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

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List of Appendices

Appendix A: BPCI Clinical Episodes and MS-DRGs

Episode	Anchor														
	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													
Coronary artery bypass graft	231	232	233	234	235	236									
Cardiac arrhythmia	308	309	310												
Cardiac defibrillator	222	223	224	225	226	227									
Cardiac valve	216	217	218	219	220	221									
Cellulitis	602	603													
Cervical spinal fusion	471	472	473												
Chest pain	313														
Combined anterior posterior spinal fusion	453	454	455												
Complex non-cervical spinal fusion	456	457	458												
Congestive heart failure	291	292	293												
Chronic obstructive pulmonary disease, bronchitis, asthma	190	191	192	202	203										
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	Anchor														
	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													
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	189	204	205	206	207	208	186	187	188						
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									
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 B: Glossary of Terms & Acronym List

Exhibit B.1: Glossary

Name	Definition
30-, 60-, 90-, 120-, 150-, 180-day Post-Discharge Period (PDP)	The 30, 60, 90, 120, 150, or 180 days following discharge from the anchor hospitalization (Models 2 and 4) or the qualifying hospital stay (Model 3)
30-, 60-day Post-Bundle Period (PBP)	The 30 or 60 days following the end of the bundle period.
30-day Post-PAC Discharge Period (PPDP)	The 30 days following discharge from the qualifying PAC provider (Model 3 IRF, LTCH, and SNF only)
30 days HH	The 30 days following the start of a HH episode/admission to HHA.
Acute care hospital (ACH)	A health care facility that provides inpatient medical care and other related services for acute medical conditions or injuries.
Acute care qualifying hospitalization	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.
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). These Awardees may or may not be Medicare providers or initiate episodes themselves.
Baseline time period	The period of time that precedes the intervention period as a basis for comparison in difference-in-difference modeling. For the first BPCI intervention quarter analysis (Q4 2013), the baseline period spans from Q4 2010 through Q3 2013.
Beneficiary Incentive	This is one of the waivers an Awardee may participate in. This allows Awardees to offer patients certain incentives not tied to standard provision of health care.
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 that a bundle lasts; 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.

Name	Definition
Clinical episode grouping	An aggregation of the 48 BPCI clinical episodes. Future analysis will most likely focus on the level 4 aggregation which has nine clinical episode groupings: (1) Non-surgical and surgical: GI; (2) Non-surgical: cardiovascular; (3) Non-surgical: neurovascular; (4) Non-surgical: ortho; (5) Non-surgical: other medical; (6) Non-surgical: respiratory; (7) Surgical: cardiovascular; (8) Surgical: ortho excluding spine; and (9) Surgical: spinal.
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 Convener (DAC)	An Awardee that may, but is not required to be an episode initiator. This participant has other episode initiators under its BPCI initiative structure. This Awardee joined the initiative under a Facilitator Convener.
Designated Awardee (DA)	An Awardee and sole episode initiator. This Awardee joined the initiative under a Facilitator Convener.
EPI Start 30, 60, 90	The first 30, 60, or 90 days of the episode of care.
Episode Initiator (EI)	Under Models 2 and 4 an episode initiator is the participating hospital where the BPCI episode begins. Under Models 2 and 3 an episode initiator may be a participating physician group practice if one of its members is the patient's admitting physician or surgeon for the anchor hospitalization. Under Model 3 an episode initiator is a participating SNF, HHA, IRF, or LTCH that admits the patient within 30 days following hospital discharge in a MS-DRG for the relevant clinical episodes.
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 practitioners who provide care to beneficiaries. Episodes start at EI-BPPOs, but these entities do not assume financial risk under the Model. They are associated with an AC or a DAC that assumes all financial risk.
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 Models 2 and 4, 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).
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 bear risk and does not have agreements with, or receive payments from, CMS.

Name	Definition
Gainsharing	This is one of the waivers an Awardee may participate in. 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.
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	An ACH, PGP, SNF, LTCH, HHA, or IRF that is actually initiating episodes under the BPCI initiative *or* an Awardee that is not an episode initiator.
Phase I	An initial period before a participant has been "Awarded" when CMS and the potential participant prepare for implementation of the BPCI initiative and assumption of financial risk.
Phase II	The phase of the initiative when a participant is considered "Awarded" and is allowed to begin initiating some or all of its clinical episodes and bearing financial risk, as applicable.
PM/RC Report	Quarterly analysis of the BPCI Initiative.
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.

Name	Definition
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.
Post-episode monitoring period	The time period (up to 60 days) beyond the end of the episode to monitor for potential unintended consequences.
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-adjusted	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 Awardee and the sole episode initiator.
Three-day SNF Waiver	This is one of the waivers an Awardee may participate in. 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 B.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
IP	Implementation Protocol
IPPS	Inpatient Prospective Payment System
IQR	Inpatient Quality Reporting
IRF	Inpatient Rehabilitation Facility

Acronym	Definition
IRF-PAI	Inpatient Rehabilitation Facility Patient Assessment
LOS	Length of stay
LTC	Long Term Care
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 C: Count of episode initiators and episodes by Model, episode initiator type, and clinical episode, Q4 2013 through Q3 2014

Table C.1: Count of Model 2 episode initiators by episode initiator type and clinical episode

