	\$26,284	-\$179	-\$1,035	\$676	-\$898	\$539
Emergency department use, 90-day PDP	10,332	10,105	23.4%	24.7%	22.9%	24.9%	-0.7	-2.4	1.1	-2.2	0.8
Unplanned readmission rate, 90-day PDP	10,332	10,105	39.7%	36.4%	40.0%	36.7%	0.0	-2.4	2.4	-2.0	2.0
All-cause mortality rate, 90-day PDP	10,085	9,933	23.7%	23.4%	24.6%	23.2%	1.1	-0.7	3.0	-0.4	2.7

Exhibit J.9: Congestive Heart Failure Episodes, Recent Institutional Use Population, Model 2 Hospitals, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	3,700	3,006	\$32,405	\$32,941	\$31,983	\$32,242	\$277	-\$1,217	\$1,770	-\$977	\$1,530
Emergency department use, 90-day PDP	3,706	3,004	19.8%	20.5%	20.5%	22.4%	-1.2	-4.1	1.7	-3.6	1.3
Unplanned readmission rate, 90-day PDP	3,706	3,004	40.9%	37.9%	41.3%	37.6%	0.7	-3.1	4.4	-2.5	3.8
All-cause mortality rate, 90-day PDP	3,630	2,962	34.9%	34.8%	35.3%	33.2%	2.0	-1.5	5.6	-1.0	5.1

Exhibit J.10: Sepsis Episodes, Dual-eligible Populations, Model 2 Hospitals, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	9,423	8,758	\$34,868	\$33,369	\$34,808	\$33,897	-\$587	-\$2,001	\$826	-\$1,773	\$599
Emergency department use, 90-day PDP	9,315	8,697	22.8%	24.1%	22.0%	24.1%	-0.8	-3.0	1.5	-2.6	1.1
Unplanned readmission rate, 90-day PDP	9,315	8,697	33.0%	31.6%	33.6%	31.4%	0.8	-1.5	3.0	-1.2	2.7
All-cause mortality rate, 90-day PDP	9,136	8,528	20.9%	19.6%	21.1%	19.5%	0.4	-1.3	2.2	-1.0	1.9

Exhibit J.11: Sepsis Episodes, Dementia Population, Model 2 Hospitals, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	11,780	11,169	\$33,662	\$32,864	\$34,076	\$33,816	-\$538	-\$1,746	\$669	-\$1,552	\$475
Emergency department use, 90-day PDP	11,772	11,185	18.2%	19.7%	18.0%	19.9%	-0.4	-2.1	1.2	-1.8	1.0
Unplanned readmission rate, 90-day PDP	11,772	11,185	31.0%	29.4%	31.3%	29.3%	0.4	-1.6	2.4	-1.2	2.1
All-cause mortality rate, 90-day PDP	11,434	10,876	30.4%	29.2%	29.7%	28.4%	0.2	-1.8	2.1	-1.4	1.8

Exhibit J.12: Sepsis Episodes, Recent Institutional Use Population, Model 2 Hospitals, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	6,593	5,772	\$40,236	\$39,194	\$40,153	\$39,870	-\$759	-\$2,412	\$894	-\$2,146	\$628
Emergency department use, 90-day PDP	6,610	5,801	16.6%	16.7%	15.9%	16.8%	-0.9	-3.0	1.2	-2.7	0.8
Unplanned readmission rate, 90-day PDP	6,610	5,801	34.3%	31.9%	34.0%	31.5%	0.2	-2.5	2.9	-2.1	2.5
All-cause mortality rate, 90-day PDP	6,462	5,657	37.1%	36.9%	38.5%	36.5%	1.8	-0.8	4.4	-0.4	4.0

Exhibit J.13: Simple Pneumonia and Respiratory Infection Episodes, Dual-eligible Population, Model 2 Hospitals, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	6,341	6,105	\$24,815	\$23,957	\$24,754	\$24,151	-\$254	-\$1,239	\$731	-\$1,081	\$573
Emergency department use, 90-day PDP	6,284	6,094	25.8%	27.4%	25.5%	27.3%	-0.2	-2.4	2.0	-2.0	1.7
Unplanned readmission rate, 90-day PDP	6,284	6,094	31.4%	29.3%	30.2%	28.6%	-0.5	-3.0	1.9	-2.6	1.5
All-cause mortality rate, 90-day PDP	6,186	6,015	15.2%	14.6%	15.5%	14.0%	1.0	-0.8	2.8	-0.5	2.5

Exhibit J.14: Simple Pneumonia and Respiratory Infection Episodes, Dementia Population, Model 2 Hospitals, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	9,230	9,041	\$26,291	\$25,495	\$26,170	\$26,382	-\$1,007	-\$1,859	-\$156	-\$1,722	-\$292
Emergency department use, 90-day PDP	9,236	9,067	20.4%	22.4%	20.2%	22.3%	-0.1	-1.8	1.6	-1.5	1.3
Unplanned readmission rate, 90-day PDP	9,236	9,067	29.0%	27.0%	28.8%	27.1%	-0.4	-2.4	1.7	-2.1	1.3
All-cause mortality rate, 90-day PDP	9,026	8,882	25.6%	23.4%	23.8%	22.4%	-0.8	-2.6	1.0	-2.3	0.7

Exhibit J.15: Simple Pneumonia and Respiratory Infection Episodes, Recent Institutional Use Population, Model 2 Hospitals, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	3,698	3,131	\$32,263	\$30,783	\$31,736	\$33,247	-\$2,991	-\$4,481	-\$1,501	-\$4,241	-\$1,741
Emergency department use, 90-day PDP	3,706	3,141	17.4%	18.0%	17.8%	19.8%	-1.3	-3.7	1.1	-3.4	0.7
Unplanned readmission rate, 90-day PDP	3,706	3,141	31.7%	28.3%	30.5%	29.3%	-2.2	-5.4	0.9	-4.9	0.4
All-cause mortality rate, 90-day PDP	3,598	3,076	34.4%	33.6%	33.5%	31.0%	1.7	-1.6	4.9	-1.0	4.4

C. Survey-based Results

The following exhibits show beneficiary survey outcome estimates for all functional status, care experience and satisfaction outcomes assessed in the vulnerable population analysis in the Year 5 Annual Report. Results are presented by clinical episode and vulnerable population. Please observe the following abbreviations, which are used throughout the appendix:

- LCI = lower confidence interval at the 5% and 10% level
- UCI = upper confidence interval at the 5% and 10% level

Note that all responses were weighted for non-response and sampling design, and estimates were risk-adjusted for beneficiary- and hospital-level characteristics. Results reflect Abt Associates analysis of beneficiary survey data for episodes that began in October 2014 through June 2017 for BPCI and comparison hospitals.

Exhibit J.16: Risk-adjusted Rates of Survey Measures for Dual-eligible Population, Major Joint Replacement of the Lower Extremity Episodes, Model 2 Hospitals, Q4 2014 – Q2 2017

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Status	Improvement in use of mobility device (less likely to use)	207	251	46.4	49.8	-3.5	-13.2	6.2	-11.6	4.7
	Improvement in walking without rest	205	256	54.6	51.4	3.2	-6.3	12.7	-4.8	11.2
	Improvement in using stairs	207	247	55.1	53.3	1.8	-7.6	11.3	-6.1	9.8
Care Experience	Never received conflicting medical advice	205	257	67.2	76.3	-9.1	-18.6	0.4	-17.1	-1.1
	Discharged at right time ¹	209	260	90.8	91.7	-0.9	-5.9	4.1	-5.1	3.3
	Understand care of self before going home ¹	196	241	96.4	95.7	0.7	-3.4	4.8	-2.8	4.2
Overall Satisfaction	Satisfaction with recovery ²	201	248	79.2	75.5	3.7	-4.0	11.5	-2.8	10.2

¹ Measure reflects that respondents either agreed or strongly agreed with this statement

² Measure reflects that respondents were either quite a bit satisfied or extremely satisfied with their recovery since leaving the hospital

Exhibit J.17: Risk-adjusted Rates of Survey Measures for Population with Dementia, Major Joint Replacement of the Lower Extremity Episodes, Model 2 Hospitals, Q4 2014 – Q2 2017

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Status	Improvement in use of mobility device (less likely to use)	173	180	60.9	54.3	6.6	-4.4	17.6	-2.6	15.8
	Improvement in walking without rest	175	181	63.0	57.8	5.2	-5.6	16.0	-3.8	14.3
	Improvement in using stairs	171	177	63.5	51.1	12.4	2.4	22.5	4.0	20.8
Care Experience	Never received conflicting medical advice	179	180	84.3	85.2	-0.9	-8.5	6.7	-7.2	5.5
	Discharged at right time ¹	179	186	95.6	97.0	-1.3	-4.6	1.9	-4.1	1.4
	Understand care of self before going home ¹	147	156	97.6	97.8	-0.2	-3.3	2.9	-2.8	2.4
Overall Satisfaction	Satisfaction with recovery ²	166	175	79.4	77.8	1.6	-6.9	10.2	-5.5	8.8

¹ Measure reflects that respondents either agreed or strongly agreed with this statement

² Measure reflects that respondents were either quite a bit satisfied or extremely satisfied with their recovery since leaving the hospital

Exhibit J.18: Risk-adjusted Rates of Survey Measures for Dual-eligible Population, Congestive Heart Failure Episodes, Model 2 Hospitals, Q2 2015 – Q2 2017

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Status	Improvement in use of mobility device (less likely to use)	395	436	28.2	27.6	0.5	-4.4	5.5	-3.6	4.7
	Improvement in walking without rest	392	433	19.3	23.5	-4.1	-9.1	0.8	-8.3	0.0
	Improvement in using stairs	391	424	25.2	21.5	3.7	-2.2	9.6	-1.2	8.7
Care Experience	Never received conflicting medical advice	406	436	56.8	55.9	0.9	-6.1	8.0	-5.0	6.8
	Discharged at right time ¹	408	444	83.4	87.6	-4.2	-9.0	0.5	-8.2	-0.2
	Understand care of self before going home ¹	357	388	94.0	95.1	-1.1	-4.5	2.2	-4.0	1.7
Overall Satisfaction	Satisfaction with recovery ²	385	427	62.2	64.2	-2.0	-9.1	5.0	-8.0	3.9

¹ Measure reflects that respondents either agreed or strongly agreed with this statement

² Measure reflects that respondents were either quite a bit satisfied or extremely satisfied with their recovery since leaving the hospital

Exhibit J.19: Risk-adjusted Rates of Survey Measures for Population with Dementia, Congestive Heart Failure Episodes, Model 2 Hospitals, Q2 2015 – Q2 2017

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Status	Improvement in use of mobility device (less likely to use)	464	484	34.1	28.6	5.5	0.6	10.3	1.4	9.6
	Improvement in walking without rest	459	475	22.4	19.4	3.0	-2.1	8.1	-1.3	7.3
	Improvement in using stairs	446	469	24.9	23.3	1.6	-4.1	7.3	-3.2	6.4
Care Experience	Never received conflicting medical advice	483	499	57.7	60.8	-3.1	-9.2	2.9	-8.2	2.0
	Discharged at right time ¹	480	499	85.9	85.6	0.3	-4.0	4.6	-3.3	3.9
	Understand care of self before going home ¹	382	395	92.5	93.1	-0.6	-4.4	3.2	-3.8	2.6
Overall Satisfaction	Satisfaction with recovery ²	454	478	55.4	62.0	-6.6	-13.6	0.4	-12.5	-0.7

¹ Measure reflects that respondents either agreed or strongly agreed with this statement

² Measure reflects that respondents were either quite a bit satisfied or extremely satisfied with their recovery since leaving the hospital

Exhibit J.20: Risk-adjusted Rates of Survey Measures for Population with Recent Institutional Use, Congestive Heart Failure Episodes, Model 2 Hospitals, Q2 2015 – Q2 2017

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Status	Improvement in use of mobility device (less likely to use)	138	85	33.9	25.8	8.1	-5.5	21.7	-3.3	19.5
	Improvement in walking without rest	134	77	18.5	13.8	4.7	-5.2	14.6	-3.6	13.0
	Improvement in using stairs	137	82	22.7	20.7	2.0	-10.8	14.7	-8.7	12.7
Care Experience	Never received conflicting medical advice	146	88	51.0	68.1	-17.1	-29.3	-4.8	-27.4	-6.8
	Discharged at right time ¹	146	86	84.2	87.5	-3.3	-12.0	5.4	-10.6	4.0
	Understand care of self before going home ¹	84	42	88.7	85.6	3.1	-12.7	18.9	-10.2	16.4
Overall Satisfaction	Satisfaction with recovery ²	140	82	47.6	61.6	-13.9	-27.6	-0.3	-25.4	-2.5

¹ Measure reflects that respondents either agreed or strongly agreed with this statement

² Measure reflects that respondents were either quite a bit satisfied or extremely satisfied with their recovery since leaving the hospital

Exhibit J.21: Risk-adjusted Rates of Survey Measures for Dual-eligible Population, Sepsis Episodes, Model 2 Hospitals, Q2 2015 – Q2 2017

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Status	Improvement in use of mobility device (less likely to use)	514	508	39.6	39.4	0.1	-4.3	4.5	-3.6	3.8
	Improvement in walking without rest	489	493	29.9	28.3	1.6	-3.2	6.4	-2.5	5.6
	Improvement in using stairs	494	493	31.6	29.2	2.4	-2.4	7.2	-1.6	6.4
Care Experience	Never received conflicting medical advice	520	518	59.2	67.6	-8.4	-14.5	-2.3	-13.5	-3.3
	Discharged at right time ¹	520	514	82.9	85.7	-2.8	-6.9	1.4	-6.2	0.7
	Understand care of self before going home ¹	418	402	90.6	95.1	-4.5	-7.5	-1.5	-7.1	-2.0
Overall Satisfaction	Satisfaction with recovery ²	507	505	62.1	69.8	-7.7	-13.6	-1.8	-12.6	-2.7

¹ Measure reflects that respondents either agreed or strongly agreed with this statement

² Measure reflects that respondents were either quite a bit satisfied or extremely satisfied with their recovery since leaving the hospital

Exhibit J.22: Risk-adjusted Rates of Survey Measures for Population with Dementia, Sepsis Episodes, Model 2 Hospitals, Q2 2015 – Q2 2017

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Status	Improvement in use of mobility device (less likely to use)	592	584	36.2	39.1	-2.9	-7.8	2.1	-7.0	1.3
	Improvement in walking without rest	569	562	25.6	27.1	-1.5	-7.1	4.1	-6.2	3.2
	Improvement in using stairs	562	562	27.0	23.9	3.1	-1.8	7.9	-1.0	7.2
Care Experience	Never received conflicting medical advice	615	613	57.2	63.2	-6.0	-11.6	-0.5	-10.7	-1.4
	Discharged at right time ¹	611	602	83.4	87.2	-3.8	-7.7	0.1	-7.0	-0.5
	Understand care of self before going home ¹	425	418	93.1	94.6	-1.5	-4.7	1.7	-4.2	1.2
Overall Satisfaction	Satisfaction with recovery ²	593	578	66.7	64.2	2.4	-3.0	7.8	-2.1	7.0

¹ Measure reflects that respondents either agreed or strongly agreed with this statement

² Measure reflects that respondents were either quite a bit satisfied or extremely satisfied with their recovery since leaving the hospital

**Exhibit J.23: Risk-adjusted Rates of Survey Measures for Population with Recent Institutional Use, Sepsis Episodes, Model 2
Hospitals, Q2 2015 – Q2 2017**

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Status	Improvement in use of mobility device (less likely to use)	209	198	33.8	30.9	2.8	-8.7	14.3	-6.9	12.5
	Improvement in walking without rest	198	183	21.5	16.0	5.5	-3.9	14.9	-2.4	13.4
	Improvement in using stairs	201	187	22.9	17.0	5.9	-5.1	17.0	-3.4	15.2
Care Experience	Never received conflicting medical advice	234	214	55.8	59.8	-4.0	-13.7	5.7	-12.2	4.1
	Discharged at right time ¹	225	209	79.2	81.4	-2.2	-9.3	5.0	-8.2	3.8
	Understand care of self before going home ¹	86	65	90.3	93.0	-2.7	-10.5	5.2	-9.2	3.9
Overall Satisfaction	Satisfaction with recovery ²	212	201	61.0	66.4	-5.3	-14.4	3.7	-13.0	2.3

¹ Measure reflects that respondents either agreed or strongly agreed with this statement

² Measure reflects that respondents were either quite a bit satisfied or extremely satisfied with their recovery since leaving the hospital

Exhibit J.24: Risk-adjusted Rates of Survey Measures for Dual-eligible Population, Simple Pneumonia and Respiratory Infection Episodes, Model 2 Hospitals, Q2 2015 – Q2 2017

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Status	Improvement in use of mobility device (less likely to use)	374	358	40.0	36.5	3.5	-2.6	9.5	-1.6	8.5
	Improvement in walking without rest	371	341	29.4	30.4	-1.0	-7.0	5.0	-6.1	4.1
	Improvement in using stairs	361	333	27.0	26.5	0.6	-6.0	7.1	-4.9	6.1
Care Experience	Never received conflicting medical advice	382	357	67.0	59.4	7.6	0.2	15.0	1.4	13.8
	Discharged at right time ¹	383	362	85.3	84.3	1.1	-4.2	6.4	-3.3	5.5
	Understand care of self before going home ¹	308	286	93.6	96.2	-2.6	-6.2	1.1	-5.6	0.5
Overall Satisfaction	Satisfaction with recovery ²	366	344	69.4	63.2	6.2	-1.1	13.5	0.1	12.4

¹ Measure reflects that respondents either agreed or strongly agreed with this statement

² Measure reflects that respondents were either quite a bit satisfied or extremely satisfied with their recovery since leaving the hospital

Exhibit J.25: Risk-adjusted Rates of Survey Measures for Population with Dementia, Simple Pneumonia and Respiratory Infection Episodes, Model 2 Hospitals, Q2 2015 – Q2 2017

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Status	Improvement in use of mobility device (less likely to use)	564	528	40.7	41.0	-0.3	-5.1	4.5	-4.3	3.7
	Improvement in walking without rest	550	519	26.1	26.6	-0.5	-5.7	4.8	-4.9	3.9
	Improvement in using stairs	536	500	27.1	29.2	-2.1	-7.8	3.6	-6.9	2.6
Care Experience	Never received conflicting medical advice	584	556	61.5	64.7	-3.2	-9.3	2.8	-8.3	1.9
	Discharged at right time ¹	586	559	84.6	86.3	-1.7	-6.5	3.1	-5.7	2.3
	Understand care of self before going home ¹	433	399	91.5	94.9	-3.4	-7.5	0.7	-6.8	0.0
Overall Satisfaction	Satisfaction with recovery ²	555	516	65.4	63.4	1.9	-4.4	8.2	-3.3	7.2

¹ Measure reflects that respondents either agreed or strongly agreed with this statement

² Measure reflects that respondents were either quite a bit satisfied or extremely satisfied with their recovery since leaving the hospital

Exhibit J.26: Risk-adjusted Rates of Survey Measures for Population with Recent Institutional Use, Simple Pneumonia and Respiratory Infection Episodes, Model 2 Hospitals, Q2 2015 – Q2 2017

Domain	Outcome	BPCI Survey Responses	Comparison Survey Responses	BPCI Rate	Comparison Rate	Difference in Rate	95% LCI	95% UCI	90% LCI	90% UCI
Functional Status	Improvement in use of mobility device (less likely to use)	126	115	32.3	40.4	-8.1	-23.5	7.3	-21.0	4.9
	Improvement in walking without rest	125	113	16.2	27.7	-11.6	-24.6	1.5	-22.5	-0.6
	Improvement in using stairs	128	110	23.7	23.2	0.5	-13.4	14.5	-11.2	12.3
Care Experience	Never received conflicting medical advice	135	125	60.0	60.4	-0.4	-13.2	12.3	-11.1	10.2
	Discharged at right time ¹	131	126	76.3	82.8	-6.4	-16.4	3.5	-14.8	1.9
	Understand care of self before going home ¹	53	40	90.2	82.8	7.4	-7.7	22.4	-5.3	20.0
Overall Satisfaction	Satisfaction with recovery ²	127	120	56.4	72.3	-15.9	-27.5	-4.3	-25.6	-6.1

¹ Measure reflects that respondents either agreed or strongly agreed with this statement

² Measure reflects that respondents were either quite a bit satisfied or extremely satisfied with their recovery since leaving the hospital

Appendix K: Impact of Terminating Participation on Payments

The BPCI program rules are based on voluntary participation; participants can withdraw from a clinical episode or from the initiative completely.¹ By December 2016, 53% of M2 hospital EIs, 54% of M2 PGP EIs, 21% of Model 3 SNF EIs, and 47% of Model 3 HHA EIs included in each sample withdrew from at least one clinical episode.

Descriptive analyses indicate that the withdrawal from BPCI is non-random and is related to success in achieving NPRA. This non-random withdrawal affects our evaluation in two ways. First, comparison groups were created for each Model, participant type, and clinical episode combination we evaluated. The comparison groups were chosen to minimize average standardized differences in baseline outcomes and provider and market characteristics between all BPCI participants that were active for at least two quarters and the comparison group providers. Non-random early withdrawal potentially reduces the balance between the BPCI and comparison groups during later intervention quarters.

Second, the BPCI impact estimates include episodes initiated through the latest quarter of participation for EIs that withdrew from a clinical episode prior to the end of 2016. For participants that have not withdrawn, the BPCI impact estimates include episodes initiated through Q4 2016. The estimates, therefore, implicitly give more weight to participants with more BPCI exposure, which could potentially introduce a bias.

We address the potential issue of non-random withdrawal by performing a sensitivity analysis that includes all episodes initiated through Q4 2016 by participants included in the BPCI impact estimate samples, augmented with the episodes generated by providers after they withdrew from the clinical episode. This is an intent-to-treat (ITT) framework, in which the effect of a policy is estimated by including all agents that are exposed to the policy, regardless of whether they comply with the policy.² We refer to these results as ITT DiD estimates. The ITT DiD estimates rely on the balance between matched BPCI participants and comparison group providers and does not give more weight to participants with more BPCI exposure. For this ITT DiD analysis, episodes are assigned to the baseline and intervention period as following:

- The ITT DiD baseline period includes the same BPCI and comparison group episodes as the BPCI impact estimates, described in Sections II.B.1, II.C.1, III.B.1 and III.C.1.
- The ITT DiD intervention period includes episodes initiated between October 1, 2013 and December 31, 2016. The intervention period includes:
 - Pre-withdrawal episodes: the intervention episodes initiated by BPCI providers and their matched comparison group providers while they were bearing financial risk (i.e., the same BPCI and comparison group episodes included in the intervention period of the BPCI impact estimates).³

¹ We use the term withdraw to reflect episode initiators that terminate their participation in BPCI or stop participating in the given clinical episode. Note that EIs that participated in a clinical episode for only one quarter are excluded from both the original and the ITT DiD analysis.

² <https://jamanetwork.com/journals/jama/fullarticle/1884555>

³ An episode is assigned to only one participant. By continuing to create episodes for BPCI providers after they withdraw from a clinical episode, the ITT episode algorithm may change which provider is ultimately assigned

- Post-withdrawal episodes: the intervention episodes initiated by BPCI providers and their matched comparison group providers⁴ after they withdrew from the clinical episode (i.e., episodes generated after withdrawal and not subject to BPCI reconciliation payments).

One implication of the ITT DiD is that it gives more weight to early participants, because they have a longer intervention period. If early participants were more likely to withdraw because they were unsuccessful in reducing payments, the ITT DiD is potentially biased toward zero. However, in the participant data stratified by BPCI start date, we did not observe any correlation between EI withdrawal and start date.

For Model 2, the ITT DiD analysis was performed for the total allowed payment amount for the anchor hospitalization plus 90-day PDP. For Model 3, the ITT DiD analysis was performed for the total allowed payment amount included in the bundle definition for 90-day episodes. We used the same risk-adjustment models for these outcomes that were used for the BPCI impact estimates.

See **Appendix D** for further details on the methodology used to create the BPCI impact estimates.

an overlapping episode relative to the assignment done by the episode algorithm used for the BPCI impact estimates. This creates a small discrepancy in the BPCI impact estimates and ITT DiD samples of episodes.

⁴ Following the methodology of the BPCI impact estimates, each post-withdrawal BPCI episode was randomly matched to one episode from the pool of comparison episodes, which originate from the comparison providers that were matched to the BPCI participant; the BPCI episode and its comparison match have the same MS-DRG and quarter.

Model 2 Hospital Results

Exhibit K.1: Impact on BPCI with Intent-to-Treat episodes for Total Standardized Medicare Allowed Payments During the Inpatient Stay plus 90 Days Post Discharge, by Clinical Episode, Model 2 Hospitals, Baseline to Intervention, Q4 2013 – Q4 2016

Clinical Episode	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	90% LCI	90% UCI	Share of Episodes Post-Withdrawal
Acute myocardial infarction	8,616	8,633	\$25,995	\$25,936	\$25,683	\$26,144	-\$519	-\$1,450	\$411	31%
Cardiac arrhythmia	8,558	8,519	\$17,034	\$17,769	\$16,799	\$18,032	-\$497	-\$1,106	\$111	24%
Cardiac valve	5,086	5,083	\$61,830	\$60,347	\$63,480	\$62,032	-\$36	-\$1,525	\$1,454	16%
Cellulitis	6,968	6,964	\$19,662	\$19,641	\$20,070	\$20,688	-\$639*	-\$1,424	\$146	17%
Cervical spinal fusion	1,662	1,664	\$28,821	\$31,192	\$29,222	\$30,680	\$912	-\$594	\$2,419	21%
Congestive heart failure	46,358	46,380	\$24,317	\$24,454	\$23,816	\$24,342	-\$388	-\$754	-\$22	23%
COPD, bronchitis, asthma	25,271	25,314	\$18,735	\$18,711	\$18,514	\$18,775	-\$284	-\$714	\$146	19%
Coronary artery bypass graft	3,876	3,882	\$47,137	\$48,615	\$47,335	\$49,507	-\$694	-\$2,370	\$983	9%
Diabetes	1,858	1,851	\$21,773	\$21,954	\$21,677	\$20,740	\$1,117	-\$533	\$2,768	14%
Esophagitis, gastroenteritis and other digestive disorders	6,096	6,111	\$16,785	\$16,971	\$16,014	\$16,996	-\$796	-\$1,590	-\$3	26%
Fractures of the femur and hip or pelvis	1,360	1,358	\$30,214	\$30,539	\$29,723	\$30,953	-\$904	-\$2,840	\$1,031	11%
Gastrointestinal hemorrhage	7,409	7,389	\$19,881	\$19,735	\$19,700	\$20,143	-\$589	-\$1,299	\$121	36%
Gastrointestinal obstruction	2,627	2,610	\$17,093	\$16,758	\$17,012	\$16,727	-\$51	-\$1,259	\$1,157	28%
Hip and femur procedures except major joint	9,873	9,858	\$43,923	\$43,521	\$43,269	\$44,774	-\$1,907	-\$2,683	-\$1,131	15%
Lower extremity and humerus procedure except hip, foot, femur	1,352	1,343	\$35,220	\$37,672	\$34,370	\$37,133	-\$312	-\$2,634	\$2,010	11%
Major bowel procedure	3,911	3,923	\$38,283	\$36,557	\$36,458	\$36,428	-\$1,696	-\$2,934	-\$457	15%
Major joint replacement of the lower extremity	117,170	117,144	\$27,530	\$25,982	\$27,059	\$26,759	-\$1,248	-\$1,518	-\$979	7%

Clinical Episode	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	90% LCI	90% UCI	Share of Episodes Post-Withdrawal
Major joint replacement of the upper extremity	2,160	2,157	\$23,305	\$24,056	\$24,500	\$25,122	\$129	-\$1,183	\$1,441	29%
Medical non-infectious orthopedic	8,790	8,761	\$27,623	\$27,974	\$25,999	\$27,620	-\$1,270	-\$2,135	-\$406	18%
Nutritional and metabolic disorders	3,897	3,903	\$20,198	\$21,404	\$20,100	\$21,436	-\$130*	-\$1,051	\$790	26%
Other respiratory	6,199	6,177	\$29,998	\$30,432	\$29,465	\$30,636	-\$737	-\$1,898	\$423	18%
Other vascular surgery	2,012	2,014	\$36,482	\$38,057	\$35,679	\$36,989	\$265	-\$1,767	\$2,296	17%
Percutaneous coronary intervention	6,332	6,360	\$24,073	\$26,975	\$24,443	\$26,758	\$587*	-\$261	\$1,435	14%
Renal failure	10,656	10,630	\$24,721	\$23,874	\$25,141	\$25,264	-\$970	-\$1,704	-\$235	24%
Revision of the hip or knee	1,656	1,656	\$35,654	\$37,100	\$35,800	\$37,352	-\$106	-\$1,873	\$1,660	25%
Sepsis	38,696	38,685	\$31,510	\$30,481	\$31,669	\$31,289	-\$648	-\$1,331	\$36	26%
Simple pneumonia and respiratory infections	28,772	28,756	\$23,031	\$22,533	\$22,673	\$22,715	-\$541	-\$934	-\$147	14%
Spinal fusion (non-cervical)	4,878	4,894	\$40,403	\$41,178	\$39,985	\$41,825	-\$1,064	-\$2,434	\$305	22%
Stroke	15,264	15,200	\$31,352	\$31,301	\$31,906	\$32,012	-\$157	-\$923	\$608	15%
Syncope and collapse	1,787	1,782	\$15,741	\$16,486	\$15,839	\$17,734	-\$1,150	-\$2,462	\$162	17%
Transient ischemia	1,426	1,435	\$15,087	\$15,683	\$14,501	\$16,214	-\$1,116	-\$2,400	\$169	18%
Urinary tract infection	9,980	9,960	\$22,134	\$22,080	\$22,245	\$22,886	-\$694*	-\$1,342	-\$46	12%

*This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate.

Note: The estimates in this exhibit are the results of an intent-to-treat difference-in-differences (ITT DiD) model. Positive ITT DiD estimates that are significant at the 5% or 10% significance level are indicated by dark and light green shaded cells, respectively. Negative ITT DiD estimates that are significant at the 5% or 10% significance level are indicated by dark and light orange shaded cells, respectively. The Medicare payment outcome is standardized to remove the effect of geographic and other adjustments. DiD=difference-in-differences. LCI=lower confidence interval. UCI=upper confidence interval. COPD=chronic obstructive pulmonary disease.

Source: Lewin analysis of Medicare claims and enrollment data for episodes that began Q4 2011 through Q4 2016 for BPCI and comparison providers.

Model 2 PGP Results

Exhibit K.2: Impact on BPCI with Intent-to-Treat Episodes for Total Standardized Medicare Allowed Payments During the Inpatient Stay plus 90 Days Post Discharge, by Clinical Episode, Model 2 PGP, Baseline to Intervention, Q4 2013 – Q4 2016

Clinical Episode	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	90% LCI	90% UCI	Share of Episodes Post-Withdrawal
Acute myocardial infarction	4,123	4,090	\$25,713	\$25,961	\$25,956	\$26,285	-\$81	-\$1,380	\$1,217	9%
Cardiac arrhythmia	3,226	3,201	\$16,780	\$18,156	\$17,316	\$18,117	\$575	-\$417	\$1,567	4%
Cellulitis	3,274	3,260	\$18,746	\$19,642	\$19,633	\$20,679	-\$151	-\$1,225	\$924	12%
Congestive heart failure	10,872	10,814	\$24,581	\$24,945	\$24,788	\$25,312	-\$159	-\$900	\$581	12%
COPD, bronchitis, asthma	10,399	10,309	\$18,330	\$19,139	\$18,576	\$19,335	\$51	-\$531	\$633	10%
Esophagitis, gastroenteritis and other digestive disorders	4,251	4,206	\$16,450	\$17,201	\$16,736	\$17,297	\$191*	-\$698	\$1,080	10%
Gastrointestinal hemorrhage	2,866	2,849	\$18,989	\$18,419	\$18,677	\$19,623	-\$1,516	-\$2,493	-\$539	11%
Gastrointestinal obstruction	1,662	1,655	\$18,708	\$16,849	\$16,792	\$17,276	-\$2,343	-\$3,679	-\$1,008	5%
Hip and femur procedures except major joint	6,683	6,664	\$43,697	\$44,057	\$42,705	\$44,471	-\$1,406*	-\$2,380	-\$433	6%
Major joint replacement of the lower extremity	65,863	65,521	\$26,171	\$23,822	\$25,923	\$25,478	-\$1,904	-\$2,211	-\$1,597	3%
Major joint replacement of the upper extremity	2,850	2,831	\$21,986	\$22,648	\$21,858	\$24,335	-\$1,816	-\$2,864	-\$767	13%
Medical non-infectious orthopedic	3,863	3,861	\$27,469	\$27,670	\$27,034	\$28,600	-\$1,365	-\$2,592	-\$138	10%
Nutritional and metabolic disorders	2,886	2,843	\$19,810	\$20,192	\$19,987	\$21,269	-\$899	-\$2,147	\$348	5%
Other respiratory	4,052	4,022	\$27,757	\$28,111	\$28,233	\$28,992	-\$406	-\$1,899	\$1,087	5%
Percutaneous coronary intervention	3,045	3,011	\$24,444	\$26,999	\$24,031	\$27,006	-\$421	-\$1,381	\$540	8%
Renal failure	6,463	6,446	\$23,956	\$24,407	\$24,824	\$24,534	\$741	-\$285	\$1,768	7%
Sepsis	22,714	22,631	\$30,145	\$29,614	\$30,737	\$30,140	\$66	-\$639	\$771	7%
Simple pneumonia and respiratory infections	11,030	10,976	\$22,239	\$21,979	\$22,848	\$22,598	-\$11	-\$692	\$669	8%
Spinal fusion (non-cervical)	2,751	2,718	\$38,672	\$38,038	\$38,677	\$40,700	-\$2,657	-\$4,063	-\$1,251	13%

Clinical Episode	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	90% LCI	90% UCI	Share of Episodes Post-Withdrawal
Stroke	3,848	3,814	\$30,061	\$29,793	\$29,415	\$30,055	-\$907	-\$2,377	\$563	8%
Urinary tract infection	7,011	6,967	\$22,282	\$23,262	\$22,091	\$23,604	-\$533	-\$1,442	\$377	7%

*This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate.

Note: The estimates in this exhibit are the results of an intent-to-treat difference-in-differences (ITT DiD) model. Positive ITT DiD estimates that are significant at the 5% or 10% significance level are indicated by dark and light green shaded cells, respectively. Negative ITT DiD estimates that are significant at the 5% or 10% significance level are indicated by dark and light orange shaded cells, respectively. The Medicare payment outcome is standardized to remove the effect of geographic and other adjustments. PGP=physician group practice. DiD=difference-in-differences. LCI=lower confidence interval. UCI=upper confidence interval. COPD=chronic obstructive pulmonary disease.

Source: Lewin analysis of Medicare claims and enrollment data for episodes that began Q4 2011 through Q4 2016 for BPCI and comparison providers.

Model 3 SNF Results

Exhibit K.3: Impact on BPCI with Intent-to-Treat Episodes for Total Standardized Medicare Allowed Amounts Included in the Bundle Definition for 90-day Episodes, by Clinical Episode, Model 3 SNF, Baseline to Intervention, Q4 2013 – Q4 2016

Clinical Episode	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	90% LCI	90% UCI	Share of Episodes Post-Withdrawal
Congestive heart failure	2,850	2,835	\$29,265	\$29,079	\$27,740	\$28,914	-\$1,361	-\$2,704	-\$18	19%
COPD, bronchitis, asthma	1,035	1,035	\$28,364	\$29,145	\$28,872	\$28,254	\$1,400	-\$643	\$3,443	25%
Hip and femur procedures except major joint	1,792	1,796	\$31,131	\$28,758	\$30,634	\$31,382	-\$3,122	-\$4,638	-\$1,605	2%
Major joint replacement of the lower extremity	4,234	4,236	\$19,792	\$18,403	\$18,382	\$18,894	-\$1,900	-\$2,863	-\$937	5%
Medical non-infectious orthopedic	2,417	2,421	\$30,173	\$30,137	\$29,419	\$30,417	-\$1,035	-\$2,376	\$307	22%
Other respiratory	807	803	\$28,953	\$30,417	\$29,588	\$30,544	\$508	-\$2,117	\$3,132	24%
Renal failure	1,558	1,551	\$30,295	\$29,715	\$27,601	\$30,045	-\$3,024	-\$4,875	-\$1,173	27%
Sepsis	4,315	4,304	\$29,605	\$28,432	\$29,073	\$30,028	-\$2,128	-\$3,324	-\$932	21%
Simple pneumonia and respiratory infections	2,306	2,292	\$27,171	\$26,045	\$26,921	\$27,165	-\$1,371	-\$2,692	-\$49	19%
Stroke	1,640	1,635	\$32,508	\$32,524	\$32,756	\$32,617	\$155	-\$1,657	\$1,967	31%
Urinary tract infection	2,015	2,014	\$28,959	\$28,278	\$27,678	\$29,247	-\$2,250	-\$3,611	-\$889	23%

Note: The estimates in this exhibit are the results of an intent-to-treat difference-in-differences (ITT DiD) model. Positive ITT DiD estimates that are significant at the 5% or 10% significance level are indicated by dark and light green shaded cells, respectively. Negative ITT DiD estimates that are significant at the 5% or 10% significance level are indicated by dark and light orange shaded cells, respectively. The Medicare payment outcome is standardized to remove the effect of geographic and other adjustments. SNF=skilled nursing facility. DiD=difference-in-differences. LCI=lower confidence interval. UCI=upper confidence interval. COPD=chronic obstructive pulmonary disease.

Source: Lewin analysis of Medicare claims and enrollment data for episodes that began Q4 2011 through Q4 2016 for BPCI and comparison providers.

Model 3 HHA Results

Exhibit K.4: Impact on BPCI with Intent-to-Treat episodes for Total Standardized Medicare Allowed Amounts Included in the Bundle Definition for 90-day Episodes, by Clinical Episode, Model 3 HHA, Baseline to Intervention, Q4 2013 – Q4 2016

Clinical Episode	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	90% LCI	90% UCI	Share of Episodes Post-Withdrawal
Congestive heart failure	5,155	5,246	\$14,957	\$15,162	\$13,987	\$14,977	-\$784	-\$1,451	-\$118	25%
Major joint replacement of the lower extremity	2,994	2,982	\$7,007	\$6,600	\$6,037	\$6,196	-\$566	-\$1,205	\$73	1%
Simple pneumonia and respiratory infections	2,033	2,038	\$11,974	\$12,591	\$12,182	\$12,081	\$718	-\$393	\$1,830	40%

Note: The estimates in this exhibit are the results of an intent-to-treat difference-in-differences (ITT DiD) model. Positive ITT DiD estimates that are significant at the 5% or 10% significance level are indicated by dark and light green shaded cells, respectively. Negative ITT DiD estimates that are significant at the 5% or 10% significance level are indicated by dark and light orange shaded cells, respectively. The Medicare payment outcome is standardized to remove the effect of geographic and other adjustments. HHA=home health agency. DiD=difference-in-differences. LCI=lower confidence interval. UCI=upper confidence interval.

Source: Lewin analysis of Medicare claims and enrollment data for episodes that began Q4 2011 through Q4 2016 for BPCI and comparison providers.

Appendix L: Market Dynamics Results

Exhibit L.1: Changes in Market Share from the Baseline to the BPCI Period, by Clinical Episode and Cohort, Model 2 Hospital EIs, Q4 2011 – Q4 2016

Clinical Episode	EI Cohort	N EIs	Statistics	Baseline Rate (%)	Changes from Baseline (Percentage Points)					
					1 st 6 month Period	2 nd 6 month Period	3 rd 6 month Period	4 th 6 month Period	5 th 6 month Period	6 th 6 month Period
Major joint replacement of the lower extremity	2014Q1	39	Mean	18.83	-0.64	-1.09	-1.35	-1.27	-1.31	-1.38
			Median	9.58	-0.58	-0.47	-0.33	-0.34	-0.25	-0.18
			P25	3.22	-1.90	-2.69	-2.99	-3.38	-3.83	-3.90
			P75	27.10	0.58	0.80	0.46	0.45	0.52	1.49
	2015Q2	58	Mean	12.73	0.15	0.48	0.30			
			Median	7.29	0.40	0.09	0.07			
			P25	2.94	-0.78	-0.95	-1.13			
			P75	18.04	1.60	1.39	1.41			
	2015Q3	77	Mean	14.93	0.91	0.89	0.62			
			Median	8.36	-0.09	-0.19	-0.07			
			P25	4.03	-1.54	-1.46	-1.62			
			P75	17.19	1.24	1.71	1.46			
Chronic obstructive pulmonary disease, bronchitis, asthma	2015Q2	36	Mean	11.51	0.20	0.10	-0.04			
			Median	8.27	0.10	0.01	0.08			
			P25	5.35	-2.57	-2.02	-1.97			
			P75	16.53	1.12	1.36	1.10			
Congestive heart failure	2015Q2	34	Mean	12.50	-0.05	1.25	1.52			
			Median	7.91	-0.68	-0.73	-0.31			
			P25	4.86	-2.13	-2.00	-1.47			
			P75	17.66	0.30	1.14	0.48			
	2015Q4	33	Mean	19.23	0.08	0.39				
			Median	11.84	0.22	-0.05				
			P25	6.38	-1.22	-1.27				
			P75	27.14	2.21	1.33				

Clinical Episode	EI Cohort	N EIs	Statistics	Baseline Rate (%)	Changes from Baseline (Percentage Points)					
					1 st 6 month Period	2 nd 6 month Period	3 rd 6 month Period	4 th 6 month Period	5 th 6 month Period	6 th 6 month Period
Hip & femur procedures except major joint	2015Q4	27	Mean	19.73	2.92	2.60				
			Median	8.79	-0.46	-0.86				
			P25	6.97	-2.30	-2.66				
			P75	24.00	2.53	2.04				
Sepsis	2015Q2	27	Mean	12.17	-1.27	-1.31	-0.97			
			Median	5.93	-0.42	-0.54	-0.81			
			P25	4.27	-3.00	-3.65	-2.29			
			P75	17.64	0.95	1.64	2.04			
Simple pneumonia and respiratory infections	2015Q2	31	Mean	15.18	-0.59	-0.83	-0.70			
			Median	8.48	-0.26	-0.48	-0.36			
			P25	4.62	-1.46	-1.73	-1.64			
			P75	21.04	0.81	0.76	1.10			

Note: This table shows the measure rate in the baseline period, and the changes from the baseline period to each six-month interval in the BPCI period. EI=episode initiators. P25=25th percentile. P75=75th percentile.

Source: Abt analysis of Medicare claims for discharges that began Q4 2011 through Q4 2016.

Exhibit L.2: Changes in Market Share from the Baseline to the BPCI Period for Major Joint Replacement of the Lower Extremity Episodes, by Fracture Status and Cohort, Model 2 Hospital EIs, Q4 2011 – Q4 2016

Clinical Episode	EI Cohort	N EIs	Statistics	Baseline Rate (%)	Changes from Baseline (Percentage Points)					
					1 st 6 month Period	2 nd 6 month Period	3 rd 6 month Period	4 th 6 month Period	5 th 6 month Period	6 th 6 month Period
Major joint replacement of the lower extremity – Non-Fracture	2014Q1	37	Mean	19.99	-0.66	-1.28	-1.66	-1.58	-1.70	-1.83
			Median	12.01	-0.07	-0.49	-0.43	-0.62	-0.72	-0.07
			P25	4.03	-2.35	-2.81	-3.69	-3.15	-3.44	-3.83
			P75	29.19	0.59	0.58	0.49	0.51	0.43	0.84
	2015Q2	58	Mean	12.71	0.17	0.45	0.40			
			Median	7.22	0.58	0.09	0.35			
			P25	2.39	-0.78	-0.89	-0.99			
			P75	18.69	2.46	1.36	1.60			
	2015Q3	77	Mean	14.74	1.05	1.07	0.69			
			Median	8.24	-0.13	-0.01	-0.23			
			P25	3.85	-1.32	-1.29	-1.70			
			P75	16.88	1.42	1.49	1.57			
Major joint replacement of the lower extremity – Fracture	2014Q1	38	Mean	16.92	0.17	-0.09	0.24	0.23	0.34	0.14
			Median	7.96	0.50	0.36	0.37	-0.22	0.23	-0.07
			P25	4.61	-1.89	-1.35	-2.39	-2.05	-2.41	-1.60
			P75	20.12	2.79	1.25	3.20	2.74	3.17	2.62
	2015Q2	57	Mean	13.37	-0.55	-0.09	-0.66			
			Median	7.36	-0.51	-0.25	0.07			
			P25	4.07	-2.19	-1.77	-2.26			
			P75	14.77	0.88	2.15	0.85			
	2015Q3	75	Mean	15.80	0.72	0.05	0.94			
			Median	9.94	-0.45	-0.66	0.04			
			P25	5.42	-1.83	-3.23	-2.56			
			P75	19.08	2.12	2.57	2.36			

Note: This table shows the measure rate in the baseline period, and the changes from the baseline period to each six-month interval in the BPCI period. EI=episode initiators. P25=25th percentile. P75=75th percentile.

Source: Abt analysis of Medicare claims for discharges that began Q4 2011 through Q4 2016.

Exhibit L.3: Changes in the Number of PAC Providers to which 75% of Inpatient Patients were Discharged from the Baseline to the BPCI Period, by Clinical Episode and Cohort, Model 2 Hospital EIs, Q4 2011 – Q4 2016

Clinical Episode	EI Cohort	PAC Type	N EIs	Statistics	Baseline Rate (%)	Changes from Baseline (Percentage Points)					
						1 st 6 month Period	2 nd 6 month Period	3 rd 6 month Period	4 th 6 month Period	5 th 6 month Period	6 th 6 month Period
Major joint replacement of the lower extremity	2014Q1	HHA	38	Mean	3.33	-0.20	0.07	0.01	-0.01	-0.17	0.01
				Median	3.00	0.00	0.00	0.00	0.00	0.00	0.00
				P25	2.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00
				P75	4.00	0.50	1.00	0.50	1.00	0.50	0.50
		SNF	42	Mean	6.61	0.06	-0.46	0.15	-0.37	-0.25	-0.30
				Median	5.75	0.00	-0.25	0.50	-0.25	0.00	0.25
				P25	3.00	-1.00	-1.50	-1.00	-2.00	-1.50	-1.00
				P75	9.00	1.00	0.50	1.50	1.50	1.50	1.00
	2015Q2	HHA	64	Mean	3.09	-0.23	-0.35	-0.43			
				Median	2.50	0.00	0.00	0.00			
				P25	1.50	-1.25	-1.25	-1.50			
				P75	4.00	1.00	1.00	0.75			
		SNF	67	Mean	5.34	-0.04	0.01	0.08			
				Median	4.00	0.00	0.00	0.00			
				P25	2.50	-1.00	-1.00	-1.00			
				P75	7.00	1.00	2.00	1.50			
	2015Q3	HHA	84	Mean	2.98	0.01	0.35	0.24			
				Median	2.50	0.00	0.00	0.00			
				P25	1.50	-1.00	-0.50	-0.50			
				P75	3.50	1.00	1.00	1.00			
		SNF	86	Mean	6.12	-0.25	0.16	-0.34			
				Median	5.00	0.00	0.25	0.00			
				P25	3.50	-1.50	-1.00	-1.00			
				P75	7.00	1.00	1.50	0.50			

Clinical Episode	EI Cohort	PAC Type	N EIs	Statistics	Baseline Rate (%)	Changes from Baseline (Percentage Points)					
						1 st 6 month Period	2 nd 6 month Period	3 rd 6 month Period	4 th 6 month Period	5 th 6 month Period	6 th 6 month Period
Chronic obstructive pulmonary disease, bronchitis, asthma	2015Q2	HHA	40	Mean	4.33	-0.70	-0.98	-1.20			
				Median	3.50	-0.50	-0.50	-0.50			
				P25	1.75	-1.50	-2.00	-2.50			
				P75	7.50	0.50	0.00	0.00			
		SNF	38	Mean	3.91	0.07	-0.22	-0.72			
				Median	3.50	0.00	0.00	-0.75			
				P25	2.00	-1.00	-1.50	-1.00			
				P75	5.00	1.00	1.00	0.00			
Congestive heart failure	2015Q2	HHA	38	Mean	4.26	-0.18	-0.50	-0.55			
				Median	3.25	-0.25	-0.25	-0.50			
				P25	2.00	-1.00	-1.50	-2.00			
				P75	5.50	1.00	0.50	0.50			
		SNF	38	Mean	4.49	0.22	0.20	0.80			
				Median	4.00	0.50	0.50	0.50			
	2015Q4	HHA	38	P25	2.50	-0.50	-1.00	0.00			
				P75	5.50	1.00	1.00	1.50			
				Mean	2.36	0.07	0.14				
				Median	2.00	0.00	0.00				
		SNF	37	P25	1.50	-1.00	-1.00				
				P75	3.00	1.00	1.00				
Mean	5.28	0.93	0.26								
Median	4.50	1.00	0.00								
P25	3.50	0.00	-1.00								
P75	7.00	2.00	1.50								

Clinical Episode	EI Cohort	PAC Type	N EIs	Statistics	Baseline Rate (%)	Changes from Baseline (Percentage Points)					
						1 st 6 month Period	2 nd 6 month Period	3 rd 6 month Period	4 th 6 month Period	5 th 6 month Period	6 th 6 month Period
Hip & femur procedures except major joint	2015Q4	HHA	9	Mean	2.39	-0.72	-0.17				
				Median	2.00	-0.50	-0.50				
				P25	1.50	-1.50	-1.50				
				P75	3.50	0.00	1.00				
		SNF	2	Mean	6.38	0.59	0.07				
				Median	6.00	0.50	0.50				
				P25	3.50	-1.00	-2.00				
				P75	8.50	2.50	1.00				
Sepsis	2015Q2	HHA	27	Mean	3.24	0.65	0.65	0.43			
				Median	2.50	0.50	0.00	0.50			
				P25	2.00	-0.50	-1.00	-1.00			
				P75	4.50	2.00	1.50	1.50			
		SNF	28	Mean	5.07	0.82	0.71	0.96			
				Median	4.75	0.50	0.25	0.50			
				P25	3.75	0.00	-0.50	-0.50			
				P75	6.50	1.50	1.50	1.75			
Simple pneumonia and respiratory infections	2015Q2	HHA	34	Mean	3.90	0.01	-0.13	-0.37			
				Median	3.00	0.00	0.00	0.00			
				P25	2.00	-1.00	-1.00	-1.50			
				P75	5.00	1.00	1.00	1.00			
		SNF	34	Mean	5.28	-0.01	0.22	0.01			
				Median	4.50	0.00	0.00	0.00			
				P25	3.00	-1.00	-1.00	-0.50			
				P75	7.00	0.50	1.00	1.00			

Note: This table shows the measure rate in the baseline period, and the changes from the baseline period to each six-month interval in the BPCI period. EI=episode initiators. P25=25th percentile. P75=75th percentile.

Source: Abt analysis of Medicare claims for discharges that began Q4 2011 through Q4 2016.

Exhibit L.4: Changes in the Share of Patients who were Discharged to High Star-Rating PAC Providers from the Baseline to the BPCI Period, by Clinical Episode and Cohort, Model 2 Hospital EIs, Q4 2011 – Q4 2016

Clinical Episode	EI Cohort	PAC Type	N EIs	Statistics	Baseline Rate (%)	Changes from Baseline (Percentage Points)					
						1 st 6 month Period	2 nd 6 month Period	3 rd 6 month Period	4 th 6 month Period	5 th 6 month Period	6 th 6 month Period
Chronic obstructive pulmonary disease, bronchitis, asthma	2015Q2	HHA	40	Mean	32.56	-0.40	2.30	5.99			
				Median	22.38	0.36	-0.19	1.43			
				P25	9.50	-7.69	-10.56	-6.18			
				P75	51.99	13.02	10.03	19.32			
		SNF	38	Mean	22.43	2.47	4.91	3.94			
				Median	15.24	0.00	0.00	-0.34			
				P25	4.17	-10.71	-4.52	-6.25			
				P75	35.90	19.70	12.05	20.00			
Major joint replacement of the lower extremity	2014Q1	HHA	38	Mean	37.80	0.59	-1.75	-0.59	1.61	3.80	0.07
				Median	24.12	0.00	-0.37	0.00	0.60	2.63	-0.06
				P25	4.76	-3.52	-6.34	-3.34	-3.48	-2.63	-4.37
				P75	76.31	4.85	5.00	8.34	7.32	6.98	2.95
		SNF	42	Mean	31.82	7.81	5.11	4.69	7.34	6.04	5.89
				Median	24.68	6.01	4.43	5.93	5.75	4.35	6.26
				P25	10.24	-1.56	-3.57	-3.03	-2.03	-3.04	-2.08
				P75	53.25	16.67	14.29	10.44	16.06	17.09	17.71
	2015Q2	HHA	64	Mean	36.43	-1.97	-0.22	-1.14			
				Median	19.49	-0.47	0.00	0.00			
				P25	3.85	-8.48	-6.84	-5.62			
				P75	69.17	6.22	9.17	6.49			
SNF	67	Mean	34.49	3.56	6.49	9.37					
		Median	27.39	0.36	6.37	3.99					
		P25	11.47	-6.94	-5.94	-3.39					
		P75	57.56	10.71	16.67	18.12					

Clinical Episode	EI Cohort	PAC Type	N EIs	Statistics	Baseline Rate (%)	Changes from Baseline (Percentage Points)					
						1 st 6 month Period	2 nd 6 month Period	3 rd 6 month Period	4 th 6 month Period	5 th 6 month Period	6 th 6 month Period
Major joint replacement of the lower extremity (cont'd)	2015Q3	HHA	83	Mean	37.19	0.63	2.42	3.47			
				Median	30.00	0.00	0.77	0.78			
				P25	4.55	-10.00	-8.16	-7.22			
				P75	65.30	6.01	9.85	10.95			
		SNF	86	Mean	34.25	7.11	8.04	7.56			
				Median	31.99	4.50	6.50	6.07			
				P25	12.50	-1.96	-0.26	-3.48			
				P75	51.25	14.41	16.07	18.60			
Congestive heart failure	2015Q2	HHA	38	Mean	44.92	0.52	-0.41	7.36			
				Median	43.45	0.36	-1.14	2.66			
				P25	14.38	-11.97	-10.56	-4.55			
				P75	78.57	10.42	11.04	16.78			
		SNF	38	Mean	33.61	6.06	4.05	4.85			
				Median	26.47	3.94	2.04	1.93			
				P25	10.42	-6.60	-8.33	-9.15			
				P75	59.03	14.47	18.75	16.99			
	2015Q4	HHA	38	Mean	27.59	-2.76	-0.90				
				Median	11.52	0.00	0.29				
				P25	3.13	-3.46	-5.00				
				P75	55.00	2.84	9.09				
SNF	37	Mean	22.56	0.58	3.94						
		Median	16.11	0.09	3.69						
		P25	7.13	-6.17	-4.19						
		P75	30.82	9.62	10.84						

Clinical Episode	EI Cohort	PAC Type	N EIs	Statistics	Baseline Rate (%)	Changes from Baseline (Percentage Points)					
						1 st 6 month Period	2 nd 6 month Period	3 rd 6 month Period	4 th 6 month Period	5 th 6 month Period	6 th 6 month Period
Hip & femur procedures except major joint	2015Q4	HHA	9	Mean	69.11	-27.82	-12.26				
				Median	81.25	-33.33	-16.67				
				P25	50.00	-35.71	-30.00				
				P75	91.67	-16.67	-2.38				
		SNF	29	Mean	34.56	7.12	5.86				
				Median	35.22	5.06	4.74				
				P25	21.25	-3.60	-2.21				
				P75	44.76	17.14	12.50				
Sepsis	2015Q2	HHA	26	Mean	37.54	8.89	3.12	4.43			
				Median	26.14	2.31	1.61	-1.67			
				P25	10.00	-8.39	-7.14	-15.40			
				P75	66.67	19.79	8.65	18.94			
		SNF	28	Mean	23.72	4.14	4.02	7.36			
				Median	14.61	3.01	5.20	5.92			
				P25	8.72	-1.98	-7.33	0.42			
				P75	40.92	12.21	10.44	12.57			
Simple pneumonia and respiratory infections	2015Q2	HHA	34	Mean	37.24	7.22	5.07	4.48			
				Median	27.66	0.00	3.59	0.17			
				P25	10.00	-6.14	-10.00	-10.00			
				P75	61.54	18.45	11.11	15.78			
		SNF	34	Mean	30.99	-0.31	-5.45	0.13			
				Median	20.54	0.03	0.00	0.00			
				P25	6.98	-10.00	-10.86	-10.56			
				P75	49.80	10.42	6.36	13.26			

Note: This table shows the measure rate in the baseline period, and the changes from the baseline period to each six-month interval in the BPCI period. EI=episode initiators. P25=25th percentile. P75=75th percentile.

Source: Abt analysis of Medicare claims for discharges that began Q4 2011 through Q4 2016.

Exhibit L.5: Changes in Market Share from the Baseline to the BPCI Period, Model 2 PGP Major Joint Replacement of the Lower Extremity EIs, Q4 2011 – Q4 2016

Clinical Episode	EI Cohort	N (PGP EI/Market)	Statistics	Baseline Rate (%)	Changes from Baseline (Percentage Points)		
					1 st 6 month Period	2 nd 6 month Period	3 rd 6 month Period
Major joint replacement of the lower extremity	2015Q3	74 (45/58)	Mean	17.93	2.94	2.33	2.12
			Median	4.86	0.51	0.24	0.39
			P25	1.47	-0.34	-0.76	-0.88
			P75	25.11	3.17	2.25	3.12
Major joint replacement of the lower extremity – Non-Fracture	2015Q3	52 (40/43)	Mean	25.32	2.67	2.82	2.57
			Median	11.55	0.95	0.66	0.73
			P25	1.86	-0.45	-0.42	-0.90
			P75	43.38	3.66	2.88	3.27
Major joint replacement of the lower extremity – Fracture	2015Q3	65 (43/52)	Mean	18.92	2.13	1.33	1.03
			Median	9.35	0.92	0.65	0.21
			P25	4.93	-3.88	-1.88	-4.01
			P75	27.18	6.40	4.58	5.91

Note: This table shows the measure rate in the baseline period, and the changes from the baseline period to each six-month interval in the BPCI period. PGP=physician group practice. EI=episode initiators. P25=25th percentile. P75=75th percentile.

Source: Abt analysis of Medicare claims for discharges that began Q4 2011 through Q4 2016.

Exhibit L.6: Changes in the Number of PAC Providers to which 75% of Inpatient Patients were Discharged from the Baseline to the BPCI Period, Model 2 PGP Major Joint Replacement of the Lower Extremity EIs, Q4 2011 – Q4 2016

Clinical Episode	EI Cohort	PAC Type	N (PGP EI/Market)	Statistics	Baseline Rate (%)	Changes from Baseline (Percentage Points)		
						1 st 6 month Period	2 nd 6 month Period	3 rd 6 month Period
Major joint replacement of the lower extremity	2015Q3	HHA	51 (41/41)	Mean	3.52	0.26	-0.13	0.09
				Median	3.00	0.00	0.00	0.00
				P25	2.00	-1.00	-1.50	-1.00
				P75	4.50	1.50	1.00	1.00
		SNF	73 (46/57)	Mean	6.59	0.00	0.15	-0.22
				Median	6.00	0.00	0.50	0.00
				P25	3.00	-1.50	-2.00	-2.00
				P75	8.50	2.00	2.50	2.00

Note: This table shows the measure rate in the baseline period, and the changes from the baseline period to each six-month interval in the BPCI period. PGP=physician group practice. EI=episode initiators. P25=25th percentile. P75=75th percentile.

Source: Abt analysis of Medicare claims for discharges that began Q4 2011 through Q4 2016.

Exhibit L.7: Changes in the Share of Patients who were Discharged to High Star-Rating PAC Providers from the Baseline to the BPCI Period, Model 2 PGP Major Joint Replacement of the Lower Extremity EIs, Q4 2011 – Q4 2016

Clinical Episode	EI Cohort	PAC Type	N (PGP EI/Market)	Statistics	Baseline Rate (%)	Changes from Baseline (Percentage Points)		
						1 st 6 month Period	2 nd 6 month Period	3 rd 6 month Period
Major joint replacement of the lower extremity	2015Q3	HHA	51 (41/41)	Mean	33.11	-0.33	2.49	-1.69
				Median	21.89	0.56	0.95	0.00
				P25	3.26	-3.63	-9.36	-13.54
				P75	64.93	6.69	12.50	9.71
		SNF	73 (46/57)	Mean	32.75	4.72	3.10	4.30
				Median	32.58	2.50	1.83	4.17
				P25	14.12	-4.03	-6.36	-5.00
				P75	45.00	13.07	11.27	13.69

Note: This table shows the measure rate in the baseline period, and the changes from the baseline period to each six-month interval in the BPCI period. PGP=physician group practice. EI=episode initiators. P25=25th percentile. P75=75th percentile.

Source: Abt analysis of Medicare claims for discharges that began Q4 2011 through Q4 2016.

Exhibit L.8: Changes in Market Share from the Baseline to the BPCI Period, by Clinical Episode and Cohort, Model 3 SNF EIs, Q4 2011 – Q4 2016

Clinical Episode	EI Cohort	N EIs	Statistics	Baseline Rate (%)	Changes from Baseline (Percentage Points)		
					1 st 6 month Period	2 nd 6 month Period	3 rd 6 month Period
Major joint replacement of the lower extremity	2015Q2	44	Mean	7.35	0.75	0.50	0.76
			Median	2.80	0.39	0.27	-0.14
			P25	1.19	-0.60	-0.70	-1.18
			P75	8.48	2.00	1.98	2.31
	2015Q3	92	Mean	6.33	0.26	-0.20	0.52
			Median	1.59	-0.05	-0.17	-0.16
			P25	0.76	-0.90	-1.15	-0.90
			P75	5.14	0.82	0.62	0.81
	2015Q4	76	Mean	6.28	-0.25	-0.03	
			Median	2.57	-0.18	0.04	
			P25	0.82	-1.12	-0.77	
			P75	7.48	0.53	1.13	
Urinary tract infection	2015Q3	34	Mean	3.77	0.51	1.06	-0.55
			Median	1.88	-0.06	-0.02	0.08
			P25	1.17	-0.98	-0.61	-0.45
			P75	3.23	0.54	1.00	0.38
	2015Q4	54	Mean	6.50	-0.70	1.24	
			Median	2.42	0.22	0.34	
			P25	1.46	-1.05	-0.52	
			P75	7.67	1.12	1.43	
Stroke	2015Q3	32	Mean	3.30	-0.40	-0.93	-0.31
			Median	1.95	-0.13	-0.40	0.05
			P25	1.04	-0.84	-1.85	-1.10
			P75	3.74	0.32	0.12	0.64
	2015Q4	56	Mean	5.41	-0.04	0.80	
			Median	2.84	-0.42	-0.37	
			P25	1.39	-1.31	-1.28	
			P75	6.87	0.05	1.05	

Clinical Episode	EI Cohort	N EIs	Statistics	Baseline Rate (%)	Changes from Baseline (Percentage Points)		
					1 st 6 month Period	2 nd 6 month Period	3 rd 6 month Period
Chronic obstructive pulmonary disease, bronchitis, asthma	2015Q4	33	Mean	6.58	2.42	2.05	
			Median	2.55	0.45	0.84	
			P25	1.28	-0.48	-0.13	
			P75	10.37	2.78	2.22	
Congestive heart failure	2015Q2	28	Mean	10.23	-0.32	-0.65	0.19
			Median	5.35	-0.10	0.14	0.18
			P25	1.57	-3.77	-1.81	-0.92
			P75	19.08	2.31	2.50	3.50
	2015Q3	33	Mean	3.45	0.19	0.13	0.11
			Median	1.94	-0.08	-0.18	0.03
			P25	1.10	-0.89	-0.75	-1.29
			P75	4.11	0.79	0.63	1.00
	2015Q4	70	Mean	5.53	0.10	0.42	
			Median	2.24	0.04	0.02	
			P25	1.02	-0.66	-0.54	
			P75	6.22	0.81	1.10	
Medical non-infectious orthopedic	2015Q3	33	Mean	4.06	1.81	1.80	1.63
			Median	2.34	-0.03	-0.10	-0.15
			P25	1.32	-0.60	-0.66	-1.07
			P75	3.42	1.97	1.75	0.86
	2015Q4	55	Mean	6.05	0.65	0.06	
			Median	2.76	0.03	-0.06	
			P25	1.09	-0.57	-1.27	
			P75	7.87	1.28	1.39	

Clinical Episode	EI Cohort	N EIs	Statistics	Baseline Rate (%)	Changes from Baseline (Percentage Points)		
					1 st 6 month Period	2 nd 6 month Period	3 rd 6 month Period
Hip & femur procedures except major joint	2015Q2	27	Mean	8.31	0.33	-0.37	-0.48
			Median	3.59	-0.03	-0.10	0.08
			P25	1.62	-1.37	-1.77	-1.54
			P75	10.90	1.15	0.85	0.87
	2015Q3	42	Mean	4.50	0.17	0.56	1.12
			Median	2.41	0.17	0.15	0.13
			P25	1.07	-0.97	-1.42	-1.20
			P75	4.86	0.68	0.96	1.21
	2015Q4	64	Mean	5.64	1.24	0.49	
			Median	2.57	0.53	0.27	
			P25	0.94	-0.25	-0.88	
			P75	6.61	1.82	1.76	
Sepsis	2015Q3	54	Mean	4.05	-0.21	-0.52	-0.62
			Median	2.06	-0.44	-0.28	-0.29
			P25	1.09	-1.34	-1.55	-1.32
			P75	4.08	0.50	0.33	0.40
	2015Q4	76	Mean	3.95	0.23	-0.25	
			Median	1.85	-0.005	-0.15	
			P25	0.86	-0.75	-1.26	
			P75	4.63	0.71	0.61	

Clinical Episode	EI Cohort	N EIs	Statistics	Baseline Rate (%)	Changes from Baseline (Percentage Points)		
					1 st 6 month Period	2 nd 6 month Period	3 rd 6 month Period
Simple pneumonia and respiratory infections	2015Q2	26	Mean	5.37	0.28	-0.14	0.08
			Median	2.02	-0.09	0.12	0.72
			P25	1.25	-0.58	-0.74	-0.81
			P75	7.64	1.25	1.16	1.35
	2015Q3	45	Mean	4.39	0.20	-0.19	-0.39
			Median	1.97	-0.12	-0.22	-0.12
			P25	1.05	-0.88	-1.18	-0.84
			P75	4.39	0.64	0.15	0.19
	2015Q4	84	Mean	6.12	0.31	0.15	
			Median	2.44	0.21	0.10	
			P25	1.13	-1.47	-0.68	
			P75	8.43	1.41	1.29	
Other respiratory	2015Q4	31	Mean	6.66	0.05	-0.44	
			Median	2.72	0.21	0.21	
			P25	1.50	-0.77	-0.71	
			P75	9.81	1.93	1.96	
Renal failure	2015Q4	37	Mean	4.52	0.22	2.08	
			Median	2.74	-0.13	0.23	
			P25	1.20	-1.12	-0.81	
			P75	5.57	1.01	1.38	

Note: This table shows the measure rate in the baseline period, and the changes from the baseline period to each six-month interval in the BPCI period. SNF = skilled nursing facility. EI=episode initiators. P25=25th percentile. P75=75th percentile.

Source: Abt analysis of Medicare claims for discharges that began Q4 2011 through Q4 2016.

Exhibit L.9: Changes in Market Share from the Baseline to the BPCI Period for Major Joint Replacement of the Lower Extremity Episodes, by Fracture Status and Cohort, Model 3 SNF EIs, Q4 2011 – Q4 2016

Clinical Episode	EI Cohort	N EIs	Statistics	Baseline Rate (%)	Changes from Baseline (Percentage Points)		
					1 st 6 month Period	2 nd 6 month Period	3 rd 6 month Period
Major joint replacement of the lower extremity – Non-Fracture	2015Q2	37	Mean	8.39	1.41	1.63	2.03
			Median	2.77	0.46	0.59	0.27
			P25	1.53	-1.08	-0.42	-0.82
			P75	9.19	2.27	3.44	5.86
	2015Q3	66	Mean	7.99	0.49	0.02	1.02
			Median	2.25	-0.12	-0.14	-0.08
			P25	0.70	-1.31	-1.97	-1.55
			P75	6.93	0.66	0.63	1.22
	2015Q4	59	Mean	7.79	-0.16	0.76	
			Median	3.54	-0.14	0.05	
			P25	1.11	-1.67	-1.00	
			P75	8.21	1.59	1.91	
Major joint replacement of the lower extremity – Fracture	2015Q2	27	Mean	10.80	-0.67	-3.10	-1.49
			Median	3.51	0.53	-0.53	-0.40
			P25	1.85	-2.77	-4.81	-3.21
			P75	15.45	1.90	1.09	1.52
	2015Q3	55	Mean	8.73	0.70	-1.16	0.93
			Median	3.25	0.27	-0.08	0.02
			P25	1.32	-0.69	-1.79	-1.14
			P75	8.01	1.51	1.88	1.59
	2015Q4	48	Mean	5.89	0.15	0.28	
			Median	3.36	-0.33	0.47	
			P25	1.71	-1.13	-0.87	
			P75	7.70	1.12	1.71	

Note: This table shows the measure rate in the baseline period, and the changes from the baseline period to each six-month interval in the BPCI period. SNF = skilled nursing facility. EI=episode initiators. P25=25th percentile. P75=75th percentile.

Source: Abt analysis of Medicare claims for discharges that began Q4 2011 through Q4 2016.

Appendix M: Impact of BPCI on Payment, Utilization, and Quality Measures, by Clinical Episode, Baseline to Intervention, Model 2 PGP

The following tables display risk-adjusted difference-in-differences results for all payment, utilization, and quality measures assessed in the Year 5 Annual Report. Results are presented by clinical episode. Please observe the following abbreviations, which are used throughout the appendix:

- DiD = difference-in-differences
- LCI = lower confidence interval at the 5% and 10% level
- UCI = upper confidence interval at the 5% and 10% level
- PDP = post-anchor hospitalization discharge period
- ADL = activities of daily living
- IP = inpatient hospitalizations
- PAC = post-acute care
- SNF = skilled nursing facility
- HHA = home health agency
- IRF = inpatient rehabilitation facility

Note that sample sizes reflect the number of episodes initiated during the intervention period that met inclusion criteria for the given outcome. Medicare payments are risk-adjusted and standardized to remove the effect of geographic differences in wages, extra amounts to account for teaching programs and other policy factors. Results reflect Lewin analysis of Medicare claims, assessment, and enrollment data for episodes that began Q4 2011 through Q3 2012 (baseline) and Q4 2013 through Q4 2016 (intervention period) for BPCI episode initiators and the matched comparison providers.