	Clinical Episode	Episode Initiators by Participant Type (N=113)		
		ACH (N=110)	PGP (N=3)	%
Non-surgical and surgical: Gastrointestinal (GI)	Esophagitis, gastroenteritis and other digestive disorders	5	0	4%
	Gastrointestinal hemorrhage	10	0	9%
	Gastrointestinal obstruction	7	0	6%
	Major bowel procedure	10	0	9%
	Total	**17**	**0**	**15%**
Non-surgical: Cardiovascular	Acute myocardial infarction	17	0	15%
	Atherosclerosis	12	0	11%
	Cardiac arrhythmia	9	0	8%
	Chest pain	8	0	7%
	Congestive heart failure	39	0	35%
	Medical peripheral vascular disorders	10	0	9%
	Syncope & collapse	5	0	4%
	Total	**41**	**0**	**36%**
Non-surgical Neurovascular	Stroke	13	0	12%
	Transient ischemia	5	0	4%
	Total	**15**	**0**	**13%**
Non-surgical Orthopedic	Fractures of the femur and hip or pelvis	12	0	11%
	Medical non-infectious orthopedic	12	0	11%
	Total	**15**	**0**	**13%**
Non-surgical: Other Medical	Cellulitis	10	0	9%
	Diabetes	7	0	6%
	Nutritional and metabolic disorders	5	0	4%
	Red blood cell disorders	5	0	4%
	Renal failure	7	0	6%
	Sepsis	13	0	12%
	Urinary tract infection	5	0	4%
	Total	**16**	**0**	**14%**
Non-surgical: Respiratory	Chronic obstructive pulmonary disease, bronchitis, asthma	29	0	26%
	Other respiratory	5	0	4%
	Simple pneumonia and respiratory infections	23	0	20%
	Total	**33**	**0**	**29%**

	Clinical Episode	Episode Initiators by Participant Type (N=113)		
		ACH (N=110)	PGP (N=3)	%
Cardiovascular surgery	AICD generator or lead	3	0	3%
	Cardiac defibrillator	6	0	5%
	Cardiac valve	12	0	11%
	Coronary artery bypass graft	17	0	15%
	Major cardiovascular procedure	9	0	8%
	Other vascular surgery	10	0	9%
	Pacemaker	9	0	8%
	Pacemaker device replacement or revision	4	0	4%
	Percutaneous coronary intervention	8	0	7%
	Total	**30**	**0**	**27%**
Orthopedic surgery	Amputation	5	0	4%
	Double joint replacement of the lower extremity	13	0	12%
	Hip & femur procedures except major joint	20	0	18%
	Lower extremity and humerus procedure except hip, foot, femur	14	0	12%
	Major joint replacement of the lower extremity	81	3	74%
	Major joint replacement of the upper extremity	12	2	12%
	Other knee procedures	1	0	1%
	Removal of orthopedic devices	13	0	12%
	Revision of the hip or knee	18	0	16%
	Total	**82**	**3**	**75%**
Spinal surgery	Back & neck except spinal fusion	5	0	4%
	Cervical spinal fusion	11	0	10%
	Combined anterior posterior spinal fusion	9	0	8%
	Complex non-cervical spinal fusion	9	0	8%
	Spinal fusion (non-cervical)	12	0	11%
	Total	**20**	**0**	**18%**

Table C.2: Count of Model 2 patient episodes during BPCI intervention period by episode initiator type and clinical episode

	Clinical Episode	Patient Episodes by Participant Type		
		ACH	PGP	%
Non-surgical and surgical: Gastrointestinal (GI)	Esophagitis, gastroenteritis and other digestive disorders	268	0	1%
	Gastrointestinal hemorrhage	647	0	1%
	Gastrointestinal obstruction	146	0	0%
	Major bowel procedure	404	0	1%
	Total	**1465**	**0**	**3%**
Non-surgical: Cardiovascular	Acute myocardial infarction	814	0	2%
	Atherosclerosis	80	0	0%
	Cardiac arrhythmia	495	0	1%
	Chest pain	105	0	0%
	Congestive heart failure	4821	0	11%
	Medical peripheral vascular disorders	245	0	1%
	Syncope & collapse	100	0	0%
	Total	**6660**	**0**	**15%**
Non-surgical Neurovascular	Stroke	1006	0	2%
	Transient ischemia	103	0	0%
	Total	**1109**	**0**	**3%**
Non-surgical Orthopedic	Fractures of the femur and hip or pelvis	123	0	0%
	Medical non-infectious orthopedic	424	0	1%
	Total	**547**	**0**	**1%**
Non-surgical: Other Medical	Cellulitis	571	0	1%
	Diabetes	148	0	0%
	Nutritional and metabolic disorders	266	0	1%
	Red blood cell disorders	134	0	0%
	Renal failure	610	0	1%
	Sepsis	2298	0	5%
	Urinary tract infection	197	0	0%
	Total	**4224**	**0**	**10%**
Non-surgical: Respiratory	Chronic obstructive pulmonary disease, bronchitis, asthma	2603	0	6%
	Other respiratory	349	0	1%
	Simple pneumonia and respiratory infections	2855	0	7%
	Total	**5807**	**0**	**13%**

	Clinical Episode	Patient Episodes by Participant Type		
		ACH	PGP	%
Cardiovascular surgery	AICD generator or lead	1	0	0%
	Cardiac defibrillator	87	0	0%
	Cardiac valve	915	0	2%
	Coronary artery bypass graft	796	0	2%
	Major cardiovascular procedure	188	0	0%
	Other vascular surgery	225	0	1%
	Pacemaker	175	0	0%
	Pacemaker device replacement or revision	8	0	0%
	Percutaneous coronary intervention	465	0	1%
	Total	**2860**	**0**	**7%**
Orthopedic surgery	Amputation	68	0	0%
	Double joint replacement of the lower extremity	124	0	0%
	Hip & femur procedures except major joint	800	0	2%
	Lower extremity and humerus procedure except hip, foot, femur	189	0	0%
	Major joint replacement of the lower extremity	17007	810	39%
	Major joint replacement of the upper extremity	275	77	1%
	Other knee procedures	2	0	0%
	Removal of orthopedic devices	65	0	0%
	Revision of the hip or knee	409	0	1%
	Total	**18939**	**887**	**46%**
Spinal surgery	Back & neck except spinal fusion	57	0	0%
	Cervical spinal fusion	218	0	1%
	Combined anterior posterior spinal fusion	78	0	0%
	Complex non-cervical spinal fusion	44	0	0%
	Spinal fusion (non-cervical)	570	0	1%
	Total	**967**	**0**	**2%**