Exhibit M.1: Major Joint Replacement of the Upper Extremity Episodes, Model 2 PGP, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	2,473	2,457	\$22,064	\$22,483	\$21,912	\$24,396	-\$2,065	-\$3,300	-\$830	-\$3,101	-\$1,028
Total allowed payment amount, IP through 120-day PDP	2,385	2,350	\$23,498	\$24,044	\$23,256	\$25,838	-\$2,036	-\$3,483	-\$590	-\$3,250	-\$822
Total amount paid by Medicare, IP through 90-day PDP ¹	2,473	2,457	\$19,533	\$20,024	\$19,486	\$21,741	-\$1,763	-\$2,871	-\$655	-\$2,693	-\$834
Total amount included in the bundle definition, 90-day episodes	2,473	2,457	\$21,727	\$22,165	\$21,812	\$24,108	-\$1,857	-\$3,055	-\$659	-\$2,863	-\$852
Total allowed payment amount, 30 days post-bundle	2,445	2,430	\$1,442	\$1,517	\$1,336	\$1,592	-\$182	-\$513	\$150	-\$460	\$96
Readmissions standardized allowed amount, 90-day PDP	2,474	2,476	\$753	\$891	\$632	\$853	-\$83	-\$406	\$240	-\$354	\$188
SNF standardized allowed amount, 90-day PDP	2,474	2,476	\$2,868	\$1,731	\$2,270	\$2,814	-\$1,681	-\$2,388	-\$974	-\$2,274	-\$1,088
HHA standardized allowed amount, 90-day PDP	2,474	2,476	\$1,324	\$943	\$1,565	\$1,371	-\$186	-\$523	\$151	-\$469	\$97
Part B standardized allowed amount, 90-day PDP	2,473	2,457	\$2,367	\$2,394	\$2,480	\$2,538	-\$31	-\$284	\$222	-\$244	\$181
Anchor inpatient length of stay	2,476	2,476	3.1	2.6	3.3	2.8	-0.1	-0.2	0.1	-0.2	0.1
Number of SNF days, 90-day PDP ²	341	455	30.4	21.5	26.6	28.8	-11.1	-16.1	-6.0	-15.3	-6.8
Number of HHA visits, 90-day PDP ²	718	929	14.2	11.7	15.8	14.3	-1.0	-3.4	1.5	-3.0	1.1
Patients discharged to PAC	2,476	2,476	43.8%	33.1%	47.6%	42.0%	-5.1	-13.9	3.6	-12.5	2.2
Patients discharged to institutional PAC (of those who received PAC)	788	1,048	47.4%	40.9%	42.8%	45.7%	-9.5	-18.3	-0.7	-16.8	-2.1
Emergency department use, 30-day PDP	2,476	2,473	7.6%	7.5%	6.7%	8.0%	-1.4	-4.0	1.2	-3.6	0.8

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Emergency department use, 90-day PDP	2,474	2,473	13.2%	15.4%	12.0%	14.6%	-0.4	-3.9	3.1	-3.4	2.5
Unplanned readmission rate, 30-day PDP	2,476	2,473	3.6%	3.4%	3.1%	3.4%	-0.5	-2.2	1.2	-1.9	0.9
Unplanned readmission rate, 90-day PDP	2,474	2,473	6.3%	6.2%	6.6%	6.4%	0.1	-2.1	2.3	-1.7	1.9
All-cause mortality rate, 30-day PDP	2,473	2,472	0.3%	0.2%	0.2%	0.4%	-0.3	-0.8	0.2	-0.7	0.1
All-cause mortality rate, 90-day PDP	2,471	2,472	0.4%	0.6%	0.5%	0.7%	0.1	-0.7	0.8	-0.6	0.7

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Exhibit M.2: Urinary Tract Infection Episodes, Model 2 PGP, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	6,328	6,291	\$22,270	\$23,215	\$22,080	\$23,708	-\$683	-\$1,795	\$429	-\$1,616	\$250
Total allowed payment amount, IP through 120-day PDP	6,156	6,113	\$25,251	\$26,274	\$25,181	\$26,920	-\$715	-\$1,980	\$549	-\$1,777	\$346
Total amount paid by Medicare, IP through 90-day PDP ¹	6,323	6,283	\$19,164	\$19,946	\$19,018	\$20,310	-\$510	-\$1,489	\$470	-\$1,332	\$312
Total amount included in the bundle definition, 90-day episodes	6,328	6,291	\$21,330	\$22,047	\$21,187	\$22,467	-\$563	-\$1,629	\$502	-\$1,458	\$331
Total allowed payment amount, 30 days post-bundle	5,568	5,565	\$3,441	\$3,464	\$3,479	\$3,605	-\$103	-\$470	\$264	-\$411	\$205
Readmissions standardized allowed amount, 90-day PDP	6,399	6,404	\$3,447	\$3,424	\$3,445	\$3,571	-\$149	-\$517	\$218	-\$457	\$159
SNF standardized allowed amount, 90-day PDP	6,399	6,404	\$6,780	\$7,104	\$6,401	\$7,259	-\$534	-\$1,215	\$147	-\$1,106	\$38
HHA standardized allowed amount, 90-day PDP	6,399	6,404	\$1,297	\$1,473	\$1,444	\$1,546	\$74	-\$51	\$200	-\$31	\$180
IRF standardized allowed amount, 90-day PDP	6,399	6,404	\$321	\$678	\$453	\$768	\$43	-\$183	\$269	-\$147	\$232
Part B standardized allowed amount, 90-day PDP	6,328	6,291	\$3,287	\$3,502	\$3,170	\$3,533	-\$148	-\$337	\$41	-\$307	\$10
Anchor inpatient length of stay	6,422	6,422	4.6	4.4	4.6	4.4	0.0	-0.2	0.1	-0.1	0.1
Number of SNF days, 90-day PDP ²	2,462	2,396	36.5	35.0	36.7	36.5	-1.3	-3.3	0.7	-2.9	0.4
Number of HHA visits, 90-day PDP ²	2,834	2,759	16.2	16.7	18.1	16.8	1.8	0.5	3.1	0.7	2.8
Patients discharged to PAC	6,422	6,421	57.0%	58.3%	57.4%	58.5%	0.2	-2.8	3.2	-2.3	2.7
Patients discharged to institutional PAC (of those who received PAC)	3,780	3,725	60.3%	59.1%	57.2%	58.2%	-2.1	-6.0	1.7	-5.4	1.1

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Emergency department use, 30-day PDP	6,384	6,396	12.8%	13.1%	11.2%	12.8%	-1.3	-3.0	0.4	-2.8	0.1
Emergency department use, 90-day PDP	6,361	6,378	24.5%	27.0%	23.2%	25.9%	-0.2	-2.7	2.4	-2.3	2.0
Unplanned readmission rate, 30-day PDP	6,384	6,396	14.1%	12.8%	14.3%	14.0%	-1.0	-2.8	0.8	-2.5	0.5
Unplanned readmission rate, 90-day PDP	6,361	6,378	26.4%	25.6%	27.8%	26.9%	0.1	-2.0	2.3	-1.7	1.9
All-cause mortality rate, 30-day PDP	6,302	6,310	6.7%	5.1%	4.3%	4.8%	-2.1	-3.4	-0.9	-3.2	-1.1
All-cause mortality rate, 90-day PDP	6,280	6,292	13.3%	11.0%	10.4%	10.5%	-2.4	-4.2	-0.7	-3.9	-1.0

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Exhibit M.3: Stroke Episodes, Model 2 PGP, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	3,455	3,417	\$30,132	\$30,016	\$29,543	\$30,115	-\$689	-\$2,522	\$1,144	-\$2,228	\$850
Total allowed payment amount, IP through 120-day PDP	3,312	3,277	\$32,901	\$32,856	\$32,338	\$32,630	-\$337	-\$2,348	\$1,674	-\$2,025	\$1,351
Total amount paid by Medicare, IP through 90-day PDP ¹	3,455	3,417	\$26,861	\$26,564	\$26,224	\$26,570	-\$643	-\$2,274	\$987	-\$2,012	\$725
Total amount included in the bundle definition, 30-day episodes	79	77	\$18,965	\$21,520	\$20,953	\$20,595	\$2,912	-\$1,907	\$7,731	-\$1,132	\$6,957
Total amount included in the bundle definition, 90-day episodes	3,376	3,340	\$29,458	\$29,235	\$28,477	\$29,271	-\$1,018	-\$2,869	\$832	-\$2,571	\$535
Total allowed payment amount, 30 days post-bundle	2,910	2,872	\$3,502	\$3,368	\$3,669	\$2,929	\$606	\$120	\$1,092	\$198	\$1,014
Readmissions standardized allowed amount, 90-day PDP	3,472	3,457	\$2,675	\$2,558	\$2,801	\$2,763	-\$77	-\$569	\$414	-\$490	\$335
SNF standardized allowed amount, 90-day PDP	3,472	3,457	\$7,407	\$7,390	\$7,467	\$7,583	-\$133	-\$1,363	\$1,096	-\$1,165	\$899
HHA standardized allowed amount, 90-day PDP	3,472	3,457	\$1,420	\$1,642	\$1,430	\$1,553	\$99	-\$61	\$259	-\$36	\$233
IRF standardized allowed amount, 90-day PDP	3,472	3,457	\$6,000	\$5,835	\$4,884	\$5,189	-\$470	-\$1,362	\$423	-\$1,219	\$279
Part B standardized allowed amount, 90-day PDP	3,455	3,417	\$3,024	\$3,128	\$3,008	\$3,284	-\$173	-\$422	\$76	-\$382	\$36
Anchor inpatient length of stay	3,485	3,485	4.9	4.5	5.0	4.5	0.1	-0.1	0.3	-0.1	0.2
Number of SNF days, 90-day PDP ²	1,191	1,192	40.7	39.3	39.8	38.7	-0.3	-3.9	3.4	-3.3	2.8
Number of HHA visits, 90-day PDP ²	1,446	1,303	16.6	17.2	16.1	15.9	0.8	-0.3	1.8	-0.1	1.6
Patients discharged to PAC	3,475	3,483	64.2%	63.3%	63.9%	63.5%	-0.5	-4.7	3.7	-4.0	3.0

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Patients discharged to institutional PAC (of those who received PAC)	2,226	2,204	78.1%	76.6%	77.9%	76.0%	0.4	-3.8	4.6	-3.1	3.9
Emergency department use, 30-day PDP	3,464	3,470	10.3%	11.0%	8.9%	11.6%	-2.1	-4.3	0.2	-3.9	-0.2
Emergency department use, 90-day PDP	3,451	3,442	20.5%	22.4%	19.3%	22.9%	-1.6	-4.8	1.5	-4.3	1.0
Unplanned readmission rate, 30-day PDP	3,464	3,470	11.4%	9.8%	12.2%	10.0%	0.7	-1.8	3.2	-1.4	2.8
Unplanned readmission rate, 90-day PDP	3,451	3,442	20.9%	17.9%	20.9%	17.7%	0.2	-2.8	3.2	-2.3	2.7
All-cause mortality rate, 30-day PDP	3,442	3,459	12.0%	11.0%	11.8%	10.3%	0.5	-1.8	2.7	-1.4	2.4
All-cause mortality rate, 90-day PDP	3,429	3,431	17.2%	15.5%	16.8%	14.9%	0.3	-2.3	2.9	-1.9	2.5

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Exhibit M.4: Chronic Obstructive Pulmonary Disease, Bronchitis, and Asthma Episodes, Model 2 PGP, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	9,036	8,966	\$18,280	\$19,137	\$18,518	\$19,447	-\$73	-\$788	\$642	-\$673	\$527
Total allowed payment amount, IP through 120-day PDP	8,663	8,585	\$21,224	\$22,261	\$21,485	\$22,605	-\$84	-\$932	\$765	-\$796	\$629
Total amount paid by Medicare, IP through 90-day PDP ¹	9,034	8,961	\$15,921	\$16,641	\$16,141	\$16,841	\$21	-\$633	\$675	-\$528	\$570
Total amount included in the bundle definition, 30-day episodes	330	327	\$10,838	\$12,354	\$10,232	\$12,017	-\$270	-\$1,643	\$1,103	-\$1,423	\$882
Total amount included in the bundle definition, 90-day episodes	8,710	8,639	\$17,447	\$18,107	\$17,804	\$18,429	\$34	-\$654	\$721	-\$543	\$611
Total allowed payment amount, 30 days post-bundle	8,243	8,221	\$3,165	\$3,325	\$3,240	\$3,439	-\$38	-\$338	\$262	-\$290	\$213
Readmissions standardized allowed amount, 90-day PDP	9,135	9,138	\$3,981	\$4,331	\$4,149	\$4,294	\$206	-\$148	\$559	-\$91	\$502
SNF standardized allowed amount, 90-day PDP	9,135	9,138	\$2,425	\$2,352	\$2,444	\$2,683	-\$312	-\$628	\$5	-\$577	-\$46
HHA standardized allowed amount, 90-day PDP	9,135	9,138	\$1,072	\$1,113	\$1,103	\$1,131	\$13	-\$75	\$101	-\$61	\$86
IRF standardized allowed amount, 90-day PDP	9,135	9,138	\$389	\$519	\$306	\$333	\$102	-\$37	\$242	-\$15	\$220
LTCH standardized allowed amount, 90-day PDP	9,135	9,138	\$364	\$432	\$571	\$685	-\$46	-\$286	\$194	-\$247	\$156
Part B standardized allowed amount, 90-day PDP	9,037	8,966	\$3,295	\$3,513	\$3,143	\$3,480	-\$119	-\$277	\$38	-\$251	\$13
Anchor inpatient length of stay	9,200	9,200	4.6	4.4	4.8	4.4	0.2	0.0	0.3	0.1	0.3
Number of SNF days, 90-day PDP ²	1,566	1,558	30.9	27.1	30.9	29.7	-2.5	-4.8	-0.2	-4.5	-0.6

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Number of HHA visits, 90-day PDP ²	3,607	3,195	14.9	14.9	15.4	15.2	0.2	-0.6	1.1	-0.5	0.9
Patients discharged to PAC	9,195	9,200	36.4%	38.1%	36.7%	37.7%	0.7	-1.8	3.1	-1.4	2.7
Patients discharged to institutional PAC (of those who received PAC)	3,614	3,361	33.6%	34.0%	36.0%	35.6%	0.8	-2.8	4.4	-2.2	3.8
Emergency department use, 30-day PDP	9,074	9,098	13.4%	14.4%	11.7%	13.5%	-0.7	-2.4	1.0	-2.1	0.7
Emergency department use, 90-day PDP	9,011	9,036	26.4%	29.4%	24.0%	26.7%	0.3*	-1.8	2.4	-1.4	2.0
Unplanned readmission rate, 30-day PDP	9,074	9,098	16.6%	16.1%	17.4%	15.8%	1.0	-0.8	2.8	-0.5	2.5
Unplanned readmission rate, 90-day PDP	9,011	9,036	31.6%	31.2%	33.4%	31.1%	2.0	0.0	3.9	0.3	3.6
All-cause mortality rate, 30-day PDP	9,008	9,036	3.3%	3.0%	3.2%	2.9%	-0.1	-0.9	0.8	-0.7	0.6
All-cause mortality rate, 90-day PDP	8,946	8,974	7.4%	7.3%	7.6%	7.3%	0.2	-1.0	1.3	-0.8	1.1

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Exhibit M.5: Major Joint Replacement of the Lower Extremity Episodes, Model 2 PGP, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	64,271	63,935	\$26,180	\$23,809	\$25,939	\$25,525	-\$1,958	-\$2,324	-\$1,592	-\$2,265	-\$1,650
Total allowed payment amount, IP through 120-day PDP	61,523	61,290	\$27,391	\$25,140	\$27,195	\$26,878	-\$1,933	-\$2,323	-\$1,544	-\$2,260	-\$1,607
Total amount paid by Medicare, IP through 90-day PDP ¹	64,270	63,934	\$23,599	\$21,241	\$23,346	\$22,835	-\$1,848	-\$2,188	-\$1,509	-\$2,133	-\$1,563
Total amount included in the bundle definition, 30-day episodes	845	841	\$24,353	\$21,385	\$22,268	\$21,089	-\$1,789	-\$3,336	-\$241	-\$3,088	-\$490
Total amount included in the bundle definition, 90-day episodes	63,434	63,094	\$25,796	\$23,457	\$25,621	\$25,242	-\$1,960	-\$2,318	-\$1,602	-\$2,261	-\$1,660
Total allowed payment amount, 30 days post-bundle	62,845	62,502	\$1,249	\$1,319	\$1,285	\$1,354	\$1	-\$78	\$80	-\$65	\$67
Readmissions standardized allowed amount, 90-day PDP	64,279	64,281	\$1,143	\$1,104	\$1,095	\$1,126	-\$71	-\$156	\$15	-\$142	\$1
SNF standardized allowed amount, 90-day PDP	64,279	64,281	\$4,887	\$3,325	\$4,854	\$4,375	-\$1,084	-\$1,371	-\$797	-\$1,325	-\$843
HHA standardized allowed amount, 90-day PDP	64,279	64,281	\$2,148	\$1,785	\$1,974	\$1,972	-\$362	-\$489	-\$236	-\$469	-\$256
IRF standardized allowed amount, 90-day PDP	64,279	64,281	\$1,197	\$445	\$1,213	\$1,077	-\$616	-\$830	-\$402	-\$795	-\$437
Part B standardized allowed amount, 90-day PDP	64,273	63,935	\$2,380	\$2,354	\$2,372	\$2,455	-\$109	-\$167	-\$51	-\$158	-\$60
Anchor inpatient length of stay	64,392	64,392	4.3	3.6	4.3	3.7	-0.1	-0.2	0.0	-0.2	0.0
Number of SNF days, 90-day PDP ²	19,220	21,409	23.9	19.2	24.0	23.2	-4.0	-4.7	-3.2	-4.6	-3.3
Number of HHA visits, 90-day PDP ²	34,087	40,682	12.1	10.5	12.3	11.8	-1.2	-1.6	-0.8	-1.5	-0.8
Patients discharged to PAC	64,388	64,390	83.4%	70.2%	80.0%	74.9%	-8.1	-11.5	-4.6	-11.0	-5.2

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Patients discharged to institutional PAC (of those who received PAC)	42,596	50,390	57.6%	45.3%	59.2%	50.8%	-3.9	-6.6	-1.2	-6.1	-1.6
Emergency department use, 30-day PDP	64,381	64,381	7.7%	7.8%	7.6%	8.3%	-0.6	-1.2	-0.1	-1.1	-0.2
Emergency department use, 90-day PDP	64,270	64,270	13.6%	13.7%	13.4%	14.5%	-1.0	-1.7	-0.3	-1.6	-0.4
Unplanned readmission rate, 30-day PDP	64,381	64,381	5.7%	4.6%	5.6%	4.6%	-0.1	-0.6	0.3	-0.5	0.2
Unplanned readmission rate, 90-day PDP	64,270	64,270	9.2%	7.5%	8.9%	7.7%	-0.5	-1.1	0.0	-1.0	0.0
All-cause mortality rate, 30-day PDP	64,201	64,217	0.9%	0.8%	0.9%	0.8%	0.0*	-0.2	0.1	-0.2	0.1
All-cause mortality rate, 90-day PDP	64,092	64,110	1.8%	1.7%	1.8%	1.7%	-0.1*	-0.3	0.2	-0.3	0.1

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Exhibit M.6: Major Joint Replacement of the Lower Extremity Fracture Episodes, Model 2 PGP, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	7,702	7,681	\$42,744	\$40,905	\$42,895	\$43,834	-\$2,778	-\$3,770	-\$1,786	-\$3,611	-\$1,945
Total allowed payment amount, IP through 120-day PDP	7,367	7,335	\$45,086	\$43,211	\$45,388	\$46,444	-\$2,930	-\$4,050	-\$1,810	-\$3,870	-\$1,990
Total amount paid by Medicare, IP through 90-day PDP ¹	7,702	7,681	\$38,225	\$36,595	\$38,322	\$39,103	-\$2,411	-\$3,273	-\$1,550	-\$3,134	-\$1,689
Total amount included in the bundle definition, 30-day episodes	68	67	\$37,219	\$35,289	\$32,676	\$32,709	-\$1,963	-\$6,150	\$2,224	-\$5,477	\$1,551
Total amount included in the bundle definition, 90-day episodes	7,635	7,614	\$42,174	\$40,370	\$42,254	\$43,278	-\$2,829	-\$3,800	-\$1,857	-\$3,644	-\$2,013
Total allowed payment amount, 30 days post-bundle	6,818	6,815	\$2,781	\$2,637	\$2,905	\$2,934	-\$173	-\$477	\$130	-\$428	\$81
Readmissions standardized allowed amount, 90-day PDP	7,704	7,706	\$2,870	\$2,776	\$2,897	\$2,849	-\$46	-\$396	\$304	-\$340	\$247
SNF standardized allowed amount, 90-day PDP	7,704	7,706	\$14,504	\$13,731	\$14,341	\$14,978	-\$1,410	-\$2,248	-\$572	-\$2,113	-\$707
HHA standardized allowed amount, 90-day PDP	7,704	7,706	\$2,175	\$2,272	\$2,057	\$2,179	-\$26	-\$142	\$91	-\$124	\$72
IRF standardized allowed amount, 90-day PDP	7,704	7,706	\$3,325	\$2,220	\$3,872	\$3,815	-\$1,048	-\$1,580	-\$515	-\$1,495	-\$601
Part B standardized allowed amount, 90-day PDP	7,702	7,681	\$3,074	\$3,045	\$2,981	\$3,120	-\$168	-\$322	-\$15	-\$297	-\$39
Anchor inpatient length of stay	7,764	7,764	6.1	5.8	6.2	5.8	0.1	0.0	0.2	0.0	0.2
Number of SNF days, 90-day PDP ²	6,007	5,634	37.8	31.8	39.0	36.7	-3.8	-5.4	-2.2	-5.1	-2.5
Number of HHA visits, 90-day PDP ²	4,620	4,482	15.5	15.1	15.9	15.9	-0.4	-1.1	0.2	-1.0	0.1
Patients discharged to PAC	7,764	7,763	94.0%	93.8%	93.4%	94.2%	-1.0	-2.2	0.2	-2.0	0.0
Patients discharged to institutional PAC (of those who received PAC)	7,256	7,332	92.7%	90.9%	92.8%	92.2%	-1.2	-2.5	0.2	-2.3	0.0

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Emergency department use, 30-day PDP	7,763	7,762	9.2%	9.7%	9.6%	9.6%	0.5*	-1.1	2.0	-0.8	1.8
Emergency department use, 90-day PDP	7,703	7,704	19.8%	19.9%	19.7%	20.4%	-0.6	-2.6	1.4	-2.3	1.1
Unplanned readmission rate, 30-day PDP	7,763	7,762	12.9%	11.4%	13.2%	10.7%	1.0	-0.8	2.8	-0.5	2.5
Unplanned readmission rate, 90-day PDP	7,703	7,704	21.5%	19.1%	21.7%	19.2%	0.0	-2.2	2.3	-1.8	1.9
All-cause mortality rate, 30-day PDP	7,597	7,605	5.6%	5.1%	5.7%	5.3%	-0.2*	-1.4	1.1	-1.2	0.9
All-cause mortality rate, 90-day PDP	7,539	7,551	11.2%	11.0%	11.2%	10.9%	0.1*	-1.6	1.8	-1.3	1.5

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Exhibit M.7: Major Joint Replacement of the Lower Extremity Planned Episodes, Model 2 PGP, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	56,569	56,254	\$23,689	\$21,210	\$23,405	\$22,782	-\$1,855	-\$2,213	-\$1,498	-\$2,155	-\$1,556
Total allowed payment amount, IP through 120-day PDP	54,156	53,955	\$24,721	\$22,387	\$24,466	\$23,946	-\$1,814	-\$2,190	-\$1,437	-\$2,130	-\$1,497
Total amount paid by Medicare, IP through 90-day PDP ¹	56,568	56,253	\$21,399	\$18,913	\$21,107	\$20,397	-\$1,776	-\$2,113	-\$1,438	-\$2,059	-\$1,492
Total amount included in the bundle definition, 30-day episodes	777	774	\$23,204	\$20,010	\$21,128	\$19,827	-\$1,893	-\$3,592	-\$195	-\$3,319	-\$468
Total amount included in the bundle definition, 90-day episodes	55,799	55,480	\$23,323	\$20,881	\$23,123	\$22,524	-\$1,843	-\$2,193	-\$1,492	-\$2,137	-\$1,549
Total allowed payment amount, 30 days post-bundle	56,027	55,687	\$1,043	\$1,136	\$1,064	\$1,141	\$17	-\$56	\$91	-\$45	\$79
Readmissions standardized allowed amount, 90-day PDP	56,575	56,575	\$883	\$852	\$819	\$863	-\$74	-\$159	\$11	-\$145	-\$3
SNF standardized allowed amount, 90-day PDP	56,575	56,575	\$3,441	\$1,930	\$3,405	\$2,834	-\$941	-\$1,205	-\$676	-\$1,163	-\$719
HHA standardized allowed amount, 90-day PDP	56,575	56,575	\$2,147	\$1,725	\$1,957	\$1,935	-\$399	-\$538	-\$260	-\$516	-\$283
IRF standardized allowed amount, 90-day PDP	56,575	56,575	\$840	\$207	\$813	\$686	-\$506	-\$704	-\$307	-\$672	-\$339
Part B standardized allowed amount, 90-day PDP	56,571	56,254	\$2,267	\$2,247	\$2,285	\$2,359	-\$94	-\$154	-\$34	-\$144	-\$43
Anchor inpatient length of stay	56,628	56,628	4.0	3.3	4.0	3.4	-0.1	-0.2	0.0	-0.2	0.0
Number of SNF days, 90-day PDP ²	13,213	15,775	18.7	14.4	18.3	18.0	-3.9	-4.7	-3.2	-4.6	-3.3
Number of HHA visits, 90-day PDP ²	29,467	36,200	11.7	9.8	11.8	11.2	-1.3	-1.7	-0.9	-1.7	-0.9
Patients discharged to PAC	56,624	56,627	81.9%	66.8%	77.9%	71.8%	-9.0	-12.9	-5.0	-12.3	-5.7
Patients discharged to institutional PAC (of those who received PAC)	35,340	43,058	50.9%	36.5%	52.6%	42.6%	-4.4	-7.5	-1.2	-7.0	-1.7

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Emergency department use, 30-day PDP	56,618	56,619	7.5%	7.5%	7.2%	8.1%	-0.8	-1.4	-0.2	-1.3	-0.3
Emergency department use, 90-day PDP	56,567	56,566	12.7%	12.8%	12.4%	13.6%	-1.1	-1.8	-0.3	-1.7	-0.4
Unplanned readmission rate, 30-day PDP	56,618	56,619	4.7%	3.6%	4.4%	3.7%	-0.3	-0.8	0.2	-0.7	0.1
Unplanned readmission rate, 90-day PDP	56,567	56,566	7.3%	5.8%	6.9%	6.0%	-0.6*	-1.2	0.0	-1.1	-0.1
All-cause mortality rate, 30-day PDP	56,604	56,612	0.2%	0.2%	0.1%	0.2%	0.0	-0.1	0.0	-0.1	0.0
All-cause mortality rate, 90-day PDP	56,553	56,559	0.4%	0.4%	0.3%	0.4%	-0.1	-0.2	0.0	-0.2	0.0

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Exhibit M.8: Percutaneous Coronary Intervention Episodes, Model 2 PGP, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	2,698	2,669	\$24,445	\$27,071	\$24,005	\$27,069	-\$438	-\$1,631	\$755	-\$1,439	\$563
Total allowed payment amount, IP through 120-day PDP	2,632	2,604	\$26,512	\$29,453	\$26,111	\$29,594	-\$541	-\$1,832	\$749	-\$1,625	\$542
Total amount paid by Medicare, IP through 90-day PDP ¹	2,697	2,669	\$22,007	\$24,415	\$21,675	\$24,414	-\$331	-\$1,439	\$777	-\$1,261	\$599
Total amount included in the bundle definition, 90-day episodes	2,698	2,670	\$23,993	\$26,223	\$23,561	\$25,731	\$60	-\$1,036	\$1,157	-\$860	\$981
Total allowed payment amount, 30-days post-bundle	2,550	2,557	\$2,116	\$2,431	\$2,148	\$2,590	-\$127	-\$587	\$334	-\$513	\$260
Readmissions standardized allowed amount, 90-day PDP	2,716	2,714	\$3,032	\$3,444	\$3,055	\$3,631	-\$163	-\$797	\$471	-\$695	\$369
SNF standardized allowed amount, 90-day PDP	2,716	2,714	\$1,236	\$1,488	\$1,416	\$1,494	\$175	-\$262	\$612	-\$192	\$542
HHA standardized allowed amount, 90-day PDP	2,716	2,714	\$726	\$755	\$583	\$660	-\$48	-\$172	\$76	-\$152	\$56
Part B standardized allowed amount, 90-day PDP	2,698	2,670	\$3,429	\$4,039	\$3,144	\$3,920	-\$167	-\$548	\$213	-\$486	\$152
Anchor inpatient length of stay	2,722	2,722	4.3	4.2	3.9	4.0	-0.2	-0.4	0.0	-0.4	0.0
Number of SNF days, 90-day PDP ²	297	270	30.0	26.8	28.4	27.5	-2.2	-8.2	3.8	-7.2	2.8
Number of HHA visits, 90-day PDP ²	682	590	15.2	14.4	14.1	14.0	-0.6	-2.6	1.3	-2.3	1.0
Patients discharged to PAC	2,720	2,721	24.7%	23.6%	21.3%	21.0%	-0.8	-3.8	2.2	-3.3	1.7
Patients discharged to institutional PAC (of those who received PAC)	675	583	34.2%	38.5%	39.9%	37.3%	6.8	-1.7	15.3	-0.3	14.0
Emergency department use, 30-day PDP	2,710	2,712	13.1%	14.4%	11.4%	14.8%	-2.1*	-4.7	0.6	-4.3	0.2
Emergency department use, 90-day PDP	2,704	2,705	23.6%	25.1%	21.5%	26.8%	-3.8*	-7.3	-0.4	-6.7	-0.9

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Unplanned readmission rate, 30-day PDP	2,710	2,712	12.0%	10.3%	11.4%	9.5%	0.2	-2.3	2.8	-1.9	2.4
Unplanned readmission rate, 90-day PDP	2,704	2,705	20.6%	18.1%	18.9%	17.9%	-1.4	-4.6	1.9	-4.1	1.4
All-cause mortality rate, 30-day PDP	2,702	2,709	1.7%	1.9%	1.9%	1.7%	0.4	-0.8	1.6	-0.6	1.4
All-cause mortality rate, 90-day PDP	2,696	2,702	3.9%	4.5%	2.9%	3.6%	-0.1	-1.7	1.5	-1.4	1.3

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Exhibit M.9: Congestive Heart Failure Episodes, Model 2 PGP, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	9,488	9,449	\$24,556	\$25,049	\$24,682	\$25,374	-\$200	-\$1,126	\$727	-\$977	\$578
Total allowed payment amount, IP through 120-day PDP	9,095	9,077	\$27,980	\$28,607	\$28,031	\$29,256	-\$598	-\$1,671	\$475	-\$1,499	\$302
Total amount paid by Medicare, IP through 90-day PDP ¹	9,488	9,443	\$21,804	\$22,141	\$21,947	\$22,401	-\$116	-\$967	\$735	-\$830	\$598
Total amount included in the bundle definition, 30-day episodes	654	650	\$15,853	\$15,835	\$15,446	\$14,825	\$603	-\$1,383	\$2,590	-\$1,064	\$2,271
Total amount included in the bundle definition, 90-day episodes	8,838	8,799	\$24,074	\$24,274	\$24,186	\$24,794	-\$408	-\$1,334	\$517	-\$1,185	\$368
Total allowed payment amount, 30-days post-bundle	7,862	7,777	\$4,223	\$4,257	\$4,163	\$4,592	-\$396	-\$801	\$10	-\$736	-\$55
Readmissions standardized allowed amount, 90-day PDP	9,518	9,509	\$5,483	\$5,581	\$5,519	\$5,685	-\$68	-\$548	\$413	-\$471	\$335
SNF standardized allowed amount, 90-day PDP	9,518	9,509	\$4,030	\$4,125	\$3,938	\$4,310	-\$278	-\$672	\$117	-\$609	\$53
HHA standardized allowed amount, 90-day PDP	9,518	9,509	\$1,457	\$1,579	\$1,490	\$1,539	\$72	-\$45	\$189	-\$26	\$170
IRF standardized allowed amount, 90-day PDP	9,518	9,509	\$533	\$646	\$491	\$526	\$79	-\$105	\$263	-\$76	\$233
LTCH standardized allowed amount, 90-day PDP	9,518	9,509	\$523	\$382	\$735	\$532	\$62	-\$201	\$324	-\$159	\$282
Part B standardized allowed amount, 90-day PDP	9,488	9,449	\$3,706	\$4,032	\$3,724	\$4,095	-\$44	-\$251	\$163	-\$218	\$129
Anchor inpatient length of stay	9,584	9,584	5.4	5.0	5.4	5.1	-0.1	-0.2	0.0	-0.2	0.0
Number of SNF days, 90-day PDP ²	2,712	2,622	30.3	28.5	31.0	29.2	0.0	-1.9	1.9	-1.6	1.6
Number of HHA visits, 90-day PDP ²	4,891	4,576	15.7	16.0	16.4	15.8	0.9	0.0	1.7	0.2	1.6
Patients discharged to PAC	9,568	9,574	54.5%	56.0%	55.7%	54.8%	2.5	-0.1	5.0	0.4	4.6

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Patients discharged to institutional PAC (of those who received PAC)	5,530	5,112	42.9%	41.5%	41.8%	42.0%	-1.5	-4.9	1.9	-4.4	1.3
Emergency department use, 30-day PDP	9,512	9,517	11.2%	12.6%	10.8%	11.9%	0.2	-1.4	1.9	-1.2	1.6
Emergency department use, 90-day PDP	9,446	9,442	23.1%	25.4%	21.9%	24.0%	0.2	-1.8	2.2	-1.5	1.9
Unplanned readmission rate, 30-day PDP	9,512	9,517	20.8%	17.9%	20.9%	17.9%	0.1	-1.9	2.0	-1.5	1.7
Unplanned readmission rate, 90-day PDP	9,446	9,442	37.3%	34.9%	38.4%	35.7%	0.4	-2.1	2.8	-1.7	2.4
All-cause mortality rate, 30-day PDP	9,396	9,439	8.7%	8.3%	7.9%	7.9%	-0.4	-1.4	0.7	-1.3	0.5
All-cause mortality rate, 90-day PDP	9,332	9,364	18.2%	16.9%	17.2%	17.1%	-1.2*	-2.9	0.5	-2.6	0.2

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Exhibit M.10: Acute Myocardial Infarction Episodes, Model 2 PGP, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	3,741	3,717	\$25,693	\$26,091	\$25,979	\$26,535	-\$159	-\$1,724	\$1,406	-\$1,472	\$1,155
Total allowed payment amount, IP through 120-day PDP	3,612	3,585	\$28,142	\$28,576	\$28,261	\$29,350	-\$656	-\$2,465	\$1,153	-\$2,175	\$862
Total amount paid by Medicare, IP through 90-day PDP ¹	3,739	3,717	\$22,967	\$23,254	\$23,243	\$23,526	\$4	-\$1,445	\$1,453	-\$1,212	\$1,220
Total amount included in the bundle definition, 90-day episodes	3,741	3,717	\$24,994	\$25,390	\$25,362	\$25,808	-\$51	-\$1,545	\$1,444	-\$1,305	\$1,203
Total allowed payment amount, 30-days post-bundle	3,084	3,089	\$2,972	\$2,984	\$2,881	\$3,201	-\$308	-\$850	\$234	-\$763	\$147
Readmissions standardized allowed amount, 90-day PDP	3,747	3,747	\$4,416	\$4,940	\$4,821	\$5,142	\$202	-\$528	\$932	-\$411	\$815
SNF standardized allowed amount, 90-day PDP	3,747	3,747	\$3,650	\$3,637	\$3,385	\$3,778	-\$406	-\$1,076	\$263	-\$968	\$156
HHA standardized allowed amount, 90-day PDP	3,747	3,747	\$1,080	\$1,003	\$1,034	\$1,075	-\$118	-\$251	\$15	-\$229	-\$7
IRF standardized allowed amount, 90-day PDP	3,747	3,747	\$538	\$535	\$735	\$539	\$193	-\$85	\$470	-\$40	\$426
Part B standardized allowed amount, 90-day PDP	3,741	3,717	\$3,356	\$3,500	\$3,494	\$3,853	-\$215	-\$522	\$92	-\$473	\$42
Anchor inpatient length of stay	3,772	3,772	5.3	4.9	5.5	4.8	0.3	0.1	0.5	0.1	0.5
Number of SNF days, 90-day PDP ²	881	858	30.2	28.3	29.8	30.8	-2.8	-6.4	0.8	-5.8	0.2
Number of HHA visits, 90-day PDP ²	1,286	1,257	14.7	14.2	14.8	15.2	-0.9	-2.2	0.3	-2.0	0.1
Patients discharged to PAC	3,746	3,757	43.0%	40.7%	42.7%	41.2%	-0.8	-4.6	3.0	-4.0	2.4
Patients discharged to institutional PAC (of those who received PAC)	1,548	1,499	50.9%	53.1%	52.4%	51.7%	2.9	-3.5	9.2	-2.5	8.2
Emergency department use, 30-day PDP	3,698	3,722	12.0%	13.3%	11.2%	13.8%	-1.3	-4.0	1.4	-3.5	1.0

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Emergency department use, 90-day PDP	3,674	3,697	22.9%	24.8%	21.2%	24.7%	-1.6	-4.9	1.8	-4.4	1.2
Unplanned readmission rate, 30-day PDP	3,698	3,722	16.1%	14.3%	18.6%	15.0%	1.7	-1.2	4.7	-0.7	4.2
Unplanned readmission rate, 90-day PDP	3,674	3,697	28.8%	25.0%	31.0%	26.6%	0.6	-2.7	4.0	-2.2	3.4
All-cause mortality rate, 30-day PDP	3,678	3,692	10.4%	9.5%	11.8%	9.5%	1.4	-1.1	3.9	-0.7	3.5
All-cause mortality rate, 90-day PDP	3,654	3,667	17.7%	17.1%	18.9%	16.8%	1.5	-1.5	4.6	-1.0	4.1

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Exhibit M.11: Cardiac Arrhythmia Episodes, Model 2 PGP, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	2,948	2,929	\$16,779	\$18,657	\$17,368	\$18,098	\$1,148	-\$58	\$2,354	\$136	\$2,160
Total allowed payment amount, IP through 120-day PDP	2,832	2,821	\$19,153	\$21,101	\$19,846	\$20,873	\$921	-\$513	\$2,356	-\$283	\$2,125
Total amount paid by Medicare, IP through 90-day PDP ¹	2,948	2,928	\$14,485	\$15,930	\$14,946	\$15,469	\$922	-\$177	\$2,021	\$0	\$1,845
Total amount included in the bundle definition, 90-day episodes	2,949	2,929	\$16,263	\$18,105	\$16,786	\$17,543	\$1,086	-\$87	\$2,259	\$102	\$2,070
Total allowed payment amount, 30-days post-bundle	2,657	2,696	\$2,591	\$2,715	\$2,690	\$2,959	-\$145	-\$623	\$333	-\$546	\$256
Readmissions standardized allowed amount, 90-day PDP	2,967	2,966	\$3,066	\$3,526	\$3,398	\$3,695	\$162	-\$448	\$772	-\$350	\$674
SNF standardized allowed amount, 90-day PDP	2,967	2,966	\$2,450	\$2,902	\$2,488	\$2,373	\$567	\$41	\$1,092	\$126	\$1,008
HHA standardized allowed amount, 90-day PDP	2,967	2,966	\$917	\$966	\$866	\$934	-\$19	-\$145	\$108	-\$124	\$87
IRF standardized allowed amount, 90-day PDP	2,967	2,966	\$332	\$619	\$380	\$464	\$202	-\$49	\$453	-\$9	\$412
Part B standardized allowed amount, 90-day PDP	2,949	2,929	\$3,378	\$4,079	\$3,517	\$4,171	\$48	-\$260	\$355	-\$211	\$306
Anchor inpatient length of stay	2,978	2,978	4.0	3.9	4.0	3.8	0.0	-0.2	0.2	-0.1	0.1
Number of SNF days, 90-day PDP ²	551	436	29.1	31.8	30.8	30.4	3.1	-1.2	7.5	-0.5	6.8
Number of HHA visits, 90-day PDP ²	1,025	862	14.6	14.5	15.3	15.0	0.2	-1.2	1.7	-1.0	1.4
Patients discharged to PAC	2,977	2,977	33.9%	36.4%	31.6%	31.9%	2.3	-1.0	5.5	-0.5	5.0
Patients discharged to institutional PAC (of those who received PAC)	1,158	931	41.4%	42.8%	43.0%	38.1%	6.3	0.1	12.4	1.1	11.4
Emergency department use, 30-day PDP	2,939	2,953	13.3%	15.1%	12.6%	13.5%	0.9	-1.6	3.3	-1.2	2.9

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Emergency department use, 90-day PDP	2,929	2,941	23.9%	27.9%	23.5%	25.8%	1.7	-1.5	5.0	-1.0	4.5
Unplanned readmission rate, 30-day PDP	2,939	2,953	12.0%	11.9%	14.1%	11.2%	2.8*	0.3	5.4	0.7	5.0
Unplanned readmission rate, 90-day PDP	2,929	2,941	21.4%	21.8%	24.7%	21.6%	3.5	0.5	6.5	1.0	6.0
All-cause mortality rate, 30-day PDP	2,928	2,943	4.2%	4.7%	3.5%	3.1%	1.0	-0.4	2.4	-0.2	2.1
All-cause mortality rate, 90-day PDP	2,918	2,931	7.8%	8.8%	7.8%	7.2%	1.6*	-0.4	3.6	-0.1	3.3

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Exhibit M.12: Gastrointestinal Hemorrhage Episodes, Model 2 PGP, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	2,438	2,427	\$19,142	\$18,620	\$18,625	\$19,633	-\$1,531	-\$2,784	-\$277	-\$2,582	-\$479
Total allowed payment amount, IP through 120-day PDP	2,339	2,337	\$21,200	\$20,936	\$20,806	\$21,900	-\$1,357	-\$2,858	\$144	-\$2,617	-\$97
Total amount paid by Medicare, IP through 90-day PDP ¹	2,436	2,427	\$16,687	\$16,069	\$16,187	\$16,966	-\$1,397	-\$2,539	-\$256	-\$2,355	-\$439
Total amount included in the bundle definition, 90-day episodes	2,438	2,427	\$17,949	\$17,483	\$17,882	\$18,535	-\$1,119	-\$2,266	\$28	-\$2,082	-\$157
Total allowed payment amount, 30 days post-bundle	2,209	2,201	\$2,369	\$2,529	\$2,444	\$2,551	\$53	-\$442	\$548	-\$363	\$468
Readmissions standardized allowed amount, 90-day PDP	2,451	2,447	\$3,784	\$3,222	\$3,391	\$3,502	-\$673	-\$1,367	\$22	-\$1,255	-\$90
SNF standardized allowed amount, 90-day PDP	2,451	2,447	\$2,587	\$2,667	\$2,753	\$3,110	-\$277	-\$879	\$326	-\$782	\$229
HHA standardized allowed amount, 90-day PDP	2,451	2,447	\$736	\$806	\$783	\$789	\$64	-\$76	\$205	-\$53	\$182
Part B standardized allowed amount, 90-day PDP	2,438	2,427	\$3,161	\$3,272	\$3,037	\$3,417	-\$269	-\$613	\$75	-\$558	\$20
Anchor inpatient length of stay	2,461	2,461	4.6	4.4	4.7	4.3	0.1	-0.1	0.3	-0.1	0.3
Number of SNF days, 90-day PDP ²	442	459	29.0	30.2	30.0	31.4	-0.2	-5.0	4.6	-4.2	3.8
Number of HHA visits, 90-day PDP ²	686	633	14.0	14.2	14.2	14.4	0.1	-1.7	1.9	-1.4	1.6
Patients discharged to PAC	2,458	2,460	31.0%	30.9%	31.1%	31.6%	-0.6	-4.3	3.2	-3.7	2.6
Patients discharged to institutional PAC (of those who received PAC)	790	777	53.1%	45.7%	53.3%	52.3%	-6.5	-14.7	1.7	-13.4	0.4
Emergency department use, 30-day PDP	2,428	2,443	10.6%	12.9%	9.2%	11.9%	-0.4	-3.0	2.1	-2.6	1.7
Emergency department use, 90-day PDP	2,418	2,429	20.2%	23.4%	19.2%	22.6%	-0.3	-3.4	2.9	-2.9	2.4

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Unplanned readmission rate, 30-day PDP	2,428	2,443	14.6%	11.5%	13.4%	12.2%	-1.9*	-4.8	0.9	-4.3	0.5
Unplanned readmission rate, 90-day PDP	2,418	2,429	24.3%	20.7%	24.3%	21.8%	-1.0	-4.8	2.8	-4.1	2.2
All-cause mortality rate, 30-day PDP	2,408	2,422	4.4%	4.3%	4.8%	3.9%	0.8	-0.8	2.4	-0.6	2.1
All-cause mortality rate, 90-day PDP	2,398	2,408	9.7%	8.8%	9.3%	8.1%	0.4	-1.7	2.5	-1.4	2.2

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Exhibit M.13: Medical Non-infectious Orthopedic Episodes, Model 2 PGP, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	3,376	3,366	\$27,392	\$27,765	\$26,902	\$28,748	-\$1,472	-\$2,967	\$23	-\$2,726	-\$217
Total allowed payment amount, IP through 120-day PDP	3,272	3,280	\$30,546	\$30,704	\$29,890	\$31,979	-\$1,932	-\$3,670	-\$193	-\$3,391	-\$473
Total amount paid by Medicare, IP through 90-day PDP ¹	3,376	3,365	\$23,667	\$23,943	\$23,374	\$24,834	-\$1,184	-\$2,507	\$140	-\$2,294	-\$73
Total amount included in the bundle definition, 90-day episodes	3,376	3,366	\$26,195	\$26,630	\$25,762	\$27,550	-\$1,353	-\$2,713	\$6	-\$2,494	-\$212
Total allowed payment amount, 30 days post-bundle	3,085	3,064	\$3,463	\$3,252	\$3,272	\$3,601	-\$540	-\$1,029	-\$50	-\$950	-\$129
Readmissions standardized allowed amount, 90-day PDP	3,425	3,430	\$3,615	\$3,315	\$3,833	\$3,520	\$13	-\$564	\$591	-\$472	\$498
SNF standardized allowed amount, 90-day PDP	3,425	3,430	\$9,770	\$10,362	\$9,225	\$10,303	-\$486	-\$1,495	\$523	-\$1,333	\$360
HHA standardized allowed amount, 90-day PDP	3,425	3,430	\$1,583	\$1,722	\$1,566	\$1,797	-\$92	-\$252	\$68	-\$227	\$43
IRF standardized allowed amount, 90-day PDP	3,425	3,430	\$1,379	\$1,616	\$1,711	\$2,267	-\$319	-\$806	\$168	-\$727	\$90
Part B standardized allowed amount, 90-day PDP	3,376	3,366	\$3,533	\$3,614	\$3,550	\$3,811	-\$180	-\$477	\$117	-\$430	\$69
Anchor inpatient length of stay	3,437	3,437	4.7	4.5	4.5	4.4	-0.1	-0.2	0.1	-0.2	0.1
Number of SNF days, 90-day PDP ²	1,785	1,760	38.8	36.6	38.6	37.6	-1.2	-3.8	1.5	-3.4	1.1
Number of HHA visits, 90-day PDP ²	1,804	1,705	15.3	15.3	15.6	15.5	0.0	-1.2	1.2	-1.1	1.0
Patients discharged to PAC	3,435	3,435	69.1%	69.7%	66.2%	70.0%	-3.1	-6.5	0.3	-6.0	-0.3
Patients discharged to institutional PAC (of those who received PAC)	2,411	2,402	74.1%	75.5%	73.0%	75.6%	-1.3	-5.3	2.8	-4.7	2.1
Emergency department use, 30-day PDP	3,399	3,415	13.2%	12.4%	11.2%	10.9%	-0.5	-2.9	1.8	-2.5	1.5

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Emergency department use, 90-day PDP	3,387	3,408	24.4%	25.6%	21.3%	23.6%	-1.1*	-4.6	2.3	-4.0	1.7
Unplanned readmission rate, 30-day PDP	3,399	3,415	13.7%	11.9%	13.5%	10.9%	0.8	-1.6	3.3	-1.2	2.9
Unplanned readmission rate, 90-day PDP	3,387	3,408	24.2%	21.9%	24.0%	23.2%	-1.5	-4.8	1.8	-4.3	1.3
All-cause mortality rate, 30-day PDP	3,359	3,391	4.4%	3.4%	4.0%	3.7%	-0.8	-2.2	0.5	-2.0	0.3
All-cause mortality rate, 90-day PDP	3,347	3,385	8.3%	7.9%	8.0%	7.9%	-0.4	-2.2	1.4	-1.9	1.1

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Exhibit M.14: Spinal Fusion (non-cervical) Episodes, Model 2 PGP, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	2,382	2,355	\$38,633	\$38,019	\$38,689	\$40,582	-\$2,507	-\$4,233	-\$782	-\$3,956	-\$1,059
Total allowed payment amount, IP through 120-day PDP	2,278	2,256	\$40,005	\$39,327	\$40,128	\$42,245	-\$2,795	-\$4,749	-\$841	-\$4,435	-\$1,155
Total amount paid by Medicare, IP through 90-day PDP ¹	2,382	2,355	\$35,593	\$34,963	\$35,713	\$37,396	-\$2,313	-\$3,914	-\$712	-\$3,657	-\$969
Total amount included in the bundle definition, 90-day episodes	2,382	2,355	\$37,996	\$37,500	\$38,255	\$39,827	-\$2,068	-\$3,678	-\$459	-\$3,419	-\$718
Total allowed payment amount, 30 days post-bundle	2,365	2,325	\$1,374	\$1,361	\$1,395	\$1,550	-\$167	-\$617	\$283	-\$545	\$210
Readmissions standardized allowed amount, 90-day PDP	2,384	2,382	\$1,412	\$1,426	\$1,715	\$2,099	-\$370	-\$928	\$188	-\$839	\$98
SNF standardized allowed amount, 90-day PDP	2,384	2,382	\$2,798	\$2,524	\$2,741	\$3,288	-\$821	-\$1,617	-\$25	-\$1,489	-\$153
HHA standardized allowed amount, 90-day PDP	2,384	2,382	\$1,104	\$884	\$1,136	\$1,182	-\$266	-\$470	-\$63	-\$437	-\$96
IRF standardized allowed amount, 90-day PDP	2,384	2,382	\$1,561	\$979	\$1,869	\$1,727	-\$440	-\$1,066	\$187	-\$966	\$86
Part B standardized allowed amount, 90-day PDP	2,382	2,355	\$2,165	\$2,123	\$2,211	\$2,378	-\$209	-\$478	\$61	-\$435	\$18
Anchor inpatient length of stay	2,391	2,391	4.4	4.1	4.4	4.0	0.0	-0.2	0.2	-0.2	0.2
Number of SNF days, 90-day PDP ²	511	574	22.4	19.9	23.2	24.0	-3.3	-7.0	0.3	-6.4	-0.3
Number of HHA visits, 90-day PDP ²	654	918	12.2	10.7	12.7	12.2	-1.0	-2.7	0.7	-2.4	0.4
Patients discharged to PAC	2,391	2,391	47.6%	39.3%	49.1%	47.5%	-6.8	-12.5	-1.2	-11.6	-2.1
Patients discharged to institutional PAC (of those who received PAC)	882	1,169	65.5%	61.5%	64.9%	61.6%	-0.7	-9.3	8.0	-7.9	6.6
Emergency department use, 30-day PDP	2,390	2,390	11.7%	11.0%	9.9%	11.7%	-2.5	-5.6	0.6	-5.1	0.1

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Emergency department use, 90-day PDP	2,383	2,381	18.4%	18.5%	16.0%	18.9%	-2.7	-6.2	0.8	-5.6	0.2
Unplanned readmission rate, 30-day PDP	2,390	2,390	6.6%	5.8%	6.5%	6.9%	-1.2	-3.6	1.2	-3.2	0.8
Unplanned readmission rate, 90-day PDP	2,383	2,381	9.8%	8.9%	9.6%	10.1%	-1.4	-4.0	1.2	-3.6	0.8
All-cause mortality rate, 30-day PDP											
All-cause mortality rate, 90-day PDP	2,383	2,380	0.9%	0.3%	0.7%	0.7%	-0.5	-1.3	0.3	-1.2	0.2

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Exhibit M.15: Hip & Femur Procedures except Major Joint Episodes, Model 2 PGP, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	6,274	6,260	\$43,579	\$44,080	\$42,677	\$44,418	-\$1,241*	-\$2,433	-\$50	-\$2,241	-\$241
Total allowed payment amount, IP through 120-day PDP	6,004	6,006	\$46,756	\$47,064	\$45,543	\$47,349	-\$1,498	-\$2,829	-\$167	-\$2,615	-\$381
Total amount paid by Medicare, IP through 90-day PDP ¹	6,274	6,260	\$38,244	\$38,563	\$37,592	\$38,993	-\$1,082	-\$2,112	-\$52	-\$1,947	-\$218
Total amount included in the bundle definition, 90-day episodes	6,207	6,194	\$43,110	\$43,571	\$42,175	\$43,812	-\$1,176	-\$2,341	-\$11	-\$2,154	-\$198
Total allowed payment amount, 30 days post-bundle	5,546	5,620	\$3,604	\$3,366	\$3,226	\$3,261	-\$273	-\$612	\$66	-\$557	\$12
Readmissions standardized allowed amount, 90-day PDP	6,280	6,291	\$2,629	\$2,371	\$2,814	\$2,592	-\$37	-\$412	\$339	-\$352	\$278
SNF standardized allowed amount, 90-day PDP	6,280	6,291	\$17,904	\$18,494	\$16,703	\$17,614	-\$321	-\$1,424	\$782	-\$1,246	\$605
HHA standardized allowed amount, 90-day PDP	6,280	6,291	\$1,994	\$2,116	\$2,017	\$2,109	\$29	-\$104	\$163	-\$83	\$142
IRF standardized allowed amount, 90-day PDP	6,280	6,291	\$3,023	\$2,493	\$3,417	\$3,533	-\$646	-\$1,356	\$64	-\$1,242	-\$50
Part B standardized allowed amount, 90-day PDP	6,274	6,261	\$3,035	\$3,112	\$2,922	\$3,066	-\$66	-\$249	\$116	-\$219	\$87
Anchor inpatient length of stay	6,328	6,328	5.9	5.8	6.0	5.7	0.1	-0.1	0.2	-0.1	0.2
Number of SNF days, 90-day PDP ²	4,974	4,681	45.7	42.0	44.2	42.8	-2.2	-4.1	-0.3	-3.8	-0.6
Number of HHA visits, 90-day PDP ²	3,573	3,567	15.5	15.5	16.0	15.7	0.4	-0.4	1.2	-0.3	1.1
Patients discharged to PAC	6,328	6,327	93.4%	93.5%	92.6%	93.3%	-0.5	-2.1	1.1	-1.9	0.8
Patients discharged to institutional PAC (of those who received PAC)	5,920	5,898	92.2%	92.3%	91.9%	91.7%	0.2	-1.4	1.9	-1.2	1.6
Emergency department use, 30-day PDP	6,325	6,324	7.6%	8.7%	7.6%	8.1%	0.6	-0.9	2.1	-0.7	1.8

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Emergency department use, 90-day PDP	6,277	6,288	17.6%	18.8%	17.0%	18.6%	-0.5	-2.6	1.7	-2.3	1.3
Unplanned readmission rate, 30-day PDP	6,325	6,324	11.4%	10.0%	12.3%	10.2%	0.8	-1.1	2.6	-0.8	2.3
Unplanned readmission rate, 90-day PDP	6,277	6,288	20.5%	18.3%	21.7%	18.8%	0.7	-1.6	3.0	-1.2	2.6
All-cause mortality rate, 30-day PDP	6,192	6,193	4.2%	5.2%	4.7%	4.7%	1.0	-0.2	2.2	0.0	2.0
All-cause mortality rate, 90-day PDP	6,145	6,157	9.2%	10.8%	10.0%	10.0%	1.5*	-0.2	3.2	0.1	2.9

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Exhibit M.16: Sepsis Episodes, Model 2 PGP, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	20,572	20,460	\$30,167	\$29,736	\$30,691	\$30,207	\$54	-\$776	\$884	-\$643	\$750
Total allowed payment amount, IP through 120-day PDP	19,847	19,683	\$33,032	\$32,716	\$33,664	\$33,314	\$35	-\$930	\$999	-\$775	\$844
Total amount paid by Medicare, IP through 90-day PDP ¹	20,563	20,453	\$26,829	\$26,379	\$27,244	\$26,695	\$99	-\$634	\$832	-\$516	\$714
Total amount included in the bundle definition, 90-day episodes	20,573	20,461	\$28,639	\$28,055	\$29,042	\$28,430	\$28	-\$692	\$748	-\$576	\$633
Total allowed payment amount, 30 days post-bundle	16,384	16,502	\$3,676	\$3,698	\$3,720	\$3,824	-\$81	-\$372	\$209	-\$325	\$162
Readmissions standardized allowed amount, 90-day PDP	20,621	20,617	\$4,353	\$4,269	\$4,412	\$4,416	-\$88	-\$408	\$232	-\$357	\$181
SNF standardized allowed amount, 90-day PDP	20,621	20,617	\$5,658	\$5,619	\$5,676	\$5,739	-\$102	-\$510	\$306	-\$445	\$240
HHA standardized allowed amount, 90-day PDP	20,621	20,617	\$1,108	\$1,145	\$1,060	\$1,084	\$13	-\$60	\$86	-\$49	\$75
IRF standardized allowed amount, 90-day PDP	20,621	20,617	\$659	\$709	\$597	\$702	-\$56	-\$217	\$106	-\$191	\$80
LTCH standardized allowed amount, 90-day PDP	20,621	20,617	\$1,597	\$1,419	\$1,918	\$1,604	\$137	-\$282	\$555	-\$214	\$488
Part B standardized allowed amount, 90-day PDP	20,573	20,461	\$3,602	\$3,721	\$3,723	\$3,792	\$50	-\$106	\$207	-\$81	\$181
Anchor inpatient length of stay	20,802	20,802	6.9	6.4	7.0	6.4	0.1	0.0	0.3	0.0	0.3
Number of SNF days, 90-day PDP ²	6,814	6,700	34.5	32.3	35.3	33.0	0.1	-1.4	1.6	-1.2	1.4
Number of HHA visits, 90-day PDP ²	7,503	6,839	15.5	15.5	15.9	15.5	0.3	-0.6	1.2	-0.4	1.1
Patients discharged to PAC	20,735	20,750	54.5%	52.9%	53.6%	52.2%	-0.3	-2.4	1.8	-2.1	1.4
Patients discharged to institutional PAC (of those who received PAC)	11,117	10,707	64.5%	62.0%	65.1%	64.1%	-1.4	-3.9	1.1	-3.5	0.7

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Emergency department use, 30-day PDP	20,565	20,630	10.3%	11.1%	10.5%	11.2%	0.1	-1.1	1.3	-1.0	1.1
Emergency department use, 90-day PDP	20,386	20,447	20.4%	21.7%	20.2%	21.7%	-0.2	-1.6	1.3	-1.4	1.1
Unplanned readmission rate, 30-day PDP	20,565	20,630	16.3%	14.4%	16.5%	14.9%	-0.3	-1.6	1.0	-1.4	0.8
Unplanned readmission rate, 90-day PDP	20,386	20,447	28.2%	25.8%	28.5%	26.8%	-0.7	-2.4	0.9	-2.1	0.6
All-cause mortality rate, 30-day PDP	20,218	20,386	13.3%	12.9%	12.5%	12.2%	-0.2	-1.5	1.0	-1.3	0.8
All-cause mortality rate, 90-day PDP	20,039	20,203	20.9%	20.2%	20.3%	19.4%	0.3	-1.3	1.8	-1.0	1.5

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Exhibit M.17: Simple Pneumonia and Respiratory Infections Episodes, Model 2 PGP, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	10,012	9,960	\$22,275	\$22,197	\$22,859	\$22,675	\$105	-\$726	\$936	-\$593	\$802
Total allowed payment amount, IP through 120-day PDP	9,699	9,662	\$24,713	\$24,785	\$25,332	\$25,424	-\$20	-\$969	\$929	-\$816	\$777
Total amount paid by Medicare, IP through 90-day PDP ¹	10,009	9,959	\$19,598	\$19,440	\$20,120	\$19,806	\$157	-\$593	\$907	-\$472	\$786
Total amount included in the bundle definition, 90-day episodes	9,745	9,693	\$21,401	\$21,089	\$21,769	\$21,716	-\$259	-\$1,040	\$521	-\$914	\$395
Total allowed payment amount, 30 days post-bundle	8,394	8,441	\$3,027	\$3,125	\$3,071	\$3,220	-\$52	-\$384	\$279	-\$331	\$226
Readmissions standardized allowed amount, 90-day PDP	10,054	10,054	\$3,668	\$3,573	\$3,861	\$3,741	\$26	-\$341	\$392	-\$282	\$333
SNF standardized allowed amount, 90-day PDP	10,054	10,054	\$4,070	\$4,290	\$4,166	\$4,292	\$95	-\$322	\$512	-\$255	\$445
HHA standardized allowed amount, 90-day PDP	10,054	10,054	\$1,023	\$1,148	\$1,003	\$1,113	\$16	-\$71	\$103	-\$57	\$89
IRF standardized allowed amount, 90-day PDP	10,054	10,054	\$448	\$567	\$425	\$521	\$22	-\$119	\$164	-\$96	\$141
LTCH standardized allowed amount, 90-day PDP	10,054	10,054	\$822	\$588	\$1,025	\$686	\$105	-\$185	\$395	-\$138	\$348
Part B standardized allowed amount, 90-day PDP	10,012	9,960	\$3,084	\$3,259	\$3,131	\$3,412	-\$105	-\$271	\$61	-\$244	\$34
Anchor inpatient length of stay	10,117	10,117	5.6	5.1	5.8	5.2	0.0	-0.1	0.2	-0.1	0.2
Number of SNF days, 90-day PDP ²	2,707	2,666	32.1	30.5	32.5	30.9	0.0	-2.1	2.1	-1.7	1.8
Number of HHA visits, 90-day PDP ²	3,677	3,454	14.7	15.5	14.9	15.3	0.4	-0.4	1.3	-0.3	1.1
Patients discharged to PAC	10,102	10,102	46.6%	46.9%	47.2%	46.4%	1.1	-1.5	3.7	-1.1	3.2
Patients discharged to institutional PAC (of those who received PAC)	4,875	4,646	54.5%	52.6%	58.2%	54.7%	1.6	-1.6	4.8	-1.1	4.3

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Emergency department use, 30-day PDP	10,022	10,053	11.3%	12.3%	10.1%	11.7%	-0.6	-1.9	0.7	-1.7	0.5
Emergency department use, 90-day PDP	9,959	9,991	22.5%	24.1%	20.8%	22.5%	-0.1	-1.9	1.8	-1.6	1.5
Unplanned readmission rate, 30-day PDP	10,022	10,053	14.6%	13.4%	15.3%	14.3%	-0.3	-1.8	1.2	-1.6	1.0
Unplanned readmission rate, 90-day PDP	9,959	9,991	26.0%	24.5%	27.3%	26.1%	-0.4	-2.3	1.5	-2.0	1.2
All-cause mortality rate, 30-day PDP	9,902	9,929	9.9%	8.6%	10.3%	8.1%	0.9	-0.3	2.1	-0.1	1.9
All-cause mortality rate, 90-day PDP	9,839	9,868	17.6%	15.6%	17.5%	14.5%	1.0	-0.6	2.5	-0.4	2.3

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Exhibit M.18: Other Respiratory Episodes, Model 2 PGP, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	3,681	3,644	\$27,545	\$28,104	\$28,167	\$28,976	-\$251	-\$2,103	\$1,602	-\$1,805	\$1,304
Total allowed payment amount, IP through 120-day PDP	3,497	3,457	\$30,655	\$31,487	\$31,365	\$32,378	-\$180	-\$2,250	\$1,889	-\$1,917	\$1,557
Total amount paid by Medicare, IP through 90-day PDP ¹	3,681	3,643	\$24,718	\$25,157	\$25,244	\$25,823	-\$140	-\$1,819	\$1,539	-\$1,549	\$1,269
Total amount included in the bundle definition, 90-day episodes	3,681	3,644	\$25,926	\$26,435	\$26,151	\$27,175	-\$515	-\$2,001	\$972	-\$1,762	\$733
Total allowed payment amount, 30 days post-bundle	3,027	2,974	\$3,881	\$3,865	\$3,848	\$4,058	-\$225	-\$876	\$427	-\$771	\$322
Readmissions standardized allowed amount, 90-day PDP	3,697	3,700	\$5,189	\$4,874	\$4,904	\$5,023	-\$434	-\$1,190	\$322	-\$1,068	\$201
SNF standardized allowed amount, 90-day PDP	3,697	3,700	\$3,625	\$3,785	\$3,851	\$4,111	-\$101	-\$813	\$611	-\$698	\$497
HHA standardized allowed amount, 90-day PDP	3,697	3,700	\$1,120	\$1,070	\$1,098	\$1,078	-\$30	-\$171	\$110	-\$148	\$88
IRF standardized allowed amount, 90-day PDP	3,697	3,700	\$507	\$724	\$640	\$771	\$85	-\$211	\$380	-\$163	\$332
LTCH standardized allowed amount, 90-day PDP	3,697	3,700	\$1,721	\$1,660	\$2,076	\$1,794	\$221	-\$544	\$985	-\$421	\$862
Part B standardized allowed amount, 90-day PDP	3,681	3,644	\$3,423	\$3,628	\$3,372	\$3,698	-\$121	-\$453	\$212	-\$400	\$159
Anchor inpatient length of stay	3,742	3,742	6.1	5.8	6.2	5.8	0.0	-0.3	0.3	-0.2	0.3
Number of SNF days, 90-day PDP ²	895	879	29.7	28.5	30.8	31.5	-1.9	-5.4	1.6	-4.8	1.1
Number of HHA visits, 90-day PDP ²	1,289	1,346	14.9	14.6	15.8	14.6	0.9	-0.4	2.2	-0.2	2.0
Patients discharged to PAC	3,732	3,727	46.9%	44.8%	47.6%	45.5%	-0.1	-3.6	3.5	-3.1	2.9
Patients discharged to institutional PAC (of those who received PAC)	1,617	1,672	53.3%	53.7%	55.9%	53.0%	3.2	-2.8	9.3	-1.8	8.3

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Emergency department use, 30-day PDP	3,683	3,678	13.2%	13.4%	12.1%	12.8%	-0.6	-3.0	1.8	-2.6	1.4
Emergency department use, 90-day PDP	3,638	3,637	25.6%	27.4%	22.7%	23.8%	0.6*	-2.3	3.5	-1.9	3.1
Unplanned readmission rate, 30-day PDP	3,683	3,678	19.3%	16.7%	18.6%	16.1%	-0.1	-3.4	3.1	-2.9	2.6
Unplanned readmission rate, 90-day PDP	3,638	3,637	32.3%	29.7%	33.4%	30.9%	-0.1	-3.7	3.6	-3.1	3.0
All-cause mortality rate, 30-day PDP	3,650	3,633	11.6%	10.7%	10.4%	10.4%	-0.8*	-3.4	1.7	-2.9	1.3
All-cause mortality rate, 90-day PDP	3,606	3,592	19.7%	17.9%	18.1%	18.1%	-1.8	-4.8	1.3	-4.3	0.8

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Exhibit M.19: Gastrointestinal Obstruction Episodes, Model 2 PGP, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	1,541	1,537	\$18,690	\$16,975	\$16,786	\$17,095	-\$2,024	-\$3,643	-\$405	-\$3,383	-\$665
Total allowed payment amount, IP through 120-day PDP	1,486	1,483	\$21,089	\$19,195	\$18,872	\$19,739	-\$2,761	-\$4,687	-\$834	-\$4,378	-\$1,144
Total amount paid by Medicare, IP through 90-day PDP ¹	1,541	1,537	\$16,249	\$14,570	\$14,499	\$14,570	-\$1,750	-\$3,235	-\$264	-\$2,997	-\$503
Total amount included in the bundle definition, 90-day episodes	1,541	1,537	\$17,581	\$15,867	\$15,593	\$16,013	-\$2,134	-\$3,621	-\$647	-\$3,382	-\$886
Total allowed payment amount, 30 days post-bundle	1,405	1,402	\$2,673	\$2,582	\$2,478	\$2,781	-\$394	-\$975	\$187	-\$881	\$94
Readmissions standardized allowed amount, 90-day PDP	1,553	1,554	\$4,185	\$3,337	\$3,418	\$3,589	-\$1,020	-\$1,890	-\$149	-\$1,751	-\$289
SNF standardized allowed amount, 90-day PDP	1,553	1,554	\$2,414	\$2,385	\$2,103	\$2,068	\$6	-\$676	\$688	-\$566	\$578
HHA standardized allowed amount, 90-day PDP	1,553	1,554	\$782	\$782	\$726	\$741	-\$15	-\$173	\$142	-\$148	\$117
Part B standardized allowed amount, 90-day PDP	1,541	1,537	\$3,346	\$3,183	\$2,815	\$3,252	-\$599	-\$965	-\$233	-\$906	-\$292
Anchor inpatient length of stay	1,563	1,563	5.0	4.6	4.8	4.7	-0.2	-0.5	0.0	-0.4	0.0
Number of SNF days, 90-day PDP ²	233	218	31.4	29.8	30.4	28.3	0.6	-5.5	6.6	-4.5	5.6
Number of HHA visits, 90-day PDP ²	395	369	14.9	14.8	15.1	14.6	0.4	-2.2	2.9	-1.8	2.5
Patients discharged to PAC	1,563	1,562	29.1%	27.6%	26.9%	24.8%	0.6	-3.6	4.8	-2.9	4.1
Patients discharged to institutional PAC (of those who received PAC)	437	390	47.4%	48.2%	45.2%	43.9%	2.1	-7.7	11.8	-6.1	10.2
Emergency department use, 30-day PDP	1,536	1,556	9.2%	11.3%	8.2%	9.3%	0.9	-1.8	3.6	-1.4	3.1
Emergency department use, 90-day PDP	1,526	1,547	19.5%	21.7%	17.6%	22.0%	-2.1	-6.1	1.8	-5.5	1.2

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Unplanned readmission rate, 30-day PDP	1,536	1,556	13.8%	10.5%	12.2%	11.2%	-2.4	-5.5	0.8	-5.0	0.3
Unplanned readmission rate, 90-day PDP	1,526	1,547	21.4%	20.7%	22.6%	22.7%	-0.7	-4.8	3.5	-4.2	2.8
All-cause mortality rate, 30-day PDP	1,527	1,541	6.1%	4.6%	6.0%	4.1%	0.4	-2.0	2.7	-1.6	2.3
All-cause mortality rate, 90-day PDP	1,517	1,533	10.9%	8.7%	9.5%	7.5%	-0.1*	-3.0	2.7	-2.5	2.3

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Exhibit M.20: Renal Failure Episodes, Model 2 PGP, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	5,843	5,825	\$23,926	\$24,286	\$24,785	\$24,607	\$539	-\$709	\$1,787	-\$508	\$1,587
Total allowed payment amount, IP through 120-day PDP	5,700	5,663	\$26,844	\$27,449	\$27,889	\$27,760	\$734	-\$705	\$2,173	-\$474	\$1,941
Total amount paid by Medicare, IP through 90-day PDP ¹	5,839	5,822	\$21,012	\$21,176	\$21,719	\$21,393	\$490	-\$617	\$1,596	-\$439	\$1,418
Total amount included in the bundle definition, 90-day episodes	5,843	5,825	\$22,773	\$23,010	\$23,494	\$23,153	\$578	-\$531	\$1,687	-\$353	\$1,509
Total allowed payment amount, 30 days post-bundle	4,816	4,841	\$3,559	\$3,783	\$3,654	\$3,785	\$93	-\$336	\$522	-\$267	\$453
Readmissions standardized allowed amount, 90-day PDP	5,876	5,879	\$4,225	\$4,362	\$4,127	\$4,250	\$13	-\$457	\$484	-\$382	\$409
SNF standardized allowed amount, 90-day PDP	5,876	5,879	\$5,086	\$5,460	\$5,618	\$5,974	\$18	-\$610	\$646	-\$509	\$545
HHA standardized allowed amount, 90-day PDP	5,876	5,879	\$1,148	\$1,267	\$1,272	\$1,266	\$125	\$13	\$237	\$31	\$219
IRF standardized allowed amount, 90-day PDP	5,876	5,879	\$684	\$780	\$570	\$574	\$92	-\$152	\$336	-\$112	\$297
Part B standardized allowed amount, 90-day PDP	5,843	5,825	\$3,637	\$3,828	\$3,636	\$3,778	\$48	-\$210	\$305	-\$168	\$264
Anchor inpatient length of stay	5,899	5,899	5.2	4.7	5.3	4.8	0.0	-0.2	0.2	-0.2	0.2
Number of SNF days, 90-day PDP ²	1,881	1,913	33.8	33.1	35.7	33.5	1.5	-1.1	4.1	-0.7	3.7
Number of HHA visits, 90-day PDP ²	2,388	2,174	15.4	15.4	16.4	15.9	0.6	-0.5	1.6	-0.3	1.5
Patients discharged to PAC	5,894	5,895	51.6%	49.6%	52.5%	50.8%	-0.3	-3.2	2.7	-2.8	2.3
Patients discharged to institutional PAC (of those who received PAC)	3,005	2,928	56.4%	56.3%	55.8%	58.6%	-2.8	-6.9	1.3	-6.2	0.7
Emergency department use, 30-day PDP	5,825	5,849	12.2%	13.0%	11.9%	12.4%	0.4	-1.7	2.4	-1.4	2.1

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Emergency department use, 90-day PDP	5,802	5,829	23.4%	25.4%	22.5%	24.5%	0.0	-2.9	3.0	-2.5	2.5
Unplanned readmission rate, 30-day PDP	5,825	5,849	17.1%	16.1%	15.9%	14.5%	0.4	-1.9	2.8	-1.5	2.4
Unplanned readmission rate, 90-day PDP	5,802	5,829	29.5%	29.8%	29.2%	26.7%	2.7	0.1	5.4	0.5	4.9
All-cause mortality rate, 30-day PDP	5,761	5,783	9.8%	9.5%	8.5%	9.0%	-0.7	-2.5	1.1	-2.2	0.8
All-cause mortality rate, 90-day PDP	5,738	5,763	17.3%	16.5%	16.0%	16.3%	-1.2	-3.6	1.2	-3.2	0.8

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Exhibit M.21: Nutritional and Metabolic Disorders Episodes, Model 2 PGP, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	2,634	2,598	\$19,803	\$20,172	\$19,959	\$21,208	-\$879	-\$2,424	\$665	-\$2,176	\$417
Total allowed payment amount, IP through 120-day PDP	2,554	2,524	\$22,744	\$23,085	\$22,801	\$24,045	-\$902	-\$2,759	\$955	-\$2,461	\$656
Total amount paid by Medicare, IP through 90-day PDP ¹	2,632	2,594	\$17,112	\$17,341	\$17,281	\$18,172	-\$661	-\$2,053	\$730	-\$1,829	\$506
Total amount included in the bundle definition, 90-day episodes	2,634	2,598	\$18,653	\$19,059	\$18,663	\$19,983	-\$914	-\$2,343	\$515	-\$2,113	\$286
Total allowed payment amount, 30 days post-bundle	2,205	2,200	\$3,441	\$3,357	\$3,385	\$3,386	-\$85	-\$688	\$517	-\$591	\$420
Readmissions standardized allowed amount, 90-day PDP	2,666	2,666	\$3,726	\$3,282	\$3,805	\$3,808	-\$447	-\$1,121	\$227	-\$1,013	\$118
SNF standardized allowed amount, 90-day PDP	2,666	2,666	\$4,824	\$4,643	\$4,542	\$5,224	-\$863	-\$1,736	\$10	-\$1,596	-\$130
HHA standardized allowed amount, 90-day PDP	2,666	2,666	\$1,063	\$1,182	\$1,124	\$1,278	-\$34	-\$200	\$132	-\$173	\$106
Part B standardized allowed amount, 90-day PDP	2,634	2,598	\$3,489	\$3,630	\$3,377	\$3,675	-\$158	-\$487	\$172	-\$434	\$119
Anchor inpatient length of stay	2,674	2,674	4.1	4.1	4.2	4.1	0.1	-0.1	0.3	-0.1	0.3
Number of SNF days, 90-day PDP ²	755	806	32.9	31.8	33.4	33.9	-1.6	-5.4	2.2	-4.8	1.6
Number of HHA visits, 90-day PDP ²	1,054	994	15.0	15.1	15.8	15.6	0.3	-1.5	2.2	-1.2	1.9
Patients discharged to PAC	2,672	2,673	46.3%	47.6%	45.5%	47.7%	-0.9	-5.1	3.3	-4.4	2.6
Patients discharged to institutional PAC (of those who received PAC)	1,289	1,298	56.3%	52.7%	54.7%	55.0%	-3.8	-10.5	2.9	-9.5	1.8
Emergency department use, 30-day PDP	2,637	2,650	12.5%	13.9%	12.2%	13.3%	0.2	-2.7	3.1	-2.2	2.6
Emergency department use, 90-day PDP	2,629	2,642	22.9%	27.2%	21.8%	24.5%	1.6	-1.8	5.0	-1.3	4.4

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Unplanned readmission rate, 30-day PDP	2,637	2,650	14.1%	12.9%	14.2%	15.4%	-2.4*	-5.5	0.8	-5.0	0.3
Unplanned readmission rate, 90-day PDP	2,629	2,642	26.3%	23.6%	26.2%	26.7%	-3.3*	-6.8	0.2	-6.2	-0.4
All-cause mortality rate, 30-day PDP	2,606	2,622	8.2%	8.6%	7.9%	7.2%	1.1	-1.3	3.4	-0.9	3.0
All-cause mortality rate, 90-day PDP	2,598	2,614	13.6%	15.6%	14.8%	13.6%	3.2	0.5	5.9	1.0	5.5

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Exhibit M.22: Cellulitis Episodes, Model 2 PGP, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	2,827	2,814	\$18,787	\$19,439	\$19,632	\$20,546	-\$262	-\$1,588	\$1,064	-\$1,375	\$851
Total allowed payment amount, IP through 120-day PDP	2,725	2,708	\$21,372	\$22,299	\$22,611	\$23,602	-\$64	-\$1,581	\$1,453	-\$1,338	\$1,209
Total amount paid by Medicare, IP through 90-day PDP ¹	2,825	2,812	\$16,190	\$16,663	\$16,966	\$17,675	-\$236	-\$1,436	\$963	-\$1,243	\$770
Total amount included in the bundle definition, 90-day episodes	2,828	2,814	\$17,554	\$18,341	\$18,557	\$19,195	\$149	-\$1,060	\$1,358	-\$866	\$1,164
Total allowed payment amount, 30 days post-bundle	2,644	2,597	\$2,881	\$2,884	\$3,077	\$3,254	-\$174	-\$626	\$277	-\$553	\$205
Readmissions standardized allowed amount, 90-day PDP	2,847	2,849	\$3,191	\$3,177	\$3,384	\$3,279	\$91	-\$489	\$671	-\$396	\$577
SNF standardized allowed amount, 90-day PDP	2,847	2,849	\$3,959	\$3,952	\$3,868	\$4,357	-\$496	-\$1,207	\$215	-\$1,092	\$101
HHA standardized allowed amount, 90-day PDP	2,847	2,849	\$1,295	\$1,284	\$1,205	\$1,372	-\$179	-\$340	-\$18	-\$314	-\$43
Part B standardized allowed amount, 90-day PDP	2,828	2,814	\$3,270	\$3,557	\$3,284	\$3,599	-\$28	-\$311	\$254	-\$265	\$209
Anchor inpatient length of stay	2,859	2,859	4.9	4.7	5.0	4.7	0.1	-0.1	0.3	0.0	0.3
Number of SNF days, 90-day PDP ²	688	698	34.5	32.1	33.2	33.4	-2.6	-6.3	1.2	-5.7	0.6
Number of HHA visits, 90-day PDP ²	1,106	1,174	18.3	17.5	17.7	18.0	-1.1	-2.7	0.5	-2.4	0.2
Patients discharged to PAC	2,858	2,857	48.2%	45.1%	45.9%	46.1%	-3.3	-7.6	1.0	-6.9	0.3
Patients discharged to institutional PAC (of those who received PAC)	1,298	1,349	47.0%	46.3%	46.0%	43.5%	1.8	-4.4	7.9	-3.4	6.9
Emergency department use, 30-day PDP	2,799	2,823	13.7%	14.4%	11.5%	12.6%	-0.4*	-3.0	2.2	-2.6	1.8
Emergency department use, 90-day PDP	2,788	2,813	24.9%	27.5%	23.0%	26.2%	-0.7	-4.2	2.9	-3.7	2.3

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Unplanned readmission rate, 30-day PDP	2,799	2,823	11.0%	11.7%	11.5%	10.6%	1.5	-1.0	4.1	-0.6	3.7
Unplanned readmission rate, 90-day PDP	2,788	2,813	21.9%	23.6%	24.3%	23.5%	2.5	-0.6	5.6	-0.1	5.1
All-cause mortality rate, 30-day PDP	2,780	2,803	3.2%	2.2%	1.9%	2.0%	-1.1	-2.2	0.0	-2.0	-0.2
All-cause mortality rate, 90-day PDP	2,769	2,793	6.5%	5.3%	5.3%	6.3%	-2.3	-4.2	-0.3	-3.9	-0.6

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Exhibit M.23: Esophagitis, Gastroenteritis, and Other Digestive Disorders Episodes, Model 2 PGP, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	3,665	3,631	\$16,464	\$17,556	\$16,727	\$17,551	\$269*	-\$819	\$1,356	-\$644	\$1,182
Total allowed payment amount, IP through 120-day PDP	3,551	3,479	\$18,945	\$20,307	\$19,442	\$20,029	\$775	-\$495	\$2,046	-\$291	\$1,842
Total amount paid by Medicare, IP through 90-day PDP ¹	3,665	3,627	\$14,083	\$14,992	\$14,373	\$14,953	\$329*	-\$659	\$1,316	-\$500	\$1,157
Total amount included in the bundle definition, 90-day episodes	3,666	3,631	\$15,439	\$16,252	\$15,886	\$16,356	\$343	-\$677	\$1,364	-\$513	\$1,200
Total allowed payment amount, 30 days post-bundle	3,403	3,364	\$2,629	\$2,831	\$2,948	\$2,712	\$437	\$66	\$809	\$126	\$749
Readmissions standardized allowed amount, 90-day PDP	3,704	3,714	\$3,583	\$3,730	\$3,615	\$3,702	\$60	-\$509	\$628	-\$418	\$537
SNF standardized allowed amount, 90-day PDP	3,704	3,714	\$2,401	\$2,600	\$2,357	\$2,534	\$22	-\$429	\$473	-\$357	\$400
HHA standardized allowed amount, 90-day PDP	3,704	3,714	\$830	\$924	\$824	\$880	\$37	-\$77	\$150	-\$59	\$132
Part B standardized allowed amount, 90-day PDP	3,666	3,631	\$3,576	\$3,793	\$3,460	\$3,762	-\$86	-\$343	\$172	-\$302	\$130
Anchor inpatient length of stay	3,723	3,723	4.2	4.0	4.2	3.9	0.1	-0.1	0.3	0.0	0.2
Number of SNF days, 90-day PDP ²	644	561	30.8	29.6	30.8	30.8	-1.2	-4.7	2.3	-4.2	1.7
Number of HHA visits, 90-day PDP ²	1,177	1,040	14.1	14.1	14.3	14.7	-0.4	-1.8	1.0	-1.6	0.7
Patients discharged to PAC	3,720	3,721	30.5%	30.5%	30.0%	29.1%	0.9	-1.9	3.8	-1.5	3.3
Patients discharged to institutional PAC (of those who received PAC)	1,174	1,049	41.2%	40.5%	41.3%	39.0%	1.5	-4.5	7.5	-3.5	6.6
Emergency department use, 30-day PDP	3,670	3,680	14.8%	15.9%	14.5%	14.4%	1.2	-1.0	3.4	-0.7	3.1
Emergency department use, 90-day PDP	3,652	3,671	27.7%	29.1%	26.9%	26.9%	1.4	-1.5	4.4	-1.0	3.9

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Unplanned readmission rate, 30-day PDP	3,670	3,680	14.0%	13.6%	14.7%	12.7%	1.7	-0.5	3.9	-0.2	3.5
Unplanned readmission rate, 90-day PDP	3,652	3,671	24.5%	23.6%	26.3%	24.9%	0.5	-2.5	3.5	-2.0	3.0
All-cause mortality rate, 30-day PDP	3,647	3,653	2.6%	3.0%	2.6%	2.5%	0.4	-0.7	1.4	-0.5	1.2
All-cause mortality rate, 90-day PDP	3,629	3,644	5.9%	6.2%	6.3%	6.4%	0.2	-1.4	1.8	-1.1	1.5

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total allowed payment amount and total amount paid by Medicare IP through 90-day PDP, emergency department visits, readmission, and mortality outcomes.