Table C.3: Count of Model 3 episode initiators by episode initiator type and clinical episode

	Clinical Episode	Episode Initiators by Participant Type (N=94)					
		SNF (N=63)	HHA (N=28)	IRF (N=1)	LTCH (N=1)	PGP (N=1)	%
Non-surgical and Surgical: Gastrointestinal (GI)	Esophagitis, gastroenteritis and other digestive disorders	38	0	0	0	0	40%
	Gastrointestinal hemorrhage	38	0	0	0	0	40%
	Gastrointestinal obstruction	38	0	0	0	0	40%
	Major bowel procedure	38	0	0	0	0	40%
	Total	**38**	**0**	**0**	**0**	**0**	**40%**
Non-surgical: Cardiovascular	Acute myocardial infarction	39	15	0	0	0	57%
	Atherosclerosis	37	0	0	0	0	39%
	Cardiac arrhythmia	38	15	0	0	0	56%
	Chest pain	38	15	0	0	0	56%
	Congestive heart failure	61	27	0	1	0	95%
	Medical peripheral vascular disorders	38	15	0	0	0	56%
	Syncope & collapse	38	0	0	0	0	40%
	Total	**61**	**27**	**0**	**1**	**0**	**95%**
Non-surgical Neurovascular	Stroke	38	15	0	0	0	56%
	Transient ischemia	38	0	0	0	0	40%
	Total	**38**	**15**	**0**	**0**	**0**	**56%**
Non-surgical Orthopedic	Fractures of the femur and hip or pelvis	45	1	1	0	0	50%
	Medical non-infectious orthopedic	41	0	0	0	0	44%
	Total	**45**	**1**	**1**	**0**	**0**	**50%**
Non-surgical: Other Medical	Cellulitis	43	0	0	0	0	46%
	Diabetes	38	2	0	0	0	43%
	Nutritional and metabolic disorders	38	0	0	0	0	40%
	Red blood cell disorders	38	0	0	0	0	40%
	Renal failure	38	0	0	0	0	40%
	Sepsis	45	0	0	1	0	49%
	Urinary tract infection	48	16	0	0	0	68%
	Total	**50**	**18**	**0**	**1**	**0**	**73%**
Non-surgical: Respiratory	Chronic obstructive pulmonary disease, bronchitis, asthma	50	19	0	1	0	74%
	Other respiratory	45	15	0	1	0	65%
	Simple pneumonia and respiratory infections	49	20	0	1	0	74%
	Total	**50**	**22**	**0**	**1**	**0**	**78%**

	Clinical Episode	Episode Initiators by Participant Type (N=94)					
		SNF (N=63)	HHA (N=28)	IRF (N=1)	LTCH (N=1)	PGP (N=1)	%
Cardiovascular surgery	AICD generator or lead	0	1	0	0	0	1%
	Cardiac defibrillator	38	15	0	0	0	56%
	Cardiac valve	38	15	0	0	0	56%
	Coronary artery bypass graft	38	17	0	0	0	59%
	Major cardiovascular procedure	0	15	0	0	0	16%
	Other vascular surgery	38	17	0	0	0	59%
	Pacemaker	43	0	0	0	0	46%
	Pacemaker device replacement or revision	38	0	0	0	0	40%
	Percutaneous coronary intervention	38	17	0	0	0	59%
	Total	**43**	**20**	**0**	**0**	**0**	**67%**
Orthopedic surgery	Amputation	5	1	0	0	0	6%
	Double joint replacement of the lower extremity	3	1	1	0	0	5%
	Hip & femur procedures except major joint	9	1	1	1	0	13%
	Lower extremity and humerus procedure except hip, foot, femur	5	0	0	0	0	5%
	Major joint replacement of the lower extremity	20	2	1	1	1	27%
	Major joint replacement of the upper extremity	38	0	0	0	0	40%
	Other knee procedures	43	0	0	0	0	46%
	Removal of orthopedic devices	42	0	0	0	0	45%
	Revision of the hip or knee	7	4	1	0	0	13%
	Total	**58**	**5**	**1**	**1**	**1**	**70%**
Spinal surgery	Back & neck except spinal fusion	0	0	0	0	0	0%
	Cervical spinal fusion	0	1	0	0	0	1%
	Combined anterior posterior spinal fusion	0	0	0	0	0	0%
	Complex non-cervical spinal fusion	38	0	0	0	0	40%
	Spinal fusion (non-cervical)	5	1	0	0	0	6%
	Total	**43**	**2**	**0**	**0**	**0**	**48%**

Table C.4: Count of Model 3 patient episodes during BPCI intervention period by episode initiator type and clinical episode

	Clinical Episode	Patient Episodes by Participant Type					
		SNF	HHA	IRF	LTCH	PGP	%
Non-surgical and Surgical: Gastrointestinal (GI)	Esophagitis, gastroenteritis and other digestive disorders	131	0	0	0	0	1%
	Gastrointestinal hemorrhage	126	0	0	0	0	1%
	Gastrointestinal obstruction	67	0	0	0	0	1%
	Major bowel procedure	154	0	0	0	0	1%
	Total	**478**	**0**	**0**	**0**	**0**	**4%**
Non-surgical: Cardiovascular	Acute myocardial infarction	117	65	0	0	0	2%
	Atherosclerosis	9	0	0	0	0	0%
	Cardiac arrhythmia	168	119	0	0	0	2%
	Chest pain	24	21	0	0	0	0%
	Congestive heart failure	562	1234	0	5	0	15%
	Medical peripheral vascular disorders	89	46	0	0	0	1%
	Syncope & collapse	118	0	0	0	0	1%
	Total	**1087**	**1485**	**0**	**5**	**0**	**22%**
Non-surgical Neurovascular	Stroke	354	233	0	0	0	5%
	Transient ischemia	42	0	0	0	0	0%
	Total	**396**	**233**	**0**	**0**	**0**	**5%**
Non-surgical Orthopedic	Fractures of the femur and hip or pelvis	112	4	14	0	0	1%
	Medical non-infectious orthopedic	546	0	0	0	0	5%
	Total	**658**	**4**	**14**	**0**	**0**	**6%**
Non-surgical: Other Medical	Cellulitis	203	0	0	0	0	2%
	Diabetes	95	3	0	0	0	1%
	Nutritional and metabolic disorders	175	0	0	0	0	1%
	Red blood cell disorders	72	0	0	0	0	1%
	Renal failure	366	0	0	0	0	3%
	Sepsis	711	0	0	27	0	6%
	Urinary tract infection	391	191	0	0	0	5%
	Total	**2013**	**194**	**0**	**24**	**0**	**19%**
Non-surgical: Respiratory	Chronic obstructive pulmonary disease, bronchitis, asthma	249	307	0	5	0	5%
	Other respiratory	290	162	0	12	0	4%
	Simple pneumonia and respiratory infections	449	376	0	5	0	7%
	Total	**988**	**845**	**0**	**22**	**0**	**16%**