Appendix N: Factors Contributing to the Variation in NPRA among Model 2 BPCI Providers, Additional Results

Exhibit N.1: Distribution of Average NPRA per Episode, by Performance Group, Model 2 Hospitals, Q4 2013 – Q4 2016

Clinical Episode	Performance Group	Els (N)	Mean	Minimum	25 th Percentile	Median	75 th Percentile	Maximum
Acute myocardial infarction	Top Performers	8	\$2,913	\$798	\$1,842	\$3,207	\$3,726	\$4,957
	Average Performers	18	-\$570	-\$2,251	-\$1,084	-\$457	-\$210	\$536
	Bottom Performers	9	-\$3,246	-\$6,682	-\$3,377	-\$2,822	-\$2,480	-\$1,540
Cardiac arrhythmia	Top Performers	10	\$1,891	\$537	\$884	\$1,649	\$3,029	\$3,377
	Average Performers	20	\$48	-\$554	-\$314	\$43	\$432	\$558
	Bottom Performers	10	-\$2,346	-\$7,653	-\$3,109	-\$1,790	-\$801	-\$464
Cellulitis	Top Performers	9	\$3,982	\$1,722	\$2,357	\$3,018	\$4,711	\$7,648
	Average Performers	18	\$1,137	\$321	\$734	\$1,133	\$1,448	\$2,237
	Bottom Performers	9	-\$1,409	-\$3,237	-\$2,340	-\$1,479	-\$249	\$112
Congestive heart failure	Top Performers	37	\$2,153	\$955	\$1,485	\$2,018	\$2,486	\$3,953
	Average Performers	76	-\$41	-\$1,734	-\$510	\$25	\$527	\$1,318
	Bottom Performers	38	-\$2,826	-\$9,614	-\$3,138	-\$2,444	-\$1,789	-\$883
COPD, bronchitis, asthma	Top Performers	28	\$2,667	\$1,061	\$1,599	\$2,076	\$2,843	\$8,553
	Average Performers	56	\$0	-\$1,400	-\$457	-\$78	\$636	\$1,124
	Bottom Performers	29	-\$2,225	-\$4,723	-\$2,510	-\$1,912	-\$1,588	-\$1,090
Hip and femur procedures except major joint	Top Performers	11	\$5,343	\$4,085	\$4,616	\$5,174	\$5,943	\$7,347
	Average Performers	22	\$1,662	-\$640	\$719	\$1,738	\$2,740	\$3,332
	Bottom Performers	11	-\$1,725	-\$4,411	-\$2,454	-\$1,386	-\$724	-\$634
Medical non-infectious orthopedic	Top Performers	10	\$4,523	\$3,301	\$3,545	\$3,974	\$4,257	\$10,170
	Average Performers	21	\$1,629	-\$199	\$781	\$1,395	\$2,703	\$3,238
	Bottom Performers	11	-\$1,760	-\$4,386	-\$2,478	-\$1,679	-\$607	-\$195
Major joint replacement of the lower extremity	Top Performers	64	\$2,809	\$1,175	\$1,986	\$2,410	\$3,191	\$8,076
	Average Performers	129	\$330	-\$847	-\$278	\$369	\$797	\$1,908
	Bottom Performers	65	-\$1,984	-\$8,410	-\$2,369	-\$1,618	-\$1,060	-\$575
Percutaneous coronary intervention	Top Performers	8	\$2,530	\$1,102	\$1,573	\$2,244	\$3,066	\$5,376
	Average Performers	16	\$297	-\$589	-\$294	\$397	\$681	\$1,454
	Bottom Performers	8	-\$1,919	-\$3,969	-\$2,981	-\$1,410	-\$955	-\$690
Renal failure	Top Performers	11	\$3,920	\$1,893	\$2,100	\$2,710	\$4,866	\$9,732
	Average Performers	22	\$590	-\$402	\$78	\$388	\$1,150	\$2,032
	Bottom Performers	12	-\$2,058	-\$3,602	-\$2,699	-\$1,825	-\$1,486	-\$493
Sepsis	Top Performers	24	\$3,844	\$1,775	\$2,625	\$3,133	\$3,845	\$9,809
	Average Performers	50	\$280	-\$2,016	-\$665	\$393	\$1,240	\$2,610
	Bottom Performers	25	-\$3,494	-\$7,937	-\$4,323	-\$3,082	-\$2,512	-\$1,537

Clinical Episode	Performance Group	EIs (N)	Mean	Minimum	25 th Percentile	Median	75 th Percentile	Maximum
Simple pneumonia and respiratory infections	Top Performers	29	\$3,251	\$1,667	\$2,180	\$2,778	\$3,647	\$7,376
	Average Performers	60	\$235	-\$1,354	-\$508	\$329	\$859	\$1,981
	Bottom Performers	30	-\$2,333	-\$6,192	-\$2,708	-\$1,689	-\$1,384	-\$924
Stroke	Top Performers	14	\$4,202	\$2,554	\$2,951	\$3,829	\$5,535	\$6,941
	Average Performers	29	\$523	-\$1,259	-\$26	\$679	\$1,006	\$2,162
	Bottom Performers	15	-\$2,380	-\$5,283	-\$3,259	-\$2,075	-\$1,163	-\$854
Urinary tract infection	Top Performers	13	\$4,201	\$2,526	\$3,107	\$3,871	\$5,244	\$7,108
	Average Performers	28	\$1,435	-\$468	\$558	\$1,650	\$2,192	\$3,156
	Bottom Performers	14	-\$2,409	-\$6,093	-\$2,987	-\$2,214	-\$1,715	-\$711

Note: NPRA = net payment reconciliation amount. EI = episode initiator. COPD=chronic obstructive pulmonary disease.

Source: Lewin analysis of net payment reconciliation amount data for episodes that began Q4 2013 through Q4 2016

Exhibit N.2: Model, Hospital, and Market Characteristics by Performance Group, Model 2 Hospitals

Clinical Episode	Performance Group	Els (N)	Average Number of Selected Clinical Episodes, Q4 2013-Q4 2016	Bed Count, 2011	Resident to Bed Ratio, 2011	Disproportionate Share %, 2011	Number of Discharges within Clinical Episode, 2011	Number of SNF Beds/10,000 Residents, 2011
Acute myocardial infarction	Top Performers	8	24.3	479.1	0.08	28%	86.4	42.8
	Average Performers	18	18.8	513.7	0.13	28%	134.9	60.5
	Bottom Performers	9	13.0	299.4	0.11	25%	115.4	69.9
Cardiac arrhythmia	Top Performers	10	17.6	350.1	0.09	26%	174.5	63.5
	Average Performers	20	20.4	322.0	0.11	27%	124.6	46.6
	Bottom Performers	10	19.2	388.2	0.03	20%	177.6	54.2
Cellulitis	Top Performers	9	21.7	338.2	0.07	30%	97.8	37.4
	Average Performers	18	18.3	291.5	0.05	21%	113.2	60.9
	Bottom Performers	9	20.1	391.3	0.14	24%	121.8	63.6
Congestive heart failure	Top Performers	37	13.9	259.2	0.06	29%	176.9	51.0
	Average Performers	76	10.3	377.9	0.11	27%	246.7	53.8
	Bottom Performers	38	11.4	355.1	0.12	31%	244.2	55.5
COPD, bronchitis, asthma	Top Performers	28	16.3	245.4	0.12	32%	212.8	57.2
	Average Performers	56	15.0	343.6	0.11	26%	198.2	50.7
	Bottom Performers	29	13.2	317.5	0.10	36%	211.5	52.4
Hip and femur procedures except major joint	Top Performers	11	14.9	352.5	0.18	20%	76.7	62.6
	Average Performers	22	15.9	438.7	0.12	25%	98.0	50.8
	Bottom Performers	11	16.4	409.0	0.09	25%	84.9	55.2
Medical non-infectious orthopedic	Top Performers	10	21.5	334.8	0.04	25%	132.7	50.7
	Average Performers	21	20.5	390.7	0.08	23%	125.8	51.4
	Bottom Performers	11	17.2	349.0	0.22	32%	95.3	58.3

Clinical Episode	Performance Group	EIs (N)	Average Number of Selected Clinical Episodes, Q4 2013-Q4 2016	Bed Count, 2011	Resident to Bed Ratio, 2011	Disproportionate Share %, 2011	Number of Discharges within Clinical Episode, 2011	Number of SNF Beds/10,000 Residents, 2011
Major joint replacement of the lower extremity	Top Performers	64	6.6	321.1	0.12	25%	204.3	56.5
	Average Performers	129	7.5	343.4	0.13	25%	265.6	54.4
	Bottom Performers	65	8.4	308.1	0.07	28%	202.3	49.7
Percutaneous coronary intervention	Top Performers	8	16.6	295.3	0.05	27%	132.0	48.5
	Average Performers	16	17.2	476.9	0.11	29%	172.1	44.5
	Bottom Performers	8	15.0	322.0	0.12	28%	177.0	63.5
Renal failure	Top Performers	11	19.8	287.4	0.02	28%	126.1	43.4
	Average Performers	22	19.8	366.1	0.08	27%	167.5	54.2
	Bottom Performers	12	17.4	367.6	0.09	30%	156.3	58.2
Sepsis	Top Performers	24	18.1	278.5	0.08	31%	160.4	42.8
	Average Performers	50	16.9	286.6	0.10	28%	185.2	49.1
	Bottom Performers	25	13.3	352.8	0.11	34%	220.2	52.1
Simple pneumonia and respiratory infections	Top Performers	29	18.9	252.4	0.04	25%	211.9	51.5
	Average Performers	60	13.5	310.2	0.06	26%	245.2	50.8
	Bottom Performers	30	12.4	290.2	0.12	33%	217.3	53.9
Stroke	Top Performers	14	17.4	341.4	0.09	32%	122.9	44.3
	Average Performers	29	10.4	485.3	0.19	26%	163.1	55.6
	Bottom Performers	15	9.7	517.5	0.19	29%	171.3	52.6
Urinary tract infection	Top Performers	13	18.6	276.6	0.05	29%	123.5	47.6
	Average Performers	28	19.1	321.6	0.05	23%	175.8	55.6
	Bottom Performers	14	16.4	329.6	0.10	32%	144.1	45.6

Note: SNF = skilled nursing facility. EI = episode initiator. COPD=chronic obstructive pulmonary disease.

Source: Lewin analysis of 2011 Medicare claims, 2011 Area Health Resource Files (AHRF), CMS' database for all Q4 2013 through Q4 2016 BPCI participating hospital EIs, and Awardee-submitted data collected February 2015 through February 2016 for Model 2 EIs participating in BPCI between Q4 2013 through Q4 2015.

Exhibit N.3: Spearman Rank-Order Correlation p-values between Standardized NPRA and Baseline Payment, Utilization, and Quality Outcomes, Model 2 Hospitals

Clinical Episode	Average Number of Selected Clinical Episodes, Q4 2013-Q4 2016	Bed Count, 2011	Resident to Bed Ratio, 2011	Disproportionate Share %, 2011	Number of Discharges within Clinical Episode, 2011	Number of SNF Beds/10,000 Residents, 2011
Acute myocardial infarction	0.01	0.38	0.80	0.16	0.07	0.38
Cardiac arrhythmia	0.34	0.47	0.16	0.02	0.37	0.29
Cellulitis	0.57	0.38	0.32	0.24	0.01	0.00
Congestive heart failure	0.19	0.01	0.06	0.15	0.02	0.36
COPD, bronchitis, asthma	0.62	0.08	0.95	0.55	0.46	0.04
Hip and femur procedures except major joint	0.53	0.79	0.30	0.31	0.89	0.97
Medical non-infectious orthopedic	0.34	0.68	0.07	0.37	0.51	0.10
Major joint replacement of the lower extremity	0.08	0.68	0.32	0.20	0.93	0.09
Percutaneous coronary intervention	0.47	0.66	0.04	0.58	0.18	1.00
Renal failure	0.56	0.35	0.02	0.80	0.31	0.07
Sepsis	0.10	0.73	0.22	0.76	0.76	0.08
Simple pneumonia and respiratory infections	0.02	0.89	0.25	0.03	0.72	0.85
Stroke	0.19	0.11	0.20	0.84	0.25	0.42
Urinary tract infection	0.52	0.95	0.16	0.58	0.94	0.75

Note: NPRA = net payment reconciliation amount. SNF = skilled nursing facility. COPD=chronic obstructive pulmonary disease.

Source: Lewin analysis of 2011 Medicare claims, 2011 Area Health Resource Files (AHRF), CMS' database for all Q4 2013 through Q4 2016 BPCI participating hospital EIs, and Awardee-submitted data collected February 2015 through February 2016 for Model 2 EIs participating in BPCI between Q4 2013 through Q4 2015.

Exhibit N.4: Spearman Rank-Order Correlation between Standardized NPRA and Baseline Payment, Utilization, and Quality Outcomes, Model 2 Hospitals, Q4 2011 – Q2 2012

Clinical Episode	Total Allowed Payment Amount	Total Part A & B 30-day Post-bundle	Unplanned Readmission Rate, 90-day PDP	ED Use 90-day, PDP	Anchor Hospital Stay LOS	Percent Discharged Home without HH	Percent Discharged with HH	Percent Discharged to Institutional PAC	Age	HCC Overall Score	Percent Medicaid Eligible
Acute myocardial infarction											
Cardiac arrhythmia											
Cellulitis											
Congestive heart failure											
COPD, bronchitis, asthma											
Hip and femur procedures except major joint											
Medical non-infectious orthopedic											
Major joint replacement of the lower extremity											
Percutaneous coronary intervention											
Renal failure											
Sepsis											
Simple pneumonia and respiratory infections											
Stroke											
Urinary tract infection											

Note: Dark green shading indicates that standardized NPRA rank positively correlated with an outcome and was statistically significant at 10%. Light green shading indicates that standardized NPRA rank was positively correlated with an outcome, but was not statistically significant. Light orange shading indicates that standardized NPRA rank was negatively correlated with an outcome, but was not statistically significant. Dark orange shading indicates that standardized NPRA rank was negatively correlated with an outcome and was statistically significant at 10%. A blank, unshaded cell indicates that the outcome cannot be presented due to insufficient sample size. NPRA = net payment reconciliation amount. LOS = length of stay. PDP = post-discharge period. HH = home health. PAC = post-acute care. HCC = hierarchical conditions category. COPD=chronic obstructive pulmonary disease.

Source: Lewin analysis of Medicare claims, enrollment, and net payment reconciliation amount data for episodes that began Q4 2011 through Q3 2012 (baseline) and Q4 2013 through Q4 2016 (intervention period)

**Exhibit N.5: Distribution of Average NPRA per Episode, by Performance Group, Model 2
PGP, Q4 2013 – Q4 2016**

Clinical Episode	Performance Group	EIs (N)	Mean	Minimum	25 th Percentile	Median	75 th Percentile	Maximum
Congestive heart failure	Top Performers	8	\$3,215	\$1,166	\$2,154	\$3,513	\$3,886	\$5,448
	Average Performers	18	-\$21	-\$1,417	-\$470	\$38	\$393	\$1,216
	Bottom Performers	9	-\$2,504	-\$4,193	-\$3,221	-\$2,439	-\$1,719	-\$920
COPD, bronchitis, asthma	Top Performers	8	\$1,771	\$982	\$1,308	\$1,590	\$2,342	\$2,703
	Average Performers	17	\$58	-\$752	-\$120	\$89	\$318	\$724
	Bottom Performers	9	-\$1,767	-\$4,645	-\$2,629	-\$882	-\$807	-\$580
Major joint replacement of the lower extremity	Top Performers	21	\$2,906	\$2,034	\$2,285	\$2,570	\$2,958	\$6,702
	Average Performers	42	\$1,227	\$247	\$789	\$1,265	\$1,694	\$2,512
	Bottom Performers	22	-\$1,055	-\$6,755	-\$1,141	-\$682	\$72	\$153
Sepsis	Top Performers	10	\$2,779	\$1,456	\$1,741	\$2,848	\$3,316	\$4,783
	Average Performers	22	-\$38	-\$998	-\$686	-\$163	\$369	\$1,550
	Bottom Performers	11	-\$2,603	-\$6,470	-\$3,267	-\$1,759	-\$1,243	-\$966
Simple pneumonia and respiratory infections	Top Performers	9	\$2,474	\$1,788	\$2,007	\$2,194	\$2,575	\$4,323
	Average Performers	20	\$61	-\$970	-\$599	\$53	\$541	\$1,379
	Bottom Performers	10	-\$2,271	-\$5,511	-\$2,649	-\$1,881	-\$1,546	-\$1,095

Note: NPRA = net payment reconciliation amount. PGP = physician group practice. EI = episode initiator. COPD=chronic obstructive pulmonary disease.

Source: Lewin analysis of net payment reconciliation amount data for episodes that began Q4 2013 through Q4 2016.

Exhibit N.6: Model and PGP Characteristics, by Performance Group, Model 2 PGP

Clinical Episode	Performance Group	EIs (N)	Average Number of Selected Clinical Episodes, Q4 2013-Q4 2016	Average NPI Count, 2012	Percent of Nurse Practitioners, 2012 (%)	Number of Discharges within Clinical Episode, 2012
Congestive heart failure	Top Performers	8	22.8	118.4	7	101.7
	Average Performers	18	20.7	93.7	9	144.6
	Bottom Performers	9	15.7	113.4	7	143.9
COPD, bronchitis, asthma	Top Performers	8	20.5	105.3	8	142.4
	Average Performers	17	22.3	113.3	10	148.7
	Bottom Performers	9	14.0	123.8	10	153.3
Major joint replacement of the lower extremity	Top Performers	21	1.9	40.6	3	113.9
	Average Performers	42	3.3	58.9	5	174.4
	Bottom Performers	22	7.7	141.8	6	182.5
Sepsis	Top Performers	10	24.8	62.8	7	78.9
	Average Performers	22	20.4	141.9	10	227.8
	Bottom Performers	11	14.1	79.8	8	154.7
Simple pneumonia and respiratory infections	Top Performers	9	21.8	64.1	7	96.6
	Average Performers	20	17.7	136.9	11	188.9
	Bottom Performers	10	22.5	75.0	9	143.3

Note: NPRA=net payment reconciliation amount. PGP=physician group practice. EI=episode initiator.

Source: Lewin analysis of CMS' database for all Q4 2013 through Q4 2016 participating PGP EIs, TIN/NPI crosswalk, Medicare Part A and B claims, and Awardee-submitted data collected February 2015 through February 2016 for Model 2 EIs participating in BPCI between Q4 2013 through Q4 2015.

**Exhibit N.7: Spearman Rank-Order Correlation p-values between
Standardized NPRA and Model and PGP Characteristics, Model 2 PGP**

Clinical Episode	Average Number of Selected Clinical Episodes, Q4 2013-Q4 2016	Average NPI Count, 2012	Percent of Nurse Practitioners, 2012 (%)	Number of Discharges within Clinical Episode, 2012
Congestive heart failure	0.17	0.35	0.86	0.70
COPD, bronchitis, asthma	0.02	0.98	0.44	0.85
Major joint replacement of the lower extremity	0.00	0.01	0.02	0.66
Sepsis	0.01	0.40	0.66	0.12
Simple pneumonia and respiratory infections	0.96	0.48	0.85	0.15

Note: NPRA=net payment reconciliation amount. PGP=physician group practice. COPD=chronic obstructive pulmonary disease.

Source: Lewin analysis of CMS' database for all Q4 2013 through Q4 2016 participating PGP episode initiators (EIs), TIN/NPI crosswalk, Medicare Part A and B claims, and Awardee-submitted data collected February 2015 through February 2016 for Model 2 EIs participating in BPCI between Q4 2013 through Q4 2015.

Exhibit N.8: Spearman Rank-Order Correlation between Standardized NPRA and Baseline Payment, Utilization, and Quality Outcomes, Model 2 PGP, Q4 2011 – Q2 2012

Clinical Episode	Total Allowed Payment Amount	Total Part A & B 30-day Post-bundle	Unplanned Readmission Rate, 90-day PDP	ED Use, 90-day PDP	Anchor Hospital Stay LOS	Percent Discharged Home without HH	Percent Discharged with HH	Percent Discharged to Institutional PAC	Age	HCC Overall Score	Percent Medicaid Eligible
Congestive heart failure	Light Green	Blank	Light Orange	Dark Orange	Light Green	Light Orange	Light Orange	Light Green	Light Green	Light Orange	Light Orange
COPD, bronchitis, asthma	Light Orange	Light Orange	Light Orange	Light Orange	Light Orange	Light Orange	Light Green	Light Green	Light Green	Light Orange	Light Green
Major joint replacement of the lower extremity	Light Green	Light Green	Dark Green	Light Orange	Light Green	Dark Orange	Light Green	Dark Green	Dark Orange	Light Orange	Light Orange
Sepsis	Light Green	Light Green	Light Orange	Light Orange	Light Green	Light Orange	Light Orange	Light Green	Light Green	Light Orange	Light Orange
Simple pneumonia and respiratory infections	Light Green	Light Orange	Light Green	Dark Orange	Light Orange	Light Green	Light Orange	Light Green	Light Orange	Light Green	Light Green

Note: Dark green shading indicates that standardized NPRA rank positively correlated with an outcome and was statistically significant at 10%. Light green shading indicates that standardized NPRA rank was positively correlated with an outcome, but was not statistically significant. Light orange shading indicates that standardized NPRA rank was negatively correlated with an outcome, but was not statistically significant. Dark orange shading indicates that standardized NPRA rank was negatively correlated with an outcome and was statistically significant at 10%. A blank, unshaded cell indicates that the outcome cannot be presented due to insufficient sample size. NPRA = net payment reconciliation amount. PGP = physician group practice. ED = emergency department. LOS = length of stay. PDP = post discharge period. HH = home health. PAC = post-acute care. HCC = hierarchical conditions category. COPD=chronic obstructive pulmonary disease. **Source:** Lewin analysis of Medicare claims, enrollment, and net payment reconciliation amount data for episodes that began Q4 2011 through Q3 2012 (baseline) and Q4 2013 through Q4 2016 (intervention period)

Appendix O: Impact of BPCI on Allowed Payment, Utilization, and Quality Measures, by Clinical Episode, Baseline to Intervention, Model 3 SNF

The following tables display risk-adjusted difference-in-differences results for all payment, utilization, and quality measures assessed in the Year 5 Annual Report. Results are presented by EI type/clinical episode. Please observe the following abbreviations, which are used throughout the appendix:

- DiD = difference-in-differences
- LCI = lower confidence interval at the 5% and 10% level
- UCI = upper confidence interval at the 5% and 10% level
- PDP = post-qualifying hospitalization discharge period
- ADL = activities of daily living
- IP = inpatient hospitalizations
- PAC = post-acute care
- SNF = skilled nursing facility
- HHA = home health agency
- IRF = inpatient rehabilitation facility

Note that sample sizes reflect the number of episodes initiated during the intervention period that met inclusion criteria for the given outcome. Medicare payments are risk-adjusted and standardized to remove the effect of geographic differences in wages, extra amounts to account for teaching programs and other policy factors. Results reflect Lewin analysis of Medicare claims, assessment, and enrollment data for episodes that began Q4 2011 through Q3 2012 (baseline) and Q4 2013 through Q4 2016 (intervention period) for BPCI episode initiators and the matched comparison providers.

Exhibit O.1: Urinary Tract Infection Episodes, Model 3 SNF, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	2,016	2,005	\$36,353	\$35,963	\$35,633	\$37,140	-\$1,897	-\$3,523	-\$271	-\$3,262	-\$532
Total allowed payment amount, IP through 120-day PDP	1,949	1,946	\$40,002	\$39,880	\$39,521	\$41,065	-\$1,667	-\$3,562	\$229	-\$3,258	-\$76
Total amount paid by Medicare, IP through 90-day PDP ¹	2,015	2,004	\$30,985	\$30,635	\$30,315	\$31,522	-\$1,557	-\$2,928	-\$185	-\$2,708	-\$405
Total amount included in bundle definition, 30-day episodes	202	200	\$12,828	\$13,628	\$13,424	\$14,812	-\$588	-\$1,971	\$794	-\$1,748	\$572
Total amount included in bundle definition, 60-day episodes	256	253	\$21,938	\$22,215	\$21,910	\$22,647	-\$461	-\$3,038	\$2,116	-\$2,624	\$1,702
Total amount included in bundle definition, 90-day episodes	1,562	1,552	\$28,892	\$28,181	\$27,599	\$29,200	-\$2,312	-\$4,027	-\$598	-\$3,752	-\$873
Total allowed payment amount, 30-day post-bundle	1,743	1,744	\$4,937	\$5,074	\$5,271	\$5,168	\$239	-\$444	\$923	-\$334	\$813
Readmissions standardized allowed amount, 90-day PDP	2,032	2,036	\$4,352	\$4,220	\$4,581	\$4,403	\$46	-\$716	\$807	-\$593	\$685
SNF standardized allowed amount, 90-day PDP	2,032	2,036	\$19,500	\$18,678	\$18,733	\$19,910	-\$1,999	-\$3,167	-\$830	-\$2,979	-\$1,018
HHA standardized allowed amount, 90-day PDP	2,032	2,036	\$1,364	\$1,686	\$1,270	\$1,661	-\$69	-\$260	\$121	-\$229	\$91
Part B standardized allowed amount, 90-day PDP	2,016	2,005	\$3,581	\$3,959	\$3,619	\$3,815	\$182	-\$123	\$486	-\$74	\$437
Number of SNF days, 90-day PDP	2,032	2,033	39.5	35.3	39.3	37.7	-2.5	-4.8	-0.2	-4.5	-0.6
Number of HHA visits, 90-day PDP ²	1,029	1,009	14.3	15.5	14.8	15.2	0.7	-0.5	2.0	-0.3	1.8
Emergency department use, 30-day PDP	2,028	2,026	9.2%	9.7%	10.1%	11.4%	-0.9	-3.7	1.9	-3.2	1.5
Emergency department use, 90-day PDP	2,024	2,026	21.4%	24.7%	22.8%	25.5%	0.5	-3.6	4.6	-3.0	4.0

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Unplanned readmission rate, 30-day PDP	2,028	2,026	16.8%	13.1%	17.5%	14.3%	-0.6	-4.0	2.8	-3.4	2.3
Unplanned readmission rate, 90-day PDP	2,024	2,026	32.8%	30.7%	33.9%	29.8%	2.0*	-2.3	6.3	-1.6	5.6
All-cause mortality rate, 30-day PDP	2,006	2,005	6.8%	5.4%	7.4%	5.3%	0.7	-1.6	3.0	-1.3	2.7
All-cause mortality rate, 90-day PDP	2,002	2,005	16.7%	15.2%	17.6%	13.8%	2.3	-1.3	5.8	-0.7	5.3
Percent successfully discharged to the community	1,550	1,575	74.0%	75.6%	72.1%	76.2%	-2.4	-7.2	2.3	-6.4	1.6
Improved Mobility ADL Function	1,662	1,673	49.0%	49.7%	44.1%	45.4%	-0.5	-6.0	5.0	-5.1	4.1
Improved Overall ADL Function	1,672	1,675	55.2%	55.7%	50.1%	51.2%	-0.6	-5.8	4.6	-5.0	3.8
Improved Self-care ADL Function	1,687	1,677	32.3%	35.4%	28.1%	30.7%	0.4	-4.8	5.5	-3.9	4.7

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total amount paid by Medicare IP through 90-day PDP, total amount included in the bundle definition for 90-day episodes, emergency department visits, readmission, and mortality outcomes.

Exhibit O.2: Stroke Episodes, Model 3 SNF, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	1,359	1,351	\$45,426	\$47,623	\$46,662	\$47,002	\$1,858	-\$716	\$4,431	-\$302	\$4,017
Total allowed payment amount, IP through 120-day PDP	1,309	1,291	\$49,849	\$52,549	\$51,039	\$51,113	\$2,626	-\$448	\$5,699	\$46	\$5,205
Total amount paid by Medicare, IP through 90-day PDP ¹	1,359	1,350	\$39,431	\$41,492	\$40,686	\$40,795	\$1,951	-\$283	\$4,185	\$76	\$3,826
Total amount included in bundle definition, 60-day episodes	201	203	\$23,892	\$24,892	\$24,616	\$24,880	\$736	-\$2,813	\$4,285	-\$2,242	\$3,715
Total amount included in bundle definition, 90-day episodes	1,137	1,129	\$32,246	\$32,930	\$32,561	\$32,672	\$574*	-\$1,696	\$2,843	-\$1,331	\$2,478
Total allowed payment amount, 30-day post-bundle	1,147	1,132	\$5,487	\$5,353	\$5,326	\$4,959	\$233	-\$650	\$1,115	-\$508	\$974
Readmissions standardized allowed amount, 90-day PDP	1,365	1,363	\$3,723	\$4,367	\$4,207	\$3,679	\$1,172	\$285	\$2,060	\$427	\$1,917
SNF standardized allowed amount, 90-day PDP	1,365	1,363	\$22,679	\$22,448	\$22,173	\$23,311	-\$1,369	-\$3,101	\$363	-\$2,823	\$85
HHA standardized allowed amount, 90-day PDP	1,365	1,363	\$1,440	\$1,724	\$1,413	\$1,661	\$36	-\$202	\$275	-\$164	\$237
IRF standardized allowed amount, 90-day PDP	1,365	1,363	\$3,274	\$4,400	\$3,993	\$4,386	\$733	-\$349	\$1,815	-\$175	\$1,641
Part B standardized allowed amount, 90-day PDP	1,359	1,352	\$3,710	\$4,313	\$3,828	\$3,766	\$665	\$293	\$1,037	\$353	\$977
Number of SNF days, 90-day PDP	1,363	1,363	43.4	40.4	42.8	42.2	-2.4	-5.5	0.7	-5.0	0.2
Number of HHA visits, 90-day PDP ²	650	619	14.0	14.9	14.1	14.8	0.2	-1.3	1.7	-1.1	1.4
Emergency department use, 30-day PDP	1,357	1,359	11.0%	13.6%	9.8%	9.3%	3.0	-0.3	6.4	0.2	5.9
Emergency department use, 90-day PDP	1,357	1,358	23.5%	26.7%	21.6%	21.5%	3.2	-1.1	7.5	-0.4	6.8

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Unplanned readmission rate, 30-day PDP	1,357	1,359	16.9%	16.9%	16.3%	15.3%	1.1	-3.1	5.3	-2.4	4.6
Unplanned readmission rate, 90-day PDP	1,357	1,358	28.4%	30.5%	30.3%	27.9%	4.4	-0.7	9.6	0.1	8.8
All-cause mortality rate, 30-day PDP	1,360	1,357	9.6%	7.1%	9.3%	8.5%	-1.6	-4.9	1.7	-4.4	1.2
All-cause mortality rate, 90-day PDP	1,360	1,356	19.1%	16.2%	18.1%	16.5%	-1.4*	-5.7	2.9	-5.0	2.2
Percent successfully discharged to the community	953	951	77.8%	74.5%	75.4%	78.1%	-6.0	-11.4	-0.6	-10.6	-1.4
Improved Mobility ADL Function	1,055	1,127	55.1%	53.1%	52.4%	54.2%	-3.7	-10.7	3.2	-9.5	2.1
Improved Overall ADL Function	1,058	1,126	60.7%	59.4%	61.9%	61.0%	-0.3	-6.7	6.0	-5.6	5.0
Improved Self-care ADL Function	1,069	1,127	36.3%	37.3%	34.7%	37.9%	-2.2	-9.1	4.7	-8.0	3.6

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total amount paid by Medicare IP through 90-day PDP, total amount included in the bundle definition for 90-day episodes, emergency department visits, readmission, and mortality outcomes.

Exhibit O.3: Chronic Obstructive Pulmonary Disease, Bronchitis, and Asthma Episodes, Model 3 SNF, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	895	894	\$37,741	\$38,661	\$38,077	\$37,725	\$1,273	-\$1,581	\$4,126	-\$1,123	\$3,668
Total allowed payment amount, IP through 120-day PDP	864	866	\$42,497	\$43,889	\$43,015	\$42,439	\$1,969	-\$1,397	\$5,334	-\$856	\$4,794
Total amount paid by Medicare, IP through 90-day PDP ¹	894	894	\$32,969	\$33,621	\$33,173	\$32,824	\$1,000	-\$1,505	\$3,504	-\$1,102	\$3,102
Total amount included in bundle definition, 30-day episodes	41	41	\$12,789	\$13,570	\$13,607	\$13,926	\$462	-\$2,933	\$3,857	-\$2,387	\$3,312
Total amount included in bundle definition, 60-day episodes	70	70	\$21,945	\$23,711	\$20,209	\$22,517	-\$541	-\$6,354	\$5,272	-\$5,420	\$4,338
Total amount included in bundle definition, 90-day episodes	784	783	\$28,264	\$28,672	\$28,793	\$27,984	\$1,217	-\$1,468	\$3,902	-\$1,036	\$3,471
Total allowed payment amount, 30-day post-bundle	721	745	\$6,104	\$6,234	\$6,145	\$5,681	\$594	-\$669	\$1,857	-\$466	\$1,654
Readmissions standardized allowed amount, 90-day PDP	903	903	\$6,420	\$6,710	\$6,747	\$6,469	\$569	-\$768	\$1,905	-\$553	\$1,690
SNF standardized allowed amount, 90-day PDP	903	903	\$16,105	\$16,154	\$16,626	\$16,769	-\$95	-\$1,859	\$1,669	-\$1,575	\$1,386
HHA standardized allowed amount, 90-day PDP	903	903	\$1,627	\$1,771	\$1,536	\$1,620	\$59	-\$200	\$318	-\$158	\$276
Part B standardized allowed amount, 90-day PDP	895	894	\$4,347	\$4,882	\$4,426	\$4,481	\$481	\$21	\$941	\$95	\$867
Number of SNF days, 90-day PDP	901	900	33.1	30.8	34.7	31.7	0.6	-2.7	4.0	-2.2	3.5
Number of HHA visits, 90-day PDP ²	535	476	14.4	14.3	14.6	14.0	0.6	-1.2	2.4	-1.0	2.1
Emergency department use, 30-day PDP	892	899	8.0%	11.2%	10.3%	10.5%	3.0	-1.0	7.0	-0.4	6.3
Emergency department use, 90-day PDP	892	899	22.4%	26.1%	23.5%	23.2%	4.0*	-1.9	10.0	-1.0	9.0

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Unplanned readmission rate, 30-day PDP	892	899	23.0%	22.4%	21.9%	21.2%	0.0	-5.6	5.6	-4.7	4.7
Unplanned readmission rate, 90-day PDP	892	899	43.0%	44.5%	44.0%	41.7%	3.7	-2.7	10.2	-1.6	9.1
All-cause mortality rate, 30-day PDP	890	893	7.3%	7.5%	8.2%	8.5%	-0.1	-3.7	3.4	-3.1	2.8
All-cause mortality rate, 90-day PDP	890	893	17.8%	19.7%	19.0%	16.9%	4.0	-1.0	9.1	-0.2	8.3
Percent successfully discharged to the community	644	693	72.7%	71.2%	68.0%	71.1%	-4.6	-11.7	2.4	-10.5	1.2
Improved Mobility ADL Function	730	748	57.2%	56.8%	53.0%	53.8%	-1.2	-9.0	6.6	-7.8	5.4
Improved Overall ADL Function	731	748	64.4%	63.0%	60.4%	58.4%	0.6	-6.7	8.0	-5.5	6.8
Improved Self-care ADL Function	738	748	45.5%	45.0%	40.2%	39.8%	-0.2	-7.9	7.6	-6.6	6.3

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total amount paid by Medicare IP through 90-day PDP, total amount included in the bundle definition for 90-day episodes, emergency department visits, readmission, and mortality outcomes.

Exhibit O.4: Major Joint Replacement of the Lower Extremity Episodes, Model 3 SNF, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	6,565	6,577	\$34,877	\$33,877	\$33,986	\$34,778	-\$1,792	-\$2,764	-\$819	-\$2,608	-\$975
Total allowed payment amount, IP through 120-day PDP	6,278	6,316	\$36,806	\$35,709	\$35,770	\$36,623	-\$1,950	-\$3,048	-\$852	-\$2,872	-\$1,028
Total amount paid by Medicare, IP through 90-day PDP ¹	6,564	6,576	\$31,347	\$30,522	\$30,551	\$31,139	-\$1,412	-\$2,262	-\$562	-\$2,125	-\$699
Total amount included in bundle definition, 30-day episodes	622	624	\$10,757	\$11,350	\$11,448	\$12,184	-\$143	-\$1,251	\$965	-\$1,073	\$787
Total amount included in bundle definition, 60-day episodes	1,786	1,785	\$15,777	\$15,034	\$15,816	\$16,141	-\$1,068	-\$2,418	\$283	-\$2,201	\$66
Total amount included in bundle definition, 90-day episodes	4,167	4,169	\$19,868	\$18,447	\$18,465	\$18,893	-\$1,849	-\$2,969	-\$730	-\$2,789	-\$909
Total allowed payment amount, 30-day post-bundle	6,387	6,350	\$2,339	\$2,227	\$2,260	\$2,327	-\$179	-\$467	\$109	-\$421	\$62
Readmissions standardized allowed amount, 90-day PDP	6,605	6,614	\$1,979	\$1,853	\$1,859	\$1,840	-\$107	-\$442	\$228	-\$388	\$174
SNF standardized allowed amount, 90-day PDP	6,605	6,614	\$12,763	\$11,384	\$12,216	\$12,664	-\$1,828	-\$2,540	-\$1,115	-\$2,426	-\$1,230
HHA standardized allowed amount, 90-day PDP	6,605	6,614	\$1,951	\$2,298	\$1,846	\$1,903	\$290	\$143	\$436	\$167	\$413
IRF standardized allowed amount, 90-day PDP	6,605	6,614	\$514	\$436	\$414	\$483	-\$147	-\$315	\$21	-\$288	-\$6
Part B standardized allowed amount, 90-day PDP	6,565	6,577	\$2,815	\$2,923	\$2,736	\$2,837	\$7	-\$140	\$153	-\$116	\$130
Number of SNF days, 90-day PDP	6,597	6,607	24.9	20.7	24.1	23.2	-3.4	-4.6	-2.2	-4.4	-2.4
Number of HHA visits, 90-day PDP ²	4,393	3,801	12.6	13.5	12.7	12.7	0.9	0.3	1.5	0.4	1.4
Emergency department use, 30-day PDP	6,584	6,578	7.7%	7.7%	8.1%	8.1%	0.0	-1.4	1.5	-1.2	1.2

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Emergency department use, 90-day PDP	6,574	6,577	15.6%	16.0%	16.6%	16.3%	0.7	-1.4	2.8	-1.0	2.5
Unplanned readmission rate, 30-day PDP	6,584	6,578	8.6%	6.1%	8.5%	6.5%	-0.5	-2.0	1.1	-1.7	0.8
Unplanned readmission rate, 90-day PDP	6,574	6,577	13.9%	11.4%	13.6%	11.5%	-0.3	-2.2	1.6	-1.9	1.3
All-cause mortality rate, 30-day PDP	6,583	6,584	1.4%	1.2%	1.2%	1.4%	-0.4	-1.0	0.2	-0.9	0.1
All-cause mortality rate, 90-day PDP	6,573	6,583	3.1%	3.0%	2.9%	3.7%	-1.0	-2.0	0.0	-1.9	-0.2
Percent successfully discharged to the community	5,850	5,834	92.1%	92.3%	91.6%	92.5%	-0.8	-2.4	0.8	-2.1	0.6
Improved Mobility ADL Function	4,951	5,509	69.2%	66.6%	67.4%	69.8%	-5.0	-9.7	-0.2	-9.0	-1.0
Improved Overall ADL Function	4,954	5,513	72.5%	71.2%	72.9%	74.8%	-3.2	-7.8	1.3	-7.0	0.6
Improved Self-care ADL Function	4,959	5,524	56.8%	52.4%	57.0%	59.3%	-6.7	-11.7	-1.6	-10.9	-2.5

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total amount paid by Medicare IP through 90-day PDP, total amount included in the bundle definition for 90-day episodes, emergency department visits, readmission, and mortality outcomes.

Exhibit O.5: Major Joint Replacement of the Lower Extremity Planned Episodes, Model 3 SNF, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	4,783	4,783	\$30,817	\$30,462	\$30,053	\$30,843	-\$1,145	-\$2,082	-\$207	-\$1,932	-\$357
Total allowed payment amount, IP through 120-day PDP	4,598	4,613	\$32,156	\$32,119	\$31,364	\$32,654	-\$1,326	-\$2,457	-\$195	-\$2,276	-\$377
Total amount paid by Medicare, IP through 90-day PDP ¹	4,783	4,782	\$27,956	\$27,623	\$27,278	\$27,864	-\$920	-\$1,757	-\$82	-\$1,623	-\$217
Total amount included in bundle definition, 30-day episodes	471	472	\$9,751	\$9,990	\$10,365	\$10,920	-\$316	-\$1,504	\$872	-\$1,313	\$681
Total amount included in bundle definition, 60-day episodes	1,325	1,325	\$13,072	\$12,937	\$13,647	\$13,772	-\$260	-\$1,550	\$1,029	-\$1,343	\$822
Total amount included in bundle definition, 90-day episodes	2,994	2,987	\$16,356	\$15,442	\$15,099	\$15,720	-\$1,536	-\$2,599	-\$472	-\$2,428	-\$643
Total allowed payment amount, 30-day post-bundle	4,754	4,741	\$1,792	\$1,826	\$1,635	\$1,770	-\$101	-\$391	\$188	-\$344	\$142
Readmissions standardized allowed amount, 90-day PDP	4,804	4,810	\$1,529	\$1,507	\$1,341	\$1,410	-\$91	-\$437	\$255	-\$382	\$199
SNF standardized allowed amount, 90-day PDP	4,804	4,810	\$10,016	\$9,051	\$9,664	\$10,090	-\$1,391	-\$2,055	-\$727	-\$1,948	-\$834
HHA standardized allowed amount, 90-day PDP	4,804	4,810	\$1,927	\$2,279	\$1,854	\$1,871	\$335	\$172	\$497	\$199	\$471
Part B standardized allowed amount, 90-day PDP	4,783	4,783	\$2,729	\$2,832	\$2,629	\$2,746	-\$14	-\$170	\$141	-\$145	\$116
Number of SNF days, 90-day PDP	4,799	4,806	19.6	16.6	19.0	18.6	-2.7	-3.8	-1.5	-3.6	-1.7
Number of HHA visits, 90-day PDP ²	3,251	2,780	11.9	12.7	12.0	12.0	0.9	0.3	1.5	0.4	1.4
Emergency department use, 30-day PDP	4,785	4,779	7.2%	6.9%	7.1%	7.4%	-0.6	-2.1	1.0	-1.9	0.8
Emergency department use, 90-day PDP	4,778	4,778	14.1%	14.5%	14.8%	14.6%	0.5	-1.7	2.8	-1.3	2.4

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Unplanned readmission rate, 30-day PDP	4,785	4,779	6.3%	4.9%	6.3%	4.5%	0.4	-1.1	1.9	-0.9	1.6
Unplanned readmission rate, 90-day PDP	4,778	4,778	10.6%	8.9%	10.0%	8.4%	0.0	-1.9	1.9	-1.6	1.5
All-cause mortality rate, 30-day PDP	4,807	4,806	0.2%	0.2%	0.1%	0.2%	-0.1	-0.4	0.1	-0.4	0.1
All-cause mortality rate, 90-day PDP	4,800	4,805	0.7%	0.6%	0.5%	0.8%	-0.3	-0.8	0.2	-0.7	0.1
Percent successfully discharged to the community	4,437	4,456	94.4%	94.2%	94.0%	94.5%	-0.8	-2.2	0.7	-2.0	0.5
Improved Mobility ADL Function	3,475	3,979	71.4%	68.4%	69.6%	71.8%	-5.2	-10.5	0.0	-9.6	-0.9
Improved Overall ADL Function	3,478	3,982	75.3%	73.7%	75.4%	77.1%	-3.4	-8.3	1.6	-7.5	0.8
Improved Self-care ADL Function	3,480	3,989	60.9%	56.6%	60.7%	63.8%	-7.5	-13.1	-1.8	-12.2	-2.7

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total amount paid by Medicare IP through 90-day PDP, total amount included in the bundle definition for 90-day episodes, emergency department visits, readmission, and mortality outcomes.

Exhibit O.6: Major Joint Replacement of the Lower Extremity Fracture Episodes, Model 3 SNF, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	1,782	1,794	\$46,483	\$43,709	\$45,010	\$45,519	-\$3,284	-\$5,318	-\$1,250	-\$4,991	-\$1,577
Total allowed payment amount, IP through 120-day PDP	1,680	1,703	\$48,859	\$46,346	\$47,633	\$48,689	-\$3,569	-\$6,065	-\$1,073	-\$5,664	-\$1,474
Total amount paid by Medicare, IP through 90-day PDP ¹	1,781	1,794	\$41,048	\$38,860	\$39,723	\$40,086	-\$2,551	-\$4,277	-\$824	-\$4,000	-\$1,102
Total amount included in bundle definition, 30-day episodes	151	152	\$13,791	\$15,613	\$15,269	\$16,159	\$932	-\$1,082	\$2,945	-\$758	\$2,622
Total amount included in bundle definition, 60-day episodes	461	460	\$24,233	\$21,402	\$22,660	\$23,450	-\$3,621	-\$6,718	-\$525	-\$6,220	-\$1,023
Total amount included in bundle definition, 90-day episodes	1,173	1,182	\$29,353	\$26,344	\$27,654	\$27,204	-\$2,558	-\$4,836	-\$281	-\$4,470	-\$647
Total allowed payment amount, 30-day post-bundle	1,633	1,609	\$3,970	\$3,615	\$4,054	\$4,029	-\$330	-\$1,067	\$407	-\$949	\$289
Readmissions standardized allowed amount, 90-day PDP	1,801	1,804	\$3,271	\$2,856	\$3,278	\$2,979	-\$116	-\$899	\$667	-\$773	\$541
SNF standardized allowed amount, 90-day PDP	1,801	1,804	\$20,598	\$17,988	\$19,494	\$19,652	-\$2,768	-\$4,271	-\$1,264	-\$4,030	-\$1,506
HHA standardized allowed amount, 90-day PDP	1,801	1,804	\$2,057	\$2,285	\$1,840	\$2,012	\$57	-\$175	\$289	-\$138	\$251
Part B standardized allowed amount, 90-day PDP	1,782	1,794	\$3,047	\$3,199	\$3,003	\$3,102	\$53	-\$248	\$353	-\$199	\$305
Number of SNF days, 90-day PDP	1,798	1,801	39.9	32.2	38.7	36.0	-5.0	-7.8	-2.2	-7.3	-2.7
Number of HHA visits, 90-day PDP ²	1,142	1,021	14.8	15.8	14.6	14.9	0.7	-0.6	2.0	-0.4	1.8
Emergency department use, 30-day PDP	1,799	1,799	9.5%	9.9%	10.7%	9.8%	1.4	-1.7	4.5	-1.2	4.0
Emergency department use, 90-day PDP	1,796	1,799	19.9%	20.2%	21.5%	20.6%	1.2	-3.3	5.6	-2.6	4.9

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Unplanned readmission rate, 30-day PDP	1,799	1,799	15.1%	9.3%	14.8%	11.7%	-2.7	-6.4	0.9	-5.8	0.3
Unplanned readmission rate, 90-day PDP	1,796	1,799	23.5%	18.4%	23.8%	19.8%	-1.1	-5.6	3.4	-4.9	2.7
All-cause mortality rate, 30-day PDP	1,776	1,778	4.7%	3.9%	4.7%	4.8%	-0.9	-3.2	1.3	-2.8	0.9
All-cause mortality rate, 90-day PDP	1,773	1,778	10.3%	9.7%	9.7%	11.9%	-2.9	-6.4	0.6	-5.8	0.0
Percent successfully discharged to the community	1,413	1,378	84.2%	85.7%	83.6%	85.7%	-0.6	-5.2	4.0	-4.5	3.3
Improved Mobility ADL Function	1,476	1,530	63.1%	61.5%	61.7%	64.3%	-4.3	-10.9	2.3	-9.8	1.3
Improved Overall ADL Function	1,476	1,531	65.1%	64.6%	66.2%	68.5%	-2.8	-9.3	3.8	-8.2	2.7
Improved Self-care ADL Function	1,479	1,535	45.7%	41.8%	47.3%	47.4%	-4.0	-10.7	2.6	-9.6	1.6

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total amount paid by Medicare IP through 90-day PDP, total amount included in the bundle definition for 90-day episodes, emergency department visits, readmission, and mortality outcomes.

Exhibit O.7: Congestive Heart Failure Episodes, Model 3 SNF, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	2,956	2,953	\$39,343	\$39,270	\$38,638	\$39,863	-\$1,299	-\$2,998	\$401	-\$2,725	\$128
Total allowed payment amount, IP through 120-day PDP	2,859	2,848	\$43,183	\$43,595	\$42,381	\$43,984	-\$1,191	-\$3,139	\$756	-\$2,826	\$443
Total amount paid by Medicare, IP through 90-day PDP ¹	2,955	2,952	\$34,571	\$34,482	\$33,799	\$34,789	-\$1,079	-\$2,560	\$401	-\$2,322	\$163
Total amount included in bundle definition, 30-day episodes	171	171	\$14,238	\$14,112	\$13,208	\$14,781	-\$1,699	-\$3,857	\$458	-\$3,511	\$112
Total amount included in bundle definition, 60-day episodes	401	407	\$21,644	\$21,142	\$22,131	\$22,971	-\$1,342	-\$3,840	\$1,156	-\$3,439	\$754
Total amount included in bundle definition, 90-day episodes	2,387	2,375	\$29,130	\$28,811	\$27,693	\$28,810	-\$1,436	-\$3,090	\$218	-\$2,825	-\$48
Total allowed payment amount, 30-day post-bundle	2,236	2,206	\$5,677	\$5,699	\$5,794	\$6,149	-\$333	-\$1,103	\$437	-\$979	\$313
Readmissions standardized allowed amount, 90-day PDP	2,974	2,977	\$6,651	\$6,751	\$6,788	\$6,743	\$145	-\$702	\$992	-\$566	\$856
SNF standardized allowed amount, 90-day PDP	2,974	2,977	\$16,213	\$15,726	\$15,469	\$16,639	-\$1,656	-\$2,681	-\$631	-\$2,516	-\$796
HHA standardized allowed amount, 90-day PDP	2,974	2,977	\$1,444	\$1,769	\$1,394	\$1,540	\$179	\$14	\$343	\$40	\$317
Part B standardized allowed amount, 90-day PDP	2,956	2,953	\$4,368	\$4,632	\$4,241	\$4,512	-\$8	-\$293	\$277	-\$247	\$231
Number of SNF days, 90-day PDP	2,964	2,966	32.9	29.6	32.7	32.0	-2.6	-4.5	-0.6	-4.2	-0.9
Number of HHA visits, 90-day PDP ²	1,649	1,488	14.5	15.2	14.7	14.9	0.5	-0.7	1.7	-0.5	1.5
Emergency department use, 30-day PDP	2,961	2,964	11.0%	10.3%	11.5%	11.8%	-1.0	-3.6	1.6	-3.2	1.2
Emergency department use, 90-day PDP	2,958	2,964	21.7%	23.0%	23.0%	23.2%	1.2	-2.3	4.6	-1.7	4.1

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Unplanned readmission rate, 30-day PDP	2,961	2,964	25.6%	22.9%	26.5%	24.7%	-1.0*	-4.6	2.7	-4.0	2.1
Unplanned readmission rate, 90-day PDP	2,958	2,964	46.4%	43.4%	46.5%	43.7%	-0.2	-4.5	4.0	-3.8	3.3
All-cause mortality rate, 30-day PDP	2,937	2,945	12.3%	11.0%	12.6%	11.9%	-0.6	-3.2	2.0	-2.8	1.6
All-cause mortality rate, 90-day PDP	2,934	2,945	29.1%	26.3%	28.7%	26.8%	-0.9	-4.5	2.6	-3.9	2.1
Percent successfully discharged to the community	2,078	2,059	66.9%	65.6%	66.7%	66.9%	-1.5	-6.1	3.1	-5.4	2.4
Improved Mobility ADL Function	2,268	2,328	52.8%	55.5%	48.5%	53.7%	-2.4	-7.6	2.8	-6.8	2.0
Improved Overall ADL Function	2,281	2,329	57.7%	61.5%	54.8%	58.1%	0.5	-4.5	5.5	-3.7	4.7
Improved Self-care ADL Function	2,299	2,332	38.4%	42.0%	34.7%	37.3%	1.0	-4.4	6.5	-3.5	5.6

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total amount paid by Medicare IP through 90-day PDP, total amount included in the bundle definition for 90-day episodes, emergency department visits, readmission, and mortality outcomes.

Exhibit O.8: Medical Non-infectious Orthopedic Episodes, Model 3 SNF, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	2,222	2,220	\$38,152	\$38,210	\$37,925	\$39,185	-\$1,203	-\$2,933	\$528	-\$2,655	\$250
Total allowed payment amount, IP through 120-day PDP	2,145	2,157	\$42,094	\$42,418	\$41,502	\$43,158	-\$1,332	-\$3,413	\$750	-\$3,079	\$416
Total amount paid by Medicare, IP through 90-day PDP ¹	2,220	2,220	\$32,722	\$32,735	\$32,524	\$33,407	-\$870	-\$2,358	\$618	-\$2,119	\$378
Total amount included in bundle definition, 30-day episodes	69	68	\$14,347	\$14,330	\$14,123	\$15,495	-\$1,389	-\$4,512	\$1,733	-\$4,010	\$1,231
Total amount included in bundle definition, 60-day episodes	252	249	\$23,182	\$22,540	\$24,013	\$25,866	-\$2,494	-\$5,107	\$120	-\$4,687	-\$300
Total amount included in bundle definition, 90-day episodes	1,903	1,905	\$29,977	\$30,148	\$29,330	\$30,250	-\$749	-\$2,367	\$869	-\$2,107	\$609
Total allowed payment amount, 30-day post-bundle	2,049	2,023	\$4,542	\$4,642	\$4,257	\$4,659	-\$302	-\$1,037	\$432	-\$919	\$314
Readmissions standardized allowed amount, 90-day PDP	2,245	2,245	\$3,784	\$3,801	\$4,431	\$4,127	\$322	-\$479	\$1,123	-\$350	\$994
SNF standardized allowed amount, 90-day PDP	2,245	2,245	\$21,192	\$20,515	\$20,312	\$21,781	-\$2,146	-\$3,461	-\$831	-\$3,250	-\$1,042
HHA standardized allowed amount, 90-day PDP	2,245	2,245	\$1,825	\$2,113	\$1,834	\$1,913	\$209	\$4	\$415	\$37	\$382
Part B standardized allowed amount, 90-day PDP	2,222	2,221	\$3,819	\$4,033	\$3,820	\$3,863	\$170	-\$121	\$462	-\$74	\$415
Number of SNF days, 90-day PDP	2,244	2,243	41.0	37.4	40.5	40.0	-3.1	-5.4	-0.7	-5.1	-1.1
Number of HHA visits, 90-day PDP ²	1,440	1,336	13.9	14.5	14.0	13.9	0.7	-0.4	1.8	-0.2	1.6
Emergency department use, 30-day PDP	2,226	2,238	8.0%	8.0%	9.5%	9.1%	0.5	-2.3	3.2	-1.8	2.8
Emergency department use, 90-day PDP	2,224	2,237	19.8%	20.3%	21.2%	21.5%	0.1	-3.9	4.1	-3.3	3.5

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Unplanned readmission rate, 30-day PDP	2,226	2,238	13.5%	11.7%	15.6%	11.5%	2.3	-0.8	5.4	-0.3	4.9
Unplanned readmission rate, 90-day PDP	2,224	2,237	26.4%	24.6%	28.4%	24.8%	1.8	-2.5	6.0	-1.8	5.3
All-cause mortality rate, 30-day PDP	2,233	2,231	3.7%	3.0%	3.3%	3.7%	-1.1	-2.8	0.7	-2.5	0.4
All-cause mortality rate, 90-day PDP	2,231	2,230	9.8%	8.1%	8.7%	9.2%	-2.2	-5.0	0.6	-4.6	0.1
Percent successfully discharged to the community	1,782	1,789	78.9%	79.7%	77.5%	80.1%	-1.8	-6.2	2.7	-5.5	2.0
Improved Mobility ADL Function	1,853	1,947	57.2%	63.8%	58.8%	60.4%	5.1	-0.8	10.9	0.2	10.0
Improved Overall ADL Function	1,861	1,948	65.2%	69.1%	62.9%	64.1%	2.6	-2.6	7.8	-1.8	7.0
Improved Self-care ADL Function	1,878	1,948	43.1%	49.9%	42.4%	45.0%	4.3	-1.4	9.9	-0.5	9.0

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total amount paid by Medicare IP through 90-day PDP, total amount included in the bundle definition for 90-day episodes, emergency department visits, readmission, and mortality outcomes.

Exhibit O.9: Hip and Femur Procedures except Major Joint Episodes, Model 3 SNF, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	2,415	2,430	\$47,441	\$45,944	\$46,856	\$47,482	-\$2,124	-\$3,763	-\$484	-\$3,500	-\$748
Total allowed payment amount, IP through 120-day PDP	2,291	2,312	\$50,470	\$48,931	\$50,141	\$50,639	-\$2,036	-\$3,871	-\$202	-\$3,576	-\$496
Total amount paid by Medicare, IP through 90-day PDP ¹	2,414	2,429	\$41,151	\$40,260	\$40,756	\$41,109	-\$1,244	-\$2,613	\$125	-\$2,393	-\$95
Total amount included in bundle definition, 30-day episodes	184	185	\$14,892	\$15,477	\$14,847	\$16,180	-\$748	-\$2,573	\$1,077	-\$2,280	\$784
Total amount included in bundle definition, 60-day episodes	442	449	\$26,973	\$25,877	\$25,772	\$26,274	-\$1,599	-\$3,845	\$647	-\$3,484	\$286
Total amount included in bundle definition, 90-day episodes	1,792	1,796	\$31,134	\$28,774	\$30,622	\$31,253	-\$2,991	-\$4,800	-\$1,181	-\$4,510	-\$1,472
Total allowed payment amount, 30-day post-bundle	2,203	2,225	\$4,120	\$3,745	\$4,705	\$4,495	-\$165	-\$710	\$380	-\$622	\$293
Readmissions standardized allowed amount, 90-day PDP	2,436	2,439	\$2,739	\$2,757	\$3,094	\$2,665	\$446	-\$147	\$1,039	-\$51	\$944
SNF standardized allowed amount, 90-day PDP	2,436	2,439	\$24,031	\$21,210	\$22,747	\$23,593	-\$3,667	-\$5,015	-\$2,319	-\$4,799	-\$2,535
HHA standardized allowed amount, 90-day PDP	2,436	2,439	\$1,785	\$2,204	\$1,803	\$1,964	\$258	\$57	\$459	\$89	\$427
IRF standardized allowed amount, 90-day PDP	2,436	2,439	\$1,400	\$1,180	\$1,383	\$1,178	-\$14	-\$461	\$433	-\$389	\$361
Part B standardized allowed amount, 90-day PDP	2,415	2,430	\$3,024	\$3,249	\$3,155	\$3,117	\$263	\$11	\$515	\$51	\$474
Number of SNF days, 90-day PDP	2,432	2,436	46.6	38.3	45.0	42.7	-6.0	-8.5	-3.6	-8.1	-4.0
Number of HHA visits, 90-day PDP ²	1,564	1,378	14.0	14.8	14.2	14.5	0.6	-0.5	1.6	-0.3	1.4
Emergency department use, 30-day PDP	2,430	2,437	7.5%	8.1%	9.1%	8.0%	1.7*	-0.9	4.3	-0.4	3.9

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Emergency department use, 90-day PDP	2,426	2,436	18.8%	18.1%	19.6%	18.3%	0.6*	-2.8	4.1	-2.2	3.5
Unplanned readmission rate, 30-day PDP	2,430	2,437	12.1%	10.3%	11.6%	9.7%	0.1	-2.9	3.0	-2.4	2.6
Unplanned readmission rate, 90-day PDP	2,426	2,436	22.1%	19.9%	23.1%	18.6%	2.3	-1.2	5.9	-0.7	5.4
All-cause mortality rate, 30-day PDP	2,398	2,404	3.9%	4.1%	3.1%	4.1%	-0.9	-2.6	0.9	-2.4	0.6
All-cause mortality rate, 90-day PDP	2,394	2,403	9.2%	9.4%	9.4%	9.3%	0.3	-2.4	3.0	-2.0	2.6
Percent successfully discharged to the community	1,923	1,875	81.7%	84.8%	82.5%	83.8%	1.8	-1.7	5.3	-1.2	4.7
Improved Mobility ADL Function	2,071	2,128	64.9%	59.7%	65.7%	66.9%	-6.4	-12.0	-0.9	-11.1	-1.8
Improved Overall ADL Function	2,074	2,135	68.6%	64.3%	67.3%	70.2%	-7.2	-13.0	-1.4	-12.1	-2.4
Improved Self-care ADL Function	2,074	2,136	47.0%	42.7%	48.6%	51.1%	-6.8	-12.9	-0.6	-11.9	-1.6

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total amount paid by Medicare IP through 90-day PDP, total amount included in the bundle definition for 90-day episodes, emergency department visits, readmission, and mortality outcomes.