	Clinical Episode	Patient Episodes by Participant Type					
		SNF	HHA	IRF	LTCH	PGP	%
Cardiovascular surgery	AICD generator or lead	0	0	0	0	0	0%
	Cardiac defibrillator	7	17	0	0	0	0%
	Cardiac valve	98	70	0	0	0	1%
	Coronary artery bypass graft	63	97	0	0	0	1%
	Major cardiovascular procedure	0	32	0	0	0	0%
	Other vascular surgery	88	75	0	0	0	1%
	Pacemaker	65	0	0	0	0	1%
	Pacemaker device replacement or revision	6	0	0	0	0	0%
	Percutaneous coronary intervention	73	55	0	0	0	1%
	Total	**400**	**346**	**0**	**0**	**0**	**4%**
Orthopedic surgery	Amputation	8	2	0	0	0	0%
	Double joint replacement of the lower extremity	17	0	4	0	0	0%
	Hip & femur procedures except major joint	138	7	55	1	0	2%
	Lower extremity and humerus procedure except hip, foot, femur	12	0	0	0	0	0%
	Major joint replacement of the lower extremity	988	75	74	0	1317	21%
	Major joint replacement of the upper extremity	31	0	0	0	0	0%
	Other knee procedures	21	0	0	0	0	0%
	Removal of orthopedic devices	23	0	0	0	0	0%
	Revision of the hip or knee	65	25	11	0	0	1%
	Total	**1303**	**109**	**144**	**1**	**1317**	**24%**
Spinal surgery	Back & neck except spinal fusion	0	0	0	0	0	0%
	Cervical spinal fusion	0	10	0	0	0	0%
	Combined anterior posterior spinal fusion	0	0	0	0	0	0%
	Complex non-cervical spinal fusion	18	0	0	0	0	0%
	Spinal fusion (non-cervical)	4	6	0	0	0	0%
	Total	**22**	**16**	**0**	**0**	**0**	**0%**

Table C.5: Count of Model 4 episode initiators by clinical episode

	Clinical Episode	Model 4 Episode Initiators (N=20)	
		N	%
Non-surgical and Surgical: Gastrointestinal (GI)	Esophagitis, gastroenteritis and other digestive disorders	0	0
	Gastrointestinal hemorrhage	0	0
	Gastrointestinal obstruction	0	0
	Major bowel procedure	0	0
	Total	**0**	**0**
Non-surgical: Cardiovascular	Acute myocardial infarction	0	0
	Atherosclerosis	0	0
	Cardiac arrhythmia	0	0
	Chest pain	0	0
	Congestive heart failure	1	5
	Medical peripheral vascular disorders	0	0
	Syncope & collapse	0	0
	Total	1	5
Non-surgical Neurovascular	Stroke	0	0
	Transient ischemia	0	0
	Total	0	0
Non-surgical Orthopedic	Fractures of the femur and hip or pelvis	0	0
	Medical non-infectious orthopedic	0	0
	Total	**0**	**0**
Non-surgical: Other Medical	Cellulitis	0	0
	Diabetes	0	0
	Nutritional and metabolic disorders	0	0
	Red blood cell disorders	0	0
	Renal failure	0	0
	Sepsis	0	0
	Urinary tract infection	0	0
	Total	**0**	**0**
Non-surgical: Respiratory	Chronic obstructive pulmonary disease, bronchitis, asthma	0	0
	Other respiratory	0	0
	Simple pneumonia and respiratory infections	0	0
	Total	**0**	**0**

	Clinical Episode	Model 4 Episode Initiators (N=20)	
		N	%
Cardiovascular surgery	AICD generator or lead	1	5
	Cardiac defibrillator	7	35
	Cardiac valve	6	30
	Coronary artery bypass graft	9	45
	Major cardiovascular procedure	0	0
	Other vascular surgery	0	0
	Pacemaker	7	35
	Pacemaker device replacement or revision	6	30
	Percutaneous coronary intervention	7	35
	Total	**10**	**50**
Orthopedic surgery	Amputation	0	0
	Double joint replacement of the lower extremity	9	45
	Hip & femur procedures except major joint	0	0
	Lower extremity and humerus procedure except hip, foot, femur	0	0
	Major joint replacement of the lower extremity	14	70
	Major joint replacement of the upper extremity	0	0
	Other knee procedures	2	10
	Removal of orthopedic devices	0	0
	Revision of the hip or knee	3	15
	Total	**14**	**70**
Spinal surgery	Back & neck except spinal fusion	4	20
	Cervical spinal fusion	4	20
	Combined anterior posterior spinal fusion	2	10
	Complex non-cervical spinal fusion	2	10
	Spinal fusion (non-cervical)	4	20
	Total	**4**	**20**

Table C.6: Count of Model 4 patient episodes during BPCI intervention period by clinical episode