Exhibit O.10: Sepsis Episodes, Model 3 SNF, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	4,428	4,418	\$45,029	\$43,842	\$44,008	\$45,470	-\$2,648	-\$4,231	-\$1,065	-\$3,977	-\$1,320
Total allowed payment amount, IP through 120-day PDP	4,257	4,250	\$49,125	\$47,867	\$47,888	\$49,721	-\$3,091	-\$4,962	-\$1,221	-\$4,661	-\$1,521
Total amount paid by Medicare, IP through 90-day PDP ¹	4,424	4,416	\$39,423	\$38,350	\$38,364	\$39,519	-\$2,228*	-\$3,614	-\$843	-\$3,391	-\$1,066
Total amount included in bundle definition, 30-day episodes	279	275	\$12,761	\$14,845	\$13,993	\$15,339	\$739	-\$1,055	\$2,533	-\$767	\$2,245
Total amount included in bundle definition, 60-day episodes	659	655	\$22,028	\$21,982	\$22,506	\$24,793	-\$2,333	-\$4,786	\$121	-\$4,392	-\$274
Total amount included in bundle definition, 90-day episodes	3,495	3,489	\$29,429	\$28,252	\$28,915	\$30,009	-\$2,270*	-\$3,742	-\$798	-\$3,505	-\$1,035
Total allowed payment amount, 30-day post-bundle	3,589	3,507	\$5,678	\$5,389	\$5,364	\$5,796	-\$720	-\$1,389	-\$52	-\$1,282	-\$159
Readmissions standardized allowed amount, 90-day PDP	4,465	4,470	\$6,398	\$5,996	\$6,219	\$6,554	-\$737	-\$1,483	\$10	-\$1,363	-\$110
SNF standardized allowed amount, 90-day PDP	4,465	4,470	\$17,559	\$16,971	\$17,529	\$18,516	-\$1,575	-\$2,520	-\$630	-\$2,368	-\$782
HHA standardized allowed amount, 90-day PDP	4,465	4,470	\$1,246	\$1,491	\$1,134	\$1,175	\$204	\$71	\$337	\$92	\$315
LTCH standardized allowed amount, 90-day PDP	4,465	4,470	\$1,343	\$1,091	\$1,159	\$1,134	-\$227	-\$787	\$333	-\$697	\$243
Part B standardized allowed amount, 90-day PDP	4,428	4,419	\$4,356	\$4,441	\$4,227	\$4,383	-\$72	-\$340	\$197	-\$297	\$153
Number of SNF days, 90-day PDP	4,448	4,451	35.9	32.2	36.9	35.9	-2.6	-4.4	-0.8	-4.1	-1.1
Number of HHA visits, 90-day PDP ²	2,098	1,722	14.1	15.3	14.2	13.9	1.5	0.4	2.6	0.6	2.4
Emergency department use, 30-day PDP	4,439	4,441	9.7%	11.5%	11.7%	11.4%	2.2	-0.1	4.4	0.2	4.1

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Emergency department use, 90-day PDP	4,433	4,441	21.2%	23.3%	22.9%	22.7%	2.3	-0.7	5.3	-0.2	4.8
Unplanned readmission rate, 30-day PDP	4,439	4,441	22.4%	20.2%	23.4%	23.0%	-1.8	-4.8	1.3	-4.4	0.8
Unplanned readmission rate, 90-day PDP	4,433	4,441	38.9%	35.9%	38.4%	38.3%	-3.0	-6.5	0.6	-5.9	0.0
All-cause mortality rate, 30-day PDP	4,400	4,421	11.5%	10.7%	12.0%	10.6%	0.5	-1.7	2.8	-1.3	2.4
All-cause mortality rate, 90-day PDP	4,394	4,421	22.6%	21.1%	23.6%	22.5%	-0.4	-3.2	2.4	-2.7	2.0
Percent successfully discharged to the community	3,161	3,016	70.0%	71.3%	70.4%	70.9%	0.8	-2.9	4.5	-2.3	3.9
Improved Mobility ADL Function	3,408	3,400	48.9%	51.0%	46.1%	47.8%	0.3	-4.3	4.9	-3.6	4.2
Improved Overall ADL Function	3,424	3,404	57.3%	58.7%	51.8%	55.3%	-2.1	-6.6	2.4	-5.9	1.6
Improved Self-care ADL Function	3,445	3,405	34.3%	37.2%	29.0%	32.6%	-0.7	-5.0	3.6	-4.3	3.0

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total amount paid by Medicare IP through 90-day PDP, total amount included in the bundle definition for 90-day episodes, emergency department visits, readmission, and mortality outcomes.

Exhibit O.11: Simple Pneumonia and Other Respiratory Infections Episodes, Model 3 SNF, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	2,892	2,870	\$37,699	\$36,951	\$37,393	\$38,575	-\$1,930	-\$3,433	-\$427	-\$3,192	-\$668
Total allowed payment amount, IP through 120-day PDP	2,793	2,759	\$41,026	\$40,296	\$40,753	\$42,143	-\$2,120	-\$3,901	-\$340	-\$3,615	-\$626
Total amount paid by Medicare, IP through 90-day PDP ¹	2,891	2,868	\$32,826	\$32,315	\$32,483	\$33,411	-\$1,439	-\$2,743	-\$134	-\$2,533	-\$344
Total amount included in bundle definition, 30-day episodes	327	323	\$13,839	\$13,620	\$14,148	\$14,680	-\$751	-\$2,442	\$941	-\$2,170	\$669
Total amount included in bundle definition, 60-day episodes	676	671	\$21,081	\$20,702	\$19,851	\$22,061	-\$2,589	-\$4,585	-\$594	-\$4,264	-\$915
Total amount included in bundle definition, 90-day episodes	1,893	1,876	\$27,046	\$25,847	\$26,795	\$27,082	-\$1,487	-\$3,122	\$148	-\$2,859	-\$114
Total allowed payment amount, 30-day post-bundle	2,262	2,312	\$5,238	\$4,757	\$5,278	\$5,539	-\$743	-\$1,414	-\$72	-\$1,306	-\$179
Readmissions standardized allowed amount, 90-day PDP	2,915	2,917	\$5,189	\$5,095	\$5,176	\$5,117	-\$35	-\$700	\$630	-\$593	\$523
SNF standardized allowed amount, 90-day PDP	2,915	2,917	\$16,590	\$15,852	\$16,366	\$17,261	-\$1,632	-\$2,637	-\$628	-\$2,475	-\$789
HHA standardized allowed amount, 90-day PDP	2,915	2,917	\$1,282	\$1,482	\$1,115	\$1,316	-\$2	-\$140	\$136	-\$118	\$114
Part B standardized allowed amount, 90-day PDP	2,892	2,870	\$3,573	\$3,716	\$3,674	\$3,820	-\$2	-\$250	\$245	-\$210	\$206
Number of SNF days, 90-day PDP	2,904	2,906	34.1	29.9	34.6	33.3	-2.9	-4.9	-1.0	-4.5	-1.3
Number of HHA visits, 90-day PDP ²	1,388	1,222	14.7	14.9	14.1	14.5	-0.2	-1.2	0.9	-1.0	0.7
Emergency department use, 30-day PDP	2,902	2,906	9.5%	10.7%	9.4%	10.2%	0.5	-1.7	2.8	-1.4	2.4
Emergency department use, 90-day PDP	2,898	2,904	20.3%	21.8%	20.7%	22.4%	-0.2	-3.4	2.9	-2.9	2.4

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Unplanned readmission rate, 30-day PDP	2,902	2,906	20.6%	19.5%	21.5%	17.8%	2.7	-0.3	5.6	0.2	5.1
Unplanned readmission rate, 90-day PDP	2,898	2,904	36.6%	33.3%	36.4%	33.4%	-0.4	-3.9	3.1	-3.4	2.6
All-cause mortality rate, 30-day PDP	2,880	2,879	11.5%	12.7%	13.1%	10.6%	3.6	1.1	6.1	1.5	5.7
All-cause mortality rate, 90-day PDP	2,876	2,877	24.8%	24.1%	25.0%	23.4%	1.0	-2.1	4.1	-1.6	3.6
Percent successfully discharged to the community	2,089	2,100	73.1%	72.6%	73.6%	72.8%	0.2*	-3.8	4.3	-3.2	3.6
Improved Mobility ADL Function	2,255	2,260	50.4%	51.2%	46.9%	48.3%	-0.6	-5.1	3.9	-4.4	3.2
Improved Overall ADL Function	2,261	2,262	55.7%	57.1%	52.0%	54.0%	-0.7	-5.2	3.8	-4.5	3.1
Improved Self-care ADL Function	2,272	2,263	33.6%	36.2%	30.1%	33.7%	-0.9	-5.2	3.4	-4.5	2.7

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total amount paid by Medicare IP through 90-day PDP, total amount included in the bundle definition for 90-day episodes, emergency department visits, readmission, and mortality outcomes.

Exhibit O.12: Other Respiratory Episodes, Model 3 SNF, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	719	719	\$47,116	\$48,987	\$47,372	\$49,159	\$84	-\$4,311	\$4,479	-\$3,605	\$3,772
Total allowed payment amount, IP through 120-day PDP	699	700	\$51,567	\$53,578	\$51,939	\$53,660	\$290	-\$4,918	\$5,498	-\$4,081	\$4,661
Total amount paid by Medicare, IP through 90-day PDP ¹	718	718	\$41,713	\$43,501	\$42,148	\$43,487	\$449	-\$3,525	\$4,423	-\$2,886	\$3,785
Total amount included in bundle definition, 60-day episodes	69	69	\$25,697	\$27,568	\$25,980	\$24,110	\$3,741	-\$3,467	\$10,949	-\$2,308	\$9,791
Total amount included in bundle definition, 90-day episodes	625	624	\$28,782	\$29,883	\$29,456	\$30,003	\$554	-\$2,620	\$3,728	-\$2,109	\$3,218
Total allowed payment amount, 30-day post-bundle	550	555	\$6,116	\$5,988	\$6,791	\$6,356	\$306	-\$1,698	\$2,311	-\$1,376	\$1,989
Readmissions standardized allowed amount, 90-day PDP	726	727	\$6,828	\$8,059	\$8,493	\$7,629	\$2,094	\$107	\$4,081	\$426	\$3,762
SNF standardized allowed amount, 90-day PDP	726	727	\$16,463	\$15,768	\$15,426	\$17,416	-\$2,685	-\$4,637	-\$734	-\$4,323	-\$1,048
HHA standardized allowed amount, 90-day PDP	726	727	\$1,449	\$1,679	\$1,382	\$1,404	\$208	-\$87	\$502	-\$40	\$455
Part B standardized allowed amount, 90-day PDP	719	719	\$4,590	\$4,966	\$4,813	\$4,825	\$364	-\$271	\$999	-\$169	\$897
Number of SNF days, 90-day PDP	724	724	33.0	29.9	31.8	33.0	-4.3	-8.0	-0.7	-7.4	-1.3
Number of HHA visits, 90-day PDP ²	387	330	14.3	14.4	14.6	14.4	0.3	-1.7	2.3	-1.4	2.0
Emergency department use, 30-day PDP	720	720	11.0%	12.0%	14.1%	10.5%	4.5	-0.3	9.3	0.5	8.5
Emergency department use, 90-day PDP	719	720	21.4%	23.7%	25.6%	23.8%	4.1	-2.3	10.6	-1.3	9.5
Unplanned readmission rate, 30-day PDP	720	720	27.7%	25.7%	31.7%	25.6%	4.1	-2.5	10.7	-1.4	9.6

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Unplanned readmission rate, 90-day PDP	719	720	43.3%	43.0%	46.5%	43.1%	3.1	-4.5	10.8	-3.3	9.6
All-cause mortality rate, 30-day PDP	718	719	12.7%	10.3%	12.5%	12.8%	-2.7	-7.6	2.3	-6.8	1.5
All-cause mortality rate, 90-day PDP	717	719	25.1%	24.5%	27.0%	24.6%	1.9*	-4.9	8.6	-3.8	7.6
Percent successfully discharged to the community	488	502	70.9%	69.2%	68.8%	68.0%	-0.8	-9.7	8.1	-8.3	6.6
Improved Mobility ADL Function	529	550	51.8%	57.1%	48.5%	53.3%	0.4	-9.1	9.9	-7.6	8.4
Improved Overall ADL Function	540	549	58.8%	64.1%	54.6%	62.6%	-2.6	-11.9	6.7	-10.4	5.2
Improved Self-care ADL Function	547	550	39.7%	43.8%	36.4%	40.1%	0.5	-8.7	9.6	-7.2	8.2

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total amount paid by Medicare IP through 90-day PDP, total amount included in the bundle definition for 90-day episodes, emergency department visits, readmission, and mortality outcomes.

Exhibit O.13: Renal Failure Episodes, Model 3 SNF, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	1,405	1,400	\$39,878	\$40,337	\$39,144	\$40,781	-\$1,178	-\$3,587	\$1,231	-\$3,199	\$844
Total allowed payment amount, IP through 120-day PDP	1,367	1,371	\$43,857	\$44,765	\$42,878	\$45,115	-\$1,329	-\$4,185	\$1,528	-\$3,726	\$1,069
Total amount paid by Medicare, IP through 90-day PDP ¹	1,404	1,399	\$34,723	\$35,020	\$34,163	\$35,314	-\$853*	-\$2,910	\$1,204	-\$2,580	\$873
Total amount included in bundle definition, 30-day episodes	153	153	\$12,654	\$13,490	\$14,990	\$15,528	\$299	-\$1,972	\$2,570	-\$1,607	\$2,205
Total amount included in bundle definition, 60-day episodes	110	113	\$21,426	\$24,253	\$23,513	\$23,323	\$3,018	-\$514	\$6,550	\$53	\$5,982
Total amount included in bundle definition, 90-day episodes	1,143	1,134	\$30,246	\$29,920	\$27,497	\$29,962	-\$2,792*	-\$5,140	-\$443	-\$4,763	-\$821
Total allowed payment amount, 30-day post-bundle	1,097	1,113	\$5,627	\$6,057	\$5,474	\$6,046	-\$142	-\$1,162	\$879	-\$998	\$715
Readmissions standardized allowed amount, 90-day PDP	1,420	1,419	\$6,161	\$6,234	\$5,656	\$6,232	-\$503	-\$1,647	\$642	-\$1,463	\$458
SNF standardized allowed amount, 90-day PDP	1,420	1,419	\$17,107	\$17,410	\$17,062	\$18,500	-\$1,134	-\$2,689	\$421	-\$2,439	\$171
HHA standardized allowed amount, 90-day PDP	1,420	1,419	\$1,425	\$1,672	\$1,344	\$1,521	\$69	-\$149	\$287	-\$114	\$252
Part B standardized allowed amount, 90-day PDP	1,405	1,400	\$4,494	\$4,739	\$4,269	\$4,559	-\$45	-\$526	\$437	-\$449	\$359
Number of SNF days, 90-day PDP	1,414	1,416	34.7	33.0	35.3	35.2	-1.6	-4.8	1.5	-4.3	1.0
Number of HHA visits, 90-day PDP ²	751	681	13.3	14.4	14.4	14.6	0.9	-0.7	2.4	-0.4	2.2
Emergency department use, 30-day PDP	1,410	1,417	11.0%	10.7%	9.9%	10.7%	-1.0	-5.0	3.1	-4.4	2.5
Emergency department use, 90-day PDP	1,409	1,415	23.2%	23.6%	22.6%	23.6%	-0.6	-5.7	4.6	-4.9	3.8

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Unplanned readmission rate, 30-day PDP	1,410	1,417	22.1%	21.4%	22.5%	23.3%	-1.5	-6.2	3.3	-5.5	2.5
Unplanned readmission rate, 90-day PDP	1,409	1,415	39.2%	38.7%	38.0%	40.5%	-3.1	-8.8	2.7	-7.9	1.8
All-cause mortality rate, 30-day PDP	1,399	1,413	9.9%	10.0%	10.5%	10.7%	-0.1	-3.6	3.4	-3.0	2.9
All-cause mortality rate, 90-day PDP	1,398	1,411	23.1%	23.7%	24.2%	23.0%	1.8	-2.8	6.4	-2.1	5.7
Percent successfully discharged to the community	1,005	998	70.1%	68.3%	69.4%	71.1%	-3.5	-9.5	2.4	-8.5	1.5
Improved Mobility ADL Function	1,093	1,140	51.5%	57.6%	53.9%	51.7%	8.3	2.0	14.6	3.0	13.6
Improved Overall ADL Function	1,100	1,141	60.6%	62.9%	57.8%	56.2%	4.0	-2.5	10.4	-1.4	9.4
Improved Self-care ADL Function	1,113	1,141	42.0%	43.7%	34.0%	36.2%	-0.4	-6.8	5.9	-5.7	4.9

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total amount paid by Medicare IP through 90-day PDP, total amount included in the bundle definition for 90-day episodes, emergency department visits, readmission, and mortality outcomes.

Appendix P: Impact of BPCI on Allowed Payment, Utilization, and Quality Measures, by Clinical Episode, Baseline to Intervention, Model 3 HHA

The following tables display risk-adjusted difference-in-differences results for all payment, utilization, and quality measures assessed in the Year 5 Annual Report. Results are presented by EI type/clinical episode. Please observe the following abbreviations, which are used throughout the appendix:

- DiD = difference-in-differences
- LCI = lower confidence interval at the 5% and 10% level
- UCI = upper confidence interval at the 5% and 10% level
- PDP = post-qualifying hospitalization discharge period
- ADL = activities of daily living
- IP = inpatient hospitalizations
- PAC = post-acute care
- SNF = skilled nursing facility
- HHA = home health agency
- IRF = inpatient rehabilitation facility

Note that sample sizes reflect the number of episodes initiated during the intervention period that met inclusion criteria for the given outcome. Medicare payments are risk-adjusted and standardized to remove the effect of geographic differences in wages, extra amounts to account for teaching programs and other policy factors. Results reflect Lewin analysis of Medicare claims, assessment, and enrollment data for episodes that began Q4 2011 through Q3 2012 (baseline) and Q4 2013 through Q4 2016 (intervention period) for BPCI episode initiators and the matched comparison providers.

Exhibit P.1: Major Joint Replacement of the Lower Extremity Episodes, Model 3 HHA, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	3,499	3,501	\$23,920	\$24,189	\$23,335	\$23,203	\$402	-\$386	\$1,190	-\$260	\$1,063
Total allowed payment amount, IP through 120-day PDP	3,330	3,339	\$25,020	\$25,451	\$24,526	\$24,427	\$530	-\$321	\$1,382	-\$185	\$1,245
Total Amount Paid by Medicare, IP through 90-day PDP ¹	3,495	3,498	\$21,793	\$21,956	\$21,255	\$21,003	\$415	-\$338	\$1,168	-\$217	\$1,047
Total amount included in bundle definition, 60-day episodes	489	497	\$4,806	\$5,786	\$5,132	\$5,879	\$232	-\$783	\$1,247	-\$620	\$1,084
Total amount included in bundle definition, 90-day episodes	3,010	3,004	\$7,023	\$6,637	\$6,023	\$6,149	-\$512*	-\$1,288	\$264	-\$1,163	\$139
Total allowed payment amount, 30-day post-bundle	3,465	3,479	\$1,122	\$1,274	\$1,202	\$1,097	\$258	-\$1	\$516	\$41	\$475
Readmissions standardized allowed amount, 90-day PDP	3,541	3,541	\$942	\$955	\$788	\$900	-\$99	-\$412	\$213	-\$362	\$163
HHA standardized allowed amount, 90-day PDP	3,541	3,541	\$3,553	\$3,532	\$3,372	\$3,367	-\$17	-\$250	\$216	-\$212	\$179
SNF standardized allowed amount, 90-day PDP	3,541	3,541	\$1,577	\$1,518	\$1,449	\$1,506	-\$116	-\$392	\$159	-\$348	\$115
IRF standardized allowed amount, 90-day PDP	3,541	3,541	\$1,541	\$1,771	\$1,574	\$1,336	\$468	-\$31	\$966	\$50	\$886
Part B standardized allowed amount, 90-day PDP	3,499	3,501	\$2,261	\$2,290	\$2,168	\$2,194	\$2	-\$233	\$237	-\$195	\$199
Number of HHA visits, 90-day PDP	3,540	3,540	12.1	12.0	11.9	11.4	0.4	-0.4	1.2	-0.2	1.0
Number of SNF days, 90-day PDP ²	481	642	15.8	16.0	14.4	14.5	0.2	-1.7	2.0	-1.4	1.7
Emergency department use, 30-day PDP	3,490	3,538	8.0%	8.5%	6.9%	7.8%	-0.4	-2.5	1.6	-2.2	1.3
Emergency department use, 90-day PDP	3,487	3,538	13.6%	14.0%	12.4%	12.8%	0.0	-2.8	2.8	-2.4	2.4

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Unplanned readmission rate, 30-day PDP	3,490	3,538	5.1%	3.6%	2.9%	2.8%	-1.3	-2.6	0.0	-2.4	-0.2
Unplanned readmission rate, 90-day PDP	3,487	3,538	8.1%	6.1%	5.2%	4.8%	-1.6*	-3.5	0.2	-3.2	-0.1
All-cause mortality rate, 90-day PDP	3,535	3,537	0.5%	0.7%	0.4%	0.5%	0.1	-0.5	0.7	-0.4	0.6
ADL Function, Improved Ambulation	2,979	2,902	89.5%	88.6%	88.4%	88.5%	-1.0	-4.6	2.6	-4.0	2.0
ADL Function, Improved Bathing	2,979	2,902	90.8%	94.0%	90.4%	93.6%	0.0	-3.1	3.1	-2.6	2.6
ADL Function, Improved Bed Transferring	2,979	2,902	84.7%	86.3%	83.9%	84.2%	1.4	-3.2	6.0	-2.5	5.2
ADL Function, Improved Lower Body Dressing	2,979	2,902	90.6%	91.6%	88.5%	91.4%	-1.9	-5.1	1.3	-4.6	0.8
ADL Function, Improved Upper Body Dressing	2,979	2,902	93.2%	93.1%	94.1%	94.9%	-0.9	-3.8	1.9	-3.3	1.5

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total amount paid by Medicare IP through 90-day PDP, total amount included in the bundle definition for 90-day episodes, emergency department visits, readmission, and mortality outcomes.

Exhibit P.2: Congestive Heart Failure Episodes, Model 3 HHA, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	4,353	4,441	\$25,267	\$25,723	\$24,065	\$25,375	-\$855	-\$1,826	\$116	-\$1,670	-\$40
Total allowed payment amount, IP through 120-day PDP	4,229	4,335	\$29,311	\$29,748	\$27,993	\$29,396	-\$966	-\$2,106	\$174	-\$1,923	-\$10
Total Amount Paid by Medicare, IP through 90-day PDP ¹	4,350	4,436	\$22,981	\$23,272	\$21,785	\$22,861	-\$785	-\$1,696	\$127	-\$1,550	-\$20
Total amount included in bundle definition, 60-day episodes	182	183	\$12,281	\$10,569	\$11,020	\$10,046	-\$738	-\$4,044	\$2,568	-\$3,513	\$2,036
Total amount included in bundle definition, 90-day episodes	3,983	4,069	\$14,814	\$14,913	\$13,847	\$14,737	-\$791	-\$1,635	\$53	-\$1,499	-\$83
Total allowed payment amount, 30-day post-bundle	3,844	3,901	\$4,751	\$4,508	\$4,254	\$4,602	-\$591	-\$1,164	-\$18	-\$1,072	-\$110
Readmissions standardized allowed amount, 90-day PDP	4,489	4,491	\$6,553	\$6,550	\$6,126	\$6,415	-\$291	-\$974	\$392	-\$865	\$282
HHA standardized allowed amount, 90-day PDP	4,489	4,491	\$3,462	\$3,337	\$3,067	\$3,094	-\$153	-\$342	\$36	-\$311	\$6
SNF standardized allowed amount, 90-day PDP	4,489	4,491	\$1,969	\$2,392	\$1,958	\$2,455	-\$75	-\$440	\$291	-\$382	\$232
IRF standardized allowed amount, 90-day PDP	4,489	4,491	\$848	\$913	\$616	\$647	\$34	-\$282	\$349	-\$231	\$299
Part B standardized allowed amount, 90-day PDP	4,353	4,442	\$3,863	\$4,118	\$3,854	\$4,267	-\$158	-\$461	\$145	-\$412	\$97
Number of HHA visits, 90-day PDP	4,479	4,487	20.8	17.0	16.8	15.7	-2.7	-5.9	0.5	-5.4	0.0
Number of SNF days, 90-day PDP ²	877	927	21.4	21.0	20.8	22.1	-1.7	-4.1	0.7	-3.7	0.3
Emergency department use, 30-day PDP	4,368	4,481	10.7%	11.9%	11.7%	12.1%	0.8	-1.3	2.8	-0.9	2.5
Emergency department use, 90-day PDP	4,365	4,481	21.1%	23.2%	23.2%	23.6%	1.7	-0.7	4.1	-0.3	3.7

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Unplanned readmission rate, 30-day PDP	4,368	4,481	24.6%	22.5%	22.7%	20.8%	-0.2	-3.3	2.9	-2.8	2.4
Unplanned readmission rate, 90-day PDP	4,365	4,481	44.1%	41.5%	40.8%	39.0%	-0.9	-3.5	1.8	-3.1	1.3
All-cause mortality rate, 30-day PDP	4,446	4,467	4.5%	3.8%	3.7%	4.3%	-1.3	-2.4	-0.1	-2.2	-0.3
All-cause mortality rate, 90-day PDP	4,443	4,467	13.3%	11.9%	11.6%	12.0%	-1.8	-3.7	0.0	-3.4	-0.3
ADL Function, Improved Ambulation	3,096	3,111	54.7%	56.1%	57.1%	61.3%	-2.7	-7.4	2.0	-6.7	1.2
ADL Function, Improved Bathing	3,096	3,111	59.0%	64.1%	62.9%	65.1%	2.9	-2.6	8.5	-1.7	7.6
ADL Function, Improved Bed Transferring	3,096	3,111	49.8%	50.3%	55.9%	56.4%	0.1	-4.1	4.2	-3.4	3.5
ADL Function, Improved Lower Body Dressing	3,096	3,111	57.6%	63.5%	63.4%	67.6%	1.8	-2.3	5.8	-1.6	5.2
ADL Function, Improved Upper Body Dressing	3,096	3,111	57.3%	62.9%	65.9%	68.2%	3.3	-1.5	8.2	-0.7	7.4

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total amount paid by Medicare IP through 90-day PDP, total amount included in the bundle definition for 90-day episodes, emergency department visits, readmission, and mortality outcomes.

Exhibit P.3: Simple Pneumonia and Other Respiratory Infections Episodes, Model 3 HHA, Q4 2011 – Q4 2016

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Total allowed payment amount, IP through 90-day PDP	1,246	1,254	\$22,650	\$24,994	\$23,612	\$23,746	\$2,210	\$132	\$4,287	\$466	\$3,953
Total allowed payment amount, IP through 120-day PDP	1,227	1,238	\$25,647	\$28,227	\$26,587	\$26,693	\$2,474	\$89	\$4,860	\$472	\$4,476
Total Amount Paid by Medicare, IP through 90-day PDP ¹	1,246	1,254	\$20,575	\$22,683	\$21,421	\$21,499	\$2,031	\$94	\$3,968	\$405	\$3,657
Total amount included in bundle definition, 90-day episodes	1,222	1,228	\$11,911	\$12,899	\$12,129	\$12,033	\$1,085	-\$443	\$2,613	-\$198	\$2,367
Total allowed payment amount, 30-day post-bundle	1,102	1,127	\$3,358	\$3,492	\$3,314	\$3,377	\$71	-\$729	\$871	-\$600	\$742
Readmissions standardized allowed amount, 90-day PDP	1,272	1,273	\$3,885	\$4,368	\$4,727	\$4,398	\$812	-\$122	\$1,745	\$28	\$1,595
HHA standardized allowed amount, 90-day PDP	1,272	1,273	\$3,678	\$3,865	\$3,494	\$3,577	\$103	-\$180	\$387	-\$135	\$341
SNF standardized allowed amount, 90-day PDP	1,272	1,273	\$2,172	\$2,337	\$2,159	\$2,288	\$37	-\$613	\$686	-\$508	\$582
IRF standardized allowed amount, 90-day PDP	1,272	1,273	\$801	\$1,571	\$617	\$905	\$481	-\$242	\$1,203	-\$126	\$1,087
Part B standardized allowed amount, 90-day PDP	1,246	1,254	\$3,260	\$3,637	\$3,264	\$3,602	\$39	-\$372	\$451	-\$306	\$385
Number of HHA visits, 90-day PDP	1,271	1,272	17.1	18.0	16.0	16.1	0.9	-0.4	2.3	-0.2	2.1
Number of SNF days, 90-day PDP ²	280	230	19.4	18.7	21.0	19.3	1.0	-2.7	4.7	-2.1	4.1
Emergency department use, 30-day PDP	1,251	1,263	14.5%	13.1%	11.8%	13.9%	-3.5	-7.5	0.6	-6.9	0.0
Emergency department use, 90-day PDP	1,250	1,263	28.6%	25.7%	24.9%	26.9%	-4.8	-10.4	0.7	-9.5	-0.2
Unplanned readmission rate, 30-day PDP	1,251	1,263	17.0%	16.5%	17.8%	16.8%	0.4*	-4.1	5.0	-3.4	4.3

Outcome	Number of BPCI Intervention Episodes	Number of Comparison Intervention Episodes	BPCI Baseline	BPCI Intervention	Comparison Baseline	Comparison Intervention	DiD	95% LCI	95% UCI	90% LCI	90% UCI
Unplanned readmission rate, 90-day PDP	1,250	1,263	29.9%	32.0%	30.8%	29.4%	3.5*	-1.5	8.4	-0.7	7.6
All-cause mortality rate, 30-day PDP	1,263	1,262	4.0%	4.3%	4.0%	3.7%	0.7	-1.6	3.0	-1.2	2.6
All-cause mortality rate, 90-day PDP	1,262	1,262	11.8%	11.1%	10.8%	10.4%	-0.3	-3.7	3.2	-3.2	2.6
ADL Function, Improved Ambulation	884	898	63.2%	62.3%	57.8%	60.6%	-3.6	-10.3	3.1	-9.2	2.0
ADL Function, Improved Bathing	884	898	61.6%	63.7%	60.7%	62.9%	-0.1	-6.7	6.5	-5.6	5.4
ADL Function, Improved Bed Transferring	884	898	56.6%	56.8%	51.8%	57.6%	-5.7	-12.1	0.6	-11.0	-0.4
ADL Function, Improved Lower Body Dressing	884	898	64.0%	64.9%	59.8%	65.4%	-4.7	-11.3	2.0	-10.2	0.9
ADL Function, Improved Upper Body Dressing	884	898	63.6%	64.2%	61.5%	66.3%	-4.2	-11.0	2.5	-9.9	1.4

¹ Does not include copays and deductibles

² Dependent on having at least one day or visit in the given setting

* This might be a biased estimate because we rejected the null hypothesis that BPCI and matched comparison providers had parallel trends for this outcome (with 90% confidence), which is required for an unbiased estimate. Equal trends test was conducted for total amount paid by Medicare IP through 90-day PDP, total amount included in the bundle definition for 90-day episodes, emergency department visits, readmission, and mortality outcomes.

Appendix Q: Technical Expert Panel Summaries and Panelists

I. Major Joint Replacement of the Hip and Knee

- Date: May 6, 2015
- Facilitator: Christine LaRocca, MD
- Panelist names and titles:
 - **James Cobey, M.D.**, Board Certified Orthopedic Surgeon; President of the Medical Society of the District of Columbia
 - **Anne Deutsch, PhD**, Certified Rehabilitation Registered Nurse with a doctoral degree in Epidemiology and Community Health; Senior Research Public Health Analyst at RTI International; Clinical Research Scientist at the Rehabilitation Institute of Chicago's Center for Rehabilitation Outcomes Research; Research Assistant Professor in the Department of Physical Medicine and Rehabilitation in Northwestern University's Feinberg School of Medicine
 - **Cindy Krafft, PT, MS**, President for the Home Health Section of the American Physical Therapy Association
 - **Tad Mabry, M.D.**, Assistant Professor of Orthopedic Surgery at the Mayo Clinic College of Medicine; Consultant of Adult Reconstruction at the Mayo Clinic; Diplomate of the American Board of Orthopedic Surgery; Member of the American Association of Hip and Knee Surgeons
 - **Trudy Mallison, PhD**, Visiting Associate Professor in the School of Medicine and Health Sciences at the George Washington University; Office for Clinical Practice Innovation
 - **Joan Marren, RN, MA, MEd**, National consultant in health care strategy and practice, primarily focused on home and community-based services; Founding member of Quadrant Consulting, LLC (partnership of four experienced leaders in home care and hospice services)
 - **Joseph G. Ouslander, M.D.**, Professor and Senior Associate Dean for Geriatric Programs at the Charles E. Schmidt College of Medicine at Florida Atlantic University and Professor (Courtesy) at the Christine E. Lynn College of Nursing at FAU
 - **Jennifer Stevens-Lapsley, PhD**, Associate Professor in the Physical Therapy Program at the University of Colorado Anschutz Medical Center.

A. Key Takeaways

- Outcomes and patterns of care are likely to differ for elective versus non-elective Total Hip Replacement (THR). We really have three populations here: non-elective THR, elective THR, and elective Total Knee Replacement (TKR).
- Panelists were interested in more information on “increased home health agency (HHA) use.” The panelists asked if this refers to an increased number of visits, an extended length of time receiving HH, and/or an increased number of therapy visits.
- Also interested in the number of therapy visits, and whether the visits are by Physical Therapy (PT), Occupational Therapy (OT) or both.
- Reasons for Emergency Department (ED) use, classified as avoidable vs unavoidable, as well as the timing of the ED visit post-discharge. For instance, we should distinguish between ED visits occurring within 24-48 hours of discharge, and those happening later in the episode.
- This following practice is not a result of BPCI participation but is worth noting as we evaluate this program. Typical practice, again not limited to BPCI participants, was generally described as 1-3 PT sessions while in the hospital after elective primary THRs, with the vast majority of patients not receiving ongoing outpatient PT. The benefits and need for ongoing outpatient therapy (PT and/or OT) after hospital discharge for THR was championed by multiple panelists as necessary for a Medicare population.
- Patient populations particularly susceptible to suboptimal functional outcomes are those with comorbidities.
- Gait distance is not a good measure of functional outcome. Mobility embedded in functional tasks was favored, as was ability to perform self-care.
- In terms of function, it is important to look at self-care and mobility separately.
- The decision of Inpatient Rehabilitation Facility (IRF) versus Skilled Nursing Facility (SNF) is often based on the admission criteria of the individual facility, insurance coverage and geographic availability, rather than being solely based on a provider’s order.

B. Questions

1. Question 1

Initial data (relative to a comparison group) found less BPCI patients discharged to a SNF (Model 2), shorter length of stay in SNF (Models 2 and 3), and increased use of HHA services (Model 2). Given this information...

1. Which patient populations may be particularly susceptible to suboptimal outcomes with these care patterns?
2. What unintended consequences should we be aware of, and how might we measure them?
3. What should we look for with respect to functional outcomes given the different capabilities of these settings?

Discussion

- It is valid to be concerned about cherry picking. There is the potential for surgeons to stop doing surgery on higher risk, “more difficult,” cases, for example patients with obesity or diabetes.
- Decisions with regard to referral to SNF are subject to geographic factors. For some smaller communities, a SNF stay is a given.
- It is a challenge to coordinate care if the orthopedic program cares for patients who come from far away to have the surgery and if the hospital is dealing with hundreds of SNFs versus 2-3.
- There was general agreement that, when possible, the best site of care is home. The main issues to consider are the adequacy and safety of the home environment. The home environment provides the truest picture of functional outcomes. Measuring functional outcomes at the end of a SNF stay may not give a true picture of what a patient can/cannot do in the home environment. Examples given included meal preparation and the performance of stairs/steps in the home. It is important to look at a patient’s function in their own home.
- With regard to, “Which patients are particularly susceptible to suboptimal outcomes?” it was noted that you cannot measure social support in claims data. Those who live alone and/or are unmarried may be at higher risk and are more likely to go to a SNF. The relevant factor is comorbidities. There is a huge difference between patients undergoing elective and non-elective hip replacement. Non-elective procedures as a result of falls are often secondary to uncontrolled comorbidities such as diabetes, heart failure, COPD, dementia, musculoskeletal conditions, and neurodegenerative conditions. For many patients undergoing non-elective hip replacement, it is not safe or feasible for them to go directly home to be managed in a home setting. The risks stem from the fact that their comorbidities are not well controlled and, because of these comorbidities, patients may not be fully rehabilitated. The unintended consequences include unnecessary rehospitalization, ED visits, further falls with injury, and poorer functional outcomes.
- While it is difficult to get at this with claims data, it is important to know to what extent the comorbidities are controlled, and the severity of the disease. Postsurgical anemia and cognitive problems with executive functioning were provided as examples of conditions which may require an inpatient post-acute setting.
- Elective THRs and non-elective THRs as a result of fracture are two different diseases.
- The available data shows increased use of HHA services relative to a comparison group. Panelists asked: Does this mean an increased number of visits and an increased number of therapy visits? We should look to see if there is an increased intensity and number of visits by HHA.
- The notion that therapy can be provided daily in a SNF but cannot be provided daily by a HHA is archaic. HHAs can see patients daily; nothing prohibits daily visits.
- We should analyze outcomes and patterns of care separately for elective versus non-elective THR. In terms of function, it is important to look at self-care and mobility

separately. Home Health (HH) care does not always provide much occupational therapy (OT) for THR patients.

- With regard to functional outcome, an objective follow up measure after TKR is Range of Motion (ROM). It was stated that patients often need supervision to ensure they are moving the knee, and if ROM isn't restored in 3-4 weeks the patient may never get it back. There was not unanimous agreement about using ROM as the sole point of emphasis; it was stated that ROM does not predict long term outcomes.
- Using an arbitrary gait distance as a primary outcome measure was not recommended. It was noted that the Care Tool listed a gait distance of 150 feet; however, this is not a realistic distance for a patient to function well in the home environment or the community.
- Gait speed was favored as an outcome measure across all facilities and was noted to predict mortality and institutionalization.

2. Question 2

What are the factors you consider when you recommend discharge to an Inpatient Rehabilitation Facility (IRF)?

Discussion

- There is a wide range of quality of care in both SNFs and IRFs. Some enrollees in alternative payment models are developing “super” SNFs. The decision of IRF versus SNF is often based on the admission criteria of the individual facility, insurance coverage and geographic availability, rather than being solely based on a provider's order.
- A MedPAC report finding comparable costs between IRFs and SNFs, largely due to shorter Length of Stay (LOS) in IRFs, was cited. There are also studies finding comparable outcomes between IRFs and “good” SNFs. However, the literature does not represent the universe of SNFs. Many of the studies included data from self-selected SNFs.
- Many physicians/providers do not know the difference between SNFs and IRFs.
- TJR patients with complicating rehabilitation problems such as preexisting stroke or coexisting rheumatoid arthritis were mentioned as those potentially benefiting from an IRF setting, acknowledging that the patient must be able to tolerate and cooperate with the required number of hours of therapy per day. Comorbidities were cited as a factor which sometimes limits a patient's ability to participate in therapy in the IRF setting. Patients who really need an IRF were described as those with complicated additional needs such as those patients requiring ongoing medical care given that IRFs have 24 hour per day physician coverage.

3. Question 3

No outpatient physical therapy after hip replacement (Model 2).

1. For which patients might this always or never result in a good outcome?
2. What unintended consequences should we be aware of, and how might we measure them?

3. What less invasive hip procedures, such as anterior hip replacement, might we see in the claims data now and in the near future? When were they developed and how frequently are they performed?

Discussion

- Typical practice was generally described as 1-3 PT sessions while in the hospital after elective primary THRs, with the vast majority of patients not receiving ongoing outpatient PT. For patients with an elective primary THR (does not include revisions or fractures), patients typically receive preoperative education, are seen multiple times by PT during their 2-3 nights in the hospital, receive a care plan upon discharge and do not receive ongoing outpatient PT unless they request it or there are safety issues. It was noted that post hospital therapy may be underutilized for a subset of patients. It was stated that patients do not need a lot of therapy so much as motivation.
- The lack of ongoing outpatient PT raised concerns among some panelists, noting that education is important to encourage patients to move and to restore a normal movement pattern. It was stated that long term problems can develop outside of the 90 day postop timeframe, such as asymmetry, low back pain, and decreased muscle strength. An interesting discussion ensued related to the benefits of OT to help patients integrate hip precautions into their self-care and home routine. However, OT is not routinely ordered post THR because the PT provides the necessary patient education. The need for OT was championed and it might be a marker of best practice. Given that it is difficult for inpatient staff to anticipate what will be needed in the home environment, 1-2 HH therapy visits were viewed as an “ounce of prevention” in order to identify problems and to provide baseline education related to red flags.
- The discussion of less invasive procedures focused on anterior hip replacement. Anterior hip replacement is not a fad and is probably here to stay. It is more technically demanding and is applicable to a smaller subset of the population. There is less room for error and the risks include early loosening and intraoperative fracture.

4. Question 4

Preoperatively, patients are encouraged to participate in a “Pre-hab” exercise program and/or patients are required to attend mandatory total joint replacement education classes (Model 2 and perhaps other models). Taken individually or in combination, are these exercises and educational programs important contributors to high quality outcomes or is the requirement to participate a subtle form of cherry picking?

Discussion

- Preoperative education was generally viewed as an important contributor to high quality outcomes. The preoperative education may be provided in a variety of formats: a 1:1 session, in a class or via internet offerings. Reference was made to Kaiser Permanente’s mandatory classes; these preoperative classes were described as valuable for increasing patient awareness, clarifying patient expectations, and helping patients prepare. In the class or group setting, patients can learn from each other’s questions. In patients with end stage osteoarthritis, prehab or preoperative PT was not viewed as terribly effective.

- One panelist was aware of programs having a mandatory class attendance requirement before surgery could be scheduled but this probably occurs in a minority of programs. More commonly, the class is strongly suggested. It is difficult to measure the effect of the class in and of itself. There are challenges for some patient populations in completing prehab exercise programs. Those with mobility issues and those who are homebound preoperatively would be unable to attend.
- HHAs are capable of offering prehab exercise programs in the home but have concerns related to potentially violating anti-kickback laws. Since the patient is not technically admitted to HH at the time of the provision of prehab services, the services are provided at no cost. This can be viewed as offering this service as an inducement to receive the referral. Question: If offered as part of the BPCI payment model with the HHA being compensated, and the patient still has the right to choose the HHA, is this acceptable? I offered to take this question back to Lewin/CMS, and then come back to the panelists with an answer but noted that I did not think participating in BPCI altered in any way the need to operate under the anti-kickback regulations.
- Pre-surgical PT for targeted strengthening can be valuable for selected patients. It was noted that more complicated patients (multiple comorbidities, poor pre-operative ambulation, etc.) for whom surgery is offered for pain relief will achieve functional milestones at a lower level and at a slower pace. Knowing the type of prehab these patients should engage in and determining how much it will help them improve is a challenge. The challenge of identifying patients in a clinic setting for preoperative physical rehabilitation, and getting reimbursed for this prehab was described.
- The literature shows prehab and education have some benefit. However, it is not one size fits all. “We want one model but the issue is more nuanced than that.” There will be some who benefit from education, some who benefit from prehab, and some patients who will not remember the instruction until it is offered postoperatively.

5. Question 5

Increased ED visits (without hospitalization) within 30 days of discharge for BPCI patients (Model 2).

1. It is possible that some of these visits are planned. What do you think about planned ED use as part of care redesign?
2. How do you interpret this finding of increased ED visits?

Discussion

- There are programs that are trying to drive down LOS to the point that outpatient joint replacements are occurring and part of the care plan is to instruct patients to go to the ED if they have a problem with pain. The ED visit is, therefore, partially or semi-planned. Patients can be given intravenous narcotics in the ED if they have trouble with pain control either after hours or even during business hours, since these medications cannot be given in clinic.

- Another condition for which planned ED use might be appropriate is postoperative anemia, which is common in patients after non-elective hip replacement. It is not always possible for patients to receive transfusions in outpatient clinics.
- The view was shared that ED use should be monitored in BPCI, as a spike or increase in ED use may suggest that LOS has been lowered too much.
- Knowing the reasons for the ED visit and the timing of the visit is an important data element to capture. Classifying the reasons for the ED visit as avoidable or unavoidable was suggested. It was noted with reference to the HH setting that there is still a tendency for physicians to send all patients to the ED upon being called by the HH nurse, described as a knee jerk response.
- Payment issues for HHAs and SNFs related to long and complex observation stays was discussed.
- Questions related to the reasons for the ED visit and the timing were raised, and it was noted that this information is needed to assist in the interpretation of and in understanding the increased ED use seen in the early data. A paper was cited indicating that HHAs with ready access during nonbusiness hours to a physician had decreased readmission rates and decreased ED visits. The patient population in this study was not limited to TJR patients. Ready access to a physician during nonbusiness hours is a recommended practice so that access to a physician is not a barrier for HHAs.

II. Heart Failure

- Date: April 12, 2016
- Facilitator: Christine LaRocca, MD, Telligen Medical Director
- Panelist names and titles:
 - **Anne Deutsch, RN, PhD, CRRN, FACRM** is a Senior Research Public Health Analyst at RTI International. She is a certified rehabilitation registered nurse with a doctoral degree in Epidemiology and Community Health. Anne also has an appointment as a Clinical Research Scientist at the Rehabilitation Institute of Chicago's Center for Rehabilitation Outcomes Research and is a Research Associate Professor in the Department of Physical Medicine and Rehabilitation in Northwestern University's Feinberg School of Medicine.
 - **Kumar Dharmarajan, MD, MBA** is a board-certified cardiologist and geriatrician who is Assistant Professor of Medicine (Cardiology) at the Yale School of Medicine. He is also a Research Scientist at the Yale-New Haven Hospital Center for Outcomes Research and Evaluation (CORE). Dr. Dharmarajan's primary interests are in improving health outcomes for older persons with cardiopulmonary disease.
 - **Edward Havranek, MD** practices general cardiology at Denver's municipal hospital, Denver Health Medical Center, and is Director of Health Services Research for Denver Health. He is a Professor of Medicine at the University of Colorado School of Medicine, currently serves as chair of the American Heart Association's Quality of Care and Outcomes Research Annual Scientific Forum Program Committee.
 - **Cindy Krafft PT, MS, HCS-O** has been involved at the senior leadership level for the Home Health Section of the American Physical Therapy Association and is the current President of that organization.
 - **Trudy Mallison, PhD, OTR./L, FAOTA, NZROT** is Associate Professor in the School of Medicine and Health Sciences at the George Washington University; she also holds a position in the newly launched Office for Clinical Practice Innovation Therapy Association (AOTA).
 - **Joan Marren, RN, MA, MED** is currently a national consultant in health care strategy and practice, primarily focused on home and community-based services. She is a founding member of Quadrant Consulting, LLC, a partnership of four experienced leaders in home care and hospice services.
 - **Kathleen McCauley PhD, RN, FAAN, FAHA** is a member of a research team led by Dr. Mary Naylor that has tested the Advanced Practice Nurse (APN) Transitional Care Model in vulnerable elders; her primary responsibility within this team includes development of clinical intervention protocols, tools, and systems to educate nurses and others in implementing transitional care and leading APN case discussions to improve patient outcomes and the expertise of the transitional care nurses.

- **Michael Rich, MD** is Professor of Medicine and Cardiology at the Washington University School of Medicine, and Director of the Cardiac Rapid Evaluation Unit at Barnes-Jewish Hospital in St. Louis. He is an internationally recognized expert in geriatric cardiovascular disease, and he is past president of the Society of Geriatric Cardiology. He currently serves on the editorial boards of numerous publications, and he is Senior Associate Editor for the *Journal of Cardiac Failure*, Associate Editor for the *American Journal of Medicine*, and past Associate Editor for the *Journal of the American Geriatrics Society*.

A. Key Takeaways

- Coinciding with the passage of the 2010 Affordable Care Act and its inclusion of penalties for readmissions, there was a major decline in national heart failure (HF) readmission rates from 2010-2012. From October 2012 to the present, there has been a slight decline in HF readmission rates. Additional significant reductions may not be achievable.
- In HF patients, two-thirds of readmissions are for conditions other than HF.
- Interventions to reduce HF readmissions generally entail providing a greater intensity of patient-centered services, such as home visits and use of multidisciplinary teams.
- To further reduce HF readmissions, panelists recommend:
 - A more patient-centered approach that will target not only HF but also coexisting comorbid conditions and psychosocial issues
 - The performance by providers of a root cause analysis for every readmission
 - Appropriate and timely palliative care and hospice services
 - Involvement of emergency department staff in planning and implementing interventions
- Improvement in function for certain HF patients may not be feasible. For these HF patients, stabilization of function is a desirable outcome and the importance of maintenance therapy was emphasized.
- Maintenance therapy in the home health setting was noted to be underutilized, which was attributed to fear of payment denial.
- The stress of hospitalization is detrimental; panelists advocated for making the experience of hospitalization more humane.
- Possible reasons for the low cardiac rehabilitation (CR) utilization rates seen in the BPCI HF data include cost, capacity and accessibility barriers for CR, as well as skepticism among cardiologists about the magnitude of CR benefits.
- Panelists did not identify much in the way of new HF treatments or breakthroughs that might affect costs now or in the near future.

B. Questions

1. Question 1

For BPCI HF patients relative to a comparison group, there are no significant changes at 30 or 90 days after anchor hospital discharge in: ED utilization, all-cause mortality rate and unplanned readmission rate. It appears that despite incentives to decrease readmissions within a 30 day or 90 day window, participants have not been able to do so.

1. Does this surprise you?
2. What, if anything, works for readmission reduction in HF Medicare Fee for Service (FFS) patients?
3. What do you want to make sure we know/CMS knows about this population of patients?

Discussion

- Noting the unchanged readmission rate, one panelist observed that BPCI participants may maintain the same number of readmissions but each readmission may be occurring at a lower cost.
- Interventions to reduce HF readmissions generally entail providing a greater intensity of patient-centered services, such as home visits and use of multidisciplinary teams. This greater intensity of patient-centered care services, as opposed to HF-specific care, is necessary to lower readmissions in HF patients because these are older patients with a range of conditions. Panelists noted that it is often very difficult for providers to generate the resources necessary to provide higher intensity care.
- National readmission rates for HF were noted to have significantly dropped from April 2010 to October 2012. Of note, the Affordable Care Act passed in 2010 and included reduced payments to Inpatient Prospective Payment System hospitals with excess readmissions, effective for discharges beginning on October 1, 2012, as part of the Hospital Readmissions Reduction Program. From October 2012 to the present day, there has been only a slight decline in the readmission rate. As BPCI started after the readmission penalties were effective in October 2012, it was questioned whether HF readmissions had already been reduced as far as possible.¹
- In HF patients, two-thirds of readmissions are for conditions other than HF. Most readmission reduction programs primarily target heart failure readmissions, and there is very little evidence from clinical studies on the impact of targeting comorbid conditions during the early follow-up period to see whether or not you can further reduce readmissions. There are on-going studies that are addressing this point.
- Looking at a person with HF holistically and managing the interplay of comorbid conditions aids in identifying services necessary to reduce readmissions.
- The practice of performing a root cause analysis for every readmission was promoted to determine the cause of the readmission and to identify what can be fixed. The importance

¹ Telligen note: The following issue brief by Boccuti and Casillas, “Aiming for Fewer Hospital U-turns: The Medicare Hospital Readmission Reduction Program,” provides additional information; <http://kff.org/medicare/issue-brief/aiming-for-fewer-hospital-u-turns-the-medicare-hospital-readmission-reduction-program/>

of performing a root cause analysis was highlighted by the following example related to medication nonadherence: The patient who cannot afford their medications and as a result doesn't take them, was contrasted with the patient who cannot adhere to his/her medication regimen because of cognitive impairment. These two patients will require very different interventions to prevent another readmission.

- The importance of reviewing admissions and readmissions with the people who are delivering service in the field (i.e. outside the hospital) as well as the people who are responsible for discharge planning within the hospital was emphasized. For each and every case, the team should ask: “what actually happened, what system or process failed, and what system or process could be improved either within the community setting or within the inpatient setting to contribute to a smoother and more successful transition?”
- The importance of palliative care, and knowing when and how to provide it, was emphasized by the panelists to improve care and reduce potentially avoidable readmissions. Appropriate and timely use of hospice care was also recommended.
- It was noted that the “low hanging fruit” related to HF readmission reduction had already been addressed, and efforts for further reductions in HF hospitalization should focus on more complex issues such as the interplay of multiple comorbidities and the psychosocial issues that often contribute to lack of stability and frequent readmissions to the hospital.
- One panelist was not convinced that readmission is a particularly important outcome measure. He noted that it is important with regard to the cost of care, but as a physician, the panelist stated that his first job is to make sure that the overall health status of his HF patient is optimized and readmission is really a small part of that.²
- In general, panelists were not surprised that readmissions were not reduced by BPCI participants. It was noted that scaling HF interventions, such as disease management programs, from randomized clinical trials in the literature to the broader population has not worked well.
- Psychosocial issues, including social isolation and poverty, are important contributors to readmissions and are much more refractory to intervention.
- The ED plays a critical role in prevention of readmissions. It is essential to involve ED staff in planning and implementing interventions aimed at preventing readmissions, improving clinical outcomes, and reducing costs. Data show that once a patient arrives in the ED with a presumptive diagnosis of HF, the likelihood of admission (including observation stays) exceeds 80%. Yet, 25-50% of these admissions could be avoided with optimal management in the ED and close follow-up after discharge from the ED.

² Telligen note: For additional information, the following article by Desai and Stevenson, “Rehospitalization for Heart Failure: Predict or Prevent,” asks the question, “Is reducing hospitalizations the metric of success?”
<http://circ.ahajournals.org/content/126/4/501.full.pdf+html>

2. Question 2

For BPCI HF patients relative to a comparison group, there are no statistically significant changes in:

- Acute Inpatient Care Length of Stay (Model 2)
- Number of Institutional Days
- Number of Skilled Nursing Facility (SNF) Days
- Number of Home Health (HH) Visits (Model 2 and Model 3-SNF)
- Percent of Episodes Discharged to Post-Acute Care (Model 2)
- Percent of Episodes Discharged to an Institution out of Those Who Received Any Post-Acute Care (Model 2)
- Hospice use

Providers have incentives to reduce service use for the hospitalization and 90-days thereafter; from the results on the previous slides, nothing appears to be changing. What factors may explain these findings?

Discussion:

- Panelists inquired if BPCI participants with reduced utilization might possibly be canceled out by those participants with higher service use, resulting in this overall finding of no significant change. Panelists asked: “Can we identify via subgroup analysis certain types of organizations, such as highly integrated health systems, that are experiencing reductions in service use for the hospitalization and 90-days thereafter? If so, what interventions are they implementing that may account for their decreased utilization?”
- Panelists noted there is a lot of variability in services rendered by SNFs and HH agencies. Panelists were interested in additional data, such as therapy costs, to indicate the services delivered by these providers. For those patients that go to a SNF, panelists remarked that it makes sense to look at what happens in the SNF. Reviewing SNF therapy costs may help determine if the focus is rehabilitation versus SNF care that was described as “a holding pattern.” Patients need to be able to manage their own care and must have systems in place to help them develop and sustain skills for long term management.
- Panelists raised the possibility that the lack of change in post-acute care utilization could be related to poor communication between the hierarchy of administrative people that are agreeing to participate in BPCI with the practitioners on the front lines taking care of the patients. Practitioners may not know their organization is participating in BPCI, and so may be unaware of the initiative’s purpose and their options within it.
- Panelists asked: “For those BPCI participants who have narrowed their network to preferred SNFs/HH agencies, can we analyze the utilization and quality outcomes from these preferred providers?”
- Improvement in function for certain HF patients may not be feasible. Stabilization of function is a desirable outcome and the importance of maintenance therapy was discussed. When improvement is not possible, it was noted that therapists need to understand their role and the stabilization goal.

- Measures in a variety of post-acute settings report and track improvement, without recognition that a patient can either improve, stabilize, or decline. Providers may expend considerable effort to prevent decline, and yet stabilization and decline are reported (“lumped”) in one category. The following example was provided: One agency has 50% of patients with improved upper body dressing and 50% with decline; this was contrasted with an agency with 50% improvement, 40% stabilization and 10% decline. However, public report cards would only reflect the 50% improvement; the implication being that the report cards do not allow us to differentiate these agencies from one another.
- Rehabilitation settings and providers are at a strategic disadvantage, according to one panelist, because the reported metrics for these settings are tied to patients getting better, which can inadvertently impede an appropriate conversation about palliative care or hospice.
- Maintenance therapy, particularly in the HH setting, was noted to be underutilized. This was attributed to fear of payment denial because in the past, maintenance therapy was felt to be unallowable. “The issue is that we’re still trying to undo the damage of many years of therapy services functioning under the [premise that the] patient ‘has to be improving or you will get a denial’.”
- The importance of finding out if there is a caregiver, family member, or someone else who can actively be involved as part of a caregiver network was emphasized. These networks can help socially isolated and/or cognitively impaired patients manage a condition as complex as heart failure.

3. Question 3

How would you, as a clinician, respond to the BPCI incentives to manage and coordinate care for HF patients within a bundle lasting 90 days, in the inpatient setting and in the outpatient/post-acute care setting? What behaviors should or could the 90 day bundle length incentivize?

Discussion

- An important mechanism for improving the coordination of care for HF patients over a 90 day period is increased interaction with the healthcare team. More frequent interaction with the HF patient was emphasized and includes a follow-up phone call within 24 hours of going home, ensuring that patients understand their medicines and are able to care for themselves or have someone available who can assist them. More frequent follow-up visits and contacts could facilitate improved outcomes, not just in the 90 day period but for a prolonged period of time. This increased contact is ideally provided by a team led by a HF nurse, such as a nurse practitioner, or someone knowledgeable in the management of HF with the authority to make changes in management. The importance of having one person who is accountable for the care coordination was noted.
- One panelist offered a dissenting view to the benefits of more frequent contact and cautioned “visits beget visits.” This panelist indicated there is literature to suggest that the more often patients are seen, the more likely they are to be sent to the ED by clinicians, and given follow-up visits and referrals related to issues for which the patient normally would not have sought attention.

- Obtaining maximum benefit from the index hospitalization was offered as an alternate strategy by one panelist, indicating that a few extra days in the hospital can result in reduced needs for outpatient care and readmissions. The downside from a longer hospital length of stay is additional deconditioning resulting in delays in recovery.
- Cross-setting collaboration with deliberate and disciplined communication was recommended.
- Although the data is not robust, one panelist advocated for making the experience of hospitalization more humane. More sleep, less bright lights, reduced noise, and early mobilization were mentioned to reduce the stress of hospitalization and aid with recovery after discharge. Patient experience surveys may be a potential source of information to capture the stress of hospitalization.
- Hospital at home programs were recommended, with one panelist suggesting that as many as half of the people that are hospitalized with HF could be managed at home. Management at home would avoid many of the hospital-related stressors previously discussed.
- One panelist recommended holding the hospital accountable for HF patients' ability to demonstrate skills to independently manage their own care, rather than simply verbalize understanding. Utilization of a simulation lab for this purpose was suggested.

4. Question 4

BPCI patients saw a decline of 3.76 HH agency visits during the 90 days after the episode start relative to a comparison group, with no change in measured functional status outcomes save for a statistically significant improvement in upper-body dressing, a measure of self-care function (source=OASIS data).

1. As clinicians and experts, we are interested in your views related to this finding.
2. During our site visits and when conducting focus groups, what questions should we pose to explore this practice pattern change in HH agency visits?

Discussion

- Panelists noted that this is a difficult result to evaluate; one commented that improved upper body dressing is “an odd thing to come out as statistically significant.”
- To better explore this finding, panelists asked if there was a change in the mix of HH agency visits, such as increased therapy (occupational and physical therapy), compared to nursing visits or use of telehealth.

5. Question 5

For BPCI HF patients relative to a comparison group, there are no significant changes in Cardiac Rehabilitation (CR) utilization (all models) in the 90 days after anchor hospitalization discharge. CR is reported to improve functional capacity and reduce mortality, readmissions, and costs, representing a seemingly attractive intervention for BPCI participants. Help us better understand the reasons CR utilization did not increase in this Medicare FFS population.

Discussion

- Panelists pointed out that patient attendance, and not physician referrals to CR, is measured by claims. Our data is dependent on HF patients following through and attending CR.
- Among cardiologists, there is some skepticism about the magnitude of CR benefits.
- There is also skepticism about benefits from CR that would accrue within a 30, 60 or 90 day bundle length, noting that HF patients are not eligible for CR under Medicare until six weeks after hospital discharge.
- Not every hospital has a CR program; therefore, there are access issues to consider.
- CR programs may have capacity issues. Physicians who want to refer more HF patients to CR may find that the physical and personnel capacity is limited.
- Logistical barriers exist in an elderly HF population. Panelists noted that elderly HF patients may not be able to independently drive to CR three times per week.
- Panelists questioned whether a decision to enter into BPCI at an institutional level filters down to real changes in practice. Panelists expressed doubt that major system realignment occurs for BPCI incentives, particularly if the realignment is associated with higher upfront costs and is for one specific condition, namely HF.
- The cost of starting a new CR program is significant. One panelist indicated that if a BPCI participant did not have access to an existing CR program, it would not be feasible to start a new CR program for BPCI.
- “Rehab-like” programs may be occurring (and would not be captured by CR claims). BPCI participants would not be constrained from initiating rehabilitation to increase activity if it was felt to be beneficial.

6. Question 6

What new treatments or breakthroughs in heart failure care might we see now and in the near future? How would these changes affect costs:

1. In the inpatient setting?
2. In the outpatient/post-acute care setting?

Discussion

- Panelists generally did not identify new treatments or breakthroughs in HF care that will affect costs.

- A new drug, valsartan, has been approved for systolic HF; however, panelists doubted it would have much impact on costs as it is not a drug that would apply to most Medicare beneficiaries with HF.
- Panelists noted that newer monitoring devices are all expensive technologies; they may be cost effective but are not cost saving.
- One area of interest is cell phone technology. There have been a number of studies showing that text messaging systems tend to improve patient adherence, including adherence with medication and diet. There is some potential for cell phone applications for improving health outcomes in HF populations. Since such a large proportion of the population, including older people, now have smart phones, panelists believed cell phone applications for improving health outcomes in HF populations could conceivably be scalable and not too expensive.
- Panelists commented that a breakthrough in HF care would be an increase in access to palliative care, noting there is evidence that earlier initiation of palliative care is associated with reduced hospitalization.

C. Potential implications of findings for current activities and analyses

Panelists suggested several patterns of care that may affect functional outcomes. To help answer the question, ‘what factors contributed to the various results under the initiative?’ we could investigate whether the following affect the quality and payment outcomes:

- Types of home health visits or changes in types of visits (e.g., therapy, skilled, home health aide)
- Rehabilitation versus nursing costs in SNFs
- Use of palliative care (explore ways in which palliative care may be identified in claims)

Potential questions or probes for site visits or quarterly calls:

- Has there been any change in the use of palliative care? Why? Does this raise or lower costs? Is it a best practice?
- What are the differences in patterns of care between your preferred SNF/HHA providers and others?

Panelists indicated that they believe that providers have reduced HF readmissions as much as is possible in response to the Hospital Readmission Reduction Program. We can study whether there is a difference between changes in readmission rates for the BPCI episodes subject to the hospital penalties compared with the episodes not subject to the penalties. This may provide some information about potential continued declines in this measure.

III. Coronary Artery Bypass Graft

- Date: July 8, 2016
- Facilitator: Christine LaRocca, MD
- Panelist names and titles:
 - **Kumar Dharmarajan, MD, MBA** is a board-certified cardiologist and geriatrician who is Assistant Professor of Medicine (Cardiology) at the Yale School of Medicine. He is also a Research Scientist at the Yale-New Haven Hospital Center for Outcomes Research and Evaluation (CORE). Dr. Dharmarajan's primary interests are in improving health outcomes for older persons with cardiopulmonary disease.
 - **Cheryl Esbrook, OTR/L, BCPR** has been a practicing occupational therapist at the University of Chicago Medical Center focusing her treatment and research on critical care patient populations in both the medical and surgical ICUs for 13 years. She is also the coordinator of the occupational therapy fieldwork program for students at the University of Chicago as well as the first occupational therapy residency program in acute care.
 - **Steven A. Farmer, MD, PhD, FACC, FASE** is Associate Professor of Medicine and Health Policy at George Washington University and Adjunct Associate Professor of Medicine and Business Strategy at Northwestern University. He is a non-invasive cardiologist with a busy clinical practice in Washington, D.C. He is a nationally recognized expert on health policy, regulation, and payment reform. He leads an NIH-funded study of the joint effect of malpractice risk and financial incentives on cardiac testing.
 - **Cindy Krafft PT, MS, HCS-O** has been involved at the senior leadership level for the Home Health Section of the American Physical Therapy Association and is the current President of that organization.
 - **Richard Parker, MD** is board-certified in general, thoracic, and cardiovascular surgery. He serves patients at Presbyterian/St. Luke Medical Center and Rose Medical Center in Denver, Colorado. Currently, he serves as Chief of Cardiovascular Surgery at Rose Medical Center and Chairman of the Department of Cardiovascular Surgery at Presbyterian/St. Luke Medical Center.
 - **Cindy Sun, MSN, FNP, COS-C** is a family nurse practitioner and university educator with experience in a variety of health care settings including home health, hospital, and physician's office. Cindy's responsibilities with Home Health Quality Improvement (HHQI) include coordinating more than 100 national Network Coordinators, developing educational resources and data reports, as well as being a primary resource for the nation's home health agencies. Her newest responsibility is leading the integration and evaluation of preventive cardiovascular care into the home health setting through the Home Health Cardiovascular Data Registry (HHCDR).

- **Mary Zellinger, APRN-CCNS, MN, ANP-BC, CCRN-CSC** is the Clinical Nurse Specialist for cardiovascular critical care at Emory University Hospital, and a collaborative faculty member of the Emory University School of Nursing in Atlanta. Mary is the coordinator for the Emory University Hospital Magnet Champions program, works closely with members of the interdisciplinary team to address quality and improvement opportunities for the CTS patient, and was a co-lead for a team that implemented the Pain, Agitation, and Delirium guidelines in 2013 for all the ICUs at Emory Healthcare.

A. Introduction

The Coronary Artery Bypass Graft (CABG) Surgery Technical Expert Panel (TEP) garnered clinician insights into patterns of care or changes in care within the BPCI initiative. BPCI TEPs ensure expert, ongoing clinical input to this initiative; this clinical expertise aids in the identification of promising practices and unintended consequences. Panel participants were asked to comment on CABG episode utilization data and quality indicators from the first seven quarters of BPCI (episodes initiated between October 2013 to June 2015) to build upon preliminary findings from claims data analysis and to raise additional areas of inquiry. The panelists helped identify potential quality implications of BPCI incentives, practice pattern changes that may impact vulnerable patient populations, questions related to practice pattern changes that may be explored through site visits or focus groups, and new methods of treating CABG patients.

This TEP concentrated on CABG Surgery under BPCI Model 2; there was insufficient sample size to risk adjust outcomes for Models 3 and 4. The panel was held via webinar and lasted two hours. Several items were shared with the TEP participants to prepare them for the discussion. A pre-work packet of relevant BPCI background information, panelist biographies, an agenda, and general expectations for the TEP was disseminated. Furthermore, the presentation slides were sent to the panelists; these slides included additional BPCI information, data descriptions, and questions for the panel. The Centers for Medicare and Medicaid Services (CMS) reviewed the materials prior to distribution. Through webinar technology, all participants viewed the same slides and were encouraged to submit comments or questions verbally or through online chat features. Dr. Christine LaRocca, a board-certified geriatrician and medical director for Telligen, facilitated the TEP. Approximately 20 minutes were allotted for each question to ensure an in-depth discussion and exploration of themes. The meeting was recorded and transcribed to ensure accurate recall and analysis.

Eight panelists were identified through professional contacts and recommendations, and were then reviewed by CMS. One panelist, an academic cardiothoracic surgeon, confirmed and subsequently was unable to attend. The remaining seven members included a variety of experts: an occupational therapist, a physical therapist, a home health expert, a board-certified cardiologist and geriatrician, a clinical nurse specialist for cardiovascular critical care, a board-certified thoracic and cardiovascular surgeon, and a board-certified cardiologist.

In BPCI, a CABG episode of care is triggered by an inpatient hospitalization for one of six MS-DRGs. These DRGs identify an episode of care as CABG. The Lewin Group and Telligen received feedback from clinicians indicating it was important to stratify the data by CABGs more likely to be urgent or emergent versus those more likely to be elective, as urgent or emergent procedures may have different quality, utilization, and payment outcomes than elective procedures. There was concern that potential differences in outcomes for “Urgent/Emergent” versus “Elective” surgeries

would be masked if the available data for the six DRGs were analyzed in the aggregate. Panelists confirmed “Urgent/Emergent” CABGs and “Elective” CABGs represent two significantly different subgroups. The stratification outlined in Exhibit W.1 was proposed by Telligen for the sole purpose of guiding the dialogue for this TEP discussion.

Exhibit Q.1 Stratification of Results to Attempt to Distinguish “Urgent/ Emergent” from “Elective” CABG

“Urgent/ Emergent” CABG (with PTCA or Cardiac Catheterization)	“Elective” CABG
DRG 231 Coronary bypass with PTCA with MCC	DRG 235 Coronary bypass without cardiac catheterization with MCC
DRG 232 Coronary bypass with PTCA without MCC	DRG 236 Coronary bypass without cardiac catheterization without MCC
DRG 233 Coronary bypass with cardiac catheterization with MCC	
DRG 234 Coronary bypass with cardiac catheterization without MCC	

Note: CABG=coronary artery bypass graft. PTCA=percutaneous transluminal coronary angioplasty. MCC=major complications.

Panelists’ observations and feedback regarding the stratification utilized in Table 1.

- Due to differences in coding and practice patterns by practitioner and by locale, “Urgent/Emergent” versus “Elective” CABG surgeries are difficult to precisely categorize using DRGs.
- The “Urgent/Emergent” group was most problematic as it includes two patient populations:
 - Those who are hospitalized because they require an emergent procedure in less than 24 hours, and
 - Those who are admitted to the hospital and require CABG (which triggers a BPCI episode), and need to stay in the hospital pre-CABG to eliminate drugs, such as clopidogrel, or to evaluate and stabilize active conditions.
- Panelists noted that patients who have difficulty getting back and forth to the hospital and/or who live great distances from the hospital may undergo a catheterization and a CABG during the same hospitalization. This is due to the challenging travel situation and not necessarily because the condition was either urgent or emergent.
- There was concern for unintended consequences if future bundles are constructed using this stratification; for example, panelists noted that these groupings may unduly influence the decision to operate sooner in order to shorten preoperative length of stay.
- With regard to post-acute care utilization, characteristics such as comorbidities (i.e. chronic lung disease and diabetes), deconditioning, frailty, and age (octogenarians have much higher risk) were noted to be predictive of post-acute care needs, regardless of whether the CABG was performed emergently, urgently, or electively. Panelists indicated there is greater potential for deconditioning in patients undergoing urgent/emergent procedures and therefore these patients may have greater post-acute therapy needs.

B. Questions

1. Question 1

Between the baseline and intervention periods, the 30 and 90 day readmission rates for BPCI “Urgent/Emergent” CABG patients did not change significantly (at the 5% alpha level) relative to the comparison group (Source: Claims data). Despite incentives to decrease readmissions within a 30 day and 90 day window for “Urgent/Emergent” CABG patients, Model 2 BPCI participants have not been able to do so.

1. Does this surprise you? What questions should we explore related to this finding?
2. What, if anything, works for readmission reduction in “urgent/emergent” CABG Medicare Fee-for-Service (FFS) patients?
3. What do you want to make sure we know/CMS knows about this population of patients?

Discussion

- To explore potential explanations for the above findings, panelists noted that examining the diagnoses associated with the readmissions is necessary to further refine strategies needed to reduce the readmission rate.
- Those caring directly for patients may be unaware that their facility is participating in bundled payments or do not know which patients are in a BPCI episode. Decisions at the executive level to participate in BPCI may not translate into care practice changes at the front line.
- The importance of coordinated patient follow-up post hospital discharge was emphasized.
- Causes for readmissions in this population include the inability to fill medication prescriptions and not having family members to help with postoperative needs.
- It was recommended that cardiovascular programs assemble a committee whose mission is to identify the causes for readmissions and pinpoint potential interventions to prevent future readmissions. This committee should assess each CABG readmission through the 90 day period after hospital discharge.

2. Question 2

While results should be interpreted with caution, ED use is increasing among BPCI “Urgent/Emergent” CABG patients. In addition, the use of institutional post-acute care (i.e. skilled nursing facility (SNF) or inpatient rehabilitation facility (IRF)), out of those who receive post-acute care, may be declining, although the results were not significant. To further explore these preliminary findings, panelists were asked: “What diagnoses might reflect stinting of SNF care or perhaps an inadequate number of SNF days?”

1. What are the primary reasons that “Urgent/Emergent” CABG patients return to the ED within 30 days and within 90 days after hospital discharge?
2. How would you, as a clinician, respond to increases in the rate of ED use in this patient population?
3. What are the potential quality implications of increases in the rate of ED use?

4. What quality indicators should we monitor in our data analyses to better understand increases in the rate of ED use?

Discussion

- To explore potential explanations for these findings, panelists raised the following questions:
 - Who is returning to the ED? [Panelists requested patient characteristics]
 - What are the reasons and associated diagnoses for returning to the ED? The reasons and associated diagnoses will lend insight to address: “Did the ED visit result from lack of follow-up care on the part of providers? If the patient had been seen in the physician’s office rather than in the ED, could the condition have been handled earlier, quicker, and better?” What is the timing of the return to ED in terms of number of days post discharge from the hospital and/or SNF? When presenting to the ED, where is the patient coming from (i.e. SNF, home with home health, or home)?
- Concern was raised about the scenario of decreasing SNF and IRF utilization without a corresponding increase in home health use. The concern centered on lack of formal follow-up that may benefit patients in the home.
- Emergency department visits from the SNF or from an outpatient setting for diagnoses related to fluid retention (i.e. pleural effusions, weight gain, edema) may raise concerns about the care provided in the post-acute setting. These diagnoses may provide quality indicators for future monitoring.
- The practice of sending physicians to the SNF to proactively identify and treat problems in an effort to prevent a return to the ED was highlighted. Transporting patients from the SNF to an office visit was noted to be challenging.
- The lack of low sodium dietary options in many SNFs was noted to be a problem.
- A patient’s geographic proximity to the discharging hospital was suggested to be a potential factor in ED use. Limited access to varying levels of care in the patient’s community may be a contributor. In addition, cardiovascular surgeons may prefer to send patients to the ED when communicating with clinicians who are hundreds of miles away and with whom they have not established trusting relationships.
- A number of variables should be considered when studying home health care, including whether the home health agency (HHA) is associated with the discharging hospital or is an independent HHA. It was noted that, for patients living hundreds of miles from the discharging hospital, the local independent HHAs and clinicians will send patients back to the ED more readily than they might if they were in an area closer to the cardiovascular surgeon.