	Clinical Episode	Patient Episodes	
		N	%
Non-surgical and Surgical: Gastrointestinal (GI)	Esophagitis, gastroenteritis and other digestive disorders	0	0%
	Gastrointestinal hemorrhage	0	0%
	Gastrointestinal obstruction	0	0%
	Major bowel procedure	0	0%
	Total	**0**	**0%**
Non-surgical: Cardiovascular	Acute myocardial infarction	0	0%
	Atherosclerosis	0	0%
	Cardiac arrhythmia	0	0%
	Chest pain	0	0%
	Congestive heart failure	106	3%
	Medical peripheral vascular disorders	0	0%
	Syncope & collapse	0	0%
	Total	**106**	**3%**
Non-surgical Neurovascular	Stroke	0	0%
	Transient ischemia	0	0%
	Total	**0**	**0%**
Non-surgical Orthopedic	Fractures of the femur and hip or pelvis	0	0%
	Medical non-infectious orthopedic	0	0%
	Total	**0**	**0%**
Non-surgical: Other Medical	Cellulitis	0	0%
	Diabetes	0	0%
	Nutritional and metabolic disorders	0	0%
	Red blood cell disorders	0	0%
	Renal failure	0	0%
	Sepsis	0	0%
	Urinary tract infection	0	0%
	Total	**0**	**0%**
Non-surgical: Respiratory	Chronic obstructive pulmonary disease, bronchitis, asthma	0	0%
	Other respiratory	0	0%
	Simple pneumonia and respiratory infections	0	0%
	Total	**0**	**0%**

	Clinical Episode	Patient Episodes	
		N	%
Cardiovascular surgery	AICD generator or lead	1	0%
	Cardiac defibrillator	35	1%
	Cardiac valve	213	6%
	Coronary artery bypass graft	353	9%
	Major cardiovascular procedure	0	0%
	Other vascular surgery	0	0%
	Pacemaker	156	4%
	Pacemaker device replacement or revision	14	0%
	Percutaneous coronary intervention	404	11%
	Total	**1176**	**32%**
Orthopedic surgery	Amputation	0	0%
	Double joint replacement of the lower extremity	17	0%
	Hip & femur procedures except major joint	0	0%
	Lower extremity and humerus procedure except hip, foot, femur	0	0%
	Major joint replacement of the lower extremity	1766	47%
	Major joint replacement of the upper extremity	0	0%
	Other knee procedures	7	0%
	Removal of orthopedic devices	0	0%
	Revision of the hip or knee	57	2%
	Total	**1847**	**49%**
Spinal surgery	Back & neck except spinal fusion	118	3%
	Cervical spinal fusion	135	4%
	Combined anterior posterior spinal fusion	12	0%
	Complex non-cervical spinal fusion	44	1%
	Spinal fusion (non-cervical)	294	8%
	Total	**603**	**16%**

Appendix D: Wave 1 and 2 Beneficiary Survey Instruments

Wave 1

CENTERS FOR MEDICARE & MEDICAID SERVICES

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 "Mark 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.

Shade Circles Like This--> ●

Not Like This--> ⊗ ✓

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 day 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 day before you were hospitalized, how much help did you need from another person with **walking from room to room**?

   - ○ No help needed from another person
   - ○ Some help needed from another person
   - ○ Complete help needed from another person
   - ○ Don't know/Don't remember
   - ○ Not applicable, I do not walk from room to room

4. Thinking about the day before you were hospitalized, how much help did you need from another person with **moving from room to room using a wheelchair, scooter, or other wheeled mobility device**?

   - ○ No help needed from another person
   - ○ Some help needed from another person
   - ○ Complete help needed from another person
   - ○ Don't know/Don't remember
   - ○ Not applicable, I do not use a wheelchair, scooter, or other wheeled mobility device

5. Thinking about the day before you were hospitalized, how much help did you need from another person with **stairs?**

   - ○ No help needed from another person
   - ○ Some help needed from another person
   - ○ Complete help needed from another person
   - ○ Don't know/Don't remember
   - ○ Not applicable, I do not use stairs

6. Thinking about the day 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

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.

7. During the **past four weeks**, how much of the time has your physical health or emotional problems interfered 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

8a. 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)

8b. 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)

9. During the **past two days**, have you limited your normal activities because of pain?

- ○ Yes
- ○ No

Now we would like to know how you are doing TODAY.

10. 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

11. How much help do you currently need from another person with **walking from room to room**?

- ○ No help needed from another person
- ○ Some help needed from another person
- ○ Complete help needed from another person
- ○ Don't know/Don't remember
- ○ Not applicable, I do not walk from room to room

12. How much help do you currently need from another person with **moving from room to room using a wheelchair, scooter, or other wheeled mobility device**?

- ○ No help needed from another person
- ○ Some help needed from another person
- ○ Complete help needed from another person
- ○ Don't know/Don't remember
- ○ Not applicable, I do not use a wheelchair, scooter, or other wheeled mobility device

13. How much help do you currently need from another person with **stairs?**

- ○ No help needed from another person
- ○ Some help needed from another person
- ○ Complete help needed from another person
- ○ Don't know/Don't remember
- ○ Not applicable, I do not use stairs

14**.** 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

15. **In general**, how would you rate your physical health?

- ○ Excellent
- ○ Very good
- ○ Good
- ○ Fair
- ○ Poor

16. **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.

17. 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

18. 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

19. What is your preferred language?

    - ○ English
    - ○ Spanish
    - ○ Other

20. 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.

21. 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 statements?

22. 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

23. Where do you reside now?

- ○ At my own home, in someone else's home, or in an assisted living facility **(CONTINUE WITH Question 24)**
- ○ In a rehabilitation center, nursing home, or other health care facility **(GO TO Question 28 located on the top of page 11)**

24. 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

25. 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

26. 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

27. 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

28. 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

Section 4. Personal Characteristics

The last set of questions is about you.