3. Question 3

Potential participant behavioral responses include reducing service intensity of bundles or providing fewer services. For CABG patients, what service use would you expect to decline with bundled payment incentives

1. In the inpatient setting?
2. In the outpatient/post-acute care setting?

Discussion

- In the inpatient setting, it was suggested that BPCI may result in cardiovascular surgeons being more involved in the postoperative care, with a concomitant decrease in intensivist and hospitalist involvement.
- A major shift of provider behavior within the hospital and/or a dramatic impact on hospital length of stay was considered unlikely as a result of BPCI, due to the longstanding influence of DRGs in the hospital setting. Therefore, BPCI's incentives will likely have a more distinct effect on post-acute care. For example, SNF length of stay could potentially be inappropriately reduced.
- There is a risk of care stinting in the provision of post-acute therapy services due to bundled payment incentives.

4. Question 4

Potential participant behavioral responses include discouraging admissions of higher-risk patients with more comorbidities or initiating bundles for lower-risk/lower-cost patients. During our site visits and when conducting focus groups with both inpatient and outpatient providers, what questions should we pose to explore these potential behaviors?

Discussion

- Discouraging admissions of higher risk patients and encouraging admissions of lower risk patients, also referred to as cherry-picking, currently occurs. The opinion was shared that every large city hospital is the receiver of patients that are labeled “too high risk [for CABG],” despite the sending location having area hospitals with cardiovascular programs. This behavior was attributed to several factors, including public reporting and programs striving to achieve higher star ratings in the STS National Database. There was interest among the panelists in an analysis of the zip code of origin for high risk CABG patients.³
- Admissions may not only be discouraged on the basis of medical risk but also due to socioeconomic status and for minorities; an article by Rachel Werner was referenced to support this assertion.⁴
- Market forces impact patient selection: if the supply of surgeons exceeds demand for surgery, then the ability to cherry-pick is substantially reduced. However, if demand for

³ Telligen provides the following reference for additional information: Omoigui NA, Miller DP, Brown KJ, Annan K, Cosgrove D 3rd, Lytle B, Loop F, Topol EJ. Outmigration for Coronary Bypass Surgery in an Era of Public Dissemination of Clinical Outcomes. *Circulation*. 1996;93(1):27-33. doi: 10.1161/01.CIR.93.1.27.

⁴ Werner RM, Asch DA, Polsky D. Racial Profiling: The Unintended Consequences of Coronary Artery Bypass Graft Report Cards. *Circulation*. 2005;111:1257-1263. doi: 10.1161/01.CIR.0000157729.59754.09.

surgery exceeds the surgeon capacity, the surgeons can be more selective about which patients they operate upon. Hospitals can also create pressures depending on market forces.

- Within the hospital, the finance department focuses on volume and the quality department focuses on outcomes; as a result, surgeons sense “divergent opinions” about which patients they should be operating upon.
- It was noted that BPCI data will not include higher risk patients seen in the outpatient setting who were discouraged from having an elective CABG.
- One panelist noted that he is seeing the occurrence of more thoughtful discussions with patients, often involving several different consultants, to look at whether the patient would be better cared for by medical care or hospice care rather than surgery.
- There is the potential for cherry-picking by HHAs; however, the higher priority currently is obtaining patients. It was suggested that it may be worthwhile to evaluate care differences between those HHAs that are affiliated with an accountable care organization (ACO) versus those that are not.

5. Question 5

For CABG surgery and related care, what are potential best practices for higher quality and more coordinated care in each of the following settings:

1. In the inpatient setting?
2. In the outpatient/post-acute care setting?

Discussion

(Both best practices and opportunities for improvement were discussed.)

- Systematic case review of the potential reasons patients return to the ED was noted to be a best practice. The review should include questions such as:
 - Why did the patient go back to the ED?
 - Was the patient able to fill his/her medications?
 - Can the patient administer his/her medications?
 - Does the patient have cognitive impairment, either post anesthesia impairment or preexisting?
 - How is the patient doing at home? Anecdotally, it was noted that many patients are unable to cook for themselves and this was only discovered after the patient immediately declined upon hospital or SNF discharge.
 - Are the providers in the care continuum all using the same tools and educational materials, or are they all creating their own?
- Telemedicine and telehealth were perceived as best practices. Anecdotally, a best practice for HHAs is to provide some sort of telecommunication with the patient on a daily basis, at least for the first 7 days after returning home.

- One panelist described better HHAs as those who stagger their visits when developing a visit schedule for patients, such that a therapist visits one day, a registered nurse the next day, a home health aide the next, etc. Days that do not include an in-person visit would be covered by a phone call.
- A noted barrier in hospitals is the lack of weekend physical therapy, occupational therapy, cardiac rehabilitation, and social work services. In home health care, there is a high rate of variability in the recognition of the importance of early rehabilitation and 7-day per week rehabilitation services for the cardiovascular population. The perception of HHA’s approach appears to be: “The priority on the weekends is the orthopedic patients, and the cardiovascular patients can wait until the beginning of next week.”

6. Question 6

1. What new treatments or breakthroughs in CABG surgery and related care might we see now and in the near future?
2. How would these changes affect costs:
 - a. In the inpatient setting?
 - b. In the outpatient/post-acute care setting?
3. What effect might BPCI participation have on the adoption of new technologies and innovation in CABG surgery and related care?

Discussion

- No new treatments or breakthroughs in CABG surgery which would significantly affect costs were described. Over time, anesthesia techniques have improved, and pump time, intubation duration, and sedation duration are all shorter. There is less narcotic use and earlier mobilization.
- Catheter-based interventions by cardiologists have improved, resulting in less CABG surgery. Those patients who receive CABG were noted to have increased severity of disease, while at the same time there is demand for better outcomes and lower costs.
- Expansion of telehealth is anticipated with the aging of the baby boomer population.
- To implement new technologies under BPCI, the proposed technology would need to have demonstrated cost savings or greater value than the existing practice. While this inquiry would be a desirable outcome of BPCI, there is the potential to stifle the implementation of new innovations which are more expensive in the short term. The potential to stifle innovation would be a larger issue for 30 day bundles when compared to 60 or 90 day bundles.

C. Potential Implications of Findings for Current Activities and Analyses

- Panelists indicated that to fully explore the potential reasons for the BPCI CABG readmissions, the diagnoses associated with these readmissions are needed. Panelists were particularly interested in the identification of potential trends among the diagnoses. Should BPCI CABG readmission rates warrant further exploration, trending by readmission diagnosis may be considered.
- In the current evaluation, most measures of post-acute care use are for the first site of post-acute care only. For example, the measure of PAC setting is based on the first discharge setting. There is no measure that looks at the proportion discharged to SNF who are subsequently discharged to HHA, although total HHA visits, regardless of when during the episode, is an outcome. If significant utilization differences emerge between BPCI and comparison providers, it might be instructive to look at subsequent post-acute care use, occurring after the first site of post-acute care.
- Evidence of cherry picking will continue to be monitored. If warranted, an analysis of the zip code of origin for high risk patients may be considered to potentially substantiate the concern for outmigration.
- Should BPCI CABG ED use warrant further exploration, and assess whether post-acute care differences might be influencing this result, panelists expressed interest in information to answer the following questions:
 - Who is returning to the ED? [Panelists requested patient characteristics, including home zip code.]
 - What are the reasons and associated diagnoses for returning to the ED?
 - What is the timing of the return to ED in terms of number of days post discharge from the hospital and/or SNF?
 - When presenting to the ED, where is the patient coming from (i.e. SNF, home with home health, home, other)?

Potential questions, inquiries for site visits, or quarterly calls

- What are the differences in patterns of care between your preferred SNF/HHA providers and others?
- Do you collect the diagnoses associated with emergency department visits from the SNF or from an outpatient setting? (Panelists noted that diagnoses related to fluid retention (i.e. pleural effusions, weight gain, edema) may raise concerns about the care provided in the post-acute setting. These diagnoses may provide quality indicators for future monitoring.)

IV. Spinal Fusion (non-cervical)

- Date: June 19, 2017
- Facilitator: Christine LaRocca, MD, Telligen Medical Director
- Panelist names and titles:
 - **Michele F. Bellantoni, MD, CMD**, is a geriatrician and current Clinical Director of the Division of Geriatric Medicine and Gerontology at the Johns Hopkins University School of Medicine and the Medical Director of the Specialty Hospital Programs at the Johns Hopkins Bayview Medical Center.
 - **Cindy Krafft PT, MS, HCS-O** has been involved at the senior leadership level for the Home Health Section of the American Physical Therapy Association and is the current President of that organization.
 - **Kathleen McCauley, PhD, RN, FAAN, FAHA** is a member of a research team led by Dr. Mary Naylor that has tested the Advanced Practice Nurse (APN) Transitional Care Model in vulnerable elders; her primary responsibility within this team includes development of clinical intervention protocols, tools, and systems to educate nurses and others in implementing transitional care and leading APN case discussions to improve patient outcomes and the expertise of the transitional care nurses.
 - **Vikas Patel, MD**, is the Chief of Orthopedic Spine Surgery at the University of Colorado Hospital where he has had a busy clinical practice and active spine research program since 2004. Dr. Patel has extensive experience with cervical, thoracic, and lumbar spinal disorders.
 - **John Ratliff, MD, FACS**, is a neurosurgeon who co-directs the Spine and Peripheral Nerve Surgery Division at Stanford University Medical Center and is Associate Professor and Vice Chair of Neurosurgery, Associate Professor of Orthopedic Surgery (Courtesy), Departmental Quality Officer, Co-Director of the Spine and Peripheral Nerve Surgery Division, and Vice Chair of Operations and Development of the Department of Neurosurgery.
 - **Philip L. Schneider, MD, FAAOS**, is a board certified, private practice orthopedic and spine surgeon who serves as medical director at Montgomery Orthopaedics, a division of The Centers for Advanced Orthopaedics.

A. Key Takeaways

- DRGs 459 and 460 include a wide range of procedures, from single level fusion to multi-level reconstruction. The extent of surgery required therefore varies for the procedures encompassed by these two DRGs.
- There is increased emphasis on sagittal balance and overall spinal alignment, i.e., treating more levels to better balance the patient. There has also been a significant increase in the number of osteotomies (the surgical cutting of a bone and removal of a piece of bone) performed. These operations result in longer hospital stays and almost always require post-acute care services.

- There's a large degree of variation in the patient population in DRG 459. Patients can range from minimally to seriously ill.
- There is healthy disagreement among surgeons and professional societies as to what is “definitely, probably, or definitely not” appropriate spinal fusion surgery. There is significant variation in spine care.
- It is both possible and “easy” to intentionally select lower risk patients and avoid higher risk patients, such as those with significant medical comorbidities, in an effort to lower costs.

B. Questions

1. Question 1

BPCI participants have not been able to lower Medicare payments.

1. What would you do to lower payments?
2. Do patients need a Skilled Nursing Facility (SNF) or Inpatient Rehabilitation Facility (IRF) stay?
3. Do patients always need home health care?

Discussion

- Panelists recognized that efforts to improve quality of care and care coordination during the anchor hospitalization may prevent emergency department utilization and readmissions. Wound complications and pain management were named as the most common causes of readmission after spinal fusion. One panelist noted that because spinal fusion in a Medicare population is a major surgery, readmissions and emergency department visits are not necessarily signs of poor quality care. Another panelist stated that there are ways to manage wounds, pain, and medical comorbidities during outpatient and homecare visits so that these problems need not be managed in the emergency department.
- Citing the fixed payment of the DRG system for hospital care, panelists commented that the key to achieving financial success in BPCI is decreasing post-acute care (PAC) utilization. Panelists speculated that the challenge of managing PAC utilization may have factored into the decision to end participation in the BPCI spinal fusion episode by 38% of acute care hospitals.
- During the TEP, the Lewin Group shared that for both BPCI and comparison hospitals, approximately 45% of spinal fusion patients are discharged without home health, SNF, long term care hospital (LTCH) or IRF care. Panelists suggested analysis of quality outcomes (mortality rate, readmission rate and emergency department use) by PAC utilization, specifically looking at outcomes for those discharged with any PAC service and outcomes for those who were discharged with no PAC services to determine whether quality of care is changing for these patients.
- In addition to managing PAC utilization, aggressive management of medical comorbidities and wounds postoperatively are ways to safely lower payments while maintaining quality outcomes within this model. For medically complex patients, patients with cognitive impairment, and patients without caregiver support in the home, panelists commented that

a comprehensive plan of care is important for preventing readmissions and complications. A study was referenced which found a high prevalence of undiagnosed cognitive impairment among inpatients over the age of 65.

- Transitional care models for creatively managing patients were highlighted, “...somewhere between keeping [patients] in the hospital longer to make sure their wound is doing well or putting them in a SNF...” One expert described a cost effective transitional care model in which Masters-prepared nurses follow patients in the home.
- According to panelists, the drivers of PAC utilization are patient level factors and procedure complexity due to the breadth of procedures included in these DRGs, from single level fusion to multi-level reconstruction.
- Panelists noted that without BPCI’s incentives, patients are sent to SNFs because it is perceived as “less risky.” Involving patients in shared decision-making for post discharge options, including education on the potential benefits of going home, was observed to be worthwhile.
- Panelists discussed that not every spinal fusion patient will need home health. Patients with a significant level of preoperative disability may benefit from home health services during the postoperative period to help them get back on their feet. “Recovery from a spinal fusion is probably about a six-month long process.”
- One panelist emphasized that access to home-based services is impacted by the requirement to be homebound under Medicare payment rules, and the homebound requirement is a barrier to care redesign. Patients may be better served in a lower-cost home environment but do not qualify under the traditional home health benefit. “We know that infection rates can be lower in the home.” This panelist noted that patients sometimes end up in higher cost PAC settings because of the homebound requirement for home health care.
- Patients have a financial incentive to go to a SNF because there is no co-pay for the first 20 days and personal care and meals are provided. It was noted that many older adults do not have caregivers at home and will need assistance getting out of bed and getting to the bathroom after this type of surgery. This is complicated by pain and the need for opioid medications. The postoperative period is noted to be “a very difficult period for these patients...I think just limiting SNF utilization to save a few dollars for Medicare is not doing the right thing for these Medicare beneficiaries.”
- The benefits of “prehab” were discussed. A panelist detailed one prehab program where physical therapists and case managers evaluate patients to assess and prepare for postoperative needs prior to surgery. Prehab has increased utilization of home health services. For those patients identified as requiring a SNF stay during the prehab assessment, the patient and family have the time needed to select a SNF. Engaging patients and family in goal setting and in the identification of necessary community resources, which may include neighbors and church groups, was recommended.
- For patients requiring a SNF stay, one panelist emphasized the importance of care redesign in the SNF to focus upon engaging and preparing patients for the home environment and not simply keeping patients according to their remaining Medicare days. Patients may not be prepared for the home environment after SNF discharge as they were not engaged in

taking their own medications, meal preparation, and other necessary activities to help them take care of themselves once home. There was disagreement among some panelists of this description of the modern SNF, with a panelist stating that SNFs have changed and are not “talking about 20 and 100 days [of Medicare coverage].” “SNFs participating in ACOs [Accountable Care Organizations] recognize that value, efficiency, and functional recovery are now being measured and being tracked.”

2. Question 2

What are the Challenges for Achieving Savings When Caring for Spinal Fusion Patients?

1. What are the sources of resource variation within DRGs 459 and 460?
2. Are minimally invasive techniques impacting the ability to achieve financial success in the Model 2 bundle as designed?
3. What is important for us to know about:
 - a. choice of bone graft?
 - b. new surgical techniques?
4. Help us better understand the impact of outpatient spine procedures on inpatient volume. Are lower risk/less complex patients being treated in outpatient settings?

Discussion

- Sources of resource variation may be procedure-related and/or patient-related. Panelists noted that:
 - DRGs 459 and 460 include a large range of procedures, from single level fusion to multi-level reconstruction.
 - The cost of spinal fusion supplies and devices varies widely across the country.
 - There is increased emphasis on sagittal balance and overall spinal alignment, i.e., treating more levels to better balance the patient. There has also been a significant increase in the number of osteotomies (the surgical cutting of a bone and removal of a piece of bone) performed. These operations result in longer hospital stays and almost always require post-acute care services.
 - Patients can fall into DRG 459 and be minimally sick or seriously ill. There’s a “huge amount” of variation in the patient population in DRG 459.
 - The patient population is complex and heterogeneous; “...you simply can't parse [this] out of [DRGs] 459 and 460.” Patients undergoing major procedures may require extended hospital stays and post-hospital inpatient stays. These DRGs include patients who require hospitalization for a week followed by an IRF stay, and those who are discharged within 23 hours or the same day.
- Panel experts suggested that resource variation could be addressed in the model by stratifying the surgeries based on the diagnosis or based on the number of levels of fusion, using CPT coding rather than DRG coding. While there will be cost variation even within

single level lumbar fusions, the use of CPT codes rather than DRGs will reduce this variation.

- With regard to the impact of minimally invasive techniques on financial success, one panelist noted that the implant costs for minimally invasive surgeries are higher than traditional surgery implant costs. In addition, the advantages of minimally invasive procedures are not realized in the 90-day postoperative period; PAC needs for those undergoing minimally invasive surgery are largely the same as for those undergoing traditional spinal fusion surgery due to associated complications and postoperative pain.
- It was mentioned that bone grafts and new surgical techniques may affect inpatient costs but will not have a major impact on PAC utilization. The use of bone morphogenetic proteins (BMPs) will not impact 90-day outcomes; even if BMPs result in improved outcomes (fusion success rates, readmissions), these will not be realized until at least six months postoperatively. One expert noted that new anesthetic approaches have shortened the recovery period, and improvements in preoperative management have resulted in shorter periods of fasting, less electrolyte issues, less fluid overload, and earlier mobility.
- According to panelists, many spinal fusion procedures have been removed from the Medicare inpatient-only list since 2013 and have been approved for the ambulatory surgical center setting. Outpatient spine procedures are impacting inpatient spinal fusion volume, as well as case mix. Lower risk, less complex patients are having surgery in the outpatient setting, leaving a higher risk and sicker patient population for the inpatient setting. There has been a “huge move in spine fusion surgery towards outpatient surgery,” but panelists did not know if this shift to the outpatient setting is occurring in the Medicare population. Panelists suggested that Medicare claims for spinal fusions performed in acute care hospitals and those performed in ambulatory surgical centers during the baseline and intervention periods could be analyzed to see if a shift has occurred in the Medicare population.

3. Question 3

BPCI beneficiary respondents reported worse changes in planning regular tasks and walking without rest.

1. Where would a BPCI participant be inclined to cut costs that might result in these negative functional status outcomes?
2. What services could prevent these negative outcomes?
3. With regard to PAC, where are the major opportunities to safely cut costs associated with spinal fusion?

Discussion

- Panelists opined that home health services can prevent early functional loss and indicated that the majority of spinal fusion patients in their clinical practices received either home healthcare services or some other post-acute care support.
- The panel experts discussed that many patients have pre-existing mild cognitive impairment which puts them at higher risk for post-operative delirium; therefore, there is an opportunity to medically manage patients and make changes to anesthesia and post-

hospital services to address cognitive impairment. Instruments to preoperatively test for cognitive impairment can be helpful in determining a patient's ability to manage complex medication regimens and anticipating necessary support services. There are opportunities to improve opioid prescribing to prevent negative outcomes. Preventing adverse events such as opioid-induced constipation and falls was noted to improve quality of life while saving money.

- It was noted that every patient handoff or transition represents a risk to continuity of care, medication reconciliation and nursing continuity, and handoffs should be limited to the extent possible.

4. Question 4

For a surgery such as spinal fusion, how likely or feasible is it to discourage admissions of higher risk patients and initiate bundles for lower risk patients? Are spinal fusions performed that should not be? How do you identify those?

Discussion

- Panelists indicated that it is both possible and “easy” to intentionally select lower risk patients and avoid higher risk patients, such as those with significant medical comorbidities, in an effort to lower costs. Mechanisms for avoiding high risk patients include:
 - Referring patients at high risk for complications, readmissions, and post-acute rehabilitation to other hospitals.
 - Denying surgery to high risk patients and referring them to pain management where they will not achieve the improvement in function afforded by surgery:
 - ◆ Not performing revisions, as pain is worse in revision cases,
 - ◆ Not performing surgery on patients with high preoperative opioid requirements as a means of selecting patients with milder disease, and
 - ◆ Not operating on patients that are significantly debilitated by the spinal condition.
 - “We can also consider treating patients with less treatments than they really need. For example, you may have a patient that has a significant deformity and we might choose to do a one level fusion instead of a 12-level fusion on that patient to get them maybe a little bit better, but in the long term, not really do them an appropriate service.”
- Panelists noted that there has been an increase in spinal fusions, and “there are probably some spinal fusions that are done ... that are obviously spurious.” However, the vast majority of spinal fusion surgeries are done for very appropriate indications.
- According to panelists, there is healthy disagreement among surgeons and professional societies as to what is “probably, or definitely not” appropriate surgery. There is significant variation in spine care. Randomized controlled trials have attempted to clarify and identify appropriate indications; unfortunately, results are conflicting. “Two qualified

spine surgeons may respectfully disagree as to what the best indication is.” It is difficult to identify inappropriate surgery from administrative data sets.

5. Final questions

1. What are current controversies in spinal fusion surgery?
2. What effect might BPCI participation have on the adoption of new technologies and innovation in spinal fusion surgery and related care?

Discussion

- Restoring sagittal balance and the performance of osteotomies are ongoing discussions in spine surgery. Panelists noted that much has been learned about sagittal balance, but “we’re still learning about how it’s going to impact a Medicare beneficiary and what kind of complication rate are you going to accept to restore sagittal balance in a 65 or 75 or 85-year-old patient?”
- With regard to the effect of BPCI participation on the adoption of new technologies, panelists noted that “few innovations start out as cheap.” Panelists believe that models like the BPCI initiative will not foster innovation or promote the adoption of new technology. One panelist stated: “At my hospital, if I do minimally invasive surgery the implant costs are much more expensive than if I do traditional surgery.”

C. Potential Implications of Findings for Current Activities and Analyses

- Panelists suggested analysis of quality outcomes (mortality rate, readmission rate, and emergency department use) by PAC utilization, specifically looking at outcomes for those discharged with any PAC service and outcomes for those who were discharged with no PAC. Although there was no change (or improvement) in the overall population, findings may differ by PAC use.
- Consideration can be given to adding spinal fusion to the special survey analysis to look at differences in survey results between BPCI and comparison groups based on claims-based utilization of services, such as ED use and readmissions.
- Panelists also suggested analysis of beneficiary survey results by first PAC setting to see if one particular PAC setting is driving outcome results.
- As noted earlier, there has been a “huge move in spine fusion surgery towards outpatient surgery,” but panelists did not know if this shift to the outpatient setting is occurring in the Medicare population. To address this question, panelists suggested that Medicare claims for spinal fusions performed in acute care hospitals and those performed in ambulatory surgical centers during the baseline and intervention periods could be analyzed to see if a shift has occurred in the Medicare population.
- Panelists provided mechanisms to avoid high risk patients; these behaviors may potentially be captured in claims data for future analyses of case mix changes.

V. Sepsis

- Date: August 10, 2017
- Facilitator: Christine LaRocca, MD
- Panelist names and titles:
 - **Margaret J. Carman, DNP, ACNP-BC, ENP-BC, FAEN**, Assistant Professor at Duke University School of Nursing; Nurse Practitioner for Wake Emergency Physicians (Raleigh); Sits on the Advisory Council of the Institute of Emergency Nursing Research for the Emergency Nurses Association, and has served as chair of the organization's Government Affairs Committee as well as North Carolina State Council President, and Heart of Carolina Chapter President.
 - **Ivor S. Douglas, MD, FCCP, FRCP**, Chief of the Division of Pulmonary Sciences and Critical Medicine at Denver Health Medical Center and the Director of the Medical Intensive Care Unit; Associate Professor of Medicine at the University of Colorado, Denver; Co-chair of the medical center's critical care committee.
 - **Jonathan M. Evans, MD, MPH, CMD**, Board certified in Internal Medicine, Geriatric Medicine, and Hospice and Palliative Medicine; Past-President of AMDA; Full-time long-term care physician in Charlottesville, Virginia; Member of Blue Ridge Long Term Care Associates; Serves on the editorial board of "Caring for The Ages."
 - **Mary Harris, OT**, practicing clinician with a Master's Degree in Occupational Therapy; Six years of experience treating older adults in long term care, assisted living communities, and memory care units; Trainer for multiple Genesis Rehab Services continuing education programs with emphasis on dementia and low vision.
 - **David T. Huang, MD, MPH, FACEP, FCCM**, Associate Professor of Critical Care Medicine, Emergency Medicine, and Clinical and Translational Science at the University of Pittsburgh; Fellow of the American College of Emergency Physicians and the American College of Critical Care Medicine; Director of MACRO (Multidisciplinary Acute Care Research Organization), Director of the CRISMA Center Administrative and Long-Term Follow-up Cores, and Associate Director of the Abdominal Organ Transplant ICU.
 - **Mark V. Williams, MD, FACP, MHM**, Chief Transformation & Learning Officer for the UK HealthCare system; Director of the Center for Health Services Research and Professor; Vice-Chair of the Department of Internal Medicine at the University of Kentucky; Principal investigator on Project ACHIEVE (Achieving Patient-Centered Care and Optimized Health In Care Transitions by Evaluating the Value of Evidence).

A. Key Takeaways

- The sepsis population is typically severely ill with multiple comorbidities, including an incidence of major depression that in some studies approaches 100%.
- There is a large degree of regional variation in sepsis care and outcomes, with a nearly three-fold variation in cost of care for a sepsis episode.
- There are many current controversies in sepsis diagnosis and treatment. In addition, recent changes to sepsis definitions are likely to result in greater subjectivity in the diagnosis of sepsis.
- Social support, health literacy, and comorbidity significantly impact the decision of whether a skilled nursing facility or other inpatient post-acute care setting is required.
- Noting the increased utilization of home health services, panelists emphasized that home health agencies must have the ability to meet the needs of this patient population.
- The skilled nursing facility/nursing home setting faces a number of challenges when caring for sepsis patients; challenges are related to information exchange, staffing, training, and resources.

B. Questions

1. Question 1

Sepsis is a leading cause of unplanned readmissions and BPCI M2 hospitals have decreased unplanned readmissions. For BPCI M2 hospitals, what best practices in unplanned readmission reduction should we look for?

Discussion

- Panelists noted that for sepsis patients who are readmitted, the primary reason for readmission is sepsis. However, the source of the sepsis upon readmission is frequently different from the sepsis source that necessitated the anchor admission.
- Regarding best practices for unplanned readmission reduction, the importance of hospital collaboration with PAC and primary care providers for longer term follow-up care was emphasized.
- One panelist highlighted the importance of emergency department resuscitative care, including fluids, and frequent reassessment, as well as following the guidelines of the Surviving Sepsis Campaign.

2. Question 2

BPCI M2 hospitals have not been able to lower total Medicare payments for anchor hospitalization and all care delivered during the 90-day post-discharge period. Help us understand challenges for hospitals to lower payments while maintaining and/or improving quality for Medicare fee-for-service sepsis patients.

Discussion

- Panelists noted that a key factor for lowering payments is whether hospitals can influence total Medicare payments for the 90-day episode. The following challenges were identified:

- “These are very sick patients with multiple comorbidities and hospitals are attempting to influence organizations (HHAs and SNFs) that they may not, and probably don’t, own.”
 - “How do you broker ... home health agencies and skilled nursing facilities to collaborate to optimize care for these patients?”
- One panelist noted the importance of optimizing care in the hospital and referenced a study showing there are better long-term outcomes when hospital quality parameters are met.
 - One panelist highlighted the large degree of regional variation in sepsis care and outcomes, including, “very significant regional variability in readmission rates.” “We know that there's almost a three-fold variation in cost of care for a sepsis episode...” One panelist, referencing health disparities described in the sepsis literature, commented, “We know for certain that there is disparity or inequality in gender, ethnicity, and race, both regionally and within cities [sic]. So, we know that there are pockets in some cities where sepsis care is both less effective and more costly.” In addition, this panelist noted there are a significant number of outlier patients with sepsis with a, “huge substantial burden of associative costs” and indicated it would be interesting to look at the frequency and contribution of outlier payments.
 - According to one panelist, imaging costs are one of the most expensive components of the bundled payment cost and most amenable to constraint. Having said that, this panelist cautioned that there is a risk that imaging might be reduced too much, and may be, “forfeited at potential adverse effect.” “As one looks at the transition to bundled payment models, it's clear that institutions will have to be more rigorous in terms of feasibility and also indication analysis for expensive imaging modalities.”

3. Question 3

Perceptions of care experience were consistently worse among BPCI respondents relative to comparison respondents, as outlined in the above results section.

Where would a BPCI participant be inclined to cut costs that might result in these survey results?

1. What services could prevent this negative outcome?
2. Do you see a connection between beneficiary survey reports of worse care experience and the BPCI M2 hospital outcomes of reduced readmissions, decreased percentage discharged to inpatient PAC setting, decreased SNF days, reduced SNF payments, increased HH payments, and unchanged total payments?

Discussion

- One panelist hypothesized that, given sepsis patients generally do not feel well, they may be less able to pay attention to discharge information at the time it is presented. From the perspective of home care providers, “it seems that when folks are coming to us, the comments can be that they'd felt pushed out of the facility, that they weren't necessarily ready in their own mind to be there (home). They're worried..., ‘I'm infected, I have sepsis, I feel terrible. How am I supposed to manage this?’” This panelist noted that providers are trying to compress more education into shorter periods of time in a facility-

based setting, which is a completely controlled environment. Patients are educated but this does not necessarily mean they can take accountability for their role as an engaged, active participant when the facility-based structure is no longer there. Another panelist commented that patients may be discharged from the hospital faster than they want to be, and faster than some of them can care for themselves at home.

- One panelist raised concern about the quality of communication between care settings, noting that redundancy of questions or staff uncertainty of what previously occurred can not only impact patient care but also impacts patients' confidence and satisfaction during their recovery.
- Occupational therapists have a role in addressing medication management and this service could potentially prevent negative perceptions of care experience.
- One panelist noted that these negative beneficiary survey outcomes all relate to patient education. The timing of delivery is important. Reference was made to patient education data showing that a multimodal experience, written instructions combined with video or an interactive session, prior to discharge will result in better outcomes in terms of patient understanding and readmissions.
- One panelist cited research showing that patients and family react negatively if they are not provided with an explanation for what is happening to them and the reason they are being transferred. In addition, seamless health information exchange is critically important between the care providers in the hospital, HHA and SNFs, and patients should be aware that these providers are talking to one another.
- One panelist commented that if patients are given the choice between the “old model where you spend a lot of time in the SNF post-hospital discharge,” and the “new model” where patients are discharged to home, receive home health services and are less likely to return to the hospital, patients will probably choose the new model. This panelist remarked, “But the thing that was kind of surprising to me... is that the patients ... seemed much less happy being at a BPCI hospital. And that's why my query of, how might they (the hospitals) have been different, even with the efforts at controlling, or were they dealing with different patient populations?” However, “there are regional differences in patients, and certainly ethnographic differences in patients and their response to how they receive care. Where some patient populations prefer to get more care at a more intensive place...others want to be at home.”
- For the finding, “medical staff less likely to speak patients' preferred language,” a panelist asked for clarification as to which party is the native English speaker, the patient or the care provider? This panelist went on to provide the following perspective on how the nursing home environment may lead to worse perceptions of care experience:
 - “...First of all, nursing homes are not hospitals. They are nothing like hospitals ... And number two, this population of patients has an incidence of major depression within three months that in some studies approaches 100%. So, there are lots of other potential barriers of illnesses that may be undiagnosed and untreated.That said, when talking about reducing hospital readmissions, keep in mind that these people are being discharged from the hospital. They chose the hospital; they didn't choose the nursing home. They're getting a new doctor and a new everybody

else. So, there's usually no continuity of care. There are lots of potential problems related to information and communication and mix-ups that result in people going back. But approximately three-quarters of the nursing workforce in nursing homes are LPNs (licensed practical nurses). They're not trained or licensed to assess patients. ...Most nursing homes do not have a registered nurse (RN) on duty 24 hours a day. So, I think some of this, when you're talking about this very sick population in what is essentially a real estate enterprise, not a medical facility, I'm surprised that the outcomes are as good as they are. Because the desire to take these patients to nursing homes was not based on an ability to care for them. And five years ago, many of these facilities wouldn't have admitted these patients.

So, there are lots of issues with nursing homes... But if you really want to get people out of the hospital and keep them out, there has to be some additional resources to go with them, whether they're in a facility or when they're at home. And for that matter ... when staffing is determined in hospitals and elsewhere, it's based on task performance. This population of patients needs way more than task performance. They need monitoring for a change in condition. And so, if all the staffing is based on performing tasks on a schedule, you don't have people that are there or that are trained to actually monitor people for changes in conditions. Of course you're going to have the outcomes that you're getting, so I guess I'm not surprised by any of this. All I can say is I wouldn't expect anything different unless there is a change in resources. I mean, the whole focus of CMS and Congress is to shift care away from hospitals to less expensive sites. But if the resources don't go with the patients, then we're not going to get better outcomes, we're just going to have low expense.”

- Panelists suggested that one way to cut costs is by having more RN staff required in the SNF. The following example was provided, “You may be able to eliminate having duplicate services with an infusion company coming in. So very often I would see that as an infusion nurse I would have to go make a visit to a SNF to give an IV antibiotic when you would think that there would be staff there that would be able to do that. You could eliminate those visits (with more RN staff).”

4. Question 4

Both BPCI M2 hospitals and BPCI M3 SNFs decreased SNF days, decreased SNF payments and increased home health payments. On BPCI site visits conducted by The Lewin Group, long-term disability of sepsis survivors and postsepsis syndrome are described.

- Are there sepsis patients who require a SNF stay and/or other inpatient PAC setting after hospital discharge?
- Are there unintended consequences, both positive and negative, of decreased SNF utilization and increased home health services?
- What consequences might BPCI's 90-day episode-based payment have on the care of patients with postsepsis syndrome?

Discussion

- One panelist pointed out that social support, health literacy, and comorbidity will significantly impact the decision of whether SNF or other inpatient PAC settings are required. “Many individuals with sepsis experience significant changes in cognitive status, which can have long term effects. With proper care, these cognitive changes can improve or (be) appropriately adapted to. Often research has shown the more an individual is able to address these cognitive deficits (i.e., through frequent sessions), the more quickly they are able to incorporate the adaptations into their everyday lives. This can lead to improved safety in their home environment, improved health literacy, and reduce likelihood of readmission. “
- The role of social support and caregiver burden were discussed. One panelist commented, “if you could take two quote identical patients: same comorbidities, same episode of sepsis, let's say it's from whatever you want, their kidneys, their lungs, skin, whatever. And we're now at the point of deciding-...they're ready to leave the hospital. You may have a situation where there is ... strong, robust family social resources, and a great home health agency. And you could have another person who had been living alone, has no relatives or friends in the area, and now is quite debilitated and would require a SNF. And there's no mechanism that with these bundled payments that you can say, ‘Okay, no social service support, they're going to need SNF care which is going to be more expensive and yet there's no modifier, if you will, for that in billing.’”
- Regarding positive and negative unintended consequences:
 - Published literature was referenced showing that most people would rather be at home than in a facility.
 - One panelist noted the importance of HHAs having the ability to meet the needs of this patient population, stating, “...it's also an industry that just got our proposed rule in the last week that's threatening nearly a billion dollar cut to our funding in the next two years. So, I think how we design care, we get very focused on the inpatient side of it. But how home health is positioned to be front loaded at that level, based on the presentation of the patient to accommodate that, has to be part of that conversation. Because I absolutely agree that if we're dealing with a compressed inpatient side of this, and then they're (patients are) going home and being seen by their nurse. I see this in the charts I audit and fight with regularly. How are you managing the septic patient with nursing once a week? And sometimes, depending where that visit falls, you haven't seen them in ten days. I don't see how that model is making us (HHAs) the viable extension.”
- One panelist postulated that BPCI’s 90-day episode-based payment may result in a more holistic approach to sepsis patients’ care and the resulting increase in care coordination would be beneficial for those with postsepsis syndrome, although he cautioned that research needs to be done to prove this theory.

5. Question 5

Potential BPCI participant actions in response to incentives: Initiate bundles for lower-risk/lower-cost patients.

1. For a medical condition such as sepsis, how likely or feasible is it to initiate bundles for lower risk patients, i.e. how subjective is the diagnosis of sepsis?
2. Is the volume of other diagnoses, such as pneumonia, being transferred to a sepsis diagnosis?
3. What are current controversies in sepsis diagnosis and treatment?

Discussion

- One panelist opined that sepsis was historically underdiagnosed. To address this, diagnostic criteria were changed in an effort to improve care and survival. As a result of this change, sepsis is now frequently over diagnosed. People are, "...being labeled as having sepsis that don't have sepsis."
- Panelists indicated that hospitals have a financial incentive to code the sepsis DRGs. When asked about subjectivity in the diagnosis of sepsis, a panelist commented, "I think hospitals are energetically working to ensure they document every effort that's undertaken to show how severely ill patients are when they're hospitalized... the fact of the matter is most of these patients who come in with sepsis have multiple comorbidities, etc., and are very sick." A general research letter was referenced to support the view that the volume of other diagnoses such as pneumonia is being transferred to a sepsis diagnosis.
- One panelist shared the perspective that there will be greater subjectivity in the diagnosis of sepsis with the 2016 changes to the sepsis definitions. As a result of these changes, the terms septicemia and severe sepsis are now obsolete. This panelist indicated that the changes to sepsis definitions "...will affect the diagnosis that's made, especially with the new electronic health records."
- In terms of controversies, one panelist noted, "Hospitals all over the place have created sepsis bundles, (and) sepsis alert teams; I think hospitals are sick of hearing about sepsis. There are a million controversies regarding sepsis diagnosis and treatment." This panelist noted that ongoing clinical trials are being conducted to study biomarkers, resuscitation strategies, and other topics. Given the controversies, this panelist noted that The Third International Consensus Definitions for Sepsis and Septic Shock (Sepsis-3) have not been universally popular. The Sepsis CMS Core Measure (SEP-1) is also not very popular. According to this panelist, one of the problems with SEP-1 is that sepsis episodes are defined based on discharge diagnosis, "which is obviously unknown at the time the patient presents to the ED (emergency department). And further, while of course everybody believes the patient should be reassessed, it's not quite clear that the reassessment variables that SEP-1 mandates actually matter."

6. Question 6

According to Howell, “At present, the international consensus definition of sepsis, the new guidelines, and CMS’s core measure requirements are unsynchronized.”

1. What implications, if any, might this lack of synchronization have on a bundled payment model?
2. Is the current diagnosis and coding of sepsis different from the diagnosis and coding of sepsis during the BPCI historical baseline period, 2010-2012?

Discussion

- The lack of synchronization between the international consensus definition of sepsis, the new guidelines, and CMS’ core measure requirements, as described by Howell, were noted to be “hugely important” for participants trying to maintain or improve quality and lower costs in sepsis.
- A panelist commented, “...for example, New York State has had mandated sepsis bundles for years, ever since the Rory Staunton tragedy. That was the child who died of sepsis and his parents went on a vigorous campaign to prevent this from happening again...So, all New York State hospitals have fine-tuned their reporting mechanisms, etc., based off the old definitions. And now Sepsis-3 comes along, as well as SEP-1, so what will they do? Do they keep on doing what they're doing or do they modify? Probably they'll have to modify in order to get paid, I'm sure.”
- One panelist addressed the implications of the current coding of sepsis for nursing home providers.
- This panelist emphasized that getting the diagnosis right is critically important, and the sudden increase in incidence is a lot higher than one would expect just based on changing awareness of sepsis.
- The panelist commented, “Over diagnosis and over treatment is not just about money...in the population of patients that I deal with, over diagnosis and over treatment results in unnecessary death due to iatrogenesis (inadvertent and preventable induction of disease or complications by the medical treatment or procedures of a physician), so this is not an insignificant thing.”
 - “As far as the nursing homes are concerned, they're concerned about that issue (the potential for SNF Value-Based Purchasing readmission penalties) but, as far as nursing home owners and operators are concerned, things are in such chaos right now that they're not able to respond to that in any coherent way. You're going to see a number of large-scale bankruptcies this year, and other companies that are exiting the operations. What's happening is the owners are really trying to protect their real estate and form real estate investment trusts. So, I can't overstate this, these are not sophisticated health care companies. These are people who are financing their accounts receivable and are really struggling with the fact that occupancy rates are down because the length of stay is down by half. And so you have to have twice as many admissions to have the same census, and so forth.

So, I think that the bigger issues for nursing homes are really their competency to care for sick, complicated patients, and identifying changes in conditions. The ability to do things in a timely manner, like acquire IV (intravenous) antibiotics, especially complicated ones that are not typically given when the pharmacy is two hours away. There are lots of logistic issues that facilities are really struggling with in order to provide decent care to patients. And then availability of diagnostic imaging and other lab services. It's really a very much reduced level of care and the facilities are concerned about bounce back rates. They're also concerned about-- they have a disincentive to order tests and so there's pressure to do less, not more. And it's a problem when you have operators criticizing doctors for resource utilization when it actually costs more to keep a sick person in the facility than it does to send them to the emergency room. So, there's a lot of tension there. But I think the good people that work in nursing homes, and there's lots of them ... I think most people that work in these facilities really care about the people they're taking care of and they want to protect them, and they don't want to send them to the hospital. But oftentimes they have to because either these people got sick or because they couldn't give them what they needed.”

7. Final questions

1. What effect might BPCI participation have on the adoption of new technologies and innovation in sepsis care?
2. For BPCI sepsis participants, what variations in impact might we see due to overlap with other healthcare and payment reform models, such as Accountable Care Organizations (ACOs)?
3. What do you want to make sure we know/CMS knows about this population of patients?

Discussion

- One panelist highlighted new technologies in the emergency department, such as point-of-care testing for certain biomarkers, and commented, “It's all expensive, and yet, if you don't take that chance and see how it plays out, we're not going to have the data to see whether it's going to change long-term outcomes.” This panelist did not believe BPCI participation will limit efforts to innovate.
- Another panelist was more pessimistic, indicating that hospitals will be even less interested in participating in research, and will have a higher bar for adopting new technologies. This was echoed by another panelist who commented that the pressure to discharge patients quickly, “makes lots of things in the academic mission difficult, including teaching. I mean, if a patient is not in the room, it's very difficult to demonstrate clinical examination or to get consent to participate in a trial...”
- As to the effect of BPCI participation on innovation in sepsis care, one panelist shared the following perspective, “Here's what would really be innovative right now in the United States of America. What would really be innovative would be to provide basic care and care of decent quality that's comparable to 50 or more other nations in the world at a price that won't explode our whole economy. That's what would be innovative, okay? But that's not sexy or appealing, okay? But it's vitally necessary or everything's going to fall apart.

And so what really needs to happen is there needs to be more innovation, and more research, and more resources in alternative models of care delivery. What we've got is, we've made a concerted effort nationwide to shift the location of care with virtually no research on how to do that well or even monitoring the outcomes. Because nobody's responsible for the outcome. I bristle a little bit whenever I hear about innovation. Because usually it's a dean or a provost or somebody talking to me about that when we're struggling to get basic resources to provide basic care.... We wouldn't be talking about bundled payment if things weren't so messed up.”

C. Potential Implications of Findings for Current Activities and Analyses

- Total Medicare payments were not statistically different between episodes initiated by BPCI M2 and comparison hospitals: Panelists suggested analysis of regional variation and outliers. Are certain hospitals reducing payments and others are not, such that the net effect is no overall change in total payments? In addition, one panelist indicated it would be interesting to look at the frequency and contribution of outlier patients and associated payments.
- Imaging: According to one panelist, imaging costs are one of the most expensive components of the bundled payment cost and most amenable to constraint. Having said that, this panelist cautioned that there is a risk that imaging might be reduced too much, and may be, “forfeited at potential adverse effect.” “As one looks at the transition to bundled payment models, it's clear that institutions will have to be more rigorous in terms of feasibility and also indication analysis for expensive imaging modalities.” Should additional quarters of data reveal negative quality outcomes, consideration may be given to analyzing imaging costs as a contributor to these outcomes.
- Survey results: For the finding, “medical staff less likely to speak patients’ preferred language,” a panelist asked for clarification as to which party is the native English speaker, the patient or the care provider? The current survey question does not capture this information, and this clarification may be of interest when interpreting responses. Another panelist raised the question of potentially unmeasured differences in the patient population to explain the negative beneficiary survey results.
- Changes in coding practices and case mix: Panelists indicated there will be greater subjectivity in the diagnosis of sepsis with the 2016 changes to sepsis definitions. As a result of these changes, the terms septicemia and severe sepsis are now obsolete. Of note, DRGs 870-872 still include the terms septicemia and severe sepsis. The changes to sepsis definitions, “...will affect the diagnosis that's made, especially with the new electronic health records.” It is not clear, however, whether this would differentially affect BPCI episodes.

D. References

- Proportion and Cost of Unplanned 30-Day Readmissions After Sepsis Compared with Other Medical Conditions. Mayr, FB. et al. *JAMA*. 2017; 317(5):530-531. <https://jamanetwork.com/journals/jama/fullarticle/2598785>
- The Third International Consensus Definitions for Sepsis and Septic Shock (Sepsis-3). Singer, M. et al. *JAMA* 801(8)315; 2016. <https://jamanetwork.com/journals/jama/fullarticle/2492881>.
- Regulatory Mandates for Sepsis Care — Reasons for Caution. Rhee, C. et al. *N Engl J Med* 2014; 370:1673-1676. <http://www.nejm.org/doi/full/10.1056/NEJMp1400276>
- Management of Sepsis and Septic Shock. Howell MD. et al. *JAMA*. 2017; 317(8):847-848. <https://jamanetwork.com/journals/jama/article-abstract/2598892>.

Appendix R: Qualitative Protocols

A. Case Study Site Visit Protocols

1. Model 2 BPCI Case Study Interview Protocol, Year 4

Before every interview with a new participant, read:

Thank you for taking the time to join us today. The Lewin Group, with its partners Abt Associates Inc. and Telligen are under contract to the Centers for Medicare & Medicaid Innovation (CMMI) to evaluate the Bundled Payments for Care Improvement (BPCI) initiative. This evaluation includes conducting site visits with health care organizations participating in the initiative.

The purpose of these interviews is to better understand the impact of the BPCI initiative on health care delivery, outcomes, and costs—particularly the challenges and the achievements of BPCI in delivering high-quality and cost-effective care. We would like your views on the implementation of the BPCI initiative in this facility and how you think it has affected patient care.

Most interviews will take 1 hour. Thank you in advance for taking the time to speak with us.

a. Opening Session

A. Organization Characteristics

1. Can you briefly describe your organization? Is this facility/EI part of a larger health system? If so, please describe it.
2. How many staff members do you have?
3. What is your bed capacity?
4. What is your total annual patient volume?
5. How many BPCI patients do you have (or expect) annually?

B. Market Characteristics

1. How would you describe the local health care market?
2. How competitive is your market?
 - a. (For hospitals) What hospitals are your main competitors?
3. How widespread is managed care in this area?
 - a. How common is participation in Medicare Advantage?
 - b. Are there local Accountable Care Organizations?
4. Are you aware of other local health systems that are participating in BPCI?

b. Executive Leadership**A. BPCI Structure**

1. Entry decision
 - a. Why did your organization decide to participate in BPCI?
 - b. Why did you select the model, episodes, and episode length you chose? Did financial analysis influence these decisions? Did you receive input from partners or consultants?
 - c. Are you considering dropping any episodes? If you were able, are there any other changes related to episodes that you would make?
2. Partnership decisions/network development
 - a. Who are your BPCI partners and why did you choose them?
 - b. Did you work previously with these partners or are these relationships new for BPCI?
 - c. Are you participating in gainsharing? If so, with whom? How is this working out?
3. Financial Results
 - a. What are your gains or losses to date? What trends have you seen in your financial results?
 - b. What is driving your gains or losses?
 - c. Have you made any adjustments to your care processes as a result? Do you anticipate eliminating episodes based on these financial results?
4. Waiver Use
 - a. What beneficiary incentives, if any, have been implemented?
 - b. Are you using the 3-day SNF waiver? Why or why not?
 - c. Have you used the home visit waiver? If so, how it is working? If not, why not?
 - d. Do you have experience with other BPCI waivers? (e.g., telehealth)

B. Planning/Operations and Other Health Reform Initiatives

1. How many patients are participating in BPCI? How does this compare to expectations?
2. Are you involved in ACOs, medical homes, or other bundled payment type initiatives? If so, did these programs affect your decision to participate in BPCI, or drive BPCI results?

C. Impact of BPCI and Care Redesign

1. Please briefly describe your care redesign activities for BPCI.
2. What was the role of physician input on this care redesign?

3. What impact, if any, is care redesign having on:
 - a. Patient outcomes (e.g., mortality, functional outcomes, readmission rate)
 - b. Cost per case
 - c. Care transitions with other health providers (hospitals, PAC, primary physicians, etc.)
 - d. Use of PAC services (% of patients discharged to PAC; SNF length of stay)
4. How do you identify appropriate PAC settings for BPCI patients?
5. For PGPs only:
 - a. Do you track individual physician performance?
 - b. What feedback is provided to physicians (benchmarking, report cards)? How often?
 - c. What data do you share with your partners (hospitals, PACs)?

D. BPCI Outcomes, Successes and Challenges

1. What have been your greatest challenges?
2. Have you seen any unintended consequences from BPCI, either good or bad?
3. Would your BPCI approach work for other providers?
4. Any important lessons to share with other BPCI participants?

c. Care Redesign Leadership

A. Care Redesign Approach

1. Did your organization redesign any aspects of patient care for BPCI? If so, please describe your approach to care redesign.
2. What information did you use to guide the care redesign process? (e.g., internal quality data, clinical guidelines, governmental reports)
3. How far along is your organization in implementing the planned care redesign activities? What parts of the implementation have been easier (or more difficult) than expected?
4. *(If not addressed already in description of care redesign)* What process changes have been part of your BPCI implementation?
 - a. *Prompts, as needed:*
 - i. New care protocols
 - ii. New meetings or reports to educate providers
 - iii. New staff responsibilities
 - iv. New patient monitoring protocols
5. (Model 2 only) How do you identify appropriate PAC settings for BPCI patients? What sort of information do you provide to patients regarding PAC provider choice? Do you have strategies to monitor patient care and functional status after discharge from your facility?

6. Does care redesign impact BPCI patients only, or does it also apply to non-BPCI patients as well?

B. Key Implementation Factors

1. In your experience, what factors were required for successful implementation of BPCI?
 - a. *Prompts, as needed:*
 - i. *Analysis of operations data (patient volume, length of stay)*
 - ii. *Financial models*
 - iii. *BPCI waivers*
 - iv. *Partnerships within your organization or in the community*
2. Would you do anything differently if you were starting again?

C. Impacts of Care Redesign Approach

1. What impact, if any, is the care redesign having on...?
 - a. Patient outcomes (e.g., mortality, functional outcomes, readmission rate)
 - b. Care transitions with other health providers (hospitals, PAC, primary physicians, etc.)
 - c. Use of PAC services
2. How has care management affected your organization's operations? (new staff, new training, new responsibilities or roles for staff?)
3. For PGPs only:
 - a. Do you track individual physician performance?
 - b. What feedback is provided to physicians (benchmarking, report cards)? How often?
 - c. How do the physicians react to this information?
 - d. What data do you share with your partners (hospitals, PACs)?
 - i. Are these data risk-adjusted?
4. For Single Awardees only:
 - a. How do you make use of the Awardee feedback report from CMS?
 - b. What have you found most helpful about this report?
 - c. Is there additional information that you would find helpful if it were included in the feedback report?

D. BPCI Outcomes, Success and Challenges

1. What have been your greatest challenges?
2. Have you seen any unintended consequences from BPCI, either good or bad?
3. What lessons do you think we should share with other BPCI participants?

d. Patient Care - Nursing & Other Interdisciplinary Staff (therapists, dieticians, etc.)

1. Are nurses and other patient care staff notified if a patient is a BPCI patient? How are they notified?
2. Did you receive any education or training in regard to BPCI? If so, what topics were covered?
3. Have you changed patient care as a result of BPCI? For example, have you implemented any standardized protocols regarding patient assessment, communication, or treatment? If so, are these protocols used for all patients, or for BPCI patients only?
4. Have patient and family education efforts changed as a result of BPCI?
5. Have you noticed a different level of physician engagement since the start of BPCI?
6. Is discharge planning different since BPCI was implemented?
7. Given your BPCI care process as described, how would you manage the following situations (as applicable):
 - a. A patient/ caregiver insists on a last minute change in discharge destination. (e.g., SNF stay instead of HH care) or resists discharge.
 - b. A physical therapist raises concerns about the patient's discharge destination.
 - c. A patient arrives in the emergency department with concerns about his/ her condition (e.g., the appearance of a wound, fever).

e. Care Coordination Leadership/Operations (including discharge/transition planning)

A. The Role of Care Navigators/ Care Coordinators

1. Describe your role in the BPCI program as it relates to:
 - a. Patient-level coordination between acute-PAC settings, with primary care, with specialty care
 - b. Patient-level case management or navigation
 - c. Clinical follow-up with patient
 - d. Medication reconciliation
2. Was your role created specifically for the BPCI initiative? If no, how is your role different since BPCI began?
3. What is your role in the broader organization structure? (e. g. are you a hospital employee, contractor, a member of a PGP?)
4. How has BPCI care management and transition planning affected your department's operations? (new staff, new training, new responsibilities or roles for staff?)

B. Care Navigation/Case Management Implementation

1. How do you know if a patient is in BPCI?

2. When do you first “meet” the BPCI patient? How often do you meet or talk with the patient during their BPCI episode?
3. Do you provide them with materials about BPCI to explain the program?
4. Is the approach of the care team different for BPCI patients? How so?
5. To what extent do you interact and communicate with physicians about specific patients’ needs – especially about their transitions to other care settings?
6. Are you involved in patient conferences and discharge planning?
 - a. How do you identify appropriate PAC settings for BPCI patients? Are there some PAC providers you prefer for BPCI patients?
 - b. How do you try to guide patients to the preferred PAC providers? How do you ensure that patient choice is maintained?
7. Did you need to establish new partners internally or in the community as a result of BPCI?
8. Do you have mechanisms to track BPCI patients throughout their episode, such as to inform you when they move from one stage to another (e.g., from SNF to HHA)?
9. [For “mixed-model” programs, those with multiple post-acute options participating in BPCI] How are transitions between PAC providers managed?
10. Please share the experience of a typical BPCI patient (no names please).
 - a. How is this different from before BPCI?
11. Given your BPCI care process as described, how would you manage the following situations (as applicable):
 - a. A patient/caregiver insists on a last minute change in discharge destination. (e.g., SNF stay instead of HH care) or resists discharge.
 - b. A physical therapist raises concerns about the patient’s discharge destination.
 - c. How is any of this this different for non-BPCI or pre-BPCI patients?

C. Impacts of Case Management Approach

1. What impact, if any, is care redesign and discharge planning for BPCI having on:
 - a. Quality metrics
 - b. Patient outcomes (e.g., mortality, functional outcomes, readmission rate)
 - c. Cost per case
 - d. Care transitions with other health providers (hospitals, PAC, primary physicians, etc.)
2. Use of PAC services (SNF to HHA vs. straight to HHA)
3. How do you ensure that care redesign does not produce unintended consequences?
 - a. Adverse patient selection (e.g., cherry picking or lemon dropping)
 - b. Inadequate or insufficient care

4. Has navigation and case management approaches affected non-BPCI patients? (e.g., spillover, change in resource allocation)

D. BPCI Successes and Challenges

1. What have been your greatest challenges?
2. Have you seen any unintended consequences from BPCI, either good or bad?
3. What lessons do you think we should share with other BPCI participants?

f. Finance Leadership

A. Financial Results

1. What are your gains or losses to date? What trends have you seen in your financial results?
2. What is driving your gains or losses?
3. Have you made any adjustments to your care processes as a result? Do you anticipate eliminating episodes based on these financial results?

B. Impact of BPCI Participation on Organization's Finances

1. How have you been measuring BPCI's impact on your organization's costs?
 - a. What important indicators do you track in regard to the impact of BPCI?
 - b. Which specific costs have been affected? (E.g., internal hospital costs, medical devices or supplies, IT system modifications, new hires, contracting with providers)
2. Are you tracking any internal savings from the redesign initiatives?
 - a. If so, what have the results been?
 - b. Have you seen greater efficiencies as a result of care redesign? If so, where?
3. Have you seen any impact of BPCI and care redesign on your non-BPCI revenues (e.g., MA, Medicaid, private insurance)?
4. What would you do differently in designing a bundled payment program to better meet your organization's needs?

C. Partner Gainsharing (if applicable)

1. How does gainsharing work in your organization?
 - a. What data sources were used to develop a model?
 - b. Were external stakeholders (partners with whom gains are shared) involved in designing the gain-sharing approach?
 - c. How are gains allocated? (To the bottom line, to innovative physician practices, to particular staff members)?
 - d. Does allocation vary by partner?

2. Did gainsharing go as planned? Any important barriers that prevented you from setting up gainsharing the way you wanted?
3. What is working well with gainsharing as it stands? What needs improvement?

D. Other Waivers

1. Are you using beneficiary incentives? If so, what are they?
 - a. How many BPCI patients have used these? What has the impact been?
2. Are you using the 3-day SNF waiver?
 - a. How many BPCI patients have used these? What has the impact been?
3. Are you using telehealth or other services permitted under BPCI?
 - a. How many BPCI patients have used these? What has the impact been?

E. Successes and Challenges

1. What have been your greatest challenges?
2. Have you seen any unintended consequences from BPCI, either good or bad?
3. What lessons do you think we should share with other BPCI participants?

g. Data and Quality Management

A. Data Management

1. What types of data systems do you use to manage BPCI patients, and how do these differ from the data systems you use for managing other patients?
2. What systems do you use to monitor or analyze the quality of care?
3. What systems do you use to monitor or analyze financial data?
4. Do you have systems for monitoring patient outcomes or healthcare utilization during the post-discharge period?
5. Do you have any systems that can share data with other organizations involved BPCI patient care?
6. Are you using existing data resources or did you have to set up new systems for this initiative? If you established new data systems, what steps did this change entail (new hires, staff training, new technology) and what were the associated costs?

B. Quality Management

1. What quality measures do you track for BPCI patients? Are these measures different from those used for non-BPCI patients?
2. Do you receive quality data from other providers, such as SNF or HHA services? If so, what approaches or systems are used to share these data? Did any of this change as a result of BPCI?
3. Have you conducted any staff training about BPCI-related quality goals?

4. Do you provide feedback on quality measures to physicians or other members of the hospital care team? If so, what form does this feedback take (e.g., benchmarking, report cards, etc.)?
 - a. If Model 2: do you provide feedback on quality to PAC providers?
5. Do you track individual physician performance on key quality measures?

C. Successes and Challenges

1. What have been your greatest successes and challenges?
2. Have you seen any unintended consequences from BPCI, either good or bad?
3. What lessons do you think we should share with other BPCI participants?

h. Patient Care - Physicians

For hospitals and PGPs, this session would ideally include at least 1 physician per BPCI clinical episode, such as hospitalists or orthopedic surgeons.

A. Care Redesign Approach

1. How has BPCI changed your approach to care?
 - a. *Prompts, as needed:*
 - i. Did you add new staff?
 - ii. Were new care protocols adopted?
 - iii. Do you have new relationships with other partners in the market?
2. Are care redesign efforts that were planned happening in practice? If not, what are the barriers?
3. How were physicians involved in care redesign?
 - a. *Prompts, as needed:*
 - i. Development of care protocols
 - ii. Enhancements in care delivery
 - iii. Patient engagement efforts
 - iv. Approach to quality management
4. Given your BPCI care process as described, how would you manage the following situations?
 - a. A patient/caregiver insists on a last minute change in discharge destination. (e.g., SNF stay instead of HH care) or resists discharge.
 - b. A physical therapist raises concerns about the patient's discharge destination.
 - c. A patient arrives in the emergency department with concerns about his/ her condition (e.g., the appearance of a wound, fever).

B. Gainsharing

1. Has gainsharing had an impact on physician engagement? Has it contributed to the success of this initiative?
 - a. How are gainsharing funds distributed?
 - b. Have there been any challenges or unplanned consequences with implementation of gainsharing?

C. Impacts of BPCI

1. What impact do you think BPCI had on your organization? What has been the impact on physician satisfaction? How has it change the quality and cost of care?
2. Have you seen any unintended consequences from BPCI? (e.g., adverse patient selection)
3. Have BPCI activities impacted non-BPCI patients, either positively or negatively?

D. Episode of Interest

1. *(If not already discussed)* Please describe how BPCI has changed your approach to care for this episode specifically.
2. Specifically in regard to the episode of interest, where do you see the greatest opportunities for improving the **quality of care** under the BPCI model?
3. What do you perceive as the greatest **opportunities** for achieving savings when caring for patients in this clinical episode?
4. What do you perceive as the greatest **challenges** for achieving savings when caring for patients in this clinical episode?
5. In your experience, what factors most clearly distinguish between “sick” and “not sick” patients in this bundle? Are there certain conditions that make these patients prone to complications or otherwise more difficulty to treat?
6. Do you believe that a bundled payment model can be successful for [episode of interest] patients? Why or why not?

E. BPCI Success and Challenges

1. What have been your greatest challenges?
2. Have you seen any unintended consequences from BPCI, either good or bad?
3. What lessons do you think we should share with other BPCI participants?

2. Model 3 BPCI Case Study Interview Protocol, Year 4

Before every interview with a new participant, read:

Thank you for taking the time to join us today. The Lewin Group, with its partners Abt Associates Inc. and Telligen are under contract to the Centers for Medicare & Medicaid Innovation (CMMI) to evaluate the Bundled Payments for Care Improvement (BPCI) initiative. This evaluation includes conducting site visits with health care organizations participating in the initiative.

The purpose of these interviews is to better understand the impact of the BPCI initiative on health care delivery, outcomes, and costs—particularly the challenges and the achievements of BPCI in delivering high-quality and cost-effective care. We would like your views on the implementation of the BPCI initiative in this facility and how you think it has affected patient care.

Most interviews will take 1 hour. Thank you in advance for taking the time to speak with us.

a. Opening Session

A. Organization Characteristics

1. Can you briefly describe your organization? Is this facility/EI part of a larger health system? If so, please describe it.
2. Does your organization own any other PAC provider entities (e.g. home health, hospice, rehabilitation)?
3. How many staff members do you have?
4. *Questions regarding organization size/capacity:*
 - a. *(For SNFs)* What is your bed capacity?
 - b. *(For home health)* What geographic area does your agency serve?
5. *Questions regarding patient volume:*
 - a. *(For SNFs)* What is your total annual patient volume?
 - b. *(For home health)* How many unique individuals are served in skilled services annually? What is your total skilled visit volume annually (or average visit volume monthly)?
6. How many BPCI patients do you have (or expect) annually?

B. Market Characteristics

1. How would you describe the local health care market?
2. How competitive is your market?
3. How widespread is managed care in this area?
 - a. How common is participation in Medicare Advantage?
 - b. Are there local Accountable Care Organizations?

4. Are you aware of other local hospitals, SNFs, physician groups, or home health agencies that are participating in BPCI? What about other care coordination programs or value based purchasing programs?
5. Are you aware of local providers participating in the Comprehensive Care for Joint Replacement model?
 - a. If so, how has the introduction of this program in your area affected your market?
 - b. Has the CCJR model affected your relationship with referring hospitals? Your organization's patient volume? Types of patients served by your organization?

b. Executive Leadership

A. BPCI Structure

1. Entry decision
 - a. Why did your organization decide to participate in BPCI?
 - b. Why did you select the model, episodes, and episode length you chose? Did financial analysis influence these decisions? Did you receive input from partners or consultants?
 - c. Are you considering dropping any episodes? If you were able, are there any other changes related to episodes that you would make?
 - d. What would you do differently if you had to do it over again?
2. Partnership decisions/network development
 - a. Do you have preferred provider relationships with referring hospitals or other PACs (for admission and discharge)?
 - b. Did you work previously with these partners or are these relationships new?
 - i. How did you select the preferred providers (Based on outcomes? Commitment to share data? Commitment to timely admissions?)
 - ii. Have preferred provider relationships evolved since BPCI began? If so what determined why new partners were added, and how have they added value to your care continuum for BPCI?
 - iii. Do you expect to make additional changes to your network of partners to enhance your organization's performance in BPCI? If so, with which partner(s)?
 - c. Are you participating in gainsharing? If so, with whom? How is this working out?
3. Financial Results
 - a. How are you tracking financial results of BPCI?
 - b. What are your gains or losses to date? What trends have you seen in your financial results?
 - c. What is driving your gains or losses?
 - d. Have you made any adjustments to any processes as a result? Do you anticipate eliminating episodes based on these financial results?

4. Waiver Use
 - a. What beneficiary incentives, if any, have been implemented? Why did you chose to use this incentive? Has this waiver supported improved outcomes?
 - b. Have you used the home visit waiver? If so, how it is working? If not, why not?
 - c. Do you have experience with the telehealth waivers?

B. Planning/Operations and Other Health Reform Initiatives

1. What proportion of your Medicare FFS patients are part of BPCI? How does this compare to expectations?
2. Are you involved in ACOs, medical homes, or other bundled payment type initiatives? If so, did these programs affect your decision to participate in BPCI, or drive BPCI results?

C. Impact of BPCI and Care Redesign

1. Please briefly describe your care redesign activities for BPCI.
2. What was the role of physician input on this care redesign?
3. What impact, if any, is care redesign having on:
 - a. Patient outcomes (e.g., mortality, functional outcomes, readmission rate)
 - b. Cost per case
 - c. Care transitions with other health providers (hospitals, PAC, primary physicians, etc.)
 - d. Use of PAC services (% of patients discharged to PAC; SNF length of stay)
 - e. Patient satisfaction
4. For PGPs only:
 - a. Do you track individual physician performance?
 - b. What feedback is provided to physicians (benchmarking, report cards)? How often?
 - c. What data do you share with your partners (hospitals, PACs)?
5. How do you ensure that care redesign does not produce unintended consequences?
 - a. Adverse patient selection (e.g., cherry picking or lemon dropping)
 - b. Inadequate or insufficient care

D. BPCI Outcomes, Successes and Challenges

1. What have been your greatest challenges?
2. Have you seen any unintended consequences from BPCI, either good or bad?
3. Would your BPCI approach work for other providers?
4. Any important lessons to share with other BPCI participants?

c. Care Redesign Leadership

A. Care Redesign Approach

1. Did your organization redesign any aspects of patient care for BPCI? If so, please describe your approach to care redesign.
2. What information did you use to guide the care redesign process? (e.g., internal quality data, clinical guidelines, governmental reports)
3. How far along is your organization in implementing the planned care redesign activities?
4. What parts of the implementation have been easier (or more difficult) than expected?
5. *(If not addressed already in description of care redesign)* What process changes have been part of your BPCI implementation?
 - a. *Prompts, as needed:*
 - i. New protocols for risk assessment or patient need assessment
 - ii. New care protocols
 - iii. New meetings or reports to educate providers
 - iv. New staff responsibilities
 - v. New patient monitoring protocols
 - vi. New patient education tools or protocols
6. Does care redesign impact BPCI patients only, or does it also apply to non-BPCI patients as well?
7. What education have you provided staff regarding BPCI?
 - a. *Prompts, as needed:*
 - i. General education regarding BPCI as a program
 - ii. Education regarding your organization's approach to BPCI implementation
 - iii. Episode-specific education
8. How has care redesign evolved over time in the BPCI program? What element of care redesign, if any, do you think will be sustained beyond the conclusion of BPCI?

B. Key Implementation Factors

1. In your experience, what factors were required for successful implementation of BPCI?
 - a. *Prompts, as needed:*
 - i. Analysis of operations data (patient volume, length of stay)
 - ii. Financial models
 - iii. BPCI waivers
 - iv. Partnerships within your organization or in the community
2. Would you do anything differently if you were starting again?

C. Impacts of Care Redesign Approach

1. What impact, if any, is the care redesign having on...?
 - a. Patient outcomes (e.g., mortality, functional outcomes, readmission rate)
 - b. Care transitions with other health providers (hospitals, PAC, primary physicians, etc.)
 - c. Your interest/ability to participate in other alternative payment models or preferred provider relationships, or embark on other care redesign/quality improvement initiatives?
2. How has care redesign affected your organization's operations? (new staff, new training, new responsibilities or roles for staff?)
3. For PGPs only:
 - a. Do you track individual physician performance?
 - b. What feedback is provided to physicians (benchmarking, report cards)? How often?
 - c. How do the physicians react to this information?
 - d. What data do you share with your partners (hospitals, PACs)?
 - i. Are these data risk-adjusted?
4. For Single Awardees only:
 - a. How do you make use of the Awardee feedback report from CMS?
 - b. What have you found most helpful about this report?
 - c. Is there additional information that you would find helpful if it were included in the feedback report?

D. BPCI Outcomes, Success and Challenges

1. What have been your greatest challenges?
2. Have you seen any unintended consequences from BPCI, either good or bad?
3. What lessons do you think we should share with other BPCI participants?
 - d. *Care Coordination (including discharge planners/care navigators/social workers)*

A. The Role of Care Navigators/ Case Managers/Care Coordinators

1. Describe your role in the BPCI program as it relates to:
 - a. Care coordination between acute-PAC settings, with primary care, with specialty care
 - b. Case management or navigation
 - c. Clinical follow-up with patient
 - d. Medication reconciliation

2. Was your role created specifically for the BPCI initiative? If no, how is your role different since BPCI began?
3. How has BPCI care redesign affected your department's operations? (new staff, new training, new responsibilities or roles for staff?)

B. Care Navigation/Case Management Implementation

1. How do you know if a patient is in BPCI? At what point in the admissions process is it determined that a patient is likely included in the program? Who makes this determination?
 - a. Has your ability to determine if a patient is in BPCI improved over time? If so, to what do you attribute this change? If not, do you have any suggestions for how to improve data tracking/sharing in a timely way?
2. Is BPCI status considered when determining if a patient will be admitted to the [PAC setting]?
3. What are challenges associated with BPCI status identification? Has your organization identified ways to mitigate these challenges?
4. Please share the experience of a typical BPCI patient (no names please). How is this different from before BPCI?
 - a. When do you first “meet” the BPCI patient? How often do you meet or talk with the patient during their BPCI episode?
 - b. Do you provide them with materials about BPCI to explain the program?
 - c. Is the approach of the care team different for BPCI patients? If so, how is it different?
5. To what extent do you interact and communicate with physicians in your organization about specific patients' needs – especially about their transitions to other care settings? To what extent do you interact and communicate with physicians outside your organization about specific patients' needs?
6. Are you involved in patient conferences and discharge planning?
 - a. How do you identify appropriate PAC settings for BPCI patients? Are there some PAC providers you prefer for BPCI patients?
 - b. Do you try to guide patients to the preferred PAC providers? How do you ensure that patient choice is maintained?
7. Do you have mechanisms to track BPCI patients throughout their episode, such as to inform you when they move from one stage to another (e.g., from SNF to HHA)?
 - a. Have any of these mechanisms been extended to other patient populations? Do you think any tracking or follow up processes will be used by your organization after the BPCI program concludes?
8. [For “mixed-model” programs, those with multiple post-acute options participating in BPCI] How are transitions between PAC providers managed?

C. *Impacts of Care Navigation/Case Management Approach*

1. What impact, if any, is care navigation/case management for BPCI having on:
 - a. Quality metrics
 - b. Patient outcomes (e.g., mortality, functional outcomes, readmission rate)
 - c. Cost per case
 - d. Care transitions with other health providers (hospitals, PAC, primary physicians, etc.)
 - e. Use of PAC services
2. Has navigation and case management approaches affected non-BPCI patients? (e.g., spillover, change in resource allocation)

D. *BPCI Successes and Challenges*

1. What have been your greatest challenges?
2. Have you seen any unintended consequences from BPCI, either good or bad?
3. Would your BPCI approach work in other organizations?
4. What lessons do you think we should share with other BPCI participants?

e. *Finance Leadership***A. *Financial Results***

1. How do you track financial results of BPCI?
2. What are your gains or losses to date? What trends have you seen in your financial results?
3. What is driving your gains or losses?
4. Have you made any changes to your BPCI program as a result?
 - a. Adjustments to care redesign?
 - b. Changing or eliminating episodes as a result?
 - c. Changed preferred partners?

B. *Impact of BPCI Participation on Organization's Finances*

1. How have you been measuring BPCI's impact on your organization's costs?
 - a. What important indicators do you track in regard to the impact of BPCI?
 - b. Which specific costs have been affected? (E.g., internal costs, medical devices or supplies, IT system modifications, new hires, contracting with providers)
 - c. How has your monitoring of costs evolved since you began participating in BPCI? Have earlier financial results changed monitoring processes or resulted in your looking at new data to identify trends or opportunities for improvement?

2. Are you tracking any internal savings from the redesign initiatives?
 - a. If so, what have the results been?
 - b. Have you seen greater efficiencies as a result of care redesign? If so, where?
3. Have you seen any impact of BPCI and care redesign on your non-BPCI revenues (e.g., Medicare Advantage, Medicaid, private insurance)?
4. What would you do differently in designing a bundled payment program to better meet your organization's needs?

C. *Partner Gainsharing (if applicable)*

1. How does gainsharing work in your organization?
 - a. What data sources were used to develop a model?
 - b. Were external stakeholders (partners with whom gains are shared) involved in designing the gain-sharing approach?
 - c. How are gains allocated? (To the bottom line, to innovative physician practices, to particular staff members)?
 - d. Does allocation vary by partner?
2. Did gainsharing go as planned? Any important barriers that prevented you from setting up gainsharing the way you wanted?
3. What is working well with gainsharing as it stands? What needs improvement?

D. *Other Waivers*

1. Are you using beneficiary incentives? If so, what are they?
 - a. How many BPCI patients have used these? What has the impact been?
2. Are you using telehealth or other services permitted under BPCI?
 - a. How many BPCI patients have used these? What has the impact been?

E. *Successes and Challenges*

1. What have been your greatest challenges?
2. Have you seen any unintended consequences from BPCI, either good or bad?
3. Would your BPCI approach work in other places?
4. What lessons do you think we should share with other BPCI participants?

f. Data and Quality Management

A. Data Management

1. What systems do you use to monitor or analyze the quality of care?
2. Are you using existing data resources or did you have to set up new systems for this initiative? If you established new data systems, what steps did this change entail (new hires, staff training, new technology) and what were the associated costs?
3. What types of data systems do you use to manage BPCI patients, and how do these differ from the data systems you use for managing other patients?
4. Do you have systems for monitoring patient outcomes or healthcare utilization during the post-discharge period?
5. Do you have any systems that can share data with other organizations involved BPCI patient care?

B. Quality Management

1. What quality measures do you track for BPCI patients? Are these measures different from those used for non-BPCI patients?
2. Do you receive quality data from other providers, such as SNF or HHA services? If so, what approaches or systems are used to share these data? Did any of this change as a result of BPCI?
3. Have you conducted any staff training about BPCI-related quality goals?
4. Do you provide feedback on quality measures to physicians or other members of the care team? If so, what form does this feedback take (e.g., benchmarking, report cards, etc.)?
5. Do you track individual physician performance on quality measures?
6. Do you track individual partner (hospital, SNF, home health agency) performance on key quality measures?

C. Successes and Challenges

1. What have been your greatest successes and challenges?
2. Have you seen any unintended consequences from BPCI, either good or bad?
3. What lessons do you think we should share with other BPCI participants?

g. Patient Care - Nursing & Other Interdisciplinary Staff (therapists, dieticians, etc.)

1. Are nurses and other patient care staff notified if a patient is a BPCI patient? How are they notified?
2. Did you receive any education or training in regard to BPCI? If so, what topics were covered?

3. Have you changed patient care as a result of BPCI? For example, have you implemented any standardized protocols regarding patient assessment, communication, or treatment? If so, are these protocols used for all patients, or for BPCI patients only?
4. Have patient and family education efforts changed as a result of BPCI?
5. Have you noticed a different level of physician engagement since the start of BPCI?
6. Is discharge planning different since BPCI was implemented?
7. Are you involved in patient teaching? If so, how does this differ from the teaching you provided prior to BPCI? Does the teaching provided to BPCI patients differ from that provided to non-BPCI patients?

h. Patient Care - Physicians (for hospitals, PGPs, and SNFs)

For hospitals and PGPs, this session would **ideally include at least 1 physician per BPCI clinical episode**, such as hospitalists or orthopedic surgeons. For SNFs, this session would ideally include at least 1 physician directly involved in delivery of care to BPCI patients. For home health, a direct care physician may not be part of the organization; a Medical Director may be better placed in the Executive Leadership, Care Redesign or Quality session.

A. Care Redesign Approach

1. Has BPCI changed your approach to care?
 - a. *Prompts, as needed:*
 - i. Did you add new staff?
 - ii. Were new care protocols adopted?
 - iii. Do you have new relationships with other partners in the market?
2. Are care redesign efforts that were planned happening in practice? If not, what are the barriers?
3. How were physicians involved in care redesign?
 - a. *Prompts, as needed:*
 - i. Development of care protocols
 - ii. Enhancements in care delivery
 - iii. Patient engagement efforts
 - iv. Approach to quality management

B. Gainsharing

1. Has gainsharing had an impact on physician engagement?
 - a. How are gainsharing funds distributed?
 - b. Have there been any challenges or unplanned consequences with implementation of gainsharing?

C. Impacts of BPCI

1. What impact do you think BPCI had on your organization? What has been the impact on physician satisfaction? How has it change the quality and cost of care?
2. Have you seen any unintended consequences from BPCI? (e.g., adverse patient selection)
3. Have BPCI activities impacted non-BPCI patients, either positively or negatively?

D. Episode of Interest (if addressed at this facility)

1. *(If not already discussed)* Please describe how your approach to care for this episode specifically has changed, if at all, in response to BPCI.
2. Specifically in regard to the episode of interest, where do you see the greatest opportunities for improving the **quality of care** under the BPCI model?
3. What do you perceive as the greatest **opportunities** for achieving savings when caring for patients in this clinical episode?
4. What do you perceive as the greatest **challenges** for achieving savings when caring for patients in this clinical episode?
5. In your experience, what factors most clearly distinguish between “highly complex” and “less complex” patients in this bundle? Are there certain conditions that make these patients prone to complications or otherwise more difficulty to treat?
6. Do you believe that a bundled payment model can be successful for [episode of interest] patients? Why or why not?
7. How do patient comorbidities impact patient care and outcomes associated with this episode of interest?

E. BPCI Success and Challenges

1. What have been your greatest challenges?
2. Have you seen any unintended consequences from BPCI, either good or bad?
3. What lessons do you think we should share with other BPCI participants?

B. BPCI Focus Group Interview Protocols

1. Focus Group 1: Care Redesign Implementation under a Convener

a. Summary

Topic: How is care redesign implemented across episode initiators under a common Convener? What is the role of the Convener across the multiple episode initiators?

Objective: The goals of this discussion group are to: understand how care redesign is implemented across multiple sites under a common Convener and explore the role of the Awardee Convener. Each episode initiator will face different challenges and successes with implementing care redesign. We will explore the variation in the challenges and successes across sites and how they reflect the unique circumstances of each episode initiator. We will examine the value that a Convener adds to the BPCI initiative and discover how each unique site has developed under a common entity.

Participants: The ideal participants for this focus group are clinical staff who supervise care redesign at each site (e.g., nurses, care coordinators/managers, discharge coordinators) and those who are responsible for the BPCI initiative at each site. We will request each site send one individual to the focus group. All participants should have similar levels of responsibility and be able to speak to the implementation of care redesign at his or her site. Participants should also be familiar with Awardee interaction. In addition, we will take into account the number of BPCI episodes initiated at each site to ensure we are only including sites with sufficient experience in care redesign within the context of the initiative.

b. Focus Group Protocol

Introduction (10 minutes)

Thank you for taking the time to join us today. The Lewin Group is under contract with CMS to evaluate the Bundled Payments for Care Improvement (BPCI) initiative. The evaluation includes conducting site visits with health care organizations participating in the initiative. During these site visits, we hold interviews with individuals at each organization who are responsible for different aspects of implementation of BPCI. This effort is to better understand the impact of the BPCI initiative on health care delivery, outcomes, and costs—particularly the challenges and the achievements of BPCI in delivering high-quality and cost-effective care. Our responsibility is to understand what is working and what is not working under BPCI—we are not evaluating individual sites or Awardees.

As part of this evaluation, our team is also conducting focus group interviews at select sites. Complementing the information gathered through the leadership interviews, these focus groups will allow us to learn about specific topics or issues that could affect implementation of BPCI, particularly important since each site differs in location, market, episode, and patient population.

Our objectives during this 90 minute focus group are to:

- Describe the role of the Convener in care redesign.
- Understand how care redesign has been implemented across multiple EIs under the Convener. Compare and contrast the experiences of different EIs.

- Identify examples of coordination or collaboration across EIs, especially in regard to the actions of the Convener.

Introduce evaluation team (Lewin/Abt/Telligen) staff

Introduce Focus group participants

With that introduction, let's begin the discussion.

Topic #1: Implementation of Care Redesign (45 minutes)

As you know, organizations are implementing care redesign for the BPCI initiative in a variety of ways. CMS would like to learn more about the experiences of episode initiators (EIs) operating under a Convener. For these sites, they would like to better understand the similarities and differences related to the implementation of care redesign.

As we understand from your materials, you are organized as episode initiators under a Convener. We will be asking about how you are organized and to what extent you coordinate with the Convener and other episode initiators under the convener.

1. What has been your approach to care redesign under BPCI?
 - a. Has your Convener provided any instructions or information on care redesign under BPCI? If so, please describe the information provided and describe your interaction with the Convener.
2. Do care redesign efforts at one site relate to care redesign at other Episode Initiating facilities? If so, how?
3. To what extent are individual episode initiators attempting to coordinate with other episode initiators under the Convener? For example, you may have the same general approach to care redesign but may be implementing them differently at individual sites, or you may be attempting to standardize your processes in some areas but not others.
 - a. Probe: In what areas are you coordinating or sharing resources with other EIs?
 - b. Probe: Can you talk about how you made these choices about your coordination strategies with other EIs?
4. How do you monitor the implementation of care redesign processes? Does the convener give you any guidance on how to monitor care delivery?
 - a. Do you ever meet with Convener representatives to discuss the implementation of care redesign? If so, how frequently?
5. Do your sites share best practices or staff members in regard to care redesign?
 - a. If yes, how does this occur? Is this a systematic process implemented by the Convener or has it developed organically?

Topic #2: Lessons Learned (30 minutes)

The latter portion of this discussion will focus on the key successes and challenges you have experienced. We would like to know what worked well, what didn't, and what lessons you have learned during BPCI that you would like to share – not only with your colleagues, but also with other sites under the BPCI initiative that could benefit from your experiences.

1. What have been your successes in regard to BPCI care redesign?
 - a. What was the Convener's role in helping you achieve those successes?
2. What challenges did you experience in implementing care redesign?
 - a. What was the Convener's role in helping you address those challenges?
 - b. What steps did you take to overcome these challenges?
 - c. How are your experiences similar to or different from those at other EIs?
3. What are the most important lessons learned from your site?

Closing remarks (15 minutes)

Any closing remarks on topics we did not cover?

This wraps up our discussion for today. Thank you for your participation and for sharing your experience with implementing care redesign under the BPCI initiative. We have taken extensive notes and will incorporate your feedback into the summary of this site visit. Your input will be shared with CMS and will contribute to improving the BPCI initiative. Again, thank you for your time.

2. Focus Group 2: Managing the care of BPCI patients in the post-acute care (PAC) setting

a. Summary

Objectives: The goal of this focus group is to understand the working relationship between the BPCI episode initiators (EIs) and the PAC providers that accept its patients. Of particular interest are patient tracking across settings, communication, care coordination and case management, and discharge planning.

Participants: The intended participants for this focus group are staff members from PAC providers that work closely with BPCI episode initiators (e.g., acute care hospitals or physician group practices). We will contact these partners to identify the most appropriate participants for the focus group. All participants in the focus group should have similar levels of responsibility and be familiar with the PAC provider’s relationship with the EI.

b. Focus Group Protocol

Introduction (10 minutes)

Thank you for taking the time to join us today. The Lewin Group, in collaboration with our colleagues at Abt Associates and Telligen, is under contract with CMS to evaluate the Bundled Payments for Care Improvement (BPCI) initiative. The evaluation includes conducting site visits with health care organizations participating in the initiative. During these site visits, we interview individuals who are responsible for different aspects of BPCI implementation. Our goal is to better understand the impact of the BPCI initiative on health care delivery, outcomes, and costs—particularly the challenges and the achievements of BPCI in delivering high-quality and cost-effective care. We aim to understand what is working and what is not working under BPCI. We are not auditing, grading, or scoring the performance individual sites or Awardees in any way.

As part of this evaluation, our team is also conducting focus groups at select sites. These focus groups complement the information gathered through the site visits and allow us to learn about specific topics or issues that could affect implementation of BPCI. This aim is particularly important since BPCI sites may differ substantially in regard to geography, local health care markets, episode choice, and patient population.

Our objectives during this 90 minute focus group are to:

- Understand the relationship between BPCI episode initiators (e.g., hospitals or PGPs) and the PAC providers that care for patients
- Understand how EIs have communicated with PAC providers and how BPCI has changed the delivery of post-acute care

With that introduction, let’s begin the discussion.

Introduce Lewin/Telligen/Abt Staff

Introduce Focus group participants on the call (if applicable)

Topic #1: Collaboration with BPCI Episode Initiators (45 minutes)

Organizations that are participating in BPCI often work closely with a number of partners to facilitate effective care redesign. These partnerships can play a crucial role in a BPCI Awardee's care redesign efforts, patient case management, and patients' post-discharge recovery.

One aspect of this partnership can involve the identification and tracking of BPCI patients across multiple care settings, including from acute to post-acute care.

1. Are you informed that a patient is in the BPCI program? If so, how does that occur?
Another important component of this partnership is the collaboration with the BPCI episode initiator(s) regarding patient care.
2. How has collaboration with the EIs changed under BPCI?
 - a. How do your staff and the hospital/PGP staff communicate about patients' needs and care plans?
 - b. Do you communicate with the EIs about patients' discharge from PAC care?
 - c. Who communicates the PAC discharge and transition plan to the patients and their families? How are patients reacting to the discharge/transition plans?
 - d. What happens if a patient or caregiver disagrees with the transition plan and discharge arrangements?
 - e. Do any of these practices differ from the way things were done prior to BPCI?
3. How has care changed for patients since the hospital began participating in the BPCI initiative? For example, are there more interactions with patients who are part of a bundled episode? Have there been any changes to how therapy is provided to these patients?
 - a. If any of these practices changed, who was involved in deciding on the changes, and how did that arrangement come about?
 - b. How were the new care plans and therapeutic approaches conveyed to your staff (nurses, physical therapists, etc.)? Were any new trainings offered, new protocols or schedules created, etc.?

Topic #2: Lessons Learned (30 minutes)

The latter portion of this discussion will focus on the key successes and challenges experienced by your site. We would like to know what worked well, what didn't, and what lessons you have learned during your collaboration with BPCI episode initiators that you would like to share – not only with your colleagues, but also with other sites under the BPCI initiative that could benefit from your experiences.

1. What care delivery successes have you experienced at your site in relation to the hospital's participation in BPCI? What was the BPCI hospital's role in those successes?

2. What care delivery challenges did you experience at your site? What was the BPCI hospital's role in helping you address those challenges?
 - a. What steps did you take to overcome these challenges?
 - b. Did you consult other PAC providers in the area? If so, how do your experiences compare with one another?
3. What are the most important lessons learned from your site?

Closing remarks (15 minutes)

Any closing remarks on topics we did not cover?

This wraps up our discussion for today. Thank you for your participation and for sharing your experience as a PAC provider. We have taken extensive notes and will incorporate your feedback into a summary. Your input will be shared with CMS and will contribute to improving the BPCI initiative.

3. Focus Group 3: Experiences of primary care physicians (PCPs) in BPCI

a. Summary

Objectives: At the end of this focus group, the interview team should be able to:

- Describe the experiences of primary care physicians whose patients have participated in a BPCI clinical episode.
- Discuss communication between Awardee/EI representatives and PCPs. Were PCPs informed of BPCI when the program launched? Have Awardees in Model 2 informed PCPs about the post-discharge period during which the Awardee is at financial risk?
- Understand whether information is shared with PCPs regarding their patients in BPCI. Was there communication with PCPs when their patients participated in a BPCI clinical episode? Was the PCP engaged in any efforts to reduce readmissions?
- Identify any benefits or unintended consequences that PCPs felt their patients experienced as a result of BPCI.

Participants: The intended participants for this focus group are care primary care physicians whose patient have participated in a BPCI clinical episode. To ensure that we select PCPs with sufficient BPCI experience, we should ideally conduct this focus group at an EI with significant tenure in the program and at least a minimum number of participating clinical episodes (3 or more).

b. Focus Group Protocol

Introduction (10 minutes)

Thank you for taking the time to join us today. The Lewin Group is under contract with CMS to evaluate the Bundled Payments for Care Improvement (BPCI) initiative. The evaluation includes conducting site visits with health care organizations participating in the initiative. During these site visits, we interview individuals who are responsible for different aspects of BPCI implementation. Our goal is to better understand the impact of the BPCI initiative on health care delivery, outcomes, and costs—particularly the challenges and the achievements of BPCI in delivering high-quality and cost-effective care. We aim to understand what is working and what is not working under BPCI. We are not auditing, grading, or scoring the performance individual sites or Awardees in any way.

As part of this evaluation, our team is also conducting focus groups at select sites. These focus groups complement the information gathered through the site visits and allow us to learn about specific topics or issues that could affect implementation of BPCI. This aim is particularly important since BPCI sites may differ substantially in regard to geography, local health care markets, episode choice, and patient population.

Our objectives during this 90 minute focus group are to:

- Describe the experiences of primary care physicians whose patients have participated in a BPCI clinical episode.

- Discuss communication between Awardee/EI representatives and PCPs. Were PCPs informed of BPCI when the program launched? Have Awardees in Model 2 informed PCPs about the post-discharge period during which the Awardee is at financial risk?
- Understand whether information is shared with PCPs regarding their patients in BPCI. Was there communication with PCPs when their patients participated in a BPCI clinical episode? Was the PCP engaged in any efforts to reduce readmissions?
- Identify any benefits or unintended consequences that PCPs felt their patients experienced as a result of BPCI.

With that introduction, let's begin the discussion.

Introduce Lewin/Telligen/Abt Staff

Introduce Focus group participants on the call (if applicable)

Topic #1: Communication with BPCI Awardees/EIs (45 minutes)

BPCI is intended to change how providers deliver care through its incentives to control costs across the entire episode of care. BPCI awardees, such as hospitals, SNFs, or PGPs, are incentivized to coordinate post-discharge care, to reduce readmissions, and to improve the efficiency of care through the elimination of waste.

Primary care physicians play a central role in helping patients navigate through the health system. At prior site visits, many BPCI Awardees described how they have interacted with primary care physicians to help improve the quality and reduce the cost of care under BPCI, such as by arranging follow-up office visits after hospital discharge.

We would like to understand your experience in the BPCI program, such as how you were informed of the program and whether you were contacted when your patients participated in a BPCI clinical episode.

1. How did you learn about the BPCI program? Did a representative from the EI (hospital/SNF/PGP) contact you? How was the purpose of the program described?
 - a. *(Probe) Were you involved in any care redesign efforts for BPCI?*
 - b. *Did the Awardee contact you to describe their financial risk under BPCI?*
 - c. *Did the Awardee offer requests or recommendations about avoid unnecessary expenses in the post-discharge period?*
2. Have you seen any changes in patient care or coordination of care since BPCI was launched?
 - a. *(If Model 2) Have any BPCI care coordinators been in touch with you?*
3. Are you aware of any BPCI-related efforts to reduce avoidable hospitalizations? If so, what is your impression of these programs?
 - a. *What sort of care coordination services do you envision would be useful in avoiding readmissions? What types of clinical conditions would most benefit from these changes?*
4. What has been the impact of BPCI on your practice? What changes, if any, have you and your office staff needed to make?
 - a. *For example, have you added availability for more rapid follow-up after discharge?*
 - b. *Have your interactions changed with SNF or HHA staff?*
5. Have you seen any unintended consequences from BPCI?

Topic #2: Lessons Learned (30 minutes)

The second portion of this discussion will focus on the key successes and challenges experienced by your site. We would like to know what worked well, what didn't, and what lessons you have learned during your implementation of BPCI that you would like to share – not only with your colleagues, but also with other sites under the BPCI initiative that could benefit from your experiences.

1. What successes have you experienced with BPCI implementation in regard to communicating with the Episode Initiator?
2. What are the major challenges in coordinating patient care under the BPCI initiative?
 - a. What steps did you take to overcome these challenges?
3. What recommendations do you have for improving the program?

Closing remarks (15 minutes)

Any closing remarks on topics we did not cover?

This wraps up our discussion for today. Thank you for your participation and for sharing your experience with implementing care redesign under the BPCI initiative. We have taken extensive notes and will incorporate your feedback into the summary of this site visit. Your input will be shared with CMS and will contribute to improving the BPCI initiative.

4. Focus Group 4: Experiences of skilled nursing facilities (SNFs) with readmissions and post-discharge follow-up

a. Summary

Objectives: At the end of this focus group, the interview team should be able to:

- Describe the strategies used by BPCI-participating SNFs to reduce hospital readmissions.
- Discuss approaches used by SNF case managers and nurses to identify patients who may be at heightened risk for clinical decline after discharge from SNF.
- Identify potential interventions that may be used when a patient’s clinical condition deteriorates following SNF discharge.

Participants: The intended participants for this focus group are SNF case managers and nurses (as applicable) from BPCI episode-initiating SNFs.

Interviewer note: Each focus group will focus questions only on COPD/Pneumonia/CHF. These are in () to note that we only need to talk about one during each focus group.

b. Focus Group Protocol

Introduction (10 minutes)

Thank you for taking the time to join us today. The Lewin Group/Abt is under contract with the Centers for Medicare & Medicaid Services (CMS) to evaluate the Bundled Payments for Care Improvement (BPCI) initiative. The evaluation includes conducting focus groups with health care organizations participating in the initiative. During these focus groups, we speak with individuals who are responsible for different aspects of BPCI implementation. These focus groups complement the information gathered through the site visits and allow us to learn about specific topics or issues that could affect implementation of BPCI. This aim is particularly important since BPCI sites may differ substantially in regard to geography, local health care markets, episode choice, and patient population.

Our goal is to better understand the impact of the BPCI initiative on health care delivery, outcomes, and costs—particularly the challenges and the achievements of BPCI in delivering high-quality and cost-effective care. We aim to understand what is working and what is not working under BPCI. We are not auditing, grading, or scoring the performance of individual sites or Awardees in any way. Your responses are confidential and will be summarized in a report delivered to CMS.

With that introduction, let’s begin the discussion.

Introduce Lewin/Telligen/Abt Staff

Introduce Focus group participants on the call (if applicable)

Topic #1: SNFs' Approaches to Reducing Readmissions for COPD/Pneumonia/CHF (45 minutes)

BPCI is intended to change how providers deliver care through its incentives to control costs across the entire episode of care. BPCI awardees, such as hospitals, skilled nursing facilities (or SNFs), or physician group practices, are incentivized to coordinate post-discharge care, to reduce readmissions, and to improve the efficiency of care.

BPCI-participating SNFs are incentivized to reduce patient costs after discharge, including the substantial costs that can result from patient readmissions to the hospital. During this focus group, we seek to understand:

- Strategies used by SNFs to reduce hospital readmissions.
 - Approaches used to identify patients who may be at heightened risk for clinical decline after discharge from SNF.
 - Potential interventions that may be used when a patient's clinical condition deteriorates following SNF discharge.
1. Why did you select COPD/Pneumonia/CHF as an episode?
 2. Does your staff perform any assessment to identify BPCI COPD/Pneumonia/CHF patients who may be at higher risk of complications or readmission? (Examples, if needed: LACE, BOOST, an in-house assessment, any other list of questions to assess patient risk)
 - a. *Was this implemented because of BPCI?*
 - b. *Tell us about the assessment used and the assessment process.*
 - c. *Which patients receive this assessment? E.g., is this assessment performed on all COPD/Pneumonia/CHF patients or only on those who the staff have concerns about?*
 - d. *What happens as a result of the assessment? For example, are there particular care interventions linked to assessment results?*
 - e. *Is the interdisciplinary care team made aware of the results? Is the physician aware of the results? Probe: How does this work?*
 3. Is there any difference in decision making related to home health care referrals for
 4. COPD/Pneumonia/CHF BPCI patients versus non-BPCI patients? If so, please explain.
 - a. *Is there any difference in decision making related to home health referrals for COPD/Pneumonia/CHF BPCI patients versus BPCI patients with other diagnoses?*
 5. After discharge, does the SNF or an organization working with the SNF maintain any regular contact with BPCI COPD/Pneumonia/CHF patients?
 - a. *If so, how is this contact maintained?*
 - b. *Is the same type of contact maintained with non-BPCI patients?*
 - c. *Does the frequency and type of contact differ based on the patient's diagnosis?*
 - d. *Does the patient's risk of readmission affect the type or frequency of contact?*

6. Are SNF staff members informed of changes in BPCI patient condition after discharge from the SNF? If so, how does this happen? (E.g., feedback from home health, discussions with family)
7. If a BPCI COPD/Pneumonia/CHF patient's clinical condition deteriorates after discharge from SNF, what actions does the SNF team take?
 - a. *Are there any factors that are used to differentiate among patients who must go to the hospital and those who could be treated with other approaches?*
 - b. *For patients who don't necessarily need to be hospitalized, what steps are taken to prevent any further worsening of their condition?*
8. How are you informed if a BPCI COPD/Pneumonia/CHF patient is readmitted to the hospital, if at all?
 - a. *If so, what actions are taken after being informed of the readmission?*
9. Please describe any tactics that we haven't discussed yet that were implemented during BPCI and intended to lower readmission rates for COPD/Pneumonia/CHF patients.

Topic #2: Successes, Challenges and Lessons Learned (30 minutes)

The second portion of this discussion will focus on successes, challenges and lessons learned. We would like to know what you have learned during your implementation of BPCI that you would like to share.

1. Do you feel like you have been successful in reducing readmissions for BPCI patients with COPD/Pneumonia/CHF? Why or why not?
 - a. *If not,*
 - i. *Do you have a plan in place for reducing readmissions for BPCI patients with COPD/Pneumonia/CHF in the future? When do you think you'll be able to roll out your plan?*
 - ii. *Do you think that you will eventually be successful in reducing readmissions for BPCI patients with COPD/Pneumonia/CHF? Why or why not?*
2. Are there any other challenges to preventing readmissions for the COPD/Pneumonia/CHF episode that we have not already discussed?
 - a. *Are these challenges unique to patients with COPD/Pneumonia/CHF or do they apply to all BPCI patients?*
3. Do you believe a bundled payment model can be successful for COPD/Pneumonia/CHF patients? Why or why not?

Closing remarks (15 minutes)

Any closing remarks on topics we did not cover?

This wraps up our discussion for today. Thank you for your participation and for sharing your experience with implementing care redesign under the BPCI initiative. Your input will be shared with CMS and will contribute to improving the BPCI initiative.

C. Interview Protocol with Awardees that terminated BPCI participation

Thank you for taking the time to talk with us today. We are conducting an evaluation of the Bundled Payments for Care Initiative for CMS. As part of the evaluation of the program we want to learn more from participants that decide to terminate their participation of the program. During this short call, which we anticipate will last about 30 minutes we hope to learn more about your experiences under BPCI, what worked, what ultimately were the challenges, and how you tried to overcome them.

1. What factors or barriers led to the decision to discontinue participation in BPCI?
 - a. Administrative burden
 - b. Leadership involvement (or lack of involvement)
 - c. Inability to form or maintain necessary partner networks
 - d. Financial losses
 - e. Episode selection
2. Who made the decision to withdraw?
3. What would you have done differently if you could start over?
4. How could CMS improve the program for current and future BPCI participants?
5. Were there any barriers in forming productive relationships?
6. Were there any legal/contractual issues related to gainsharing and data sharing?
 - a. Data/IT misalignment, inability to reconcile data
 - b. Difficulties with TPA or other financial administrative burden?
 - c. Inadequate/unavailable software systems for care management?
7. Were there any barriers to implementing care redesign?
 - a. Leadership involvement
 - b. Physician pushback
 - c. Care management challenges
 - d. Patient/family factors
 - e. Inadequate quality metrics
8. Were solutions attempted to overcome these barriers, or did the cost of necessary changes outweigh potential gains?

D. Participant Interview Protocols

1. BPCI Participant Interview Protocol, Q1 2014

Objective: Understand the reasons why Awardees decided to join BPCI and how/why they made certain decisions regarding participation in BPCI.

A. Introductions and Background

1. Introduce Lewin team members on the call
2. Awardee introductions
 - a. Please tell me about your current position and your BPCI-related responsibilities.
 - b. Is your role new or was it created specifically to support BPCI?

B. Entry Decisions and BPCI Structure

1. What attracted you to the BPCI initiative?
 - a. Are you involved in any ACOs, medical homes, or other bundled payment type initiatives either through CMS, a state initiative or a private payer initiative? How did these experiences affect your decision to participate in BPCI?
 - b. *(If participating in gainsharing)* What about the gainsharing model seemed advantageous to you?
 - c. *(If not participating in gainsharing)* Why did you decide not to participate in gainsharing?
 - i. Will this influence your decision to gainshare in the future?
2. What types of partners, if any, did you involve in the decision to participate in the initiative?
 - a. What types of partnerships did you have with them?
 - b. Why did you involve them in the decision making process?
3. How did you select which model to participate in?
 - a. Whose leadership was critical to these decisions?
4. How did you select which DRGs to include?
 - a. Whose leadership was critical to these decisions?
5. How did you decide which episode lengths to include (30, 60, 90 days)?
 - a. Whose leadership was critical to these decisions?
6. Once you decided to participate in the initiative, what types of relationships, if any, did you establish with others outside of your provider network that might be “touching” BPCI patients (e.g., other BPCI episode initiating organizations, hospitals, other providers in the community, aging network organizations, community centers)?
 - a. How did you select these partners?
 - b. Did you need to establish new contracts with other providers?

- c. What percent of your local providers are in your BPCI “network”?
 - d. Have you established any other formal or informal collaborations?
7. Is there anything else you would like to share with us about your decision to participate in the BPCI initiative or how you selected partners?

2. BPCI Participant Interview Protocol, Q2 2014 BPCI

Objective: Understand the reasons why Awardees decided to join BPCI and how/why they made certain decisions regarding participation in BPCI.

A. Introductions and Background

1. Introduce Lewin team members on the call
2. Awardee introductions
 - a. Please tell me about your current position and your BPCI-related responsibilities.
 - b. Do you have other responsibilities in addition to BPCI?
 - c. Have you established any new roles specifically to support BPCI?

B. Entry Decisions and BPCI Structure

1. What attracted you to the BPCI initiative?
 - a. Are you involved in any ACOs, medical homes, or other bundled payment type initiatives either through CMS, a state initiative or a private payer initiative? How did these experiences affect your decision to participate in BPCI?
 - b. *(If participating in gainsharing)* What about the gainsharing model seemed advantageous to you?
 - c. *(If not participating in gainsharing)* Why did you decide not to participate in gainsharing?
 - i. Will this influence your decision to gainshare in the future?
2. When you first decided to participate in the initiative, what types of partners, if any were involved in the decision?
 - a. What types of partnerships did you have with them during the decision making process?
 - b. Why did you involve them in the decision making process?
 - c. What is the nature of your ongoing relationship with these partners?
 - d. Did you receive any outside analytical or IT support during the decision making process?
3. How did you select which model to participate in?
 - a. Whose leadership was critical to these decisions?

4. How did you select which episodes to include?
 - a. Whose leadership was critical to these decisions?
5. *(If participating in Model 2 or 3)* How did you decide which episode lengths to include (30, 60, 90 days)?
 - a. Whose leadership was critical to these decisions?
6. Once you decided to participate in the initiative, did you establish relationships with other individuals or organizations to facilitate your participation in BPCI (e.g., other BPCI episode initiating organizations, hospitals, other providers in the community, aging network organizations, and community centers)?
 - a. How did you select and establish relationships with these people?
 - b. What is the nature of these relationships?
7. Is there anything else you would like to share with us about your decision to participate in the BPCI initiative or how you selected partners?
8. Given that we likely will not have another call until next year, is there anything else you would like to share about your experience in the initiative so far?

3. BPCI Participant Interview Protocol, Q3 2014 – Q4 2014

Objective: Understand how care redesign is implemented, and what cost-saving strategies are employed by Awardees under the BPCI initiative.

A. Introductions and Background

1. Introduce Lewin team members on the call
2. Awardee introductions
 - a. Please tell me about your current position and your BPCI-related responsibilities.

B. Care Redesign Efforts

1. We've reviewed your care redesign plans as presented in your IPs. The next section asks about those plans. Before we begin, is there anything you would like to comment on about the implementation of these plans (e.g., improvements in quality, access, or care coordination)?
2. To what extent are partners integrated into the implementation of your care redesign activity plans?
 - a. What role do partners play in your care redesign efforts?
 - b. How do you see your partnerships advancing the success of your care redesign efforts? How have partnerships contributed to any outcomes you have seen so far?
 - c. Are these partnerships new or an augmentation of your usual practices?
 - d. Do you have a formal (e.g., contract) or informal relationship with your partners?

3. Does the implementation of care redesign initiatives differ from your planned approach or are you planning on changing your approach? If so, how, and why did you need to change course?
4. What challenges or successes have you faced when implementing care redesign?
 - a. How are you responding to these challenges?

C. Cost-Saving Strategies

1. Many providers are involved in efforts to increase internal or external cost savings as part of their efforts under BPCI. These efforts can be related to or separate from your care redesign activities. Could you talk a little about how your organization has been thinking about generating cost savings or improving efficiency in the treatment of you episode payments?
2. Please describe how you see your care redesign activities relating to your cost savings strategies.
 - a. Beyond preventing readmissions/reducing PAC intensity, how do you see your care redesign activities affecting your costs or Medicare costs?
 - b. Are you doing anything related to cost savings that is not part of your care redesign activities (e.g., device standardization, lab/test protocols, OR efficiency projects, etc.)?
3. Have your cost savings approaches been organized primarily within your organization or have they involved your outside partners? If applicable, please describe your approach to involving your partners, gainsharing or otherwise, in your cost savings activities.
4. Please describe any successes or challenges so far in your cost savings efforts.

4. BPCI Participant Interview Protocol, Q1 2015

Objective: Understand the motivations for organizations to join as Facilitator Conveners, how they operate with their partner organizations, and their experiences with their Awardees under the BPCI initiative.

A. Introductions and Background

1. Introduce Lewin team members on the call
2. Awardee introductions
 - a. Please tell me about your current position and your BPCI-related responsibilities.

B. Rationale for Joining as a Facilitator Convener

1. What are your organization's objectives as an FC under BPCI? That is, what do you expect to achieve?
2. What has been your progress toward meeting those objectives?
 - a. What has worked well for you?
 - b. What has impeded your progress?

3. As you were thinking about how you wanted to be involved in BPCI, how did you decide to be an FC rather than an Awardee? Why did you choose this organizational structure?
 - a. By definition, reconciliation occurs at the Awardee level and the Awardee is financially at risk for the performance of the Episode Initiators underneath them. How did you determine the appropriate level to house risk within your organization? What impact did that have on your structure?

C. Selection of Partners

1. How did you select the organizations you are working with?
 - a. Were these preexisting relationships or brand-new relationships?
 - i. *If new*: How did you go about selecting these organizations?
 - ii. *If preexisting*: Do you operate within the same, larger organization? To what extent did the existing organizational relationships between you, your Awardees, and any episode initiators factor into how you organized your BPCI participation? If you had multiple organizations to choose from within your larger organization, how did you go about selecting which organization you would work with under BPCI?

D. Interactions with DAs/DACs

1. How do you structure your organizational relationship with your Awardees?
 - a. What do you do for your DAs or DACs (e.g., coordination, data analytics, technical support)?
 - b. What role, if any, do you play in your DAs/DACs' care redesign efforts? Does your organization strongly influence these decisions?
 - c. What decisions do the DAs/DACs make (episode selection, partners, staffing)?
 - d. What role, if any, do you play in determining the objectives of your DAs/DACs under BPCI and how these objectives will be achieved or measures?
2. Describe your working relationships with your DAs/DACs.
 - a. Who typically initiates communication? Is it formal, regular, weekly conversation or more hands-off/as needed?
 - b. How often do you typically communicate with your DAs/DACs?
 - c. How much do you interact with the EIs? For what purposes, if any?
3. What did your financial stake in the performance of the Awardees/EIs under you? Did the fact that facilitators cannot participate in gainsharing factor into your choices? By what other financial mechanisms are you tied to the Awardees and Episode Initiators under you? Are these performance-based or more administrative in nature?
4. What are the objectives of your DAs/DACs under BPCI?
 - a. Are they achieving those objectives?
 - b. What has worked well for them?
 - c. What are their challenges?

5. How does your interaction with Awardees vary across DAs/DACs, if at all?
 - a. How does your interaction with Awardees differ from how you envisioned it? How has it evolved from your initial expectations?

5. BPCI Participant Interview Protocol, Q2 2015

Objective: Better understand how Awardees are using the SNF waiver, the relationship between Awardees and SNF partners, and how Awardees have or intend to affect the use of post-acute care.

A. Introductions and Background

1. Introduce Lewin team members on the call
2. Awardee introductions
 - a. Please tell me about your current position and your BPCI-related responsibilities.

B. SNF Waiver Use

1. Why did you request the waiver of the 3-day hospitalization requirement for SNF coverage?
 - a. Do you have experience using it under other circumstances (e.g., Medicare Advantage, Pioneer ACOs)? If so, can you describe your experience?
2. Waiver use
 - a. How much are you using the waiver? Roughly what proportion of your patients discharged to a Medicare-covered SNF stay had a hospitalization of less than 3 days?
 - b. How do you decide which patients can be discharged in less than 3 days to a SNF?
 - i. Which episodes are you likely to target for shorter hospitalizations prior to SNF?
 - ii. What is your protocol for determining who should have a shorter inpatient stay under the waiver?
 - iii. Are the patients with the short inpatient stays more likely to have been living in a nursing home prior to their hospitalization?
3. Do you encourage your patients to choose particular SNFs when discharging them after a short hospitalization? If yes, what are the characteristics of those SNFs?
4. How do you monitor your patients who are admitted to a SNF? Does this differ for patients admitted after a short inpatient stay under the waiver?
5. Do you think Medicare should change its policy and allow Medicare SNF coverage following a hospitalization of less than three days?
 - a. Would this lead to lower cost episodes?
 - b. Is the SNF length of stay or intensity of service use higher in these cases?
 - c. Do you think this policy could increase hospital admissions of patients who could have been treated in the nursing facility or at home?
 - d. Have you identified any negative effects of waiver use?

C. Relationships with SNF Partners

1. SNF Partners
 - a. What are your criteria for choosing SNF partners?
 - i. Does your choice of partners/criteria for selecting partners vary by episode, and if so, how?
 - b. What role has gainsharing played, if any, in your choice of partners?
 - c. What is the organizational relationship between you and your partner SNFs?
2. How are you communicating to SNFs when a patient is in a BPCI episode?
3. How/when do you monitor partner SNFs' star ratings?
 - a. A SNF waiver adherence rule is that 50% of the patients admitted to a SNF under the waiver are sent to a 3-star (or above) rated SNF. When do you identify (i.e. for what month) the star rating at the time of admission?
 - b. What has been the impact of changes to the star rating methods in Feb 2015 on selecting your SNF partners, if any?

D. Post-Acute Care Decision Making

1. Thinking beyond use of the SNF waiver, how are you deciding which patients to send to which PAC facility?
 - a. Do you have protocols for determining when patients should be discharged to a particular PAC facility?
 - b. Have you implemented any care redesign that helps you decide to send patients home with home health instead of to a SNF (or other PAC facility)? If so, was this always part of your care redesign plan, or did this evolve over time?
 - c. What patient or episode-specific factors do you consider during discharge planning?

If there are multiple EIs in your Awardee structure: Do you share this guidance across all EIs?

5. BPCI Participant Interview Protocol, Q3 2015

Objective: *Better understand what is driving post-acute care (PAC) use, the impact of care redesign interventions on PAC utilization, and successes and challenges in changing PAC use among Model 2 and 4 Awardees.*

A. Introductions and Background

1. Introduce Lewin team members on the call
2. Awardee introductions
 - a. Please tell me about your current position and your BPCI-related responsibilities.

B. Care Redesign Efforts to Impact PAC Use

1. Have you implemented care redesign interventions specifically targeted at reducing PAC use or moving to more efficient PAC services?
 - a. Were these interventions developed specifically for BPCI?
 - b. Do you have protocols for determining when patients should be discharged to a particular type of PAC facility?
 - c. Do you have distinct strategies to guide PAC use depending on the patient's episode/DRG?
 - i. Besides DRG, what other factors are considering in determining the best PAC options for the patient?
 - d. To what extent do you educate patients on their PAC options?
2. Are PAC partners integrated into the implementation of your care redesign activity plans?
 - a. [If yes]: What role do PAC partners play in your care redesign efforts?
 - b. How closely do you monitor PAC partner activities?
 - i. Do you have an employee, such as a patient navigator or care coordinator, who checks in with PAC providers on patient status? Do these employees attempt to influence the PAC length of stay?
 1. [If yes]: Is this new to BPCI or something you have always done prior to BPCI?
 2. Have these strategies influenced the behavior of the PAC facilities?
 - ii. Are you able to influence PAC behavior?
3. Does the implementation of care redesign interventions for PAC utilization differ from your planned approach? Are you planning on changing your approach to PAC utilization?
4. Is waiver use an element of your care redesign efforts to transform PAC utilization?
 - a. Are you gainsharing with PAC providers? How important is gainsharing with regards to changing PAC partner behavior?
 - b. How important are beneficiary incentives in reducing the need for and use of PAC services?

- c. Have you utilized the 3-day stay waiver for Medicare-covered SNF stays? Is this waiver used impact overall PAC use? Have you observed any improved outcomes for beneficiaries?
 - d. Do you think you could influence PAC utilization as you have described without the ability to use any or all of these waivers?
5. What successes and challenges have you experienced when implementing PAC-focused care redesign interventions?
- a. Are partnerships with PACs contributing to successes and challenges? How so?

C. PAC Utilization during BPCI

1. Has your care redesign regarding PAC utilization resulted in a change in PAC utilization during BPCI?
 - a. [If yes]: How so? Why do you think this is?
 - b. Has the change in PAC utilization varied by clinical episode?
2. Do you collect and analyze data on PAC use? If so, how?
3. Do you monitor patient status while at a PAC facility? If so, how?
4. Have you noticed:
 - a. Changes in patient outcomes?

Cost-savings that could be attributed to changes in PAC utilization

6. BPCI Participant Interview Protocol, Q4 2015 – Q1 2016

Objective: To better understand the decision of physician group practices (PGPs) to enter BPCI, the organizational arrangements and partnerships PGPs have with other entities (such as with the facilities at which the BPCI episode is initiated, Conveners, and third party contractors), and successes and challenges PGPs have experienced during BPCI.

A. Introductions and Background

1. Introduce Lewin team members on the call
2. Awardee introductions
 - a. Please tell me about your current position and your BPCI-related responsibilities.

B. PGP Characteristics

1. What is the specialty mix of the practitioners at your PGP?
2. How many non-physician clinicians work at the practice?
3. Does your practice have multiple locations?
4. How long has your practice been in business?

C. Entry Decision

1. What attracted you to the BPCI initiative? Who was involved in the decision to participate?
2. Why did you choose to join as your participant type?
3. What factors influenced your decision to enter the initiative when you did?
 - a. What, if any data did you analyze or find most useful when making the decision to join BPCI?
 - b. Was participation in BPCI tied with other organizational changes?
4. How did you select the Model in which you are participating?
5. How did you select the BPCI DRGs in which you are participating?
 - a. Do you admit patients to hospitals for DRGs other than the BPCI DRG(s) you are participating in?
6. How did you prepare to join BPCI prior to your start date?
7. How did the opportunity to use waivers (e.g., gainsharing, three-day hospital stay waiver for Model 2 EIs, beneficiary incentives) impact your decision to join the BPCI initiative?

D. Organizational Arrangements and Partnerships

1. Please describe any arrangements with the facilities at which your BPCI episodes are initiated.
2. Please describe any arrangements with PAC providers to which patients are discharged.
 - a. If you have specific arrangements or partnerships with PAC providers, what were the criteria for selecting those partners?
 - b. What role do you play once patients are discharged from acute care? How involved are you during the post-discharge period?
 - c. What strategies are you using to influence PAC use?
3. Please describe any arrangements you have with third party contractors. For example, do you have agreements with data analysis consultants, financial consultants, or IT vendors?
4. [For PGPs under a Convener] Please describe the functions performed by your Convener.
 - a. Does your Convener offer certain supports or assistance that would otherwise be provided by third party contractors?
 - b. Did these services influence your decision to join BPCI under this convener?
5. How would you describe the stability of physician and other practitioner employees in your PGP over time? Have you experienced changes in the mix or size of practitioners within your PGP due to BPCI?
 - a. Has participation in BPCI been a method to bring in more practitioners or has it deterred practitioners from joining your group?

6. How do you expect practice patterns to change due to BPCI (e.g., will there be greater standardization of procedures, are referral patterns changing, etc.)?
7. What are the benefits and challenges of the PGP structure you have experienced as they relate to the BPCI initiative?

7. BPCI Participant Interview Protocol, Q2 2016

Objective: Understand how care redesign is implemented, and what cost-saving strategies are employed by Model 3 Awardees under the BPCI Initiative.

A. Introductions and Background

1. Introduce Lewin team members on the call
2. Awardee introductions
 - a. Please tell me about your current position and your BPCI-related responsibilities.

B. Care Redesign Efforts

1. Have you changed the way you deliver care since you joined BPCI? If yes, please briefly describe these changes.
2. Can you identify which of your patients are in BPCI?
3. Are your care redesign efforts the same for all patients regardless of bundle, or are there aspects of BPCI care redesign that are specific to certain bundles?
4. What is your discharge planning process? Has this changed since you joined BPCI?
 - a. Does discharge planning vary by bundle? By other patient characteristics?
 - b. What determines when a patient can be discharged home?
 - c. Are you in contact with patients after they are discharged from your facility?
 - d. Do you collect and analyze data on patient outcomes after discharge?
 - e. Who communicates the PAC discharge plan to the patients and their families? Please describe this process.
 - i. What happens if a patient or caregiver disagrees with the discharge plan?
 - f. If a patient contacts your facility after discharge and reports they are getting worse, what is your role?
 - i. Are patients ever re-admitted directly to your facility?
5. Have you used any strategies to reduce readmissions? If so, have they been successful?
6. Do you coordinate care with other health care providers or community organizations? If so, please describe these partners.
 - a. Do you have any “preferred partner” organizations that you work especially closely with, even if they are not directly involved in your care redesign?
7. Has the severity or complexity of your patients changed since joining BPCI?

8. What challenges or successes have you faced when implementing care redesign under BPCI?
 - a. How are you responding to these challenges?
 - b. What role have your partners (i.e., hospitals, PGPs, other PAC providers, community partners) had in helping you address those challenges?
 - c. What unintended consequences have you experienced as a result of BPCI?

C. Cost Saving Strategies

1. What strategies are you using to achieve cost savings?
2. Have you been successful in reducing costs for your BPCI bundles?
 - a. How do your savings under BPCI compare to what you expected?
3. SNFs only: How does the NPRA from BPCI compare to your daily per diem reimbursement?
 - a. If you reduce length of stay to create savings in BPCI, how does that impact your total revenues?
 - b. Have you experienced a higher rate of patient turnover since joining BPCI? If so, what strategies have been used to increase or maintain patient volume?
4. Please describe any challenges so far in your cost savings efforts.
5. Are there any other successes related to cost savings that we have not yet discussed?

D. Gainsharing

1. Do you participate in gainsharing for BPCI?

E. Successes/Challenges

1. Have there been any policy or regulatory changes for your facility type that have impacted your BPCI performance? If so, what were they and how did they affect you?
2. What lessons would you want to share with another Model 3 BPCI participant?

8. BPCI Participant Interview Protocol, Q3 2016

Objective: Understand Awardees' gainsharing experience, the impact of gainsharing on care delivery, and what cost saving strategies are employed under the BPCI initiative.

A. Introductions and Background

1. Introduce Lewin team members on the call
2. Awardee introductions
 - a. Please tell me about your current position and your BPCI-related responsibilities.

B. Gainsharing Experience

1. Why did you decide to participate in gainsharing?
 - a. How have your reasons for participating in gainsharing changed, if at all?
 - b. What types of behaviors are you trying to incentivize?
2. Why did you select the gainsharing quality metrics identified in your Implementation Protocol?
 - a. Has gainsharing allowed you to implement quality metrics that you otherwise would not have been able to? If yes, please explain.
 - b. What systems are in place to monitor changes in quality associated with gainsharing?
3. What types of partners are you gainsharing with?
 - a. What drives partner selection for gainsharing?
 - b. Who did you consider gainsharing with?
 - c. Who would you like to gainshare with but are not able to?
 - d. What information is shared with partners regarding the details of gainsharing?
4. What does successful gainsharing look like to you?
5. What challenges have you experienced with gainsharing?
6. Are you planning to make changes to your gainsharing agreements, based on your experience to date?

C. Impact on Care Delivery

1. Has gainsharing changed care delivery? If yes, how so?
 - a. What care redesign strategies do you expect your gainsharing partners to follow, if any?
 - b. Does the promise of gainsharing dollars drive change? If yes, how so?
 - c. Have you experienced any unintended consequences of gainsharing? If yes, please explain.

D. Cost Savings

1. What strategies are employed to achieve cost savings?
 - a. How are you tracking and monitoring cost savings?
2. Have you measured the impact of gainsharing on cost savings?
3. Are your cost savings in line with what you expected when you joined the initiative?

9. BPCI Participant Interview Protocol, Q4 2016 – Q1 2017

Objective: Understand care redesign and cost savings opportunities and challenges experienced by Model 2 EIs in the AMI episode under the BPCI initiative.

A. Introductions and Background

1. Introduce Lewin team members on the call
2. Awardee introductions
 - a. Please tell me about your current position and your BPCI-related responsibilities.

B. Care Redesign and Cost Savings

1. Why did you select AMI as an episode in BPCI?
2. Are you able to easily identify which patients are in the AMI episode under BPCI prior to their discharge from the hospital?
 - a. If not, what makes it challenging to identify patients in this episode?
3. What, if anything, has changed in your care for AMI patients since joining BPCI?
 - a. Part of the BPCI evaluation looks at changes in PAC use and referral patterns. Please describe the factors that determine a patient's discharge location for the AMI episode.
 - i. Has changing PAC use been a priority for your practice or hospital? Why or why not?
 1. Where have you been successful? Where have you experienced challenges?
 - b. Have physicians engaged with the design and implementation of care redesign for AMI? If so, how?
 - i. If not, what has been challenging about engaging physicians in the AMI episode?
 - c. Where have you experienced the greatest opportunities to improve the quality of care in the AMI episode?
 - i. Where have you experienced challenges in improving the quality of care for the AMI episode?
4. In your experience, what factors or characteristics determine the severity or complexity of your AMI patients? Are there certain conditions that make these patients prone to complications or otherwise more difficult to treat, compared to other BPCI patients?
 - a. How has the severity or complexity of your patients for the AMI episode changed since joining BPCI?
 - i. At what point during the episode are you able to determine patient complexity for AMI patients?
5. Do you believe that a bundled payment model can be successful for AMI patients? Why or why not?

10. BPCI Participant Interview Protocol, Q4 2016 – Q1 2017

Objective: Understand care redesign and cost savings opportunities and challenges experienced by Model 2 EIs in the sepsis episode under the BPCI initiative.

A. Introductions and Background

1. Introduce Lewin team members on the call
2. Awardee introductions
 - a. Please tell me about your current position and your BPCI-related responsibilities.

B. Care Redesign and Cost Savings

1. Why did you select sepsis as an episode in BPCI?
2. Are you able to easily identify which patients are in the sepsis episode under BPCI prior to their discharge from the hospital?
 - a. If not, what makes it challenging to identify patients in this episode?
3. What, if anything, has changed in your care for sepsis patients since joining BPCI?
 - a. Part of the BPCI evaluation looks at changes in PAC use and referral patterns. Please describe the factors that determine a patient's discharge location for the sepsis episode.
 - i. Has changing PAC use been a priority for your practice or hospital? Why or why not?
 1. Where have you been successful? Where have you experienced challenges?
 - b. Have physicians engaged with the design and implementation of care redesign for sepsis? If so, how?
 - i. If not, what has been challenging about engaging physicians in the sepsis episode?
 - c. Where have you experienced the greatest opportunities to improve the quality of care in the sepsis episode?
 - i. Where have you experienced challenges in improving the quality of care for the sepsis episode?
4. In your experience, what factors or characteristics determine the severity or complexity of your sepsis patients? Are there certain conditions that make these patients prone to complications or otherwise more difficult to treat, compared to other BPCI patients?
 - a. How has the severity or complexity of your patients for the sepsis episode changed since joining BPCI?
 - i. At what point during the episode are you able to determine patient complexity for sepsis patients?

5. What surveys or metrics are you using to measure patient satisfaction among sepsis patients?
 - a. Please briefly describe your patient satisfaction results for sepsis patients.
 - i. Have satisfaction results for sepsis patients changed since joining BPCI?
 - ii. How does patient satisfaction differ for patients with sepsis compared to other patients?
6. Do you believe that a bundled payment model can be successful for sepsis patients? Why or why not?

11. BPCI Participant Interview Protocol, Q4 2016 – Q1 2017

Objective: Understand care redesign and cost savings opportunities and challenges experienced by Model 3 EIs in the sepsis episode under the BPCI initiative.

A. Introductions and Background

1. Introduce Lewin team members on the call
2. Awardee introductions
 - a. Please tell me about your current position and your BPCI-related responsibilities.

B. Care Redesign and Cost Savings

1. Why did you select sepsis as an episode in BPCI?
2. Are you able to easily identify which patients are in the sepsis episode under BPCI?
 - a. If not, what makes it challenging to identify patients in this episode?
3. What, if anything, has changed in your care for sepsis patients since joining BPCI?
 - a. Where have you experienced the greatest opportunities to improve the quality of care in the sepsis episode?
 - i. Where have you experienced challenges in improving the quality of care for the sepsis episode?
4. In your experience, what factors or characteristics determine the severity or complexity of your sepsis patients? Are there certain conditions that make these patients prone to complications or otherwise more difficult to treat, compared to other BPCI patients?
 - a. How has the severity or complexity of your patients for the sepsis episode changed since joining BPCI?
 - i. At what point during the episode are you able to determine patient complexity for sepsis patients?
5. Do you believe that a bundled payment model can be successful for sepsis patients? Why or why not?

12. BPCI Participant Interview Protocol, Q2 2017

Objective: Understand successes and challenges in care delivery, care redesign, and cost savings for BPCI EIs in rural markets.

A. Introductions and Background

1. Introduce Lewin team members on the call
2. Awardee introductions
 - a. Please tell me about your current position and your BPCI-related responsibilities.

B. Care Delivery, Care Redesign, and Cost Savings

1. How would you define your local market?
 - a. What is the average distance and farthest distance your patients travel to receive care at your facility?
2. We are interested in exploring whether rural providers have particular advantages or disadvantages in responding to BPCI. Do you think that being a rural facility affects your ability to collaborate with [other] hospitals or [other] PAC providers on BPCI efforts? If so, how?
 - a. Are you ever informed of patient readmissions to [other] hospitals? If so, please explain.
 - b. Do you encounter challenges regarding the quality of [other] PAC providers in your local market? If so, please explain.
 - c. How has being a rural facility impacted your collaboration with primary care providers, if at all?
 - d. How has being a rural facility impacted your collaboration with specialists, if at all?
 - i. Please describe any challenge you have experienced with the availability of specialists in your local market. How often do you encounter these challenges?
 - e. What type of community services (such as Meals on Wheels) do you use in your local market?
 - i. Has being a rural facility impacted your collaboration with community services? If so, please describe.
3. How does being a rural facility impact your ability to follow-up with patients, if at all? Are there specific challenges you have encountered?
4. Do you use any remote monitoring services after discharge, such as measuring patient weight, oxygen levels, or heart function? If so, please explain.
5. Please explain any challenges you may have with transportation for your patients.

6. We've recently heard that the competitive bidding process for Medicare durable medical equipment (DME) has affected the some rural providers' ability to obtain DME in a timely manner.
 - a. Has your process of obtaining DME changed since starting BPCI? Please explain.
 - b. Do you have any challenges in obtaining DME for patients? Please explain.
 - c. Has the availability (or scarcity) of DME had an impact on patient discharges? If so, please explain.
7. Does being a rural facility impact your ability to recruit and retain staff? If so, please describe the impact of staffing on your facility's ability to support initiatives such as BPCI?
 - a. Have you shifted staff or changed job descriptions to support your BPCI program? If so, please explain.
8. Are there any other challenges related to being a rural BPCI participant that we haven't already discussed today? If so, please explain.
 - a. Have these challenges impacted your costs? How so?
9. Are there any other successes related to being a rural BPCI participant that we haven't already discussed today? If so, please explain.
 - a. Have these successes impacted your costs? How so?
10. Among the care delivery and care redesign aspects we've discussed today, do you think any have impacted your BPCI costs? How so?
11. What should CMS know about implementing a bundled payment model in a rural market?

13. BPCI Participant Interview Protocol, Q2 2017

Objective: Understand successes and challenges in care delivery, care redesign, and cost savings for BPCI EIs that are teaching hospitals.

A. Introductions and Background

1. Introduce Lewin team members on the call
2. Awardee introductions
 - a. Please tell me about your current position and your BPCI-related responsibilities.

B. Care Delivery, Care Redesign, and Cost Savings

1. How would you define your local market?
 - a. What is the average distance and farthest distance your patients travel to receive care at your facility?
 - b. How close is the nearest hospital to your facility?
 - i. Do you compete with that hospital for patients? For physicians or other clinical staff?
 - ii. Does your hospital own any PAC facilities? Please explain.

2. We are interested in exploring whether teaching hospitals have particular advantages or disadvantages in responding to BPCI. Do you think that being a teaching hospital affects your ability to collaborate with other hospitals or PAC providers on BPCI efforts? If so, how?
 - a. Have you ever experienced challenges in being notified of patient readmissions to other hospitals? If so, please explain.
 - b. Have you ever experienced challenges with the quality of PAC providers in your local market? If so, please explain.
 - c. What type of community services (such as Meals on Wheels) do you use in your local market?
 - i. Has being a teaching hospital impacted your collaboration with community services? If so, please describe.
3. Teaching hospitals often use newer technologies and procedures compared to other hospitals. Do you believe this is true for your facility? If so, how does this impact your ability to achieve cost savings in BPCI?
4. Are you typically aware of which patients are in BPCI? If so, are residents informed of the BPCI program?
 - a. Is their level of engagement with BPCI patients any different than for non-BPCI patients?
 - b. How have residents impacted your BPCI efforts, if at all?
5. We are also interested in learning how the size of a teaching hospital's medical staff could affect BPCI. For example, some teaching hospitals may have a very large number of staff physicians, and the size of the staff could make it difficult to disseminate new practice guidelines. Alternatively, having a large pool of staff physicians could allow for greater resources that might facilitate the launch of a new program. Do you think the size of your medical staff has affected your ability to respond to BPCI? Please describe.
 - a. Do you provide any specific education to staff physicians on BPCI and its financial incentives?
6. Are there any other challenges related to being a teaching hospital in BPCI that we haven't already discussed today? If so, please explain.
 - a. Have these challenges impacted your costs? How so?
7. Are there any other successes related to being a teaching hospital in BPCI that we haven't already discussed today? If so, please explain.
 - a. Have these successes impacted your costs? How so?
8. Among the care delivery and care redesign aspects we've discussed today, do you think any have impacted your BPCI costs? How so?
9. What should CMS know about implementing a bundled payment model in teaching hospitals?

Appendix S: Comparison Group Standardized Difference Tables

Exhibit S.1: Standardized Differences Before and After Matching, Model 2 Hospitals, Major Joint Replacement of the Upper Extremity

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	0.31	0.11
Ownership - Government*		
Ownership - For Profit*	-0.31	-0.11
Urban	0.47	0.00
Bed Count	0.29	0.07
Chain Indicator	-0.11	0.04
Medicare Days as a Percent of Total Inpatient Days	-0.18	0.01
Resident-Bed Ratio	0.27	0.05
Disproportionate Share Percent	-0.10	-0.01
Teaching Status	0.37	-0.04
Population Size of Market Area	0.39	-0.07
Median Household Income	0.75	0.00
Medicare Advantage Penetration	-0.16	-0.04
Primary Care Providers per 10,000 in Market	0.31	0.00
SNF Beds per 10,000 in Market	-0.14	-0.01
Inpatient Rehabilitation Facility in Market	0.48	-0.09
Provider Market Share of the 48 potential BPCI episodes	-0.47	0.03
Herfindahl Index of Hospital Market Shares	-0.55	0.04
Percentage of total discharges in the 48 clinical episodes in 2011	-0.13	-0.07
Number of discharges for clinical episode in 2011	0.15	0.05
Percent of patients in 2011 that went home with no post-acute care by clinical episode	-0.27	0.03
Percent of patients in 2011 that used an inpatient rehabilitation facility as first post-acute care setting by clinical episode	-0.29	-0.04
Percent of patients in 2011 that used a SNF as first post-acute care setting by clinical episode	0.55	-0.06
Percent of patients in 2011 that used a long-term care hospital as first post-acute care setting by clinical episode	0.20	0.02
Percent of patients in 2011 that went home with HHA services as first post-acute care setting by clinical episode*	-0.07	0.02
Unplanned readmission rate by clinical episode in 2011	-0.21	0.04
Change in unplanned readmission rate by clinical episode from 2011 to 2012	0.05	-0.10
All-cause mortality rate in 2011 by clinical episode	-0.20	0.04
Change in all-cause mortality rate by clinical episode from 2011 to 2012	0.07	0.01
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.52	-0.04

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	-0.37	-0.03
Emergency Room rate by clinical episode in 2011	0.01	0.02
Change in Emergency room rate by clinical episode from 2011 to 2012	-0.01	0.06

* These variables were not included for this model.

** Caliper was 1/10th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -3.84 and the standard deviation was 1.45.

Note: A blank cell indicates there were no participants with the characteristic.

Exhibit S.2: Standardized Differences Before and After Matching, Model 2 Hospitals, Urinary Tract Infection

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	0.09	-0.04
Ownership - Government	-0.62	0.00
Ownership - For Profit*	0.41	0.04
Urban	0.96	0.04
Bed Count	0.48	0.03
Chain Indicator	-0.16	-0.02
Medicare Days as a Percent of Total Inpatient Days	-0.34	0.01
Resident-Bed Ratio	0.05	-0.06
Disproportionate Share Percent	-0.01	-0.04
Teaching Status	0.29	-0.03
Population Size of Market Area	0.41	-0.01
Median Household Income	0.73	-0.02
Medicare Advantage Penetration	0.31	0.00
Primary Care Providers per 10,000 in Market	0.45	0.02
SNF Beds per 10,000 in Market	-0.56	0.05
Inpatient Rehabilitation Facility in Market	0.50	0.01
Provider Market Share of the 48 potential BPCI episodes	-0.51	-0.05
Herfindahl Index of Hospital Market Shares	-0.68	-0.05
Percentage of total discharges in the 48 clinical episodes in 2011	-0.23	0.01
Number of discharges for clinical episode in 2011	0.63	0.02
Percent of patients in 2011 that went home with no post-acute care by clinical episode	-0.38	-0.03
Percent of patients in 2011 that used an inpatient rehabilitation facility as first post-acute care setting by clinical episode	0.37	-0.05
Percent of patients in 2011 that used a SNF as first post-acute care setting by clinical episode	0.12	0.06
Percent of patients in 2011 that used a long-term care hospital as first post-acute care setting by clinical episode	0.09	-0.03

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Percent of patients in 2011 that went home with HHA services as first post-acute care setting by clinical episode*	0.19	-0.01
Unplanned readmission rate by clinical episode in 2011	0.04	0.02
Change in unplanned readmission rate by clinical episode from 2011 to 2012	0.11	0.00
All-cause mortality rate by clinical episode in 2011	-0.07	0.04
Change in all-cause mortality rate by clinical episode from 2011 to 2012	0.08	-0.06
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.45	0.01
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	-0.18	-0.02
Emergency Room rate by clinical episode in 2011	-0.30	-0.08
Change in Emergency room rate by clinical episode from 2011 to 2012	0.01	0.04

* These variables were not included for this model.

** Caliper was 1/10th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -4.42 and the standard deviation was 2.13.

Exhibit S.3: Standardized Differences Before and After Matching, Model 2 Hospitals, Stroke

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	0.06	0.03
Ownership - Government	-0.38	-0.04
Ownership - For Profit*	0.31	0.00
Urban	0.96	0.05
Bed Count	0.79	-0.04
Chain Indicator	-0.06	-0.03
Medicare Days as a Percent of Total Inpatient Days	-0.49	-0.01
Resident-Bed Ratio	0.49	-0.04
Disproportionate Share Percent	0.08	-0.09
Teaching Status	0.53	-0.04
Population Size of Market Area	0.53	-0.07
Median Household Income	0.69	0.03
Medicare Advantage Penetration	0.20	-0.01
Primary Care Providers per 10,000 in Market	0.42	-0.01
SNF Beds per 10,000 in Market	-0.47	0.02
Inpatient Rehabilitation Facility in Market	0.58	-0.01
Provider Market Share of the 48 potential BPCI episodes	-0.57	0.00
Herfindahl Index of Hospital Market Shares	-0.82	0.02
Percentage of total discharges in the 48 clinical episodes in 2011	-0.54	0.03

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Number of discharges for clinical episode in 2011	0.84	-0.04
Percent of patients in 2011 that went home with no post-acute care by clinical episode	-0.30	0.03
Percent of patients in 2011 that used an inpatient rehabilitation facility as first post-acute care setting by clinical episode	0.50	0.02
Percent of patients in 2011 that used a SNF as first post-acute care setting by clinical episode	-0.35	-0.02
Percent of patients in 2011 that used a long-term care hospital as first post-acute care setting by clinical episode	0.08	0.05
Percent of patients in 2011 that went home with HHA services as first post-acute care setting by clinical episode*	0.18	-0.06
Unplanned readmission rate by clinical episode in 2011	0.13	-0.07
Change in unplanned readmission rate by clinical episode from 2011 to 2012	0.14	0.06
All-cause mortality rate in 2011 by clinical episode	-0.12	0.02
Change in all-cause mortality rate by clinical episode from 2011 to 2012*	0.01	0.01
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.49	0.00
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	0.09	0.00
Emergency Room rate by clinical episode in 2011	-0.20	0.00
Change in Emergency room rate by clinical episode from 2011 to 2012	-0.09	-0.01

* These variables were not included for this model.

** Caliper was 1/10th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -4.55 and the standard deviation was 2.27.

Exhibit S.4: Standardized Differences Before and After Matching, Model 2 Hospitals, Chronic Obstructive Pulmonary Disease, Bronchitis, Asthma

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	0.25	0.00
Ownership - Government	-0.56	-0.05
Ownership - For Profit*	0.21	0.02
Urban	0.81	0.04
Bed Count	0.55	-0.09
Chain Indicator	-0.04	0.01
Medicare Days as a Percent of Total Inpatient Days	-0.33	0.01
Resident-Bed Ratio	0.27	-0.04
Disproportionate Share Percent	-0.04	0.02
Teaching Status	0.41	-0.07
Population Size of Market Area	0.42	0.00

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Median Household Income	0.71	0.04
Medicare Advantage Penetration	0.17	0.06
Primary Care Providers per 10,000 in Market	0.46	0.04
SNF Beds per 10,000 in Market	-0.43	-0.01
Inpatient Rehabilitation Facility in Market	0.45	0.01
Provider Market Share of the 48 potential BPCI episodes	-0.37	-0.04
Herfindahl Index of Hospital Market Shares	-0.55	-0.05
Percentage of total discharges in the 48 clinical episodes in 2011	-0.34	-0.02
Number of discharges for clinical episode in 2011	0.52	-0.08
Percent of patients in 2011 that went home with no post-acute care by clinical episode	-0.57	-0.06
Percent of patients in 2011 that used an inpatient rehabilitation facility as first post-acute care setting by clinical episode	0.39	-0.02
Percent of patients in 2011 that used a SNF as first post-acute care setting by clinical episode	0.24	0.04
Percent of patients in 2011 that used a long-term care hospital as first post-acute care setting by clinical episode	0.13	0.03
Percent of patients in 2011 that went home with HHA services as first post-acute care setting by clinical episode*	0.40	0.03
Unplanned readmission rate by clinical episode in 2011	0.33	0.05
Change in unplanned readmission rate by clinical episode from 2011 to 2012	-0.03	-0.08
All-cause mortality rate in 2011 by clinical episode	0.04	-0.02
Change in all-cause mortality rate by clinical episode from 2011 to 2012	0.00	-0.02
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.60	0.03
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	-0.13	-0.03
Emergency Room rate by clinical episode in 2011	-0.26	-0.01
Change in Emergency room rate by clinical episode from 2011 to 2012	0.04	0.02

* These variables were not included for this model.

** Caliper was 1/10th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -3.53 and the standard deviation was 1.69.

Exhibit S.5: Standardized Differences Before and After Matching, Model 2 Hospitals, Coronary Artery Bypass Graft

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	0.29	0.04
Ownership - Government	-0.41	-0.09
Ownership - For Profit*	0.04	0.03

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Urban	0.31	-0.07
Bed Count	0.47	-0.05
Chain Indicator	-0.06	0.08
Medicare Days as a Percent of Total Inpatient Days	-0.37	-0.04
Resident-Bed Ratio	0.54	-0.11
Disproportionate Share Percent	-0.03	-0.19
Teaching Status	0.47	-0.03
Population Size of Market Area	0.77	-0.16
Median Household Income	0.72	-0.01
Medicare Advantage Penetration	0.11	0.04
Primary Care Providers per 10,000 in Market	0.44	0.05
SNF Beds per 10,000 in Market	0.12	0.05
Inpatient Rehabilitation Facility in Market	0.57	-0.08
Provider Market Share of the 48 potential BPCI episodes	-0.55	0.07
Herfindahl Index of Hospital Market Shares	-0.61	0.05
Percentage of total discharges in the 48 clinical episodes in 2011	-0.24	0.00
Number of discharges for clinical episode in 2011	0.21	0.15
Percent of patients in 2011 that went home with no post-acute care by clinical episode	-0.53	-0.05
Percent of patients in 2011 that used an inpatient rehabilitation facility as first post-acute care setting by clinical episode	0.20	0.09
Percent of patients in 2011 that used a SNF as first post-acute care setting by clinical episode	0.26	0.04
Percent of patients in 2011 that used a long-term care hospital as first post-acute care setting by clinical episode	-0.19	-0.07
Percent of patients in 2011 that went home with HHA services as first post-acute care setting by clinical episode*	0.28	-0.03
Unplanned readmission rate by clinical episode in 2011	0.23	-0.05
Change in unplanned readmission rate by clinical episode from 2011 to 2012	-0.07	-0.03
All-cause mortality rate in 2011 by clinical episode	-0.20	0.07
Change in all-cause mortality rate by clinical episode from 2011 to 2012	0.08	0.02
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.23	-0.04
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	-0.01	-0.08
Emergency Room rate by clinical episode in 2011	-0.31	0.11
Change in Emergency room rate by clinical episode from 2011 to 2012	-0.01	0.03

* These variables were not included for this model.

** Caliper was 1/10th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -3.31 and the standard deviation was 1.59.

**Exhibit S.6: Standardized Differences Before and After Matching, Model 2
Hospitals, Major Joint Replacement of the Lower Extremity**

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	0.18	-0.03
Ownership - Government	-0.39	-0.02
Ownership - For Profit*	0.14	0.05
Urban	0.67	0.02
Bed Count	0.51	-0.08
Chain Indicator	-0.07	-0.01
Medicare Days as a Percent of Total Inpatient Days	-0.12	0.01
Resident-Bed Ratio	0.27	-0.01
Disproportionate Share Percent	-0.10	0.00
Teaching Status	0.28	-0.04
Population Size of Market Area	0.30	0.03
Median Household Income	0.44	0.00
Medicare Advantage Penetration	0.06	0.02
Primary Care Providers per 10,000 in Market	0.35	0.00
SNF Beds per 10,000 in Market	-0.30	0.04
Inpatient Rehabilitation Facility in Market	0.50	0.01
Provider Market Share of the 48 potential BPCI episodes	-0.47	-0.06
Herfindahl Index of Hospital Market Shares	-0.62	-0.05
Percentage of total discharges in the 48 clinical episodes in 2011	-0.28	0.03
Number of discharges for clinical episode in 2011	0.44	-0.08
Percent of patients in 2011 that went home with no post-acute care by clinical episode	-0.44	-0.02
Percent of patients in 2011 that used an inpatient rehabilitation facility as first post-acute care setting by clinical episode	0.06	0.04
Percent of patients in 2011 that used a SNF as first post-acute care setting by clinical episode	0.18	-0.02
Percent of patients in 2011 that used a long-term care hospital as first post-acute care setting by clinical episode	-0.09	0.00
Percent of patients in 2011 that went home with HHA services as first post-acute care setting by clinical episode	0.11	0.00
Unplanned readmission rate by clinical episode in 2011	0.09	0.05
Change in unplanned readmission rate by clinical episode from 2011 to 2012	-0.02	0.02
All-cause mortality rate in 2011 by clinical episode	-0.10	0.01
Change in all-cause mortality rate by clinical episode from 2011 to 2012	0.06	0.01
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.09	0.00
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	-0.01	0.00
Emergency Room rate by clinical episode in 2011	-0.20	0.03

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Change in Emergency room rate by clinical episode from 2011 to 2012	0.00	-0.03

* These variables were not included for this model.