29. Who do you live with?

- ○ Live alone
- ○ Live with other(s)
- ○ Live with a paid helper

30. Are you male or female?

- ○ Male
- ○ Female

31. 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

32. Are you of Hispanic, Latino, or Spanish origin? (Choose all that apply.)

- ☐ No, not of Hispanic, Latino, or Spanish origin
- ☐ Yes, Mexican, Mexican American, or Chicano
- ☐ Yes, Puerto Rican
- ☐ Yes, Cuban
- ☐ Yes, another Hispanic, Latino, or Spanish origin

33. What is your race? (Choose all that apply.)

- ☐ White
- ☐ Black or African American
- ☐ American Indian or Alaska Native
- ☐ Asian Indian
- ☐ Chinese
- ☐ Filipino
- ☐ Japanese
- ☐ Korean
- ☐ Vietnamese
- ☐ Other Asian
- ☐ Native Hawaiian
- ☐ Guamanian or Chamorro
- ☐ Samoan
- ☐ Other Pacific Islander

Thank you for completing the survey and mailing it back in the enclosed envelope.

Wave 2

CENTERS FOR MEDICARE & MEDICAID SERVICES

Health Care Experience Survey

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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.
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- 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.

Shade Circles Like This--> ●

Not Like This--> ⊗ ✓

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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.

Appendix E: Case Study Interview Protocol

BPCI Case Study Interview Protocol

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.

I. Executive Leadership/Kickoff

A. BPCI Structure

1. Entry decisions

a. Why did your organization decide to participate in BPCI?

b. Did you consult any partners, consultants or other outside entities in deciding whether to participate?

c. How did you select which Model to enroll in?

d. How did you select which episode types, diagnostic groups, and episode lengths to include in your intervention?

   i. E.g., did you conduct any financial analyses? Consult stakeholders/partners?

   ii. Are you considering adding to or otherwise changing any of the episodes you have selected in the coming year? If so, why?

2. Partnership decisions/ network development

a. Structure: Please confirm the partners in your bundle and discuss how these other organizations have impacted your network under BPCI.

b. Did you have any arrangements (formal or informal) in place with your partners/EIs before BPCI implementation?

   i. If partners/EIs were recruited for BPCI, how did you go about recruiting them?

      1. What criteria were used to select them?

      2. What decisions or negotiations took place?

c. Is your organization involved in any gainsharing arrangements under BPCI with any of the partners mentioned above? If so:

   i. With which partners are you intending to share savings?

   ii. What is your experience to date with how this gainsharing has been implemented or the realization of internal costs savings?

   iii. What are your current expectations for the distribution of gainsharing funds?

d. Are you still establishing new network arrangements or planning to change any partners/EIs in your network?

e. Have you established any relationships outside of your local healthcare network with community-based service organizations, (e.g., aging network organizations, community senior centers, others)?

   i. If so, with whom, and what effect has this had on your program?

f. *(If appropriate)* How have partners (e.g., partners in gainsharing arrangements, referral partners) contributed to your success or challenges in the BPCI initiative?
   i. How are partner relationships going? What were main challenges to collaboration? Discuss:
      1. Care protocols/ Quality assurance
      2. Transitions of care protocols
      3. Documentation/electronic tracking
      4. Gainsharing decision-making
   ii. What, if anything, needs to be better communicated from CMS about partnerships/ gainsharing regulations?
   iii. Has one partner/EI played a larger role/been more active than others?

B. Experience with BPCI

1. Planning/ operations and other health reform initiatives

a. What proportion of your patients is in the BPCI program?

b. Have you had the volume of BPCI cases you expected?

c. How has this affected your planning or operations?

d. 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?

e. Are others in your local market involved in any of these initiatives? If so, has this had any impact on your decision to participate in BPCI, or the effects of BPCI? How?

C. Impact of Care Redesign Approach

1. Care redesign

a. What impact, if any, is care redesign having on the following:
   i. Patient outcomes (e.g., readmissions, individual length of stay)
   ii. Costs/case
   iii. Operations
   iv. Patient Flow
      1. Are these impacts aligning with your expectations?
      2. When did you first observe these changes relative to your start in the BPCI initiative?

b. How has care management affected your organization's operations?
   i. E.g., did you need new types of staff, new ways of thinking, new relationships to be established, or new areas of responsibility for patient discharge?

2. **For all interviewees who have completed at least one cycle and have received data:**
   a. Did you gain or lose in the reconciliation process for the most recent cycle?
   b. What do you believe contributed to this gain (loss)?
   c. What specific costs were affected? (e.g., internal hospital costs, device or implant costs, price of blood and blood products)
   d. What adjustments are you making based on this initial gain (loss)?

3. **What beneficiary incentives, if any, have been implemented?**
   a. How is this process going so far? Are there any results or consequences of these incentives?

4. **Aside from those outlined in your implementation protocol, do you have any experience with other BPCI waivers? (e.g., telehealth, home visits)**

D. BPCI Outcomes, Success and Challenges

1. **What challenges have you confronted?**
   a. Were these challenges expected? If so, what steps (if any) did you take to prepare for these challenges?
   b. How have you handled the aforementioned challenges so far?

2. **Given your experience in BPCI, are you considering any changes in your approach in the near term? Are some of these changes due to any unintended consequences?**

3. **Do you think your BPCI approach is replicable?**

4. **What do you think would be important lessons from your experiences to share with other BPCI participants?**

II. Care Redesign Leadership

A. Care Redesign Approach

1. **Please describe your care redesign approach under the BPCI initiative.**
    a. E.g., Redesign care pathways, Enhancements in care delivery, Patient activation, engagement, and risk management, Care coordination, System changes to support care
        i. If you have more than one redesign approach that you are working on currently, please describe the extent to which these different projects are integrated as opposed to operating separately.
    b. Did you start any of your care redesign initiatives prior to BPCI?
    c. How is your BPCI care redesign different from your prior service approaches?

2. **Please describe where your organization currently is with respect to implementing your planned care redesign activities.**
    a. Have you fully realized the care redesign activities outlined in your Implementation Protocol?
    b. How did you prioritize what care redesign initiatives were addressed early in the BPCI process?
    c. What are planned next steps in your care redesign efforts?