** Caliper was 1/20th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -2.14 and the standard deviation was 1.36.

Exhibit S.7: Standardized Differences Before and After Matching, Model 2 Hospitals, Percutaneous Coronary Intervention

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	-0.20	-0.01
Ownership - Government	-0.56	0.05
Ownership - For Profit*	0.66	0.00
Urban	0.38	-0.04
Bed Count	0.16	0.08
Chain Indicator	-0.29	-0.02
Medicare Days as a Percent of Total Inpatient Days	-0.17	-0.07
Resident-Bed Ratio	0.00	0.05
Disproportionate Share Percent	-0.08	-0.03
Teaching Status	0.21	0.02
Population Size of Market Area	0.55	0.04
Median Household Income	0.51	0.00
Medicare Advantage Penetration	0.07	-0.01
Primary Care Providers per 10,000 in Market	0.16	-0.05
SNF Beds per 10,000 in Market	-0.27	0.02
Inpatient Rehabilitation Facility in Market	0.56	-0.01
Provider Market Share of the 48 potential BPCI episodes	-0.56	0.05
Herfindahl Index of Hospital Market Shares	-0.57	0.04
Percentage of total discharges in the 48 clinical episodes in 2011	-0.06	-0.03
Number of discharges for clinical episode in 2011	0.12	0.07
Percent of patients in 2011 that went home with no post-acute care by clinical episode	-0.62	0.06
Percent of patients in 2011 that used an inpatient rehabilitation facility as first post-acute care setting by clinical episode	0.30	0.01
Percent of patients in 2011 that used a SNF as first post-acute care setting by clinical episode	0.45	0.04
Percent of patients in 2011 that used a long-term care hospital as first post-acute care setting by clinical episode	0.01	0.01
Percent of patients in 2011 that went home with HHA services as first post-acute care setting by clinical episode*	0.36	-0.12
Unplanned readmission rate by clinical episode in 2011	0.25	0.00

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Change in unplanned readmission rate by clinical episode from 2011 to 2012	0.04	-0.05
All-cause mortality rate in 2011 by clinical episode	-0.01	0.07
Change in all-cause mortality rate by clinical episode from 2011 to 2012	0.14	-0.09
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.51	0.04
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	-0.04	-0.08
Emergency Room rate by clinical episode in 2011	-0.38	0.00
Change in Emergency room rate by clinical episode from 2011 to 2012 ¹	-0.11	0.00

* These variables were not included for this model.

** Caliper was 1/4th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -3.90 and the standard deviation was 1.75.

¹ For this episode, an additional categorical variable indicating a positive change in emergency room rate from 2011 to 2012 was included in the model.

Exhibit S.8: Standardized Differences Before and After Matching, Model 2 Hospitals, Congestive Heart Failure

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	0.36	-0.04
Ownership - Government	-0.50	-0.05
Ownership - For Profit*	0.05	0.09
Urban	0.69	0.04
Bed Count	0.60	0.02
Chain Indicator	-0.04	-0.06
Medicare Days as a Percent of Total Inpatient Days	-0.27	-0.03
Resident-Bed Ratio	0.22	0.02
Disproportionate Share Percent	-0.11	-0.01
Teaching Status	0.31	-0.01
Population Size of Market Area	0.29	0.02
Median Household Income	0.52	0.00
Medicare Advantage Penetration	0.14	0.09
Primary Care Providers per 10,000 in Market	0.36	0.00
SNF Beds per 10,000 in Market	-0.42	0.01
Inpatient Rehabilitation Facility in Market	0.28	0.01
Provider Market Share of the 48 potential BPCI episodes	-0.29	-0.05
Herfindahl Index of Hospital Market Shares	-0.45	-0.04
Percentage of total discharges in the 48 clinical episodes in 2011	-0.27	-0.05
Number of discharges for clinical episode in 2011	0.68	-0.01

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Percent of patients in 2011 that went home with no post-acute care by clinical episode	-0.31	-0.02
Percent of patients in 2011 that used an inpatient rehabilitation facility as first post-acute care setting by clinical episode	0.28	0.01
Percent of patients in 2011 that used a SNF as first post-acute care setting by clinical episode	0.03	0.03
Percent of patients in 2011 that used a long-term care hospital as first post-acute care setting by clinical episode	-0.05	0.04
Percent of patients in 2011 that went home with HHA services as first post-acute care setting by clinical episode*	0.31	-0.03
Unplanned readmission rate by clinical episode in 2011	0.23	0.03
Change in unplanned readmission rate by clinical episode from 2011 to 2012	-0.08	-0.01
All-cause mortality rate in 2011 by clinical episode	0.09	-0.03
Change in all-cause mortality rate by clinical episode from 2011 to 2012	-0.14	0.08
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.27	0.06
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	0.04	-0.02
Emergency Room rate by clinical episode in 2011	-0.31	-0.01
Change in Emergency room rate by clinical episode from 2011 to 2012	-0.10	-0.01

* These variables were not included for this model.

** Caliper was 1/20th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -3.02 and the standard deviation was 1.43.

Exhibit S.9: Standardized Differences Before and After Matching, Model 2 Hospitals, Acute Myocardial Infarction

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	0.18	0.03
Ownership - Government	-0.44	0.05
Ownership - For Profit*	0.21	-0.06
Urban	0.70	0.01
Bed Count	0.52	0.10
Chain Indicator	-0.16	0.07
Medicare Days as a Percent of Total Inpatient Days	-0.28	-0.03
Resident-Bed Ratio	0.20	-0.01
Disproportionate Share Percent	-0.09	0.09
Teaching Status	0.21	-0.02
Population Size of Market Area	0.33	-0.01
Median Household Income	0.62	-0.03
Medicare Advantage Penetration	0.20	-0.04

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Primary Care Providers per 10,000 in Market	0.34	-0.07
SNF Beds per 10,000 in Market	-0.39	0.05
Inpatient Rehabilitation Facility in Market	0.41	-0.01
Provider Market Share of the 48 potential BPCI episodes	-0.42	0.04
Herfindahl Index of Hospital Market Shares	-0.52	0.02
Percentage of total discharges in the 48 clinical episodes in 2011	-0.22	-0.02
Number of discharges for clinical episode in 2011	0.53	0.09
Percent of patients in 2011 that went home with no post-acute care by clinical episode	-0.24	-0.01
Percent of patients in 2011 that used an inpatient rehabilitation facility as first post-acute care setting by clinical episode	0.05	0.02
Percent of patients in 2011 that used a SNF as first post-acute care setting by clinical episode	0.06	-0.01
Percent of patients in 2011 that used a long-term care hospital as first post-acute care setting by clinical episode	-0.09	0.02
Percent of patients in 2011 that went home with HHA services as first post-acute care setting by clinical episode*	0.28	0.00
Unplanned readmission rate by clinical episode in 2011	0.11	0.05
Change in unplanned readmission rate by clinical episode from 2011 to 2012	0.02	-0.01
All-cause mortality rate in 2011 by clinical episode	-0.15	0.03
Change in all-cause mortality rate by clinical episode from 2011 to 2012	0.05	0.01
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.01	0.03
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	-0.04	-0.01
Emergency Room rate by clinical episode in 2011	-0.16	0.05
Change in Emergency room rate by clinical episode from 2011 to 2012	-0.03	-0.02

* These variables were not included for this model.

** Caliper was 1/10th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -3.43 and the standard deviation was 1.33.

Exhibit S.10: Standardized Differences Before and After Matching, Model 2 Hospitals, Cardiac Arrhythmia

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	0.21	-0.04
Ownership - Government	-0.44	0.02
Ownership - For Profit*	0.17	0.03
Urban	0.69	0.04
Bed Count	0.45	-0.05
Chain Indicator	-0.04	0.03

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Medicare Days as a Percent of Total Inpatient Days	-0.31	0.01
Resident-Bed Ratio	0.21	-0.06
Disproportionate Share Percent	-0.01	-0.04
Teaching Status	0.18	-0.03
Population Size of Market Area	0.45	-0.05
Median Household Income	0.62	0.01
Medicare Advantage Penetration	0.28	-0.03
Primary Care Providers per 10,000 in Market	0.34	-0.02
SNF Beds per 10,000 in Market	-0.46	-0.03
Inpatient Rehabilitation Facility in Market	0.43	0.00
Provider Market Share of the 48 potential BPCI episodes	-0.38	-0.01
Herfindahl Index of Hospital Market Shares	-0.49	0.00
Percentage of total discharges in the 48 clinical episodes in 2011	-0.18	0.04
Number of discharges for clinical episode in 2011	0.43	-0.04
Percent of patients in 2011 that went home with no post-acute care by clinical episode	-0.16	0.01
Percent of patients in 2011 that used an inpatient rehabilitation facility as first post-acute care setting by clinical episode	0.30	0.00
Percent of patients in 2011 that used a SNF as first post-acute care setting by clinical episode	0.05	0.04
Percent of patients in 2011 that used a long-term care hospital as first post-acute care setting by clinical episode	0.09	-0.01
Percent of patients in 2011 that went home with HHA services as first post-acute care setting by clinical episode*	0.05	-0.05
Unplanned readmission rate by clinical episode in 2011	-0.08	0.00
Change in unplanned readmission rate by clinical episode from 2011 to 2012	0.11	0.01
All-cause mortality rate in 2011 by clinical episode	-0.08	0.04
Change in all-cause mortality rate by clinical episode from 2011 to 2012	-0.01	-0.02
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.23	-0.02
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	-0.13	0.04
Emergency Room rate by clinical episode in 2011	-0.20	-0.02
Change in Emergency room rate by clinical episode from 2011 to 2012	-0.16	0.01

* These variables were not included for this model.

** Caliper was 1/4th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -3.84 and the standard deviation was 1.32.

**Exhibit S.11: Standardized Differences Before and After Matching, Model 2
Hospitals, Cardiac Valve**

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	0.21	0.12
Ownership - Government	-0.09	-0.09
Ownership - For Profit*	-0.22	-0.07
Urban	0.03	0.07
Bed Count	0.70	0.02
Chain Indicator	0.13	-0.02
Medicare Days as a Percent of Total Inpatient Days	-0.43	0.01
Resident-Bed Ratio	0.50	0.00
Disproportionate Share Percent	-0.02	0.03
Teaching Status	0.33	0.02
Population Size of Market Area ¹	0.90	0.42
Median Household Income	0.51	0.17
Medicare Advantage Penetration	0.22	-0.06
Primary Care Providers per 10,000 in Market	0.35	0.05
SNF Beds per 10,000 in Market	0.05	-0.07
Inpatient Rehabilitation Facility in Market	0.48	0.02
Provider Market Share of the 48 potential BPCI episodes ¹	-0.55	-0.05
Herfindahl Index of Hospital Market Shares ¹	-0.59	-0.08
Percentage of total discharges in the 48 clinical episodes in 2011	-0.23	-0.01
Number of discharges for clinical episode in 2011	0.53	-0.08
Percent of patients in 2011 that went home with no post-acute care by clinical episode	-0.24	-0.04
Percent of patients in 2011 that used an inpatient rehabilitation facility as first post-acute care setting by clinical episode	0.09	-0.05
Percent of patients in 2011 that used a SNF as first post-acute care setting by clinical episode	0.34	0.11
Percent of patients in 2011 that used a long-term care hospital as first post-acute care setting by clinical episode	-0.44	-0.01
Percent of patients in 2011 that went home with HHA services as first post-acute care setting by clinical episode*	-0.09	-0.04
Unplanned readmission rate by clinical episode in 2011	0.27	0.00
Change in unplanned readmission rate by clinical episode from 2011 to 2012	0.04	0.00
All-cause mortality rate in 2011 by clinical episode	-0.15	0.02
Change in all-cause mortality rate by clinical episode from 2011 to 2012	0.22	-0.09
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.12	0.16
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	0.06	-0.10

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Emergency Room rate by clinical episode in 2011	-0.09	-0.04
Change in Emergency room rate by clinical episode from 2011 to 2012	-0.18	0.05

* These variables were not included for this model.

** Caliper was 1/4th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -3.80 and the standard deviation was 1.83.

¹ Continuous values for these variables were coarsened to indicator variables to identify continuous values above the 50th percentile.

Exhibit S.12: Standardized Differences Before and After Matching, Model 2 Hospitals, Other Vascular Surgery

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	0.17	0.00
Ownership - Government	-0.52	-0.06
Ownership - For Profit*	0.25	0.04
Urban	0.48	0.09
Bed Count	0.35	-0.11
Chain Indicator	-0.07	-0.11
Medicare Days as a Percent of Total Inpatient Days	-0.22	0.00
Resident-Bed Ratio	0.25	-0.12
Disproportionate Share Percent	-0.16	0.06
Teaching Status	0.21	-0.12
Population Size of Market Area	0.38	0.02
Median Household Income	0.64	0.00
Medicare Advantage Penetration	0.09	0.04
Primary Care Providers per 10,000 in Market	0.10	-0.01
SNF Beds per 10,000 in Market	-0.14	-0.05
Inpatient Rehabilitation Facility in Market	0.56	-0.04
Provider Market Share of the 48 potential BPCI episodes	-0.63	-0.09
Herfindahl Index of Hospital Market Shares	-0.65	-0.09
Percentage of total discharges in the 48 clinical episodes in 2011	-0.01	0.11
Number of discharges for clinical episode in 2011	0.26	-0.15
Percent of patients in 2011 that went home with no post-acute care by clinical episode	-0.64	-0.14
Percent of patients in 2011 that used an inpatient rehabilitation facility as first post-acute care setting by clinical episode	0.27	0.05
Percent of patients in 2011 that used a SNF as first post-acute care setting by clinical episode	0.40	0.05
Percent of patients in 2011 that used a long-term care hospital as first post-acute care setting by clinical episode	0.14	0.01
Percent of patients in 2011 that went home with HHA services as first post-acute care setting by clinical episode*	0.11	0.08

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Unplanned readmission rate by clinical episode in 2011	0.35	-0.09
Change in unplanned readmission rate by clinical episode from 2011 to 2012	-0.04	0.12
All-cause mortality rate in 2011 by clinical episode	0.02	0.00
Change in all-cause mortality rate by clinical episode from 2011 to 2012	0.07	0.08
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.41	0.06
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	0.16	0.00
Emergency Room rate by clinical episode in 2011	-0.32	-0.06
Change in Emergency room rate by clinical episode from 2011 to 2012	0.07	0.06

* These variables were not included for this model.

** Caliper was 1/10th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -4.19 and the standard deviation was 1.63.

Exhibit S.13: Standardized Differences Before and After Matching, Model 2 Hospitals, Gastrointestinal Hemorrhage

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	0.26	0.01
Ownership - Government	-0.68	-0.06
Ownership - For Profit*	0.27	0.01
Urban	0.74	0.03
Bed Count	0.56	-0.06
Chain Indicator	-0.23	0.08
Medicare Days as a Percent of Total Inpatient Days	-0.28	-0.04
Resident-Bed Ratio	0.34	-0.10
Disproportionate Share Percent	-0.13	0.03
Teaching Status	0.27	-0.05
Population Size of Market Area	0.52	-0.02
Median Household Income	0.74	-0.04
Medicare Advantage Penetration	0.16	0.04
Primary Care Providers per 10,000 in Market	0.40	-0.05
SNF Beds per 10,000 in Market	-0.36	-0.04
Inpatient Rehabilitation Facility in Market	0.85	0.02
Provider Market Share of the 48 potential BPCI episodes	-0.51	-0.01
Herfindahl Index of Hospital Market Shares	-0.64	0.01
Percentage of total discharges in the 48 clinical episodes in 2011	-0.28	0.03
Number of discharges for clinical episode in 2011	0.64	0.00
Percent of patients in 2011 that went home with no post-acute care by clinical episode	-0.34	0.04

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Percent of patients in 2011 that used an inpatient rehabilitation facility as first post-acute care setting by clinical episode	0.21	0.02
Percent of patients in 2011 that used a SNF as first post-acute care setting by clinical episode	0.17	-0.01
Percent of patients in 2011 that used a long-term care hospital as first post-acute care setting by clinical episode	0.15	0.03
Percent of patients in 2011 that went home with HHA services as first post-acute care setting by clinical episode*	0.19	-0.06
Unplanned readmission rate by clinical episode in 2011	0.18	0.01
Change in unplanned readmission rate by clinical episode from 2011 to 2012	-0.04	-0.02
All-cause mortality rate in 2011 by clinical episode	-0.13	-0.05
Change in all-cause mortality rate by clinical episode from 2011 to 2012	0.00	0.07
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.27	0.04
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	0.04	-0.08
Emergency Room rate by clinical episode in 2011	-0.29	-0.05
Change in Emergency room rate by clinical episode from 2011 to 2012	-0.09	0.05

* These variables were not included for this model.

**Caliper was 1/20th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -4.49 and the standard deviation was 1.83.

Exhibit S.14: Standardized Differences Before and After Matching, Model 2 Hospitals, Major Bowel Procedure

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	0.12	0.05
Ownership - Government	-0.51	0.00
Ownership - For Profit*	0.31	-0.05
Urban	0.66	0.04
Bed Count	0.51	0.04
Chain Indicator	-0.12	-0.13
Medicare Days as a Percent of Total Inpatient Days	-0.24	-0.03
Resident-Bed Ratio	0.40	0.01
Disproportionate Share Percent	-0.11	-0.02
Teaching Status	0.39	-0.02
Population Size of Market Area	0.45	0.07
Median Household Income	0.62	0.06
Medicare Advantage Penetration	0.08	-0.04
Primary Care Providers per 10,000 in Market	0.40	0.06

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
SNF Beds per 10,000 in Market	-0.20	-0.02
Inpatient Rehabilitation Facility in Market	0.72	-0.03
Provider Market Share of the 48 potential BPCI episodes	-0.61	-0.01
Herfindahl Index of Hospital Market Shares	-0.74	-0.01
Percentage of total discharges in the 48 clinical episodes in 2011	-0.41	-0.02
Number of discharges for clinical episode in 2011	0.46	0.09
Percent of patients in 2011 that went home with no post-acute care by clinical episode	-0.70	0.01
Percent of patients in 2011 that used an inpatient rehabilitation facility as first post-acute care setting by clinical episode	0.31	-0.06
Percent of patients in 2011 that used a SNF as first post-acute care setting by clinical episode	0.06	0.03
Percent of patients in 2011 that used a long-term care hospital as first post-acute care setting by clinical episode	0.28	-0.05
Percent of patients in 2011 that went home with HHA services as first post-acute care setting by clinical episode*	0.47	0.03
Unplanned readmission rate by clinical episode in 2011	0.27	0.07
Change in unplanned readmission rate by clinical episode from 2011 to 2012	-0.10	-0.05
All-cause mortality rate in 2011 by clinical episode	-0.10	-0.08
Change in all-cause mortality rate by clinical episode from 2011 to 2012	0.02	0.01
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.45	-0.02
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	0.02	-0.05
Emergency Room rate by clinical episode in 2011	-0.21	-0.03
Change in Emergency room rate by clinical episode from 2011 to 2012	0.31	0.01

* This variable was not included for this model.

**Caliper was 1/20th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -4.33 and the standard deviation was 1.51.

Exhibit S.15: Standardized Differences Before and After Matching, Model 2 Hospitals, Fractures of the Femur and Hip or Pelvis

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	0.16	-0.04
Ownership - Government	-0.46	0.01
Ownership - For Profit*	0.25	0.03
Urban	0.58	-0.02
Bed Count	0.37	-0.02
Chain Indicator	-0.11	0.01
Medicare Days as a Percent of Total Inpatient Days	-0.15	0.05

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Resident-Bed Ratio	0.28	-0.07
Disproportionate Share Percent	-0.24	0.03
Teaching Status	0.31	-0.03
Population Size of Market Area	0.24	0.05
Median Household Income	0.54	0.01
Medicare Advantage Penetration	0.02	-0.06
Primary Care Providers per 10,000 in Market	0.51	0.01
SNF Beds per 10,000 in Market	-0.18	0.05
Inpatient Rehabilitation Facility in Market	0.55	0.01
Provider Market Share of the 48 potential BPCI episodes	-0.66	0.01
Herfindahl Index of Hospital Market Shares	-0.71	0.01
Percentage of total discharges in the 48 clinical episodes in 2011	-0.18	0.05
Number of discharges for clinical episode in 2011	0.45	0.00
Percent of patients in 2011 that went home with no post-acute care by clinical episode	-0.27	-0.06
Percent of patients in 2011 that used an inpatient rehabilitation facility as first post-acute care setting by clinical episode	-0.16	0.00
Percent of patients in 2011 that used a SNF as first post-acute care setting by clinical episode	0.40	0.05
Percent of patients in 2011 that used a long-term care hospital as first post-acute care setting by clinical episode	-0.01	0.00
Percent of patients in 2011 that went home with HHA services as first post-acute care setting by clinical episode*	-0.18	-0.01
Unplanned readmission rate by clinical episode in 2011	0.09	0.01
Change in unplanned readmission rate by clinical episode from 2011 to 2012	-0.04	0.01
All-cause mortality rate in 2011 by clinical episode	-0.21	-0.06
Change in all-cause mortality rate by clinical episode from 2011 to 2012	0.01	0.05
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.24	0.06
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	-0.02	-0.01
Emergency Room rate by clinical episode in 2011	0.09	-0.01
Change in Emergency room rate by clinical episode from 2011 to 2012	-0.18	0.05

* These variables were not included for this model.

** Caliper was 1/20th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -3.87 and the standard deviation was 1.44.

**Exhibit S.16: Standardized Differences Before and After Matching, Model 2
Hospitals, Medical Non-infectious Orthopedic**

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	-0.08	0.02
Ownership - Government	-0.42	-0.04
Ownership - For Profit*	0.48	0.00
Urban	0.90	0.05
Bed Count	0.39	-0.01
Chain Indicator	-0.21	-0.02
Medicare Days as a Percent of Total Inpatient Days	-0.33	0.00
Resident-Bed Ratio	0.11	-0.03
Disproportionate Share Percent	-0.14	0.02
Teaching Status	0.24	-0.07
Population Size of Market Area	0.38	-0.02
Median Household Income	0.70	0.00
Medicare Advantage Penetration	0.20	-0.03
Primary Care Providers per 10,000 in Market	0.38	-0.05
SNF Beds per 10,000 in Market	-0.54	0.05
Inpatient Rehabilitation Facility in Market	0.72	0.02
Provider Market Share of the 48 potential BPCI episodes	-0.67	0.03
Herfindahl Index of Hospital Market Shares	-0.78	0.02
Percentage of total discharges in the 48 clinical episodes in 2011	-0.25	-0.01
Number of discharges for clinical episode in 2011	0.52	-0.02
Percent of patients in 2011 that went home with no post-acute care by clinical episode	-0.29	0.01
Percent of patients in 2011 that used an inpatient rehabilitation facility as first post-acute care setting by clinical episode	0.26	0.05
Percent of patients in 2011 that used a SNF as first post-acute care setting by clinical episode	0.08	-0.06
Percent of patients in 2011 that used a long-term care hospital as first post-acute care setting by clinical episode	0.13	0.02
Percent of patients in 2011 that went home with HHA services as first post-acute care setting by clinical episode*	-0.07	0.03
Unplanned readmission rate by clinical episode in 2011	-0.01	0.02
Change in unplanned readmission rate by clinical episode from 2011 to 2012	0.05	0.04
All-cause mortality rate in 2011 by clinical episode	-0.06	-0.01
Change in all-cause mortality rate by clinical episode from 2011 to 2012	-0.10	-0.02
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.45	-0.02
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	-0.12	0.07

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Emergency Room rate by clinical episode in 2011	-0.23	0.02
Change in Emergency room rate by clinical episode from 2011 to 2012	-0.06	-0.04

* This variable was not included for this model.

**Caliper was 1/20th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -3.92 and the standard deviation was 1.88.

Exhibit S.17: Standardized Differences Before and After Matching, Model 2 Hospitals, Revision of the Hip or Knee

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	0.00	0.05
Ownership - Government	-0.30	-0.07
Ownership - For Profit*	0.27	-0.01
Urban*		
Bed Count	0.38	0.18
Chain Indicator	-0.08	-0.09
Medicare Days as a Percent of Total Inpatient Days	-0.07	-0.05
Resident-Bed Ratio	0.07	0.02
Disproportionate Share Percent	-0.07	0.16
Teaching Status	0.38	0.00
Population Size of Market Area	0.18	0.02
Median Household Income	0.34	0.01
Medicare Advantage Penetration	0.10	0.05
Primary Care Providers per 10,000 in Market	0.28	-0.05
SNF Beds per 10,000 in Market	0.06	0.05
Inpatient Rehabilitation Facility in Market	0.25	-0.01
Provider Market Share of the 48 potential BPCI episodes	-0.33	0.00
Herfindahl Index of Hospital Market Shares	-0.46	-0.05
Percentage of total discharges in the 48 clinical episodes in 2011	0.01	-0.16
Number of discharges for clinical episode in 2011	0.51	-0.05
Percent of patients in 2011 that went home with no post-acute care by clinical episode	-0.49	0.10
Percent of patients in 2011 that used an inpatient rehabilitation facility as first post-acute care setting by clinical episode	-0.10	0.07
Percent of patients in 2011 that used a SNF as first post-acute care setting by clinical episode	0.51	-0.01
Percent of patients in 2011 that used a long-term care hospital as first post-acute care setting by clinical episode	-0.04	0.14
Percent of patients in 2011 that went home with HHA services as first post-acute care setting by clinical episode*	-0.10	-0.11
Unplanned readmission rate by clinical episode in 2011	0.22	0.12

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Change in unplanned readmission rate by clinical episode from 2011 to 2012	0.11	-0.06
All-cause mortality rate in 2011 by clinical episode	-0.09	-0.08
Change in all-cause mortality rate by clinical episode from 2011 to 2012	-0.15	0.06
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.43	0.07
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	-0.23	-0.03
Emergency Room rate by clinical episode in 2011	-0.11	-0.04
Change in Emergency room rate by clinical episode from 2011 to 2012	-0.04	-0.01

* This variable was not included for this model.

**Caliper was 1/4th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -3.89 and the standard deviation was 1.77.

Note: A blank cell indicates there were no participants with the characteristic.

Exhibit S.18: Standardized Differences Before and After Matching, Model 2 Hospitals, Spinal Fusion (non-cervical)

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	0.17	0.00
Ownership - Government	-0.51	0.04
Ownership - For Profit*	0.19	-0.02
Urban	0.39	-0.05
Bed Count	0.29	0.04
Chain Indicator	-0.21	0.02
Medicare Days as a Percent of Total Inpatient Days	-0.06	-0.02
Resident-Bed Ratio	0.34	0.02
Disproportionate Share Percent	-0.04	0.00
Teaching Status	0.29	0.01
Population Size of Market Area	0.14	0.01
Median Household Income	0.43	0.01
Medicare Advantage Penetration	-0.03	-0.04
Primary Care Providers per 10,000 in Market	0.32	0.00
SNF Beds per 10,000 in Market	-0.05	0.01
Inpatient Rehabilitation Facility in Market	0.64	0.06
Provider Market Share of the 48 potential BPCI episodes	-0.49	0.00
Herfindahl Index of Hospital Market Shares	-0.49	0.01
Percentage of total discharges in the 48 clinical episodes in 2011	-0.11	-0.01
Number of discharges for clinical episode in 2011	0.45	0.05
Percent of patients in 2011 that went home with no post-acute care by clinical episode	-0.36	-0.12

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Percent of patients in 2011 that used an inpatient rehabilitation facility as first post-acute care setting by clinical episode	0.34	0.05
Percent of patients in 2011 that used a SNF as first post-acute care setting by clinical episode	0.14	-0.05
Percent of patients in 2011 that used a long-term care hospital as first post-acute care setting by clinical episode	-0.09	0.03
Percent of patients in 2011 that went home with HHA services as first post-acute care setting by clinical episode*	0.00	0.16
Unplanned readmission rate by clinical episode in 2011	0.19	0.04
Change in unplanned readmission rate by clinical episode from 2011 to 2012	0.03	0.09
All-cause mortality rate in 2011 by clinical episode	0.01	-0.04
Change in all-cause mortality rate by clinical episode from 2011 to 2012	-0.07	0.07
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.47	0.02
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	-0.03	0.05
Emergency Room rate by clinical episode in 2011	-0.16	0.04
Change in Emergency room rate by clinical episode from 2011 to 2012	0.32	-0.07

*These variables were not included for this model.

**Caliper was 1/10th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -3.74 and the standard deviation was 1.75.

Exhibit S.19: Standardized Differences Before and After Matching, Model 2 Hospitals, Hip & Femur Procedures Except Major Joint

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	0.03	-0.02
Ownership - Government	-0.49	0.02
Ownership - For Profit*	0.40	0.01
Urban	0.86	0.00
Bed Count	0.49	-0.01
Chain Indicator	-0.13	-0.03
Medicare Days as a Percent of Total Inpatient Days	-0.28	-0.03
Resident-Bed Ratio	0.25	0.01
Disproportionate Share Percent	-0.09	0.02
Teaching Status	0.35	-0.01
Population Size of Market Area	0.36	-0.02
Median Household Income	0.64	-0.01
Medicare Advantage Penetration	0.12	0.02
Primary Care Providers per 10,000 in Market	0.44	-0.01

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
SNF Beds per 10,000 in Market	-0.40	0.03
Inpatient Rehabilitation Facility in Market	0.71	0.01
Provider Market Share of the 48 potential BPCI episodes	-0.61	-0.03
Herfindahl Index of Hospital Market Shares	-0.76	-0.02
Percentage of total discharges in the 48 clinical episodes in 2011	-0.33	-0.05
Number of discharges for clinical episode in 2011	0.45	-0.04
Percent of patients in 2011 that went home with no post-acute care by clinical episode	-0.27	-0.01
Percent of patients in 2011 that used an inpatient rehabilitation facility as first post-acute care setting by clinical episode	0.23	0.05
Percent of patients in 2011 that used a SNF as first post-acute care setting by clinical episode	-0.10	-0.05
Percent of patients in 2011 that used a long-term care hospital as first post-acute care setting by clinical episode	0.09	0.00
Percent of patients in 2011 that went home with HHA services as first post-acute care setting by clinical episode*	-0.20	0.02
Unplanned readmission rate by clinical episode in 2011	0.25	-0.03
Change in unplanned readmission rate by clinical episode from 2011 to 2012	-0.06	0.04
All-cause mortality rate in 2011 by clinical episode	-0.02	0.00
Change in all-cause mortality rate by clinical episode from 2011 to 2012	0.04	0.05
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.37	0.00
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	0.01	0.04
Emergency Room rate by clinical episode in 2011	-0.22	-0.01
Change in Emergency room rate by clinical episode from 2011 to 2012	-0.05	0.01

*These variables were not included for this model.

**Caliper was 1/20th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -3.70 and the standard deviation was 1.87.

Exhibit S.20: Standardized Differences Before and After Matching, Model 2 Hospitals, Cervical Spinal Fusion

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	0.06	0.17
Ownership - Government	-0.49	-0.11
Ownership - For Profit*	0.31	-0.13
Urban	0.25	-0.11
Bed Count	0.39	-0.03

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Chain Indicator	-0.13	0.02
Medicare Days as a Percent of Total Inpatient Days	-0.25	-0.03
Resident-Bed Ratio	0.46	0.19
Disproportionate Share Percent	0.07	0.06
Teaching Status	0.46	0.06
Population Size of Market Area	0.25	-0.03
Median Household Income	0.56	-0.04
Medicare Advantage Penetration	0.08	-0.04
Primary Care Providers per 10,000 in Market	0.31	0.08
SNF Beds per 10,000 in Market	0.04	0.06
Inpatient Rehabilitation Facility in Market	0.60	-0.17
Provider Market Share of the 48 potential BPCI episodes	-0.46	0.11
Herfindahl Index of Hospital Market Shares	-0.51	0.16
Percentage of total discharges in the 48 clinical episodes in 2011	-0.16	-0.06
Number of discharges for clinical episode in 2011	0.33	0.09
Percent of patients in 2011 that went home with no post-acute care by clinical episode	-0.29	0.11
Percent of patients in 2011 that used an inpatient rehabilitation facility as first post-acute care setting by clinical episode	0.17	0.03
Percent of patients in 2011 that used a SNF as first post-acute care setting by clinical episode	0.14	-0.11
Percent of patients in 2011 that used a long-term care hospital as first post-acute care setting by clinical episode	-0.15	-0.10
Percent of patients in 2011 that went home with HHA services as first post-acute care setting by clinical episode*	0.22	-0.10
Unplanned readmission rate by clinical episode in 2011	0.01	-0.07
Change in unplanned readmission rate by clinical episode from 2011 to 2012	0.19	-0.02
All-cause mortality rate in 2011 by clinical episode	-0.16	-0.04
Change in all-cause mortality rate by clinical episode from 2011 to 2012	0.17	-0.02
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.03	-0.02
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	0.12	0.03
Emergency Room rate by clinical episode in 2011	-0.28	-0.07
Change in Emergency room rate by clinical episode from 2011 to 2012	0.43	0.10

* These variables were not included for this model.

** Caliper was 1/10th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -4.24 and the standard deviation was 2.16.

Exhibit S.21: Standardized Differences Before and After Matching, Model 2 Hospitals, Lower Extremity and Humerus Procedure Except Hip, Foot, Femur

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	0.19	0.02
Ownership - Government	-0.44	0.05
Ownership - For Profit*	0.20	-0.05
Urban	0.54	-0.09
Bed Count	0.33	0.10
Chain Indicator	-0.13	-0.07
Medicare Days as a Percent of Total Inpatient Days	-0.04	0.09
Resident-Bed Ratio	0.05	-0.06
Disproportionate Share Percent	-0.19	-0.04
Teaching Status	0.21	-0.07
Population Size of Market Area	0.35	0.05
Median Household Income	0.38	0.00
Medicare Advantage Penetration	-0.04	-0.05
Primary Care Providers per 10,000 in Market	0.59	0.07
SNF Beds per 10,000 in Market	0.06	-0.01
Inpatient Rehabilitation Facility in Market	0.50	-0.03
Provider Market Share of the 48 potential BPCI episodes	-0.60	0.03
Herfindahl Index of Hospital Market Shares	-0.59	0.04
Percentage of total discharges in the 48 clinical episodes in 2011	-0.03	-0.06
Number of discharges for clinical episode in 2011	0.35	0.11
Percent of patients in 2011 that went home with no post-acute care by clinical episode	-0.43	0.01
Percent of patients in 2011 that used an inpatient rehabilitation facility as first post-acute care setting by clinical episode	-0.04	-0.02
Percent of patients in 2011 that used a SNF as first post-acute care setting by clinical episode	0.39	-0.03
Percent of patients in 2011 that used a long-term care hospital as first post-acute care setting by clinical episode	-0.22	0.09
Percent of patients in 2011 that went home with HHA services as first post-acute care setting by clinical episode*	-0.07	0.05
Unplanned readmission rate by clinical episode in 2011	0.06	-0.02
Change in unplanned readmission rate by clinical episode from 2011 to 2012	-0.19	0.01
All-cause mortality rate in 2011 by clinical episode	0.07	0.00
Change in all-cause mortality rate by clinical episode from 2011 to 2012	-0.08	0.04
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.51	0.04
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	-0.25	-0.07

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Emergency Room rate by clinical episode in 2011	0.03	0.00
Change in Emergency room rate by clinical episode from 2011 to 2012	-0.14	0.00

* These variables were not included for this model.

** Caliper was 1/10th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -4.20 and the standard deviation was 1.63.

Exhibit S.22: Standardized Differences Before and After Matching, Model 2 Hospitals, Sepsis

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	0.05	0.09
Ownership - Government	-0.58	-0.02
Ownership - For Profit*	0.43	-0.08
Urban	0.81	0.02
Bed Count	0.47	-0.04
Chain Indicator	-0.20	-0.02
Medicare Days as a Percent of Total Inpatient Days	-0.26	-0.07
Resident-Bed Ratio	0.17	-0.01
Disproportionate Share Percent	-0.03	-0.05
Teaching Status	0.28	-0.04
Population Size of Market Area	0.34	0.03
Median Household Income	0.55	0.02
Medicare Advantage Penetration	0.21	0.02
Primary Care Providers per 10,000 in Market	0.21	0.00
SNF Beds per 10,000 in Market	-0.55	-0.03
Inpatient Rehabilitation Facility in Market	0.53	0.01
Provider Market Share of the 48 potential BPCI episodes	-0.45	-0.04
Herfindahl Index of Hospital Market Shares	-0.62	-0.03
Percentage of total discharges in the 48 clinical episodes in 2011	-0.28	-0.07
Number of discharges for clinical episode in 2011	0.47	-0.08
Percent of patients in 2011 that went home with no post-acute care by clinical episode	-0.38	-0.07
Percent of patients in 2011 that used an inpatient rehabilitation facility as first post-acute care setting by clinical episode	0.38	0.07
Percent of patients in 2011 that used a SNF as first post-acute care setting by clinical episode	0.08	0.00
Percent of patients in 2011 that used a long-term care hospital as first post-acute care setting by clinical episode	0.23	0.04
Percent of patients in 2011 that went home with HHA services as first post-acute care setting by clinical episode*	0.00	0.02

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Unplanned readmission rate by clinical episode in 2011	0.31	-0.02
Change in unplanned readmission rate by clinical episode from 2011 to 2012	-0.01	0.01
All-cause mortality rate in 2011 by clinical episode	0.25	0.01
Change in all-cause mortality rate by clinical episode from 2011 to 2012	0.07	0.01
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.52	0.02
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	0.01	0.05
Emergency Room rate by clinical episode in 2011	-0.29	0.04
Change in Emergency room rate by clinical episode from 2011 to 2012	-0.03	-0.02

*These variables were not included for this model.

**Caliper was 1/20th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -3.74 and the standard deviation was 1.86.

Exhibit S.23: Standardized Differences Before and After Matching, Model 2 Hospitals, Diabetes

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	0.41	0.06
Ownership - Government	-0.64	0.04
Ownership - For Profit*	0.08	-0.08
Urban	0.87	-0.11
Bed Count	0.56	0.11
Chain Indicator	-0.34	0.03
Medicare Days as a Percent of Total Inpatient Days	-0.40	-0.04
Resident-Bed Ratio	0.16	0.14
Disproportionate Share Percent	0.03	-0.01
Teaching Status	0.30	0.06
Population Size of Market Area	0.46	0.01
Median Household Income	0.64	0.01
Medicare Advantage Penetration	0.36	0.00
Primary Care Providers per 10,000 in Market	0.39	0.04
SNF Beds per 10,000 in Market	-0.58	-0.01
Inpatient Rehabilitation Facility in Market	0.46	-0.03
Provider Market Share of the 48 potential BPCI episodes	-0.55	0.04
Herfindahl Index of Hospital Market Shares	-0.71	0.02
Percentage of total discharges in the 48 clinical episodes in 2011	-0.18	-0.11
Number of discharges for clinical episode in 2011	0.61	0.15

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Percent of patients in 2011 that went home with no post-acute care by clinical episode	-0.30	-0.01
Percent of patients in 2011 that used an inpatient rehabilitation facility as first post-acute care setting by clinical episode	0.17	0.00
Percent of patients in 2011 that used a SNF as first post-acute care setting by clinical episode	0.09	0.01
Percent of patients in 2011 that used a long-term care hospital as first post-acute care setting by clinical episode	-0.01	-0.01
Percent of patients in 2011 that went home with HHA services as first post-acute care setting by clinical episode*	0.29	0.01
Unplanned readmission rate by clinical episode in 2011	0.03	-0.03
Change in unplanned readmission rate by clinical episode from 2011 to 2012	0.04	0.05
All-cause mortality rate in 2011 by clinical episode	0.13	0.04
Change in all-cause mortality rate by clinical episode from 2011 to 2012	-0.05	0.00
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.34	-0.07
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	0.03	0.06
Emergency Room rate by clinical episode in 2011	-0.07	-0.07
Change in Emergency room rate by clinical episode from 2011 to 2012	-0.10	0.05

*These variables were not included for this model.

**Caliper was 1/10th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -4.78 and the standard deviation was 2.07.

Exhibit S.24: Standardized Differences Before and After Matching, Model 2 Hospitals, Simple Pneumonia and Respiratory Infections

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	0.23	-0.08
Ownership - Government	-0.56	-0.01
Ownership - For Profit*	0.23	0.09
Urban	0.84	-0.05
Bed Count	0.47	0.02
Chain Indicator	-0.08	-0.01
Medicare Days as a Percent of Total Inpatient Days	-0.25	-0.02
Resident-Bed Ratio	0.08	0.00
Disproportionate Share Percent	-0.13	0.04
Teaching Status	0.24	-0.04
Population Size of Market Area	0.30	0.00
Median Household Income	0.61	-0.02

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Medicare Advantage Penetration	0.20	0.05
Primary Care Providers per 10,000 in Market	0.43	-0.02
SNF Beds per 10,000 in Market	-0.46	-0.04
Inpatient Rehabilitation Facility in Market	0.36	-0.02
Provider Market Share of the 48 potential BPCI episodes	-0.40	-0.03
Herfindahl Index of Hospital Market Shares	-0.55	-0.02
Percentage of total discharges in the 48 clinical episodes in 2011	-0.21	-0.02
Number of discharges for clinical episode in 2011	0.59	0.01
Percent of patients in 2011 that went home with no post-acute care by clinical episode	-0.48	0.03
Percent of patients in 2011 that used an inpatient rehabilitation facility as first post-acute care setting by clinical episode	0.29	-0.01
Percent of patients in 2011 that used a SNF as first post-acute care setting by clinical episode	0.26	0.00
Percent of patients in 2011 that used a long-term care hospital as first post-acute care setting by clinical episode	0.06	0.00
Percent of patients in 2011 that went home with HHA services as first post-acute care setting by clinical episode*	0.20	-0.05
Unplanned readmission rate by clinical episode in 2011	0.09	0.07
Change in unplanned readmission rate by clinical episode from 2011 to 2012	0.05	-0.02
All-cause mortality rate in 2011 by clinical episode	0.11	0.03
Change in all-cause mortality rate by clinical episode from 2011 to 2012	0.06	0.00
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.40	0.02
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	-0.04	-0.02
Emergency Room rate by clinical episode in 2011	-0.33	0.01
Change in Emergency room rate by clinical episode from 2011 to 2012	0.04	-0.02

*These variables were not included for this model.

**Caliper was 1/20th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -3.49 and the standard deviation was 1.66.

Exhibit S.25: Standardized Differences Before and After Matching, Model 2 Hospitals, Other Respiratory

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	0.23	-0.01
Ownership - Government	-0.59	-0.04
Ownership - For Profit*	0.24	0.02
Urban	0.66	0.01

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Bed Count	0.43	0.07
Chain Indicator	-0.22	-0.04
Medicare Days as a Percent of Total Inpatient Days	-0.11	0.02
Resident-Bed Ratio	0.24	0.09
Disproportionate Share Percent	-0.16	-0.01
Teaching Status	0.23	0.10
Population Size of Market Area	0.33	0.09
Median Household Income	0.63	0.02
Medicare Advantage Penetration	0.14	-0.08
Primary Care Providers per 10,000 in Market	0.28	0.10
SNF Beds per 10,000 in Market	-0.39	0.07
Inpatient Rehabilitation Facility in Market	0.59	0.07
Provider Market Share of the 48 potential BPCI episodes	-0.47	-0.04
Herfindahl Index of Hospital Market Shares	-0.60	-0.05
Percentage of total discharges in the 48 clinical episodes in 2011	-0.11	-0.10
Number of discharges for clinical episode in 2011	0.54	-0.02
Percent of patients in 2011 that went home with no post-acute care by clinical episode	-0.51	-0.03
Percent of patients in 2011 that used an inpatient rehabilitation facility as first post-acute care setting by clinical episode	0.22	-0.02
Percent of patients in 2011 that used a SNF as first post-acute care setting by clinical episode	0.21	0.04
Percent of patients in 2011 that used a long-term care hospital as first post-acute care setting by clinical episode	0.18	-0.11
Percent of patients in 2011 that went home with HHA services as first post-acute care setting by clinical episode	0.17	0.14
Unplanned readmission rate by clinical episode in 2011	0.13	0.08
Change in unplanned readmission rate by clinical episode from 2011 to 2012	0.02	-0.04
All-cause mortality rate in 2011 by clinical episode	0.19	0.00
Change in all-cause mortality rate by clinical episode from 2011 to 2012	-0.08	0.00
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.24	-0.01
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	-0.02	0.01
Emergency Room rate by clinical episode in 2011	-0.42	0.04
Change in Emergency room rate by clinical episode from 2011 to 2012	0.09	-0.02

*These variables were not included for this model.

**Caliper was 1/20th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -4.27 and the standard deviation was 1.74.

**Exhibit S.26: Standardized Differences Before and After Matching, Model 2
Hospitals, Gastrointestinal Obstruction**

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	0.29	-0.02
Ownership - Government	-0.56	0.00
Ownership - For Profit*	0.17	0.02
Urban	0.70	0.09
Bed Count	0.57	-0.12
Chain Indicator	-0.12	-0.03
Medicare Days as a Percent of Total Inpatient Days	-0.28	-0.07
Resident-Bed Ratio	0.32	-0.04
Disproportionate Share Percent	-0.29	0.02
Teaching Status	0.30	-0.13
Population Size of Market Area	0.40	0.03
Median Household Income	0.62	0.04
Medicare Advantage Penetration	0.12	0.08
Primary Care Providers per 10,000 in Market	0.32	0.00
SNF Beds per 10,000 in Market	-0.29	-0.10
Inpatient Rehabilitation Facility in Market	0.45	-0.07
Provider Market Share of the 48 potential BPCI episodes	-0.48	-0.04
Herfindahl Index of Hospital Market Shares	-0.60	-0.03
Percentage of total discharges in the 48 clinical episodes in 2011	-0.39	-0.07
Number of discharges for clinical episode in 2011	0.61	-0.15
Percent of patients in 2011 that went home with no post-acute care by clinical episode	-0.14	0.03
Percent of patients in 2011 that used an inpatient rehabilitation facility as first post-acute care setting by clinical episode	-0.01	0.01
Percent of patients in 2011 that used a SNF as first post-acute care setting by clinical episode	0.11	0.00
Percent of patients in 2011 that used a long-term care hospital as first post-acute care setting by clinical episode	-0.10	-0.02
Percent of patients in 2011 that went home with HHA services as first post-acute care setting by clinical episode*	0.10	-0.04
Unplanned readmission rate by clinical episode in 2011	0.16	0.11
Change in unplanned readmission rate by clinical episode from 2011 to 2012	0.04	-0.12
All-cause mortality rate in 2011 by clinical episode	-0.06	0.00
Change in all-cause mortality rate by clinical episode from 2011 to 2012	0.15	0.09
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.26	0.10
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	-0.12	-0.07

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Emergency Room rate by clinical episode in 2011	-0.08	0.00
Change in Emergency room rate by clinical episode from 2011 to 2012	-0.08	-0.02

* These variables were not included for this model.

** Caliper was 1/4th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -4.19 and the standard deviation was 1.45.

Exhibit S.27: Standardized Differences Before and After Matching, Model 2 Hospitals, Syncope & Collapse

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	-0.10	0.01
Ownership - Government	-0.41	0.02
Ownership - For Profit*	0.47	-0.03
Urban*		
Bed Count	0.10	-0.01
Chain Indicator	-0.18	-0.02
Medicare Days as a Percent of Total Inpatient Days	-0.18	-0.10
Resident-Bed Ratio	0.00	-0.01
Disproportionate Share Percent	-0.10	0.03
Teaching Status	-0.05	-0.04
Population Size of Market Area	0.33	-0.01
Median Household Income	0.45	0.03
Medicare Advantage Penetration	0.09	0.02
Primary Care Providers per 10,000 in Market	0.04	0.01
SNF Beds per 10,000 in Market	-0.55	-0.09
Inpatient Rehabilitation Facility in Market	0.43	0.04
Provider Market Share of the 48 potential BPCI episodes	-0.49	-0.05
Herfindahl Index of Hospital Market Shares	-0.45	-0.03
Percentage of total discharges in the 48 clinical episodes in 2011	0.22	-0.03
Number of discharges for clinical episode in 2011	0.39	-0.09
Percent of patients in 2011 that went home with no post-acute care by clinical episode	0.11	0.00
Percent of patients in 2011 that used an inpatient rehabilitation facility as first post-acute care setting by clinical episode	0.06	0.06
Percent of patients in 2011 that used a SNF as first post-acute care setting by clinical episode	-0.13	0.00
Percent of patients in 2011 that used a long-term care hospital as first post-acute care setting by clinical episode	-0.20	-0.04
Percent of patients in 2011 that went home with HHA services as first post-acute care setting by clinical episode*	-0.02	-0.03

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Unplanned readmission rate by clinical episode in 2011	0.06	-0.06
Change in unplanned readmission rate by clinical episode from 2011 to 2012	-0.03	0.04
All-cause mortality rate in 2011 by clinical episode	0.04	-0.01
Change in all-cause mortality rate by clinical episode from 2011 to 2012	0.03	0.02
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.14	0.01
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	0.15	0.00
Emergency Room rate by clinical episode in 2011	-0.33	0.00
Change in Emergency room rate by clinical episode from 2011 to 2012	0.13	0.04

* These variables were not included for this model.

** Caliper was 1/4th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -4.07 and the standard deviation was 1.47.

Note: A blank cell indicates there were no participants with the characteristic.

Exhibit S.28: Standardized Differences Before and After Matching, Model 2 Hospitals, Renal Failure

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	0.06	-0.08
Ownership - Government	-0.56	0.06
Ownership - For Profit*	0.40	0.06
Urban	0.89	0.01
Bed Count	0.49	0.01
Chain Indicator	-0.09	0.01
Medicare Days as a Percent of Total Inpatient Days	-0.35	-0.04
Resident-Bed Ratio	0.10	-0.04
Disproportionate Share Percent	0.03	-0.01
Teaching Status	0.19	-0.05
Population Size of Market Area	0.44	-0.02
Median Household Income	0.59	0.02
Medicare Advantage Penetration	0.34	-0.03
Primary Care Providers per 10,000 in Market	0.29	-0.01
SNF Beds per 10,000 in Market	-0.52	-0.01
Inpatient Rehabilitation Facility in Market	0.60	0.00
Provider Market Share of the 48 potential BPCI episodes	-0.54	-0.05
Herfindahl Index of Hospital Market Shares	-0.69	-0.05
Percentage of total discharges in the 48 clinical episodes in 2011	-0.25	-0.04
Number of discharges for clinical episode in 2011	0.57	-0.03

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Percent of patients in 2011 that went home with no post-acute care by clinical episode	-0.31	-0.01
Percent of patients in 2011 that used an inpatient rehabilitation facility as first post-acute care setting by clinical episode	0.41	0.01
Percent of patients in 2011 that used a SNF as first post-acute care setting by clinical episode	0.01	0.01
Percent of patients in 2011 that used a long-term care hospital as first post-acute care setting by clinical episode	0.05	0.04
Percent of patients in 2011 that went home with HHA services as first post-acute care setting by clinical episode*	0.21	-0.03
Unplanned readmission rate by clinical episode in 2011	0.21	0.01
Change in unplanned readmission rate by clinical episode from 2011 to 2012	-0.04	0.01
All-cause mortality rate in 2011 by clinical episode	-0.30	-0.01
Change in all-cause mortality rate by clinical episode from 2011 to 2012	0.13	-0.01
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.38	0.01
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	-0.01	-0.07
Emergency Room rate by clinical episode in 2011	-0.17	0.04
Change in Emergency room rate by clinical episode from 2011 to 2012	-0.04	0.03

*These variables were not included for this model.

**Caliper was 1/10th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -4.20 and the standard deviation was 1.88.

Exhibit S.29: Standardized Differences Before and After Matching, Model 2 Hospitals, Nutritional and Metabolic Disorders

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	0.32	-0.04
Ownership - Government	-0.70	-0.03
Ownership - For Profit*	0.22	0.06
Urban	0.91	0.11
Bed Count	0.59	0.03
Chain Indicator	-0.10	0.04
Medicare Days as a Percent of Total Inpatient Days	-0.43	0.03
Resident-Bed Ratio	0.20	-0.01
Disproportionate Share Percent	0.11	0.01
Teaching Status	0.24	0.02
Population Size of Market Area	0.51	0.04

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Median Household Income	0.75	0.03
Medicare Advantage Penetration	0.42	-0.04
Primary Care Providers per 10,000 in Market	0.32	0.00
SNF Beds per 10,000 in Market	-0.58	-0.04
Inpatient Rehabilitation Facility in Market	0.43	0.01
Provider Market Share of the 48 potential BPCI episodes	-0.49	-0.03
Herfindahl Index of Hospital Market Shares	-0.64	-0.03
Percentage of total discharges in the 48 clinical episodes in 2011	-0.31	-0.05
Number of discharges for clinical episode in 2011	0.55	0.04
Percent of patients in 2011 that went home with no post-acute care by clinical episode	-0.23	0.11
Percent of patients in 2011 that used an inpatient rehabilitation facility as first post-acute care setting by clinical episode	0.30	-0.14
Percent of patients in 2011 that used a SNF as first post-acute care setting by clinical episode	0.11	-0.06
Percent of patients in 2011 that used a long-term care hospital as first post-acute care setting by clinical episode	0.09	0.04
Percent of patients in 2011 that went home with HHA services as first post-acute care setting by clinical episode*	0.05	0.00
Unplanned readmission rate by clinical episode in 2011	-0.02	-0.01
Change in unplanned readmission rate by clinical episode from 2011 to 2012	0.04	0.02
All-cause mortality rate in 2011 by clinical episode	0.01	0.05
Change in all-cause mortality rate by clinical episode from 2011 to 2012	-0.17	0.01
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.36	-0.07
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	-0.14	-0.01
Emergency Room rate by clinical episode in 2011	-0.30	-0.07
Change in Emergency room rate by clinical episode from 2011 to 2012	-0.05	0.11

* This variable was not included for this model.

**Caliper was 1/20th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -4.77 and the standard deviation was 2.18.

Exhibit S.30: Standardized Differences Before and After Matching, Model 2 Hospitals, Cellulitis

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	0.36	0.02
Ownership - Government	-0.65	0.03
Ownership - For Profit*	0.14	-0.03

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Urban	0.83	-0.05
Bed Count	0.50	0.02
Chain Indicator	-0.02	0.05
Medicare Days as a Percent of Total Inpatient Days	-0.27	-0.01
Resident-Bed Ratio	0.15	0.00
Disproportionate Share Percent	-0.15	-0.06
Teaching Status	0.23	-0.01
Population Size of Market Area	0.38	-0.05
Median Household Income	0.62	0.02
Medicare Advantage Penetration	0.24	0.02
Primary Care Providers per 10,000 in Market	0.30	-0.02
SNF Beds per 10,000 in Market	-0.48	0.05
Inpatient Rehabilitation Facility in Market	0.50	-0.01
Provider Market Share of the 48 potential BPCI episodes	-0.34	0.05
Herfindahl Index of Hospital Market Shares	-0.52	0.05
Percentage of total discharges in the 48 clinical episodes in 2011	-0.20	-0.03
Number of discharges for clinical episode in 2011	0.72	0.06
Percent of patients in 2011 that went home with no post-acute care by clinical episode	-0.38	0.07
Percent of patients in 2011 that used an inpatient rehabilitation facility as first post-acute care setting by clinical episode	0.28	0.04
Percent of patients in 2011 that used a SNF as first post-acute care setting by clinical episode	0.07	-0.05
Percent of patients in 2011 that used a long-term care hospital as first post-acute care setting by clinical episode	0.05	-0.05
Percent of patients in 2011 that went home with HHA services as first post-acute care setting by clinical episode*	0.28	-0.03
Unplanned readmission rate by clinical episode in 2011	0.15	0.01
Change in unplanned readmission rate by clinical episode from 2011 to 2012	-0.03	-0.01
All-cause mortality rate in 2011 by clinical episode	0.12	0.00
Change in all-cause mortality rate by clinical episode from 2011 to 2012	0.03	0.02
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.35	-0.07
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	-0.05	0.01
Emergency Room rate by clinical episode in 2011	-0.05	0.02
Change in Emergency room rate by clinical episode from 2011 to 2012	0.06	-0.03

*These variables were not included for this model.

**Caliper was 1/4th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -4.18 and the standard deviation was 1.86.

**Exhibit S.31: Standardized Differences Before and After Matching, Model 2
Hospitals, Transient Ischemia**

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	0.10	0.00
Ownership - Government	-0.51	-0.04
Ownership - For Profit*	0.32	0.02
Urban	0.71	-0.04
Bed Count	0.63	-0.03
Chain Indicator	-0.08	-0.05
Medicare Days as a Percent of Total Inpatient Days	-0.42	-0.05
Resident-Bed Ratio	0.42	0.01
Disproportionate Share Percent	-0.01	0.03
Teaching Status	0.61	0.00
Population Size of Market Area	0.55	-0.05
Median Household Income	0.57	-0.04
Medicare Advantage Penetration	0.38	0.07
Primary Care Providers per 10,000 in Market	0.25	-0.05
SNF Beds per 10,000 in Market	-0.48	0.04
Inpatient Rehabilitation Facility in Market	0.52	-0.01
Provider Market Share of the 48 potential BPCI episodes	-0.66	-0.02
Herfindahl Index of Hospital Market Shares	-0.83	-0.02
Percentage of total discharges in the 48 clinical episodes in 2011	-0.33	0.02
Number of discharges for clinical episode in 2011	0.72	0.00
Percent of patients in 2011 that went home with no post-acute care by clinical episode	-0.10	-0.04
Percent of patients in 2011 that used an inpatient rehabilitation facility as first post-acute care setting by clinical episode	-0.02	0.11
Percent of patients in 2011 that used a SNF as first post-acute care setting by clinical episode	-0.05	0.07
Percent of patients in 2011 that used a long-term care hospital as first post-acute care setting by clinical episode	0.08	-0.04
Percent of patients in 2011 that went home with HHA services as first post-acute care setting by clinical episode*	0.19	-0.06
Unplanned readmission rate by clinical episode in 2011	0.25	0.07
Change in unplanned readmission rate by clinical episode from 2011 to 2012	-0.09	-0.03
All-cause mortality rate in 2011 by clinical episode	0.06	0.05
Change in all-cause mortality rate by clinical episode from 2011 to 2012	-0.25	0.00
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.22	0.08
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	-0.10	-0.06

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Emergency Room rate by clinical episode in 2011	-0.11	-0.04
Change in Emergency room rate by clinical episode from 2011 to 2012	-0.18	0.07

* These variables were not included for this model.

** Caliper was 1/4th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -4.90 and the standard deviation was 1.88.

Exhibit S.32: Standardized Differences Before and After Matching, Model 2 Hospitals, Esophagitis, Gastroenteritis and Other Digestive Disorders

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	0.23	-0.02
Ownership - Government	-0.69	0.06
Ownership - For Profit*	0.30	0.00
Urban	0.98	0.00
Bed Count	0.60	-0.03
Chain Indicator	-0.22	0.02
Medicare Days as a Percent of Total Inpatient Days	-0.44	-0.05
Resident-Bed Ratio	0.10	-0.05
Disproportionate Share Percent	-0.15	0.01
Teaching Status	0.29	-0.07
Population Size of Market Area	0.50	-0.03
Median Household Income	0.72	-0.01
Medicare Advantage Penetration	0.23	0.01
Primary Care Providers per 10,000 in Market	0.24	-0.04
SNF Beds per 10,000 in Market	-0.80	0.00
Inpatient Rehabilitation Facility in Market	0.67	-0.02
Provider Market Share of the 48 potential BPCI episodes	-0.62	-0.01
Herfindahl Index of Hospital Market Shares	-0.80	0.01
Percentage of total discharges in the 48 clinical episodes in 2011	-0.28	0.01
Number of discharges for clinical episode in 2011	0.62	-0.05
Percent of patients in 2011 that went home with no post-acute care by clinical episode	-0.27	-0.08
Percent of patients in 2011 that used an inpatient rehabilitation facility as first post-acute care setting by clinical episode	0.38	0.15
Percent of patients in 2011 that used a SNF as first post-acute care setting by clinical episode	0.07	0.03
Percent of patients in 2011 that used a long-term care hospital as first post-acute care setting by clinical episode	0.08	0.06
Percent of patients in 2011 that went home with HHA services as first post-acute care setting by clinical episode*	0.13	0.01

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Unplanned readmission rate by clinical episode in 2011	0.17	-0.02
Change in unplanned readmission rate by clinical episode from 2011 to 2012	-0.10	-0.04
All-cause mortality rate in 2011 by clinical episode	-0.01	0.00
Change in all-cause mortality rate by clinical episode from 2011 to 2012	-0.08	-0.03
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.50	0.03
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	-0.21	-0.07
Emergency Room rate by clinical episode in 2011	-0.15	0.05
Change in Emergency room rate by clinical episode from 2011 to 2012	-0.06	-0.08

*These variables were not included for this model.

**Caliper was 1/10th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -5.21 and the standard deviation was 2.55.

Exhibit S.33: Standardized Differences Before and After Matching, Model 2 Physician Group Practices, Major Joint Replacement of the Upper Extremity

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	-0.18	-0.05
Ownership - Government	0.00	0.00
Ownership - For Profit*	0.23	0.06
Urban	0.57	0.08
Bed Count	0.38	0.09
Chain Indicator	-0.17	0.02
Medicare Days as a Percent of Total Inpatient Days	-0.28	0.00
Resident-Bed Ratio	-0.37	0.05
Disproportionate Share Percent	0.01	-0.11
Teaching Status	-0.18	-0.05
Population Size of Market Area	0.16	0.08
Median Household Income	0.14	0.17
Medicare Advantage Penetration	0.23	0.04
Primary Care Providers per 10,000 in Market	-0.20	0.07
SNF Beds per 10,000 in Market	-0.55	-0.11
Inpatient Rehabilitation Facility in Market	0.47	-0.06
Provider Market Share of the 48 potential BPCI episodes	-0.67	-0.01
Herfindahl Index of Hospital Market Shares	-0.85	0.03
Percentage of total discharges in the 48 clinical episodes in 2011	0.13	0.04
Number of discharges for clinical episode in 2011	0.43	0.13

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Percent of patients in 2011 that went home with no post-acute care by clinical episode	-0.18	0.04
Percent of patients in 2011 that used an inpatient rehabilitation facility as first post-acute care setting by clinical episode	0.18	-0.15
Percent of patients in 2011 that used a SNF as first post-acute care setting by clinical episode	0.09	0.01
Percent of patients in 2011 that used a long-term care hospital as first post-acute care setting by clinical episode*		
Percent of patients in 2011 that went home with HHA services as first post-acute care setting by clinical episode*	0.08	0.01
Unplanned readmission rate by clinical episode in 2011	0.01	0.10
Change in unplanned readmission rate by clinical episode from 2011 to 2012	0.09	-0.04
All-cause mortality rate in 2011 by clinical episode	-0.15	-0.02
Change in all-cause mortality rate by clinical episode from 2011 to 2012	0.13	-0.09
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.18	-0.04
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	-0.12	0.05
Emergency Room rate by clinical episode in 2011	-0.13	-0.06
Change in Emergency room rate by clinical episode from 2011 to 2012	0.14	0.06

* These variables were not included for this model.

** Caliper was 1/10th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -2.57 and the standard deviation was 2.07.

Note: A blank cell indicates there were no participants with the characteristic.

Exhibit S.34: Standardized Differences Before and After Matching, Model 2 Physician Group Practices, Urinary Tract Infection

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	0.08	-0.14
Ownership - Government	-0.39	0.03
Ownership - For Profit*	0.27	0.13
Urban	0.95	0.04
Bed Count	0.77	-0.10
Chain Indicator	-0.32	-0.04
Medicare Days as a Percent of Total Inpatient Days	-0.36	0.07
Resident-Bed Ratio	-0.03	-0.08
Disproportionate Share Percent	-0.20	0.02
Teaching Status	0.19	-0.06

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Population Size of Market Area	0.26	-0.02
Median Household Income	0.33	-0.08
Medicare Advantage Penetration	0.45	0.01
Primary Care Providers per 10,000 in Market	0.15	-0.08
SNF Beds per 10,000 in Market	-0.64	-0.11
Inpatient Rehabilitation Facility in Market	0.47	-0.03
Provider Market Share of the 48 potential BPCI episodes	-0.42	-0.05
Herfindahl Index of Hospital Market Shares	-0.66	-0.02
Percentage of total discharges in the 48 clinical episodes in 2011	-0.36	0.03
Number of discharges for clinical episode in 2011	0.84	-0.04
Percent of patients in 2011 that went home with no post-acute care by clinical episode	-0.46	0.05
Percent of patients in 2011 that used an inpatient rehabilitation facility as first post-acute care setting by clinical episode	0.27	0.05
Percent of patients in 2011 that used a SNF as first post-acute care setting by clinical episode	0.10	-0.04
Percent of patients in 2011 that used a long-term care hospital as first post-acute care setting by clinical episode	0.04	-0.01
Percent of patients in 2011 that went home with HHA services as first post-acute care setting by clinical episode*	0.39	-0.02
Unplanned readmission rate by clinical episode in 2011	0.05	0.00
Change in unplanned readmission rate by clinical episode from 2011 to 2012	-0.02	0.04
All-cause mortality rate by clinical episode in 2011	-0.03	0.03
Change in all-cause mortality rate by clinical episode from 2011 to 2012	-0.01	0.04
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.49	-0.03
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	-0.21	0.05
Emergency Room rate by clinical episode in 2011	-0.28	-0.02
Change in Emergency room rate by clinical episode from 2011 to 2012	-0.03	-0.04

* These variables were not included for this model.

** Caliper was 1/3rd of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -2.60 and the standard deviation was 1.89.

**Exhibit S.35: Standardized Differences Before and After Matching, Model 2
Physician Group Practices, Stroke**

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	0.16	0.05
Ownership - Government	-0.22	-0.01
Ownership - For Profit*	0.04	-0.05
Urban	0.51	0.00
Bed Count	0.38	0.04
Chain Indicator	0.02	-0.02
Medicare Days as a Percent of Total Inpatient Days	-0.10	0.00
Resident-Bed Ratio	-0.31	-0.02
Disproportionate Share Percent	-0.29	-0.04
Teaching Status	0.10	-0.03
Population Size of Market Area	-0.07	0.00
Median Household Income	0.30	0.05
Medicare Advantage Penetration	0.27	0.01
Primary Care Providers per 10,000 in Market	0.00	0.01
SNF Beds per 10,000 in Market	-0.45	0.00
Inpatient Rehabilitation Facility in Market	-0.02	-0.02
Provider Market Share of the 48 potential BPCI episodes	0.08	-0.01
Herfindahl Index of Hospital Market Shares	-0.03	0.00
Percentage of total discharges in the 48 clinical episodes in 2011	-0.01	0.00
Number of discharges for clinical episode in 2011	0.51	-0.01
Percent of patients in 2011 that went home with no post-acute care by clinical episode	-0.07	-0.01
Percent of patients in 2011 that used an inpatient rehabilitation facility as first post-acute care setting by clinical episode	0.15	0.00
Percent of patients in 2011 that used a SNF as first post-acute care setting by clinical episode	-0.19	0.02
Percent of patients in 2011 that used a long-term care hospital as first post-acute care setting by clinical episode	-0.03	-0.01
Percent of patients in 2011 that went home with HHA services as first post-acute care setting by clinical episode*	0.20	-0.02
Unplanned readmission rate by clinical episode in 2011	-0.05	0.01
Change in unplanned readmission rate by clinical episode from 2011 to 2012	0.06	-0.01
All-cause mortality rate in 2011 by clinical episode	0.04	-0.01
Change in all-cause mortality rate by clinical episode from 2011 to 2012	-0.04	0.03
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	-0.03	-0.01
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	0.02	0.04

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Emergency Room rate by clinical episode in 2011	-0.05	0.04
Change in Emergency room rate by clinical episode from 2011 to 2012	-0.03	-0.02

* These variables were not included for this model.

** Caliper was 1/4th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -2.99 and the standard deviation was 1.40.

**Exhibit S.36: Standardized Differences Before and After Matching, Model 2
Physician Group Practices, Chronic Obstructive Pulmonary Disease, Bronchitis, Asthma**

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	0.10	-0.09
Ownership - Government	-0.33	-0.03
Ownership - For Profit*	0.20	0.14
Urban	0.83	-0.01
Bed Count	0.71	-0.02
Chain Indicator	-0.17	-0.07
Medicare Days as a Percent of Total Inpatient Days	-0.29	0.02
Resident-Bed Ratio	-0.06	0.01
Disproportionate Share Percent	-0.17	-0.02
Teaching Status	0.22	-0.02
Population Size of Market Area	0.24	0.06
Median Household Income	0.32	0.00
Medicare Advantage Penetration	0.33	0.08
Primary Care Providers per 10,000 in Market	0.19	0.00
SNF Beds per 10,000 in Market	-0.56	-0.07
Inpatient Rehabilitation Facility in Market	0.42	0.04
Provider Market Share of the 48 potential BPCI episodes	-0.23	-0.12
Herfindahl Index of Hospital Market Shares	-0.47	-0.11
Percentage of total discharges in the 48 clinical episodes in 2011	-0.35	0.02
Number of discharges for clinical episode in 2011	0.84	-0.03
Percent of patients in 2011 that went home with no post-acute care by clinical episode	-0.36	-0.10
Percent of patients in 2011 that used an inpatient rehabilitation facility as first post-acute care setting by clinical episode	0.24	0.08
Percent of patients in 2011 that used a SNF as first post-acute care setting by clinical episode	-0.09	0.05
Percent of patients in 2011 that used a long-term care hospital as first post-acute care setting by clinical episode	0.08	0.04
Percent of patients in 2011 that went home with HHA services as first post-acute care setting by clinical episode*	0.49	0.05

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Unplanned readmission rate by clinical episode in 2011	0.20	0.01
Change in unplanned readmission rate by clinical episode from 2011 to 2012	0.03	-0.03
All-cause mortality rate in 2011 by clinical episode	-0.02	0.11
Change in all-cause mortality rate by clinical episode from 2011 to 2012	0.07	-0.05
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.29	0.05
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	0.07	-0.07
Emergency Room rate by clinical episode in 2011	-0.14	-0.05
Change in Emergency room rate by clinical episode from 2011 to 2012	-0.20	0.04

* These variables were not included for this model.

** Caliper was 1/3rd of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -2.29 and the standard deviation was 1.61.

Exhibit S.37: Standardized Differences Before and After Matching, Model 2 Physician Group Practices, Major Joint Replacement of the Lower Extremity

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	-0.02	-0.05
Ownership - Government	-0.20	-0.04
Ownership - For Profit*	0.22	0.09
Urban	0.76	0.05
Bed Count	0.56	-0.05
Chain Indicator	-0.07	-0.06
Medicare Days as a Percent of Total Inpatient Days	-0.24	-0.04
Resident-Bed Ratio	-0.21	-0.05
Disproportionate Share Percent	-0.18	0.02
Teaching Status	0.06	-0.04
Population Size of Market Area	0.11	0.03
Median Household Income	0.37	-0.02
Medicare Advantage Penetration	0.20	0.04
Primary Care Providers per 10,000 in Market	0.00	-0.01
SNF Beds per 10,000 in Market	-0.63	-0.07
Inpatient Rehabilitation Facility in Market	0.41	0.04
Provider Market Share of the 48 potential BPCI episodes	-0.53	-0.06
Herfindahl Index of Hospital Market Shares	-0.71	-0.04
Percentage of total discharges in the 48 clinical episodes in 2011	-0.20	0.06
Number of discharges for clinical episode in 2011	0.59	-0.01

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Percent of patients in 2011 that went home with no post-acute care by clinical episode	-0.15	0.02
Percent of patients in 2011 that used an inpatient rehabilitation facility as first post-acute care setting by clinical episode	-0.05	0.08
Percent of patients in 2011 that used a SNF as first post-acute care setting by clinical episode	-0.04	-0.07
Percent of patients in 2011 that used a long-term care hospital as first post-acute care setting by clinical episode	-0.11	0.06
Percent of patients in 2011 that went home with HHA services as first post-acute care setting by clinical episode*	0.24	0.00
Unplanned readmission rate by clinical episode in 2011	-0.02	0.01
Change in unplanned readmission rate by clinical episode from 2011 to 2012	0.00	-0.02
All-cause mortality rate in 2011 by clinical episode	-0.04	-0.02
Change in all-cause mortality rate by clinical episode from 2011 to 2012	0.05	-0.01
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	-0.08	-0.01
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	0.01	0.05
Emergency Room rate by clinical episode in 2011	-0.16	-0.02
Change in Emergency room rate by clinical episode from 2011 to 2012	0.02	-0.04

* These variables were not included for this model.