3. ***(If not addressed already in description of care redesign):*** **How have transitions of care evolved as BPCI has been implemented?**
    a. E.g., are protocols being put into place? Meetings held? New documentation required?
    b. Have staff responsibilities evolved to maintain improved transitions of care?
    c. Do you have protocols in place to monitor patient care/ functional status as they move across settings?
    d. Are care redesign initiatives working better with certain partners or types of sites (hospitals vs. PCPs, for example)?

4. **To what extent are care redesign efforts being implemented onto other non-BPCI populations? Alternatively, are services to non-BPCI participants changing as a result of BPCI? How? What services are most affected?**

B. Key Implementation Factors

1. **What would you describe as the key factors required for successful implementation of this initiative?**
   a. Building an infrastructure to support successful implementation
   b. Generating and using actionable data across the clinical episode
   c. Improving the processes of care/care redesign
   d. Meeting the terms/conditions of this initiative

2. **Have any of the waivers under the BPCI program affected your design or planned implementation of your care redesign interventions?**

3. **What new relationships either across system departments, or with others in the community, were needed to implement these changes?**

4. **What would you do differently if you were starting again?**

C. Impact of Care Redesign Approach

1. **What impact, if any, is the care redesign having on…?**
   a. Patient outcomes (e.g., readmissions, individual length of stay)
   b. Costs/case
   c. Operations
   d. Patient Flow
   e. Types of services used
   f. Re-hospitalizations
   g. Re-admissions to PAC, if applicable
   h. Referral to PAC facilities. If applicable, please discuss your efforts to identify appropriate PAC settings for BPCI patients. How do you ensure that patient choice is maintained throughout the referral process?
      i. Are these impacts aligning with your expectations?
      ii. Over what time period have you observed changes? For how long? (E.g. three months, six months, years?)

2. **How has care management affected your organization's operations?**
   a. Did you need new types of staff, new ways of thinking, new relationships to be established, or new areas of responsibility for patient discharges?

3. **How do you ensure that your care redesign approach does not produce unintended consequences?**
    a. Cherry picking or lemon dropping (i.e. selecting low cost patients/ avoiding high cost patients)
    b. Reduction in quality of care or stinting on care

D. BPCI Outcomes, Success and Challenges

1. **What challenges have you had so far?**
    a. Were these challenges expected? If so, what steps (if any) did you take to prepare for these challenges?
    b. How have you handled these challenges so far?

2. **Do you think your BPCI approach is replicable?**

3. **Can you identify important lessons from your experiences to share with other BPCI participants?**

III. Quality Management

A. BPCI Quality Management Approaches/Implementation

1. **Please describe the role of quality management in your care redesign approach(es) under BPCI**
   a. What elements of quality management existed prior to BPCI?
   b. What has been newly implemented?

2. **Is there a quality management/ monitoring team? Which staff members are involved in implementing quality management procedures?**
   a. Do these staff members meet or review data on a periodic basis?
      i. If so, how frequently do they meet? Is this more/less frequent than pre-BPCI?
   b. What types of professionals are involved in your quality monitoring team (nurses, physicians, therapists, data managers, finance, operations, others)?
      i. Were these positions filled specifically for the BPCI initiative?
      ii. Do these individuals perform their duties across multiple facilities? (e.g., with other members of the Awardee organization)?

3. **What metrics or other data are you reviewing as part of quality management initiatives?**
   a. E.g., length of stay, functional status scores, infection rates, expected outcome measures?
   b. *(If not already addressed above)* In what settings (e.g., hospital, PAC, home as appropriate for Bundle Model) are these quality metrics monitored?
   c. Are these quality metrics being monitored only for BPCI patients?

4. **What data sources are you using to produce the information for the team? Did these sources already exist or did your team need to set up a new data system?**

5. **What data are you providing to your site clinicians?**
   a. How is this information communicated (meetings, emails, data trackers)? How frequently?

6. **Are these approaches different than your pre-BPCI quality monitoring approaches? If so, how?**

7. **Do the quality management activities used as part of the BPCI program influence any gainsharing or provider incentives tied to partnerships you maintain as part of BPCI?**
   a. If so, describe how these quality management activities influence gainsharing (i.e., do all/some quality measures need to be passed at a particular threshold?)

B. BPCI Outcomes, Successes and Challenges

1. **Are you seeing any changes in practice, outcomes, or clinical relationships as a result of your quality monitoring process?**
   a. Patient outcomes (e.g., readmissions, individual length of stay)
   b. Costs/case
   c. Operations
   d. Patient Flow
      i. Are these impacts aligning with your expectations?
      ii. Over what time period have you observed changes? For how long? (E.g. three months, six months, years?)

2. **How has care management affected your organization's operations?**
   a. E.g., did you need new types of staff, new ways of thinking, new relationships to be established, or new areas of responsibility for patient discharge?

3. **Have you encountered any challenges in establishing/using this quality management process? How have you addressed those challenges?**

4. **What factors are critical to your success?**

5. **Are you monitoring whether care redesign is having any impact on quality of care or functional status?**

6. **Given your experience thus far, what types of changes are you considering in your approach and why?**

7. **Do you think your BPCI approach is replicable?**

8. **Can you identify important lessons from your experiences to share with other BPCI participants?**

IV. Care Coordination Leadership/ Care Redesign Operations

A. The Role of Care Navigation/Care Coordinators

1. **Describe your role in the bundled payment initiative 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. **How is this position different from past case management responsibilities?**
    a. *(If not already mentioned):* Is patient navigation part of current case management roles/activities?
    b. Was your role created specifically for the BPCI initiative?
    c. What is your role in the broader Awardee structure? (e. g. are you a hospital employee, contractor, a member of a PGP?)