** Caliper was 1/4th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -1.49 and the standard deviation was 1.79.

Exhibit S.38: Standardized Differences Before and After Matching, Model 2 Physician Group Practices, Percutaneous Coronary Intervention

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	0.04	-0.02
Ownership - Government	-0.36	0.05
Ownership - For Profit*	0.30	-0.01
Urban	0.47	0.05
Bed Count	0.31	0.13
Chain Indicator	-0.26	0.01
Medicare Days as a Percent of Total Inpatient Days	-0.13	0.02
Resident-Bed Ratio	-0.34	0.09
Disproportionate Share Percent	-0.10	-0.03
Teaching Status	-0.08	0.15
Population Size of Market Area	0.18	-0.01
Median Household Income	0.04	-0.13
Medicare Advantage Penetration	0.22	0.02

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Primary Care Providers per 10,000 in Market	-0.24	-0.02
SNF Beds per 10,000 in Market	-0.30	-0.09
Inpatient Rehabilitation Facility in Market	0.41	0.00
Provider Market Share of the 48 potential BPCI episodes	-0.57	-0.01
Herfindahl Index of Hospital Market Shares	-0.58	-0.03
Percentage of total discharges in the 48 clinical episodes in 2011	0.21	-0.15
Number of discharges for clinical episode in 2011	-0.03	0.15
Percent of patients in 2011 that went home with no post-acute care by clinical episode	-0.56	0.04
Percent of patients in 2011 that used an inpatient rehabilitation facility as first post-acute care setting by clinical episode	0.22	-0.06
Percent of patients in 2011 that used a SNF as first post-acute care setting by clinical episode	0.22	-0.04
Percent of patients in 2011 that used a long-term care hospital as first post-acute care setting by clinical episode	-0.07	-0.07
Percent of patients in 2011 that went home with HHA services as first post-acute care setting by clinical episode*	0.52	0.01
Unplanned readmission rate by clinical episode in 2011	0.20	0.07
Change in unplanned readmission rate by clinical episode from 2011 to 2012	-0.10	-0.02
All-cause mortality rate in 2011 by clinical episode	-0.04	0.06
Change in all-cause mortality rate by clinical episode from 2011 to 2012	0.14	-0.07
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.15	-0.11
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	-0.06	0.07
Emergency Room rate by clinical episode in 2011	-0.25	-0.04
Change in Emergency room rate by clinical episode from 2011 to 2012	-0.14	0.07

* These variables were not included for this model.

** Caliper was 1/3rd of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -1.93 and the standard deviation was 1.80.

Exhibit S.39: Standardized Differences Before and After Matching, Model 2 Physician Group Practices, Congestive Heart Failure

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	0.27	-0.04
Ownership - Government	-0.50	-0.07
Ownership - For Profit*	0.14	0.09
Urban	0.88	-0.01

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Bed Count	0.58	0.01
Chain Indicator	-0.17	0.01
Medicare Days as a Percent of Total Inpatient Days	-0.18	0.06
Resident-Bed Ratio	-0.01	-0.03
Disproportionate Share Percent	-0.30	0.01
Teaching Status	0.27	0.01
Population Size of Market Area	0.38	0.00
Median Household Income	0.64	-0.07
Medicare Advantage Penetration	0.17	-0.01
Primary Care Providers per 10,000 in Market	0.22	-0.05
SNF Beds per 10,000 in Market	-0.55	0.02
Inpatient Rehabilitation Facility in Market	0.54	0.10
Provider Market Share of the 48 potential BPCI episodes	-0.43	-0.10
Herfindahl Index of Hospital Market Shares	-0.66	-0.08
Percentage of total discharges in the 48 clinical episodes in 2011	-0.30	0.01
Number of discharges for clinical episode in 2011	0.75	0.01
Percent of patients in 2011 that went home with no post-acute care by clinical episode	-0.43	0.04
Percent of patients in 2011 that used an inpatient rehabilitation facility as first post-acute care setting by clinical episode	0.24	-0.01
Percent of patients in 2011 that used a SNF as first post-acute care setting by clinical episode	-0.03	0.00
Percent of patients in 2011 that used a long-term care hospital as first post-acute care setting by clinical episode	0.09	0.03
Percent of patients in 2011 that went home with HHA services as first post-acute care setting by clinical episode*	0.51	-0.05
Unplanned readmission rate by clinical episode in 2011	0.01	0.10
Change in unplanned readmission rate by clinical episode from 2011 to 2012	0.15	-0.04
All-cause mortality rate in 2011 by clinical episode	-0.01	0.00
Change in all-cause mortality rate by clinical episode from 2011 to 2012	0.03	0.02
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.31	0.00
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	-0.01	0.03
Emergency Room rate by clinical episode in 2011	-0.40	-0.01
Change in Emergency room rate by clinical episode from 2011 to 2012	-0.08	0.04

* These variables were not included for this model.

** Caliper was 1/4th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -2.91 and the standard deviation was 1.82.

**Exhibit S.40: Standardized Differences Before and After Matching, Model 2
Physician Group Practices, Acute Myocardial Infarction**

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	-0.02	-0.04
Ownership - Government	-0.21	-0.03
Ownership - For Profit*	0.25	0.08
Urban	0.65	0.01
Bed Count	0.47	-0.01
Chain Indicator	-0.12	-0.08
Medicare Days as a Percent of Total Inpatient Days	-0.11	0.01
Resident-Bed Ratio	-0.12	0.03
Disproportionate Share Percent	-0.23	-0.07
Teaching Status	0.11	0.00
Population Size of Market Area	0.07	-0.02
Median Household Income	0.19	-0.05
Medicare Advantage Penetration	0.23	0.04
Primary Care Providers per 10,000 in Market	-0.11	0.00
SNF Beds per 10,000 in Market	-0.55	-0.05
Inpatient Rehabilitation Facility in Market	0.26	-0.01
Provider Market Share of the 48 potential BPCI episodes	-0.25	-0.03
Herfindahl Index of Hospital Market Shares	-0.39	-0.01
Percentage of total discharges in the 48 clinical episodes in 2011	-0.09	-0.09
Number of discharges for clinical episode in 2011	0.54	-0.07
Percent of patients in 2011 that went home with no post-acute care by clinical episode	0.01	-0.03
Percent of patients in 2011 that used an inpatient rehabilitation facility as first post-acute care setting by clinical episode	0.19	0.06
Percent of patients in 2011 that used a SNF as first post-acute care setting by clinical episode	-0.29	-0.03
Percent of patients in 2011 that used a long-term care hospital as first post-acute care setting by clinical episode	-0.02	0.03
Percent of patients in 2011 that went home with HHA services as first post-acute care setting by clinical episode*	0.26	0.04
Unplanned readmission rate by clinical episode in 2011	0.01	-0.01
Change in unplanned readmission rate by clinical episode from 2011 to 2012	0.04	0.03
All-cause mortality rate in 2011 by clinical episode	0.04	0.04
Change in all-cause mortality rate by clinical episode from 2011 to 2012	0.09	-0.03
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	-0.15	0.01
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	0.08	0.01

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Emergency Room rate by clinical episode in 2011	-0.17	0.02
Change in Emergency room rate by clinical episode from 2011 to 2012	-0.06	0.02

* These variables were not included for this model.

** Caliper was 1/3rd of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -2.22 and the standard deviation was 1.38.

Exhibit S.41: Standardized Differences Before and After Matching, Model 2 Physician Group Practices, Cardiac Arrhythmia

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	0.29	-0.03
Ownership - Government	-0.37	-0.01
Ownership - For Profit*	0.02	0.05
Urban	0.67	0.05
Bed Count	0.52	0.03
Chain Indicator	0.04	-0.06
Medicare Days as a Percent of Total Inpatient Days	-0.34	-0.01
Resident-Bed Ratio	-0.23	0.01
Disproportionate Share Percent	-0.32	0.00
Teaching Status	0.09	0.00
Population Size of Market Area	0.13	0.07
Median Household Income	0.56	-0.03
Medicare Advantage Penetration	0.24	0.07
Primary Care Providers per 10,000 in Market	0.06	0.00
SNF Beds per 10,000 in Market	-0.53	-0.01
Inpatient Rehabilitation Facility in Market	0.32	0.06
Provider Market Share of the 48 potential BPCI episodes	-0.19	-0.07
Herfindahl Index of Hospital Market Shares	-0.37	-0.05
Percentage of total discharges in the 48 clinical episodes in 2011	-0.21	-0.03
Number of discharges for clinical episode in 2011	0.63	0.01
Percent of patients in 2011 that went home with no post-acute care by clinical episode	-0.08	-0.03
Percent of patients in 2011 that used an inpatient rehabilitation facility as first post-acute care setting by clinical episode	0.29	0.05
Percent of patients in 2011 that used a SNF as first post-acute care setting by clinical episode	-0.14	0.00
Percent of patients in 2011 that used a long-term care hospital as first post-acute care setting by clinical episode	0.09	0.03
Percent of patients in 2011 that went home with HHA services as first post-acute care setting by clinical episode*	0.16	0.02

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Unplanned readmission rate by clinical episode in 2011	-0.11	-0.01
Change in unplanned readmission rate by clinical episode from 2011 to 2012	0.12	0.07
All-cause mortality rate in 2011 by clinical episode	-0.01	-0.02
Change in all-cause mortality rate by clinical episode from 2011 to 2012	0.00	0.03
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	-0.16	0.00
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	0.12	0.04
Emergency Room rate by clinical episode in 2011	-0.14	-0.08
Change in Emergency room rate by clinical episode from 2011 to 2012	-0.03	-0.01

* These variables were not included for this model.

** Caliper was 1/3rd of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -3.06 and the standard deviation was 1.53.

Exhibit S.42: Standardized Differences Before and After Matching, Model 2 Physician Group Practices, Gastrointestinal Hemorrhage

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	0.18	-0.03
Ownership - Government	-0.36	-0.03
Ownership - For Profit*	0.14	0.06
Urban	0.63	0.01
Bed Count	0.39	0.02
Chain Indicator	-0.10	-0.04
Medicare Days as a Percent of Total Inpatient Days	-0.37	0.06
Resident-Bed Ratio	-0.28	0.02
Disproportionate Share Percent	-0.25	0.04
Teaching Status	0.08	0.08
Population Size of Market Area	0.08	-0.06
Median Household Income	0.50	-0.04
Medicare Advantage Penetration	0.30	-0.01
Primary Care Providers per 10,000 in Market	0.03	-0.03
SNF Beds per 10,000 in Market	-0.64	-0.01
Inpatient Rehabilitation Facility in Market	-0.02	-0.01
Provider Market Share of the 48 potential BPCI episodes	-0.07	0.10
Herfindahl Index of Hospital Market Shares	-0.19	0.07
Percentage of total discharges in the 48 clinical episodes in 2011	-0.12	-0.02
Number of discharges for clinical episode in 2011	0.54	0.02

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Percent of patients in 2011 that went home with no post-acute care by clinical episode	0.08	-0.04
Percent of patients in 2011 that used an inpatient rehabilitation facility as first post-acute care setting by clinical episode	0.12	0.03
Percent of patients in 2011 that used a SNF as first post-acute care setting by clinical episode	-0.18	-0.04
Percent of patients in 2011 that used a long-term care hospital as first post-acute care setting by clinical episode	-0.03	0.03
Percent of patients in 2011 that went home with HHA services as first post-acute care setting by clinical episode*	0.06	0.09
Unplanned readmission rate by clinical episode in 2011	-0.01	-0.07
Change in unplanned readmission rate by clinical episode from 2011 to 2012	-0.05	0.00
All-cause mortality rate in 2011 by clinical episode	-0.09	-0.08
Change in all-cause mortality rate by clinical episode from 2011 to 2012	0.03	0.03
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	-0.09	-0.02
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	-0.05	0.06
Emergency Room rate by clinical episode in 2011	-0.21	0.05
Change in Emergency room rate by clinical episode from 2011 to 2012	0.01	0.01

* These variables were not included for this model.

**Caliper was 1/4th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -3.20 and the standard deviation was 1.43.

Exhibit S.43: Standardized Differences Before and After Matching, Model 2 Physician Group Practices, Medical Non-infectious Orthopedic

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	0.05	-0.12
Ownership - Government	-0.24	0.02
Ownership - For Profit*	0.18	0.13
Urban	0.69	-0.02
Bed Count	0.55	-0.07
Chain Indicator	-0.07	0.01
Medicare Days as a Percent of Total Inpatient Days	-0.34	0.05
Resident-Bed Ratio	-0.36	-0.08
Disproportionate Share Percent	-0.26	0.04
Teaching Status	-0.08	-0.04
Population Size of Market Area	0.08	0.04
Median Household Income	0.27	0.00

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Medicare Advantage Penetration	0.32	0.01
Primary Care Providers per 10,000 in Market	0.01	-0.03
SNF Beds per 10,000 in Market	-0.64	-0.07
Inpatient Rehabilitation Facility in Market	0.28	-0.05
Provider Market Share of the 48 potential BPCI episodes	-0.27	-0.03
Herfindahl Index of Hospital Market Shares	-0.40	-0.01
Percentage of total discharges in the 48 clinical episodes in 2011	-0.12	0.07
Number of discharges for clinical episode in 2011	0.56	-0.01
Percent of patients in 2011 that went home with no post-acute care by clinical episode	-0.19	-0.04
Percent of patients in 2011 that used an inpatient rehabilitation facility as first post-acute care setting by clinical episode	0.26	-0.01
Percent of patients in 2011 that used a SNF as first post-acute care setting by clinical episode	-0.05	0.00
Percent of patients in 2011 that used a long-term care hospital as first post-acute care setting by clinical episode	0.03	0.08
Percent of patients in 2011 that went home with HHA services as first post-acute care setting by clinical episode*	0.12	0.06
Unplanned readmission rate by clinical episode in 2011	-0.05	0.08
Change in unplanned readmission rate by clinical episode from 2011 to 2012	0.08	-0.04
All-cause mortality rate in 2011 by clinical episode	0.15	-0.01
Change in all-cause mortality rate by clinical episode from 2011 to 2012	-0.06	0.01
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.27	0.05
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	-0.03	-0.04
Emergency Room rate by clinical episode in 2011	-0.19	-0.02
Change in Emergency room rate by clinical episode from 2011 to 2012	0.09	0.02

* This variable was not included for this model.

**Caliper was 1/4th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -2.44 and the standard deviation was 1.75.

Exhibit S.44: Standardized Differences Before and After Matching, Model 2 Physician Group Practices, Spinal Fusion (non-cervical)

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	-0.02	-0.05
Ownership - Government	0.12	0.09
Ownership - For Profit*	-0.11	-0.04
Urban		

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Bed Count	0.05	0.04
Chain Indicator	-0.23	0.07
Medicare Days as a Percent of Total Inpatient Days	-0.10	-0.04
Resident-Bed Ratio	-0.35	0.01
Disproportionate Share Percent	-0.12	0.08
Teaching Status	-0.24	-0.03
Population Size of Market Area	-0.15	0.03
Median Household Income	0.23	-0.01
Medicare Advantage Penetration	0.01	0.02
Primary Care Providers per 10,000 in Market	0.01	-0.03
SNF Beds per 10,000 in Market	-0.25	-0.10
Inpatient Rehabilitation Facility in Market	-0.12	-0.03
Provider Market Share of the 48 potential BPCI episodes	-0.22	0.09
Herfindahl Index of Hospital Market Shares	-0.29	0.04
Percentage of total discharges in the 48 clinical episodes in 2011	0.20	-0.09
Number of discharges for clinical episode in 2011	0.49	0.01
Percent of patients in 2011 that went home with no post-acute care by clinical episode	0.02	-0.03
Percent of patients in 2011 that used an inpatient rehabilitation facility as first post-acute care setting by clinical episode	-0.11	0.01
Percent of patients in 2011 that used a SNF as first post-acute care setting by clinical episode	0.11	-0.03
Percent of patients in 2011 that used a long-term care hospital as first post-acute care setting by clinical episode	0.18	0.01
Percent of patients in 2011 that went home with HHA services as first post-acute care setting by clinical episode*	-0.08	0.07
Unplanned readmission rate by clinical episode in 2011	0.01	0.01
Change in unplanned readmission rate by clinical episode from 2011 to 2012	-0.11	0.06
All-cause mortality rate in 2011 by clinical episode	0.01	0.02
Change in all-cause mortality rate by clinical episode from 2011 to 2012	-0.06	-0.01
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.16	0.05
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	-0.07	0.02
Emergency Room rate by clinical episode in 2011	-0.04	0.06
Change in Emergency room rate by clinical episode from 2011 to 2012	-0.03	-0.05

*These variables were not included for this model.

**Caliper was 1/3rd of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -2.54 and the standard deviation was 1.25.

Note: A blank cell indicates there were no participants with the characteristic.

**Exhibit S.45: Standardized Differences Before and After Matching, Model 2
Physician Group Practices, Hip and Femur Procedures Except Major Joint**

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	-0.13	-0.03
Ownership - Government	-0.13	-0.03
Ownership - For Profit*	0.31	0.06
Urban	0.73	0.02
Bed Count	0.42	-0.07
Chain Indicator	-0.20	-0.05
Medicare Days as a Percent of Total Inpatient Days	-0.26	0.04
Resident-Bed Ratio	-0.25	-0.01
Disproportionate Share Percent	-0.23	0.01
Teaching Status	0.01	-0.04
Population Size of Market Area	0.22	0.07
Median Household Income	0.35	0.02
Medicare Advantage Penetration	0.15	-0.01
Primary Care Providers per 10,000 in Market	-0.01	0.02
SNF Beds per 10,000 in Market	-0.66	-0.08
Inpatient Rehabilitation Facility in Market	0.33	0.05
Provider Market Share of the 48 potential BPCI episodes	-0.53	-0.07
Herfindahl Index of Hospital Market Shares	-0.62	-0.06
Percentage of total discharges in the 48 clinical episodes in 2011	-0.16	0.06
Number of discharges for clinical episode in 2011	0.56	-0.08
Percent of patients in 2011 that went home with no post-acute care by clinical episode	-0.10	0.02
Percent of patients in 2011 that used an inpatient rehabilitation facility as first post-acute care setting by clinical episode	0.05	0.02
Percent of patients in 2011 that used a SNF as first post-acute care setting by clinical episode	-0.03	-0.03
Percent of patients in 2011 that used a long-term care hospital as first post-acute care setting by clinical episode	-0.02	0.02
Percent of patients in 2011 that went home with HHA services as first post-acute care setting by clinical episode*	0.05	-0.01
Unplanned readmission rate by clinical episode in 2011	0.14	0.02
Change in unplanned readmission rate by clinical episode from 2011 to 2012	-0.09	0.04
All-cause mortality rate in 2011 by clinical episode	0.01	0.06
Change in all-cause mortality rate by clinical episode from 2011 to 2012	0.00	-0.02
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.10	0.05
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	0.07	0.04

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Emergency Room rate by clinical episode in 2011	-0.14	0.04
Change in Emergency room rate by clinical episode from 2011 to 2012	-0.01	-0.03

*These variables were not included for this model.

**Caliper was 1/4th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -2.06 and the standard deviation was 1.77.

Exhibit S.46: Standardized Differences Before and After Matching, Model 2 Physician Group Practices, Sepsis

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	0.05	-0.14
Ownership - Government	-0.31	0.05
Ownership - For Profit*	0.25	0.12
Urban	0.82	0.04
Bed Count	0.66	-0.08
Chain Indicator	-0.28	-0.06
Medicare Days as a Percent of Total Inpatient Days	-0.21	0.04
Resident-Bed Ratio	-0.11	0.00
Disproportionate Share Percent	-0.19	-0.02
Teaching Status	0.10	0.04
Population Size of Market Area	0.20	0.01
Median Household Income	0.25	-0.05
Medicare Advantage Penetration	0.29	0.11
Primary Care Providers per 10,000 in Market	0.11	0.03
SNF Beds per 10,000 in Market	-0.60	-0.05
Inpatient Rehabilitation Facility in Market	0.47	0.01
Provider Market Share of the 48 potential BPCI episodes	-0.32	-0.13
Herfindahl Index of Hospital Market Shares	-0.51	-0.11
Percentage of total discharges in the 48 clinical episodes in 2011	-0.28	-0.02
Number of discharges for clinical episode in 2011	0.64	-0.08
Percent of patients in 2011 that went home with no post-acute care by clinical episode	-0.22	-0.03
Percent of patients in 2011 that used an inpatient rehabilitation facility as first post-acute care setting by clinical episode	0.34	0.02
Percent of patients in 2011 that used a SNF as first post-acute care setting by clinical episode	-0.11	-0.02
Percent of patients in 2011 that used a long-term care hospital as first post-acute care setting by clinical episode	0.13	0.05
Percent of patients in 2011 that went home with HHA services as first post-acute care setting by clinical episode*	0.25	0.00

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Unplanned readmission rate by clinical episode in 2011	0.13	0.06
Change in unplanned readmission rate by clinical episode from 2011 to 2012	-0.02	-0.03
All-cause mortality rate in 2011 by clinical episode	0.38	0.05
Change in all-cause mortality rate by clinical episode from 2011 to 2012	0.00	0.03
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.29	0.07
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	-0.04	0.00
Emergency Room rate by clinical episode in 2011	-0.21	-0.06
Change in Emergency room rate by clinical episode from 2011 to 2012	-0.10	0.02

*These variables were not included for this model.

**Caliper was 1/4th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -2.15 and the standard deviation was 1.70.

Exhibit S.47: Standardized Differences Before and After Matching, Model 2 Physician Group Practices, Simple Pneumonia and Respiratory Infections

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	0.20	0.00
Ownership - Government	-0.32	-0.04
Ownership - For Profit*	0.09	0.03
Urban	0.65	0.01
Bed Count	0.50	0.02
Chain Indicator	-0.08	-0.02
Medicare Days as a Percent of Total Inpatient Days	-0.33	0.02
Resident-Bed Ratio	-0.30	0.08
Disproportionate Share Percent	-0.26	0.00
Teaching Status	0.12	0.03
Population Size of Market Area	0.17	0.07
Median Household Income	0.45	0.01
Medicare Advantage Penetration	0.15	0.00
Primary Care Providers per 10,000 in Market	0.04	0.00
SNF Beds per 10,000 in Market	-0.50	0.00
Inpatient Rehabilitation Facility in Market	0.20	0.06
Provider Market Share of the 48 potential BPCI episodes	-0.09	-0.10
Herfindahl Index of Hospital Market Shares	-0.28	-0.09
Percentage of total discharges in the 48 clinical episodes in 2011	-0.25	0.03
Number of discharges for clinical episode in 2011	0.66	0.05

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Percent of patients in 2011 that went home with no post-acute care by clinical episode	-0.34	-0.06
Percent of patients in 2011 that used an inpatient rehabilitation facility as first post-acute care setting by clinical episode	0.26	0.01
Percent of patients in 2011 that used a SNF as first post-acute care setting by clinical episode	-0.06	0.02
Percent of patients in 2011 that used a long-term care hospital as first post-acute care setting by clinical episode	0.22	0.08
Percent of patients in 2011 that went home with HHA services as first post-acute care setting by clinical episode*	0.39	-0.01
Unplanned readmission rate by clinical episode in 2011	-0.12	0.06
Change in unplanned readmission rate by clinical episode from 2011 to 2012	0.20	-0.05
All-cause mortality rate in 2011 by clinical episode	0.09	0.00
Change in all-cause mortality rate by clinical episode from 2011 to 2012	0.14	0.01
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.27	0.04
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	-0.01	0.01
Emergency Room rate by clinical episode in 2011	-0.21	-0.07
Change in Emergency room rate by clinical episode from 2011 to 2012	-0.04	0.06

*These variables were not included for this model.

**Caliper was 1/10th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -2.71 and the standard deviation was 1.68.

Exhibit S.48: Standardized Differences Before and After Matching, Model 2 Physician Group Practices, Other Respiratory

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	0.20	-0.04
Ownership - Government	-0.17	0.05
Ownership - For Profit*	-0.08	0.00
Urban	0.50	-0.03
Bed Count	0.37	0.04
Chain Indicator	0.01	0.04
Medicare Days as a Percent of Total Inpatient Days	-0.23	0.06
Resident-Bed Ratio	-0.29	0.08
Disproportionate Share Percent	-0.34	0.07
Teaching Status	0.07	0.03
Population Size of Market Area	0.05	0.01
Median Household Income	0.27	-0.01
Medicare Advantage Penetration	0.16	-0.06

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Primary Care Providers per 10,000 in Market	0.04	-0.03
SNF Beds per 10,000 in Market	-0.32	-0.03
Inpatient Rehabilitation Facility in Market	0.00	-0.02
Provider Market Share of the 48 potential BPCI episodes	0.00	0.04
Herfindahl Index of Hospital Market Shares	-0.12	0.04
Percentage of total discharges in the 48 clinical episodes in 2011	0.01	0.01
Number of discharges for clinical episode in 2011	0.58	0.07
Percent of patients in 2011 that went home with no post-acute care by clinical episode	-0.16	-0.02
Percent of patients in 2011 that used an inpatient rehabilitation facility as first post-acute care setting by clinical episode	0.26	0.04
Percent of patients in 2011 that used a SNF as first post-acute care setting by clinical episode	0.02	0.02
Percent of patients in 2011 that used a long-term care hospital as first post-acute care setting by clinical episode	0.00	-0.01
Percent of patients in 2011 that went home with HHA services as first post-acute care setting by clinical episode*	0.07	-0.01
Unplanned readmission rate by clinical episode in 2011	-0.06	0.06
Change in unplanned readmission rate by clinical episode from 2011 to 2012	0.16	-0.06
All-cause mortality rate in 2011 by clinical episode	0.11	0.00
Change in all-cause mortality rate by clinical episode from 2011 to 2012	0.07	0.02
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	-0.04	0.06
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	0.01	-0.06
Emergency Room rate by clinical episode in 2011	0.01	0.01
Change in Emergency room rate by clinical episode from 2011 to 2012	0.01	-0.04

*These variables were not included for this model.

**Caliper was 1/10th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -2.76 and the standard deviation was 1.21.

Exhibit S.49: Standardized Differences Before and After Matching, Model 2 Physician Group Practices, Gastrointestinal Obstruction

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	0.07	-0.14
Ownership - Government	-0.30	0.03
Ownership - For Profit*	0.21	0.14
Urban	0.80	0.02
Bed Count	0.65	-0.05
Chain Indicator	-0.19	-0.05

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Medicare Days as a Percent of Total Inpatient Days	-0.33	0.05
Resident-Bed Ratio	-0.33	-0.04
Disproportionate Share Percent	-0.31	0.05
Teaching Status	-0.01	0.01
Population Size of Market Area	0.22	-0.02
Median Household Income	0.23	-0.06
Medicare Advantage Penetration	0.35	0.04
Primary Care Providers per 10,000 in Market	0.03	-0.04
SNF Beds per 10,000 in Market	-0.59	-0.07
Inpatient Rehabilitation Facility in Market	0.51	-0.01
Provider Market Share of the 48 potential BPCI episodes	-0.42	-0.02
Herfindahl Index of Hospital Market Shares	-0.54	-0.02
Percentage of total discharges in the 48 clinical episodes in 2011	-0.31	0.00
Number of discharges for clinical episode in 2011	0.66	0.00
Percent of patients in 2011 that went home with no post-acute care by clinical episode	0.06	-0.05
Percent of patients in 2011 that used an inpatient rehabilitation facility as first post-acute care setting by clinical episode	0.11	0.00
Percent of patients in 2011 that used a SNF as first post-acute care setting by clinical episode	-0.22	0.03
Percent of patients in 2011 that used a long-term care hospital as first post-acute care setting by clinical episode	-0.08	0.06
Percent of patients in 2011 that went home with HHA services as first post-acute care setting by clinical episode*	0.16	0.04
Unplanned readmission rate by clinical episode in 2011	-0.12	0.01
Change in unplanned readmission rate by clinical episode from 2011 to 2012	0.04	0.01
All-cause mortality rate in 2011 by clinical episode	0.04	0.01
Change in all-cause mortality rate by clinical episode from 2011 to 2012	-0.01	-0.03
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	-0.08	0.05
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	0.05	-0.03
Emergency Room rate by clinical episode in 2011	-0.25	-0.03
Change in Emergency room rate by clinical episode from 2011 to 2012	0.09	0.02

* These variables were not included for this model.

** Caliper was 1/4th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -2.85 and the standard deviation was 1.96.

**Exhibit S.50: Standardized Differences Before and After Matching, Model 2
Physician Group Practices, Renal Failure**

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	0.00	-0.12
Ownership - Government	-0.26	0.00
Ownership - For Profit*	0.26	0.14
Urban	0.91	0.03
Bed Count	0.72	-0.12
Chain Indicator	-0.33	-0.07
Medicare Days as a Percent of Total Inpatient Days	-0.38	0.01
Resident-Bed Ratio	-0.30	-0.10
Disproportionate Share Percent	-0.20	-0.04
Teaching Status	0.08	-0.08
Population Size of Market Area	0.33	0.01
Median Household Income	0.33	-0.04
Medicare Advantage Penetration	0.31	0.08
Primary Care Providers per 10,000 in Market	0.03	-0.01
SNF Beds per 10,000 in Market	-0.71	-0.03
Inpatient Rehabilitation Facility in Market	0.46	0.09
Provider Market Share of the 48 potential BPCI episodes	-0.36	-0.13
Herfindahl Index of Hospital Market Shares	-0.56	-0.10
Percentage of total discharges in the 48 clinical episodes in 2011	-0.32	0.02
Number of discharges for clinical episode in 2011	0.85	-0.08
Percent of patients in 2011 that went home with no post-acute care by clinical episode	-0.26	-0.06
Percent of patients in 2011 that used an inpatient rehabilitation facility as first post-acute care setting by clinical episode	0.32	0.14
Percent of patients in 2011 that used a SNF as first post-acute care setting by clinical episode	-0.12	-0.03
Percent of patients in 2011 that used a long-term care hospital as first post-acute care setting by clinical episode	0.00	0.10
Percent of patients in 2011 that went home with HHA services as first post-acute care setting by clinical episode*	0.45	0.01
Unplanned readmission rate by clinical episode in 2011	0.14	0.01
Change in unplanned readmission rate by clinical episode from 2011 to 2012	-0.05	0.02
All-cause mortality rate in 2011 by clinical episode	-0.08	0.10
Change in all-cause mortality rate by clinical episode from 2011 to 2012	0.05	-0.13
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.27	0.07
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	-0.10	0.03

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Emergency Room rate by clinical episode in 2011	-0.28	-0.08
Change in Emergency room rate by clinical episode from 2011 to 2012	-0.07	0.08

*These variables were not included for this model.

**Caliper was 1/4th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -3.11 and the standard deviation was 2.23.

**Exhibit S.51: Standardized Differences Before and After Matching, Model 2
Physician Group Practices, Nutritional and Metabolic Disorders**

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	0.09	-0.14
Ownership - Government	-0.31	0.11
Ownership - For Profit*	0.20	0.07
Urban	0.81	0.07
Bed Count	0.73	-0.07
Chain Indicator	-0.06	-0.04
Medicare Days as a Percent of Total Inpatient Days	-0.46	0.02
Resident-Bed Ratio	-0.31	-0.10
Disproportionate Share Percent	-0.12	0.09
Teaching Status	0.15	-0.09
Population Size of Market Area	0.12	0.01
Median Household Income	0.38	-0.09
Medicare Advantage Penetration	0.55	0.03
Primary Care Providers per 10,000 in Market	0.08	0.01
SNF Beds per 10,000 in Market	-0.74	-0.07
Inpatient Rehabilitation Facility in Market	0.16	0.01
Provider Market Share of the 48 potential BPCI episodes	-0.19	-0.10
Herfindahl Index of Hospital Market Shares	-0.37	-0.07
Percentage of total discharges in the 48 clinical episodes in 2011	-0.32	0.05
Number of discharges for clinical episode in 2011	0.53	-0.05
Percent of patients in 2011 that went home with no post-acute care by clinical episode	-0.06	-0.08
Percent of patients in 2011 that used an inpatient rehabilitation facility as first post-acute care setting by clinical episode	0.20	0.10
Percent of patients in 2011 that used a SNF as first post-acute care setting by clinical episode	-0.21	-0.05
Percent of patients in 2011 that used a long-term care hospital as first post-acute care setting by clinical episode	-0.04	0.09
Percent of patients in 2011 that went home with HHA services as first post-acute care setting by clinical episode*	0.29	0.10
Unplanned readmission rate by clinical episode in 2011	-0.11	0.02

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Change in unplanned readmission rate by clinical episode from 2011 to 2012	0.12	0.02
All-cause mortality rate in 2011 by clinical episode	0.09	-0.02
Change in all-cause mortality rate by clinical episode from 2011 to 2012	-0.07	0.00
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.04	0.10
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	-0.01	-0.11
Emergency Room rate by clinical episode in 2011	-0.27	-0.09
Change in Emergency room rate by clinical episode from 2011 to 2012	0.05	0.04

* This variable was not included for this model.

**Caliper was 1/4th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -3.14 and the standard deviation was 2.10.

Exhibit S.52: Standardized Differences Before and After Matching, Model 2 Physician Group Practices, Cellulitis

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	0.27	-0.05
Ownership - Government	-0.36	0.00
Ownership - For Profit*	0.02	0.06
Urban	0.62	-0.03
Bed Count	0.48	-0.05
Chain Indicator	-0.07	-0.01
Medicare Days as a Percent of Total Inpatient Days	-0.44	0.00
Resident-Bed Ratio	-0.28	-0.04
Disproportionate Share Percent	-0.24	0.01
Teaching Status	0.11	-0.02
Population Size of Market Area	0.19	-0.02
Median Household Income	0.46	-0.01
Medicare Advantage Penetration	0.24	-0.01
Primary Care Providers per 10,000 in Market	0.09	0.01
SNF Beds per 10,000 in Market	-0.67	-0.03
Inpatient Rehabilitation Facility in Market	0.07	-0.03
Provider Market Share of the 48 potential BPCI episodes	-0.11	-0.02
Herfindahl Index of Hospital Market Shares	-0.27	0.00
Percentage of total discharges in the 48 clinical episodes in 2011	-0.16	0.04
Number of discharges for clinical episode in 2011	0.57	-0.04
Percent of patients in 2011 that went home with no post-acute care by clinical episode	-0.09	0.03

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Percent of patients in 2011 that used an inpatient rehabilitation facility as first post-acute care setting by clinical episode	0.07	-0.02
Percent of patients in 2011 that used a SNF as first post-acute care setting by clinical episode	-0.11	0.03
Percent of patients in 2011 that used a long-term care hospital as first post-acute care setting by clinical episode	0.17	-0.02
Percent of patients in 2011 that went home with HHA services as first post-acute care setting by clinical episode*	0.14	-0.05
Unplanned readmission rate by clinical episode in 2011	-0.12	0.04
Change in unplanned readmission rate by clinical episode from 2011 to 2012	0.05	-0.01
All-cause mortality rate in 2011 by clinical episode	0.17	0.03
Change in all-cause mortality rate by clinical episode from 2011 to 2012	-0.08	-0.02
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.06	0.04
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	-0.01	-0.09
Emergency Room rate by clinical episode in 2011	0.02	-0.01
Change in Emergency room rate by clinical episode from 2011 to 2012	0.02	0.02

*These variables were not included for this model.

**Caliper was 1/10th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -2.73 and the standard deviation was 1.68.

Exhibit S.53: Standardized Differences Before and After Matching, Model 2 Physician Group Practices, Esophagitis, Gastroenteritis and Other Digestive Disorders

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	0.19	-0.07
Ownership - Government	-0.33	0.01
Ownership - For Profit*	0.10	0.08
Urban	0.66	0.01
Bed Count	0.47	-0.03
Chain Indicator	-0.04	-0.02
Medicare Days as a Percent of Total Inpatient Days	-0.35	-0.02
Resident-Bed Ratio	-0.26	-0.04
Disproportionate Share Percent	-0.23	0.01
Teaching Status	0.07	-0.02
Population Size of Market Area	0.14	0.00
Median Household Income	0.56	0.04
Medicare Advantage Penetration	0.26	0.01
Primary Care Providers per 10,000 in Market	0.06	0.02

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
SNF Beds per 10,000 in Market	-0.74	-0.02
Inpatient Rehabilitation Facility in Market	0.14	0.06
Provider Market Share of the 48 potential BPCI episodes	-0.14	-0.05
Herfindahl Index of Hospital Market Shares	-0.31	-0.05
Percentage of total discharges in the 48 clinical episodes in 2011	-0.21	-0.01
Number of discharges for clinical episode in 2011	0.45	0.00
Percent of patients in 2011 that went home with no post-acute care by clinical episode	-0.27	0.02
Percent of patients in 2011 that used an inpatient rehabilitation facility as first post-acute care setting by clinical episode	0.11	0.06
Percent of patients in 2011 that used a SNF as first post-acute care setting by clinical episode	0.04	-0.03
Percent of patients in 2011 that used a long-term care hospital as first post-acute care setting by clinical episode	0.10	0.01
Percent of patients in 2011 that went home with HHA services as first post-acute care setting by clinical episode*	0.29	-0.01
Unplanned readmission rate by clinical episode in 2011	0.02	0.08
Change in unplanned readmission rate by clinical episode from 2011 to 2012	0.06	-0.08
All-cause mortality rate in 2011 by clinical episode	0.14	-0.02
Change in all-cause mortality rate by clinical episode from 2011 to 2012	-0.17	0.02
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.18	0.00
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	-0.06	-0.04
Emergency Room rate by clinical episode in 2011	-0.09	-0.02
Change in Emergency room rate by clinical episode from 2011 to 2012	0.10	-0.02

*These variables were not included for this model.

**Caliper was 1/4th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -2.83 and the standard deviation was 1.58.

**Exhibit S.54: Standardized Differences Before and After Matching, Model 3
Skilled Nursing Facilities, Urinary Tract Infection**

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	-0.29	-0.03
Ownership - Government	-0.22	0.06
Ownership - For Profit*	0.36	0.01
Urban Location	0.18	0.00
SNF in Hospital	-0.18	-0.01
Bed Count	0.00	-0.01
Chain Indicator	0.06	0.00
Number of points out of 5 in overall rating and in three areas: Quality, Survey/Health Inspections, and Staffing (from Nursing Home Compare)	0.29	0.00
Population Size of Market Area	-0.02	0.00
Median Household Income	0.35	0.00
Medicare Advantage Penetration	-0.06	-0.02
SNF Beds per 10,000 in Market	-0.03	-0.01
Inpatient Rehabilitation Facility in Market	0.11	0.00
Provider Market Share of the 48 potential BPCI episodes	-0.04	0.01
Herfindahl Index of Hospital Market Shares	-0.06	0.01
Herfindahl Index of SNF Market Shares	-0.14	0.02
Percentage of total discharges in the 48 clinical episodes in 2011	-0.31	0.02
Number of discharges for clinical episode in 2011	0.19	0.08
Number of institutional PAC days per patient within 90 days of a hospital discharge by clinical episode in 2011	0.03	0.00
Number of SNF days per patient within 90 days within 90 days of a hospital discharge by clinical episode in 2011	0.03	0.00
Unplanned readmission rate by clinical episode in 2011	0.13	0.01
Change in unplanned readmission rate by clinical episode from 2011 to 2012	-0.06	-0.02
All-cause mortality rate by clinical episode in 2011	0.03	0.01
Change in all-cause mortality rate by clinical episode from 2011 to 2012	0.02	0.00
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.15	-0.02
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	-0.05	0.00
Emergency Room rate by clinical episode in 2011	0.08	0.00
Change in Emergency room rate by clinical episode from 2011 to 2012	-0.07	-0.02

* These variables were not included for this model.

**Caliper was 1/20th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -3.54 and the standard deviation was 0.95.

**Exhibit S.55: Standardized Differences Before and After Matching, Model 3
Skilled Nursing Facilities, Stroke**

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	-0.44	0.03
Ownership - Government*		
Ownership - For Profit*	0.44	-0.03
Urban Location	0.25	-0.03
SNF in Hospital	-0.26	0.01
Bed Count	-0.04	0.04
Chain Indicator	-0.10	0.05
Number of points out of 5 in overall rating and in three areas: Quality, Survey/Health Inspections, and Staffing (from Nursing Home Compare)	0.15	-0.02
Population Size of Market Area	-0.01	0.01
Median Household Income	0.19	-0.05
Medicare Advantage Penetration	0.00	-0.01
SNF Beds per 10,000 in Market	0.02	0.07
Inpatient Rehabilitation Facility in Market	0.00	0.05
Provider Market Share of the 48 potential BPCI episodes	-0.14	0.01
Herfindahl Index of Hospital Market Shares	-0.09	-0.01
Herfindahl Index of SNF Market Shares	-0.21	0.00
Percentage of total discharges in the 48 clinical episodes in 2011	-0.19	-0.02
Number of discharges for clinical episode in 2011	0.15	-0.05
Number of institutional PAC days per patient within 90 days of a hospital discharge by clinical episode in 2011	0.30	0.01
Number of SNF days per patient within 90 days of a hospital discharge by clinical episode in 2011	0.31	0.01
Unplanned readmission rate by clinical episode in 2011	0.12	0.04
Change in unplanned readmission rate by clinical episode from 2011 to 2012	-0.09	-0.03
All-cause mortality rate by clinical episode in 2011	-0.12	0.07
Change in all-cause mortality rate by clinical episode from 2011 to 2012	0.17	-0.02
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.41	0.03
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	-0.26	-0.01
Emergency Room rate by clinical episode in 2011	0.01	0.01
Change in Emergency room rate by clinical episode from 2011 to 2012	0.05	0.01

* These variables were not included for this model.

**Caliper was 1/20th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -3.40 and the standard deviation was 1.00.

Note: A blank cell indicates there were no participants with the characteristic.

**Exhibit S.56: Standardized Differences Before and After Matching, Model 3
Skilled Nursing Facilities, Chronic Obstructive Pulmonary Disease, Bronchitis, Asthma**

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	-0.31	-0.05
Ownership - Government	-0.13	0.00
Ownership - For Profit*	0.35	0.05
Urban Location	0.26	0.01
SNF in Hospital	-0.32	-0.02
Bed Count	-0.02	0.02
Chain Indicator	-0.16	-0.03
Number of points out of 5 in overall rating and in three areas: Quality, Survey/Health Inspections, and Staffing (from Nursing Home Compare)	0.26	0.00
Population Size of Market Area	-0.05	0.01
Median Household Income	0.19	0.01
Medicare Advantage Penetration	-0.02	-0.02
SNF Beds per 10,000 in Market	-0.08	-0.01
Inpatient Rehabilitation Facility in Market	0.07	0.03
Provider Market Share of the 48 potential BPCI episodes	-0.03	0.01
Herfindahl Index of Hospital Market Shares	-0.07	0.02
Herfindahl Index of SNF Market Shares	-0.10	0.03
Percentage of total discharges in the 48 clinical episodes in 2011	-0.26	0.03
Number of discharges for clinical episode in 2011	0.13	0.01
Number of institutional PAC days per patient within 90 days of a hospital discharge by clinical episode in 2011	0.11	0.05
Number of SNF days per patient within 90 days of a hospital discharge by clinical episode in 2011	0.09	0.04
Unplanned readmission rate by clinical episode in 2011	0.06	0.02
Change in unplanned readmission rate by clinical episode from 2011 to 2012	-0.14	0.03
All-cause mortality rate by clinical episode in 2011	-0.01	-0.02
Change in all-cause mortality rate by clinical episode from 2011 to 2012	-0.13	0.02
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.32	0.03
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	-0.15	0.00
Emergency Room rate by clinical episode in 2011	-0.05	0.01
Change in Emergency room rate by clinical episode from 2011 to 2012	0.04	-0.05

* These variables were not included for this model.

**Caliper was 1/20th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -3.41 and the standard deviation was 0.98.

**Exhibit S.57: Standardized Differences Before and After Matching, Model 3
Skilled Nursing Facilities, Major Joint Replacement of the Lower Extremity**

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	-0.21	-0.01
Ownership - Government	-0.26	0.05
Ownership - For Profit*	0.29	0.01
Urban Location	0.31	0.01
SNF in Hospital	-0.24	0.00
Bed Count	-0.08	-0.01
Chain Indicator	-0.01	0.04
Number of points out of 5 in overall rating and in three areas: Quality, Survey/Health Inspections, and Staffing (from Nursing Home Compare)	0.16	-0.01
Population Size of Market Area	-0.08	0.01
Median Household Income	0.21	0.00
Medicare Advantage Penetration	0.17	0.01
SNF Beds per 10,000 in Market	-0.13	0.00
Inpatient Rehabilitation Facility in Market	-0.04	-0.03
Provider Market Share of the 48 potential BPCI episodes	-0.11	-0.03
Herfindahl Index of Hospital Market Shares	-0.12	0.00
Herfindahl Index of SNF Market Shares	-0.18	-0.02
Percentage of total discharges in the 48 clinical episodes in 2011	-0.09	0.00
Number of discharges for clinical episode in 2011	0.07	-0.01
Number of institutional PAC days per patient within 90 days of a hospital discharge by clinical episode in 2011	0.05	0.01
Number of SNF days per patient within 90 days of a hospital discharge by clinical episode in 2011	0.06	0.01
Unplanned readmission rate by clinical episode in 2011	0.01	-0.02
Change in unplanned readmission rate by clinical episode from 2011 to 2012	-0.05	0.00
All-cause mortality rate by clinical episode in 2011	0.03	0.04
Change in all-cause mortality rate by clinical episode from 2011 to 2012	-0.01	-0.03
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.15	0.00
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	-0.21	0.02
Emergency Room rate by clinical episode in 2011	-0.03	0.00
Change in Emergency room rate by clinical episode from 2011 to 2012	-0.05	0.01

* These variables were not included for this model.

**Caliper was 1/20th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -3.13 and the standard deviation was 0.90.

**Exhibit S.58: Standardized Differences Before and After Matching, Model 3
Skilled Nursing Facilities, Congestive Heart Failure**

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	-0.30	0.00
Ownership - Government	-0.23	0.05
Ownership - For Profit*	0.37	-0.01
Urban Location	0.35	0.01
SNF in Hospital	-0.26	0.03
Bed Count	-0.04	0.01
Chain Indicator	0.00	0.00
Number of points out of 5 in overall rating and in three areas: Quality, Survey/Health Inspections, and Staffing (from Nursing Home Compare)	0.22	0.01
Population Size of Market Area	0.07	0.01
Median Household Income	0.31	0.02
Medicare Advantage Penetration	0.07	0.01
SNF Beds per 10,000 in Market	0.01	-0.02
Inpatient Rehabilitation Facility in Market	-0.02	-0.01
Provider Market Share of the 48 potential BPCI episodes	-0.18	0.00
Herfindahl Index of Hospital Market Shares	-0.16	0.00
Herfindahl Index of SNF Market Shares	-0.26	-0.01
Percentage of total discharges in the 48 clinical episodes in 2011	-0.23	0.01
Number of discharges for clinical episode in 2011	0.26	0.04
Number of institutional PAC days per patient within 90 days of a hospital discharge Hospital by clinical episode in 2011	0.07	-0.02
Number of SNF days per patient within 90 days of a hospital discharge by clinical episode in 2011	0.06	-0.02
Unplanned readmission rate by clinical episode in 2011	0.03	0.00
Change in unplanned readmission rate by clinical episode from 2011 to 2012	-0.05	-0.01
All-cause mortality rate by clinical episode in 2011	-0.03	0.02
Change in all-cause mortality rate by clinical episode from 2011 to 2012	-0.06	-0.01
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.17	-0.02
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	-0.10	0.01
Emergency Room rate by clinical episode in 2011	0.03	-0.02
Change in Emergency room rate by clinical episode from 2011 to 2012	0.02	0.01

* These variables were not included for this model.

**Caliper was 1/10th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -3.40 and the standard deviation was 1.06.

**Exhibit S.59: Standardized Differences Before and After Matching, Model 3
Skilled Nursing Facilities, Medical Non-infectious Orthopedic**

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	-0.60	0.04
Ownership - Government	-0.18	0.01
Ownership - For Profit*	0.64	-0.05
Urban Location	0.20	0.02
SNF in Hospital	-0.35	-0.02
Bed Count	-0.12	0.08
Chain Indicator	-0.23	-0.03
Number of points out of 5 in overall rating and in three areas: Quality, Survey/Health Inspections, and Staffing (from Nursing Home Compare)	0.04	-0.03
Population Size of Market Area	-0.03	0.05
Median Household Income	0.12	0.03
Medicare Advantage Penetration	0.10	0.01
SNF Beds per 10,000 in Market	-0.08	0.00
Inpatient Rehabilitation Facility in Market	0.02	0.05
Provider Market Share of the 48 potential BPCI episodes	-0.22	-0.02
Herfindahl Index of Hospital Market Shares	-0.16	-0.01
Herfindahl Index of SNF Market Shares	-0.20	-0.01
Percentage of total discharges in the 48 clinical episodes in 2011	-0.33	-0.05
Number of discharges for clinical episode in 2011	0.19	0.04
Number of institutional PAC days per patient within 90 days of a hospital discharge by clinical episode in 2011	0.32	0.03
Number of SNF days per patient within 90 days of a hospital discharge by clinical episode in 2011	0.32	0.03
Unplanned readmission rate by clinical episode in 2011	0.09	0.05
Change in unplanned readmission rate by clinical episode from 2011 to 2012	0.01	-0.01
All-cause mortality rate by clinical episode in 2011	-0.08	0.02
Change in all-cause mortality rate by clinical episode from 2011 to 2012	-0.02	-0.02
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.44	0.03
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	-0.19	-0.01
Emergency Room rate by clinical episode in 2011	0.09	-0.04
Change in Emergency room rate by clinical episode from 2011 to 2012	-0.01	0.00

* These variables were not included for this model.

**Caliper was 1/20th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -3.43 and the standard deviation was 1.09.

**Exhibit S.60: Standardized Differences Before and After Matching, Model 3
Skilled Nursing Facilities, Hip and Femur Procedures Except Major Joint**

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	-0.18	0.02
Ownership - Government	-0.21	-0.02
Ownership - For Profit*	0.25	-0.02
Urban Location	0.24	0.03
SNF in Hospital	-0.27	-0.04
Bed Count	-0.11	0.02
Chain Indicator	0.02	-0.02
Number of points out of 5 in overall rating and in three areas: Quality, Survey/Health Inspections, and Staffing (from Nursing Home Compare)	0.23	0.04
Population Size of Market Area	-0.03	0.01
Median Household Income	0.18	0.01
Medicare Advantage Penetration	0.18	-0.05
SNF Beds per 10,000 in Market	-0.05	0.01
Inpatient Rehabilitation Facility in Market	-0.03	0.03
Provider Market Share of the 48 potential BPCI episodes	-0.05	0.01
Herfindahl Index of Hospital Market Shares	-0.07	0.00
Herfindahl Index of SNF Market Shares	-0.11	0.01
Percentage of total discharges in the 48 clinical episodes in 2011	0.04	-0.03
Number of discharges for clinical episode in 2011	0.06	-0.01
Number of institutional PAC days per patient within 90 days of a hospital discharge by clinical episode in 2011	0.19	-0.01
Number of SNF days per patient within 90 days of a hospital discharge by clinical episode in 2011	0.19	0.00
Unplanned readmission rate by clinical episode in 2011	0.11	0.02
Change in unplanned readmission rate by clinical episode from 2011 to 2012	-0.13	-0.02
All-cause mortality rate by clinical episode in 2011	0.08	-0.03
Change in all-cause mortality rate by clinical episode from 2011 to 2012	0.01	0.06
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.29	-0.01
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	-0.18	0.00
Emergency Room rate by clinical episode in 2011	-0.07	0.00
Change in Emergency room rate by clinical episode from 2011 to 2012	-0.02	0.00

* These variables were not included for this model.

**Caliper was 1/20th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -3.50 and the standard deviation was 0.87.

**Exhibit S.61: Standardized Differences Before and After Matching, Model 3
Skilled Nursing Facilities, Sepsis**

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	-0.46	0.00
Ownership - Government*		
Ownership - For Profit*	0.46	0.00
Urban Location	0.24	0.04
SNF in Hospital	-0.24	0.02
Bed Count	-0.17	0.02
Chain Indicator	-0.01	0.01
Number of points out of 5 in overall rating and in three areas: Quality, Survey/Health Inspections, and Staffing (from Nursing Home Compare)	0.19	0.00
Population Size of Market Area	-0.08	0.00
Median Household Income	0.29	0.00
Medicare Advantage Penetration	0.12	-0.01
SNF Beds per 10,000 in Market	-0.04	-0.02
Inpatient Rehabilitation Facility in Market	-0.11	0.00
Provider Market Share of the 48 potential BPCI episodes	-0.17	0.04
Herfindahl Index of Hospital Market Shares	-0.06	0.02
Herfindahl Index of SNF Market Shares	-0.19	0.03
Percentage of total discharges in the 48 clinical episodes in 2011	-0.15	0.02
Number of discharges for clinical episode in 2011	0.13	0.02
Number of institutional PAC days per patient within 90 days of a hospital discharge by clinical episode in 2011	0.09	0.01
Number of SNF days per patient within 90 days of a hospital discharge by clinical episode in 2011	0.10	0.01
Unplanned readmission rate by clinical episode in 2011	0.05	0.00
Change in unplanned readmission rate by clinical episode from 2011 to 2012	-0.09	0.00
All-cause mortality rate by clinical episode in 2011	-0.09	0.01
Change in all-cause mortality rate by clinical episode from 2011 to 2012	0.08	0.00
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.18	0.01
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	-0.08	-0.01
Emergency Room rate by clinical episode in 2011	0.02	0.00
Change in Emergency room rate by clinical episode from 2011 to 2012	-0.05	0.01

* These variables were not included for this model.

**Caliper was 1/20th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -3.53 and the standard deviation was 0.97.

Note: A blank cell indicates there were no participants with the characteristic.

**Exhibit S.62: Standardized Differences Before and After Matching, Model 3
Skilled Nursing Facilities, Simple Pneumonia and Respiratory Infections**

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	-0.24	0.00
Ownership - Government	-0.28	0.01
Ownership - For Profit*	0.34	0.00
Urban Location	0.31	-0.01
SNF in Hospital	-0.28	0.00
Bed Count	0.03	-0.04
Chain Indicator	0.04	0.02
Number of points out of 5 in overall rating and in three areas: Quality, Survey/Health Inspections, and Staffing (from Nursing Home Compare)	0.19	0.00
Population Size of Market Area	0.01	-0.01
Median Household Income	0.37	0.01
Medicare Advantage Penetration	0.02	-0.03
SNF Beds per 10,000 in Market	-0.06	0.01
Inpatient Rehabilitation Facility in Market	0.02	-0.01
Provider Market Share of the 48 potential BPCI episodes	-0.08	-0.01
Herfindahl Index of Hospital Market Shares	-0.12	0.02
Herfindahl Index of SNF Market Shares	-0.18	0.00
Percentage of total discharges in the 48 clinical episodes in 2011	-0.26	0.02
Number of discharges for clinical episode in 2011	0.15	-0.03
Number of institutional PAC days per patient within 90 days of a hospital discharge by clinical episode in 2011	0.03	0.00
Number of SNF days per patient within 90 days of a hospital discharge by clinical episode in 2011	0.04	0.01
Unplanned readmission rate by clinical episode in 2011	0.13	-0.01
Change in unplanned readmission rate by clinical episode from 2011 to 2012	-0.12	0.01
All-cause mortality rate by clinical episode in 2011	-0.13	0.02
Change in all-cause mortality rate by clinical episode from 2011 to 2012	0.08	-0.01
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.20	0.01
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	-0.09	-0.01
Emergency Room rate by clinical episode in 2011	-0.04	0.00
Change in Emergency room rate by clinical episode from 2011 to 2012	-0.08	0.01

* These variables were not included for this model.

**Caliper was 1/20th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -3.53 and the standard deviation was 1.14.

**Exhibit S.63: Standardized Differences Before and After Matching, Model 3
Skilled Nursing Facilities, Other Respiratory**

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	-0.40	-0.02
Ownership - Government*		
Ownership - For Profit*	0.40	0.02
Urban Location	0.14	-0.01
SNF in Hospital	-0.14	0.01
Bed Count	-0.21	-0.07
Chain Indicator	-0.11	-0.03
Number of points out of 5 in overall rating and in three areas: Quality, Survey/Health Inspections, and Staffing (from Nursing Home Compare)	0.18	0.03
Population Size of Market Area	-0.09	0.00
Median Household Income	0.20	0.00
Medicare Advantage Penetration	0.06	0.05
SNF Beds per 10,000 in Market	-0.02	-0.03
Inpatient Rehabilitation Facility in Market	0.07	0.03
Provider Market Share of the 48 potential BPCI episodes	-0.12	0.00
Herfindahl Index of Hospital Market Shares	-0.04	-0.04
Herfindahl Index of SNF Market Shares	-0.17	-0.02
Percentage of total discharges in the 48 clinical episodes in 2011	-0.10	0.03
Number of discharges for clinical episode in 2011	0.14	0.00
Number of institutional PAC days per patient within 90 days of a hospital discharge by clinical episode in 2011	0.00	0.00
Number of SNF days per patient within 90 days of a hospital discharge by clinical episode in 2011	-0.03	0.00
Unplanned readmission rate by clinical episode in 2011	0.26	0.00
Change in unplanned readmission rate by clinical episode from 2011 to 2012	-0.17	-0.02
All-cause mortality rate by clinical episode in 2011	0.08	-0.02
Change in all-cause mortality rate by clinical episode from 2011 to 2012	-0.04	0.00
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.14	0.03
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	0.02	-0.02
Emergency Room rate by clinical episode in 2011	0.02	0.03
Change in Emergency room rate by clinical episode from 2011 to 2012	0.16	-0.05

* These variables were not included for this model.

**Caliper was 1/4th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -2.79 and the standard deviation was 0.78.

Note: A blank cell indicates there were no participants with the characteristic.

**Exhibit S.64: Standardized Differences Before and After Matching, Model 3
Skilled Nursing Facilities, Renal Failure**

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	-0.47	0.02
Ownership - Government*		
Ownership - For Profit*	0.47	-0.02
Urban Location	0.15	-0.02
SNF in Hospital	-0.22	-0.02
Bed Count	-0.13	0.05
Chain Indicator	-0.08	0.01
Number of points out of 5 in overall rating and in three areas: Quality, Survey/Health Inspections, and Staffing (from Nursing Home Compare)	0.11	0.02
Population Size of Market Area	-0.05	-0.02
Median Household Income	0.17	-0.01
Medicare Advantage Penetration	-0.01	-0.05
SNF Beds per 10,000 in Market	0.06	0.07
Inpatient Rehabilitation Facility in Market	-0.10	-0.05
Provider Market Share of the 48 potential BPCI episodes	0.03	-0.01
Herfindahl Index of Hospital Market Shares	-0.07	0.00
Herfindahl Index of SNF Market Shares	-0.01	-0.02
Percentage of total discharges in the 48 clinical episodes in 2011	-0.17	0.00
Number of discharges for clinical episode in 2011	0.23	0.04
Number of institutional PAC days per patient within 90 days of a hospital discharge by clinical episode in 2011	0.07	0.00
Number of SNF days per patient within 90 days of a hospital discharge by clinical episode in 2011	0.06	0.00
Unplanned readmission rate by clinical episode in 2011	-0.05	0.04
Change in unplanned readmission rate by clinical episode from 2011 to 2012	0.02	-0.07
All-cause mortality rate by clinical episode in 2011	-0.10	0.04
Change in all-cause mortality rate by clinical episode from 2011 to 2012	0.04	-0.04
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.09	0.03
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	-0.11	0.01
Emergency Room rate by clinical episode in 2011	-0.10	0.03
Change in Emergency room rate by clinical episode from 2011 to 2012	0.07	-0.04

* These variables were not included for this model.

**Caliper was 1/20th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -3.58 and the standard deviation was 0.91.

Note: A blank cell indicates there were no participants with the characteristic.

**Exhibit S.65: Standardized Differences Before and After Matching, Model 3
Home Health Agencies, Major Joint Replacement of the Lower Extremity**

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	0.04	-0.05
Ownership - Government*		
Ownership - For Profit*	-0.04	0.05
Urban	0.13	-0.06
Number of Nurses Employed by an HHA	0.11	-0.07
Population Size of Market Area	-0.13	-0.02
Percentage of total discharges in the 48 clinical episodes in 2011	0.47	0.07
Number of discharges for clinical episode in 2011	0.20	-0.02
Number of HHA days per patient within 90 days of a hospital discharge by clinical episode in 2011	-0.17	-0.03
Unplanned readmission rate by clinical episode in 2011	-0.01	-0.02
Change in unplanned readmission rate by clinical episode from 2011 to 2012	-0.23	0.11
All-cause mortality rate by clinical episode in 2011	-0.05	-0.01
Change in all-cause mortality rate by clinical episode from 2011 to 2012	-0.03	0.00
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.24	0.04
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	-0.44	0.03
Emergency Room rate by clinical episode in 2011	-0.30	0.01
Change in Emergency room rate by clinical episode from 2011 to 2012	0.28	0.07

* These variables were not included for this model.

**Caliper was 1/4th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -4.33 and the standard deviation was 0.92.

Note: A blank cell indicates there were no participants with the characteristic.

**Exhibit S.66: Standardized Differences Before and After Matching, Model 3
Home Health Agencies, Congestive Heart Failure**

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	-0.28	-0.04
Ownership - Government*		
Ownership - For Profit*	0.28	0.04
Urban	0.14	-0.02
Number of Nurses Employed by an HHA ¹	0.24	0.18
Population Size of Market Area	-0.11	0.06
Percentage of total discharges in the 48 clinical episodes in 2011*	0.20	0.18
Number of discharges for clinical episode in 2011 ¹	0.27	0.15
Number of HHA days per patient within 90 days of a hospital discharge by clinical episode in 2011*	0.33	0.13
Unplanned readmission rate by clinical episode in 2011	-0.08	-0.05
Change in unplanned readmission rate by clinical episode from 2011 to 2012	0.27	0.17
All-cause mortality rate by clinical episode in 2011	-0.13	0.04
Change in all-cause mortality rate by clinical episode from 2011 to 2012	0.33	0.16
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.05	0.07
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	0.05	-0.01
Emergency Room rate by clinical episode in 2011	0.07	0.07
Change in Emergency room rate by clinical episode from 2011 to 2012	0.15	0.06

* These variables were not included for this model.

**A Mahalanobis Distance Matching model was used for this episode. There is no caliper.

¹ These variables were replaced with indicator variables for values greater than the median.

Note: A blank cell indicates there were no participants with the characteristic.

**Exhibit S.67: Standardized Differences Before and After Matching, Model 3
Home Health Agencies, Simple Pneumonia and Respiratory Infections**

Variable	Standardized Difference Before Matching	Standardized Difference After Matching**
Ownership - Non-Profit	-0.34	0.00
Ownership - Government*		
Ownership - For Profit*	0.34	0.00
Urban	0.09	0.00
Number of Nurses Employed by an HHA	0.11	0.10
Population Size of Market Area	-0.40	0.12
Percentage of total discharges in the 48 clinical episodes in 2011	0.26	-0.04
Number of discharges for clinical episode in 2011	0.20	0.10
Number of HHA days per patient within 90 days of a hospital discharge by clinical episode in 2011	0.10	-0.02
Unplanned readmission rate by clinical episode in 2011	0.06	0.00
Change in unplanned readmission rate by clinical episode from 2011 to 2012	0.01	-0.07
All-cause mortality rate by clinical episode in 2011	0.30	0.09
Change in all-cause mortality rate by clinical episode from 2011 to 2012	-0.29	-0.07
Average 90-day standardized Medicare Part A payment amount by clinical episode in 2011	0.16	0.00
Change in average 90-day standardized Medicare Part A payment amount by clinical episode from 2011 to 2012	-0.01	-0.08
Emergency Room rate by clinical episode in 2011	0.07	-0.01
Change in Emergency room rate by clinical episode from 2011 to 2012*	-0.03	-0.06

* These variables were not included for this model.

**Caliper was 1/20th of the standard deviation of the log-odds propensity score. The mean log-odds propensity score was -4.25 and the standard deviation was 0.87.

Note: A blank cell indicates there were no participants with the characteristic.

Appendix T: Beneficiary Survey Instrument Waves 2-10



Health Care Experience Survey

If the person this survey was mailed to cannot complete the survey, and there is no one else who can do so for him or her, please check here and return the blank survey in the enclosed postage-paid envelope.

Thank you.

Instructions:

- Please read each question carefully and respond by shading the circle or box next to the response that most closely represents your opinion.
- Please shade only one circle for each question, unless it tells you to “Choose all that apply.”
- While you can use a pen, please use a PENCIL in case you want to change your answer.
- Please do NOT use felt tip pens.
- Please erase cleanly or white out any marks you wish to change.
- Please do not make any stray marks on the form.



We are interested in the quality of care you received in the hospital listed in the cover letter, and how your recovery has been going. We understand that this was probably a difficult time for you and your family. We appreciate you taking the time to tell us about your health care experiences. Please be assured that all responses are confidential.

There are four sections of this survey. The first section asks about how you were feeling just before you went into the hospital listed in the cover letter. The second section asks about how you are currently feeling. The third section asks about your experience and satisfaction in the hospital and other places you received care after you left the hospital. The last part of the survey asks a few general questions about you.

1. Please indicate who is completing this survey.
 - Person named in the cover letter
 - Person named in the cover letter, with help from a family member, friend or caregiver
 - A family member, friend, or caregiver of the person named in the cover letter
 - Someone else who is not a family member, friend, or caregiver of the person named in the cover letter

Section 1. Before the Hospital

We would like to know how you were doing BEFORE you went to the hospital listed in the cover letter.

2. Thinking about the week before you were hospitalized, how much help did you need from another person with **bathing, dressing, using the toilet, or eating**?
 - No help needed from another person
 - Some help needed from another person
 - Complete help needed from another person
 - Don't know/Don't remember

3. Thinking about the week before you were hospitalized, how much help did you need from another person with **planning regular tasks**, such as shopping or remembering to take medication?
- No help needed from another person
 - Some help needed from another person
 - Complete help needed from another person
 - Don't know/Don't remember
4. Thinking about the week before you were hospitalized, what best describes your **use of a mobility device** such as a wheelchair, scooter, walker, or cane?
- I never used a mobility device
 - I sometimes used a mobility device
 - I always used a mobility device
 - Don't know/Don't remember
5. Thinking about the week before you were hospitalized, what best describes your ability to **walk by yourself** without resting? That is, without the help of another person or the help of a mobility device.
- I could walk several blocks by myself without resting
 - I could walk one block by myself without resting
 - I could walk from one room to another by myself without resting
 - I was not able to walk by myself without resting
 - Don't know/Don't remember
6. Thinking about the week before you were hospitalized, how much difficulty did you have **walking up or down 12 stairs**?
- I had no difficult walking up or down 12 stairs
 - I had some difficulty walking up or down 12 stairs
 - I had a lot of difficulty walking up or down 12 stairs
 - I was not able to walk up or down 12 stairs
 - Don't know/Don't remember

7. Thinking about the week before you were hospitalized, how often did your **physical health or emotional problems** interfere with your social activities (like visiting friends, relatives, etc.)?
- All of the time
 - Most of the time
 - Some of the time
 - A little of the time
 - None of the time
 - Don't know/Don't remember
8. Thinking about the week before you were hospitalized, how much did **pain** interfere with your normal activities?
- All of the time
 - Most of the time
 - Some of the time
 - A little of the time
 - None of the time
 - Don't know/Don't remember

Section 2. After the Hospital

It has been a few months since you left the hospital and we would like to know how you have been doing LATELY.

9. Over the **past two weeks**, how often have you been bothered by feeling little interest or pleasure in doing things?
- Not at all
 - Several days (1-7 days)
 - More than half the days (8-11 days)
 - Nearly every day (12 or more days)

10. Over the **past two weeks**, how often have you been bothered by feeling down, depressed or hopeless?

- Not at all
- Several days (1-7 days)
- More than half the days (8-11 days)
- Nearly every day (12 or more days)

Now we would like to know how you are doing TODAY.

11. How much help do you currently need from another person with **bathing, dressing, using the toilet, or eating**?

- No help needed from another person
- Some help needed from another person
- Complete help needed from another person
- Don't know/Don't remember

12. How much help do you currently need from another person with **planning regular tasks**, such as shopping or remembering to take medication?

- No help needed from another person
- Some help needed from another person
- Complete help needed from another person
- Don't know/Don't remember

13. What currently best describes your **use of a mobility device** such as a wheelchair, scooter, walker, or cane?

- I never use a mobility device
- I sometimes use a mobility device
- I always use a mobility device
- Don't know/Don't remember

14. What best describes your current ability to **walk by yourself** without resting? That is, without the help of another person or the help of a mobility device.

- I can walk several blocks by myself without resting
- I can walk one block by myself without resting
- I can walk from one room to another by myself without resting
- I am not able to walk by myself without resting
- Don't know/Don't remember

15. Do you currently have difficulty **walking up or down 12 stairs**?

- I have no difficulty walking up or down 12 stairs
- I have some difficulty walking up or down 12 stairs
- I have a lot of difficulty walking up or down 12 stairs
- I am not able to walk up or down 12 stairs
- Don't know/Don't remember

16. How often does your physical **health or emotional problems** currently interfere with your social activities (like visiting friends, relatives, etc.)?

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time
- Don't know/Don't remember

17. How much does **pain** currently interfere with your normal activities?

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time
- Don't know/Don't remember

18. **In general**, how would you rate your physical health?

- Excellent
- Very good
- Good
- Fair
- Poor

19. **In general**, how would you rate your mental health today, including your mood and your ability to think?

- Excellent
- Very good
- Good
- Fair
- Poor

Section 3. Health Care Experiences

Now, we would like to hear about your experiences while you were in the hospital listed in the cover letter and any other place where you received care following that stay in the hospital.

In the following questions, the term “medical staff” means doctors, nurses, physical or occupational therapists and any other medical professionals who helped take care of you during your time in the hospital and afterwards, in other facilities or at home. For example, after leaving the hospital, you may have received care from medical staff in a nursing home, rehabilitation facility, skilled nursing facility, an assisted living facility, or at home.

20. Thinking about all of the care you received in the hospital and afterwards, how often did you, your family, or your caregiver **get conflicting advice from medical staff about your treatment?**
- Never
 - Sometimes
 - Usually
 - Always
21. Thinking about all of the care you received in the hospital and afterwards, how often were **the services you got appropriate for the level of care you needed?**
- Never
 - Sometimes
 - Usually
 - Always
22. What is your preferred language?
- English
 - Spanish
 - Other

23. Thinking about all of the care you received in the hospital and afterwards, **how often did medical staff speak to you in your preferred language?**

- Never
- Sometimes
- Usually
- Always

We'd like to learn about your experience as you were leaving the hospital in the cover letter.

24. Thinking about when you left the hospital, **were you discharged at the right time?**

- No, I was discharged too early
- No, I was discharged too late
- Yes, it was the right time

How much do you agree or disagree with the following statement?

25. Thinking about when you left the hospital listed in the cover letter, the medical staff **took your preferences and those of your family or your caregiver into account** in deciding what health care services you should have after you left the hospital.

- Strongly Disagree
- Disagree
- Agree
- Strongly Agree
- Don't Know/Don't Remember
- Not Applicable

26. Where do you reside now?

- At my own home, in someone else's home, or in an assisted living facility
(CONTINUE WITH Question 27)
- In a rehabilitation center, nursing home, or other health care facility
(GO TO Question 31 located on the bottom of page 11)

→ 27. Before you prepared to go home (or to someone else's home, or to an assisted living facility), you and your family or caregiver had a **good understanding of how to take care of yourself**.

- Strongly Disagree
- Disagree
- Agree
- Strongly Agree
- Don't Know/Don't Remember
- Not Applicable

28. Before you prepared to go home (or to someone else's home, or to an assisted living facility), **medical staff clearly explained how to take your medications**.

- Strongly Disagree
- Disagree
- Agree
- Strongly Agree
- Don't Know/Don't Remember
- Not Applicable, did not receive new medications

If you currently reside in a rehabilitation center, nursing home, or other health care facility, start at Question 31

29. Before you prepared to go home (or to someone else’s home, or to an assisted living facility), **medical staff clearly explained what follow-up appointments or treatments would be needed.**

- Strongly Disagree
- Disagree
- Agree
- Strongly Agree
- Don’t Know/Don’t Remember
- Not Applicable

30. Overall, since you returned home (or to someone else’s home, or to an assisted living facility), **you and your caregivers have been able to manage your health needs.**

- Strongly Disagree
- Disagree
- Agree
- Strongly Agree
- Don’t Know/Don’t Remember
- Not applicable

31. Overall, how satisfied are you with your recovery **since you left the hospital?**

- Not at all satisfied
- Slightly satisfied
- Moderately satisfied
- Quite a bit satisfied
- Extremely satisfied

Continue onto back cover



The last set of questions is about you.

32. Who do you live with?

- Live alone
- Live with other(s)
- Live with a paid helper

33. Are you male or female?

- Male
- Female

34. What is the highest grade or level of school that you completed?

- 8th grade or less
- Some high school, but did not graduate
- High school graduate or GED
- Some college or 2-year degree
- 4-year college degree
- More than 4-year college degree

35. Are you of Hispanic, Latino, or Spanish origin?

- No, not of Hispanic, Latino, or Spanish origin
- Yes, of Hispanic, Latino, or Spanish origin

36. What is your race? (Choose all that apply.)

- White
- Black or African American
- American Indian or Alaska Native
- Asian
- Native Hawaiian or Other Pacific Islander

Thank you for completing the survey and mailing it back in the enclosed envelope.