B. Care Navigation/Case Management Implementation

1. **How are you informed of the new BPCI enrollee?**
2. **When do you first "meet" the patient?**
3. **What materials, if any, do you provide the patient?**
4. **How often do you meet or talk with the patient during their BPCI episode?**
5. **Are you involved in patient conferences and discharge planning?**
    a. Can you describe any additional efforts to identify appropriate PAC settings for BPCI patients? (e.g. list of preferred providers)
    b. How do you ensure that patient choice is maintained throughout the referral process?
6. **Do you report on your patient conferences to any part of the BPCI team? If so, how is that information used?**
7. **Please describe your role in influencing the patient's care and treatment. To what extent do you interact and communicate with physicians regarding specific patients?**
8. **Do you have any type of tracking mechanism for your BPCI patients throughout their episode? Please describe.**
9. **What new relationships, either across system departments or with others in the community, were needed to implement these care redesign initiatives?**

10. **Please share the experience of a typical BPCI patient (de-identified). 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 specialist (e.g. 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).
        i. How do your responses to these scenarios differ from pre-BPCI care?

C. Impacts of Case Management Approach

1. **Do you think care management has affected patient outcomes, such as…?**
    a. Patient flow or transitions
    b. Cost/case
    c. Individual length of stay
    d. Types of services used
    e. Re-hospitalizations
    f. Re-admissions to PAC, if applicable
    g. Referral to home care, if applicable
        i. Over what time period have you observed changes? For how long? (E.g. three months, six months, years?)

2. **How has care management affected your organization's operations?**
    a. E.g., did you need new types of staff, new ways of thinking, new relationships to be established, or new areas of responsibility for patient discharge?

3. **How have care redesign approaches affected non-BPCI patients? (e.g., spillover, change in resource allocation)**

D. BPCI Successes and Challenges

1. **What types of implementation or outcomes successes have you seen so far?**
2. **What types of anticipated or unanticipated challenges have you encountered so far? How have you addressed those challenges?**
3. **Given this experience, what changes are you considering in your approach? Why?**
4. **Do you think your BPCI approach is replicable?**
5. **Can you identify important lessons from your experiences to share with other BPCI participants?**

V. Finance Leadership

A. BPCI Entry Determinants

1. **Why did your organization decide to participate in BPCI? What types of information did you use to make this decision?**

2. **Were you involved in the selection of BPCI Models and episode groups?**

3. ***(If applicable)* Were you involved in determining how gainsharing would work in your bundle(s)?**

4. **Were you involved in determining who to have as partners in the initiative?**

5. **Based on financial results to date, are you considering changing any of the episodes you are participating in, or any other aspects of your participation in BPCI?**

B. Impact of BPCI Participation on Organization's Finances

1. **How did you expect the initiative to affect your organization's finances?**

2. **How have initial results (or results over time if not a new participant) compared to expectations?**
   a. What do you believe contributed to recent gains (losses)?
   b. What adjustments are you making based on this initial gain (loss)?

3. **How have you been measuring BPCI's impact on your organization's costs?**
   a. What do you think are important indicators of the initiative on your organization?
   b. Which specific costs have been affected? (E.g., internal hospital costs, device or implant costs, price of blood or blood products)

4. **Did you need to modify your IT system? If so, was it a significant expense?**

5. **Did you need to establish new contracts with other providers with whom you are partnering in this initiative? If so, please describe.**

6. **Were there other costs associated with the initiative?**

7. **Have you achieved any internal savings from the redesign initiatives?**
   a. Is it due to greater efficiencies in any areas of operation? If so, which areas?

8. **Have you seen any impact on your non-BPCI revenues? On your Medicaid populations?**

9. **What would you do differently in designing a bundled payment program to better meet your organization's needs?**

C. Gainsharing (*if applicable*)

1. **Can you explain your gainsharing methodology and how it was developed?**
   a. What data sources were used to develop a model?
   b. Were external stakeholders (partners with which gains are shared) involved in decision-making?
   c. How are gains allocated when achieved? (E.g., to the bottom line; to innovative practices; to particular staff members)
   d. Does allocation vary by partner?

2. **What is your experience to date with how this gainsharing has been implemented or the realization of internal costs savings?**
   a. Were there any barriers, from partners, CMS, or internally that prevented you from setting up gainsharing how you originally intended?

3. **What is working well with gainsharing as it stands? What needs improvement? How are you planning to change your gainsharing approach in response?**

D. Successes and Challenges

1. **How do you define success under the BPCI? And what types of successes or challenges have you experienced so far?**

2. **Given this experience, what types of changes are you considering in the future and why?**

3. **Can you identify important lessons from your experiences to share with other BPCI participants?**

4. **Do you think your approach is easily replicable? Why or why not?**

VI. Data Management Leadership

A. Data Systems

1. **What types of data systems do you need to manage your BPCI-related activities?**
   a. Gainsharing (or other waiver-related activities)
   b. Quality monitoring
   c. Internal cost calculations
   d. Feedback (or other reporting activities)
   e. Patient data/ patient care tracking activities
   f. Data reconciliation among partners
   g. Other care redesign activities
   h. BPCI administrative activities

2. **Are you using existing data resources or did you have to set up new systems for this initiative? What staff members have been working on these new systems or tools?**

3. **How much of the data input or output from these systems is new vs. data or output/reports that existed prior to BPCI?**
   a. If data is new, is it being produced for BPCI patients only, or for all patients (i.e., is there spillover of data monitoring to other patient populations)?
   b. Did you have to train staff members to use new systems or tools?

4. **What was involved in setting up this information management approach?**

B. Outcomes

1. **What kinds of outcomes have the data tracking processes had on…?**
   a. Operations (e.g., saved time, improved efficiency)
   b. Improved clinical outcomes
   c. Costs

2. **Have there been any unintended/ unforeseen consequences or costs of implementing this/these system(s)? (e.g., high cost of implementation or training; change management in turnover to new system)**

C. Successes and Challenges

1. **What have been your greatest successes thus far and why do you think they occurred?**

2. **What have been your greatest challenges? How have you solved them? Were these challenges expected or unexpected?**

3. **Given your experience thus far, what changes are you considering in the future? Why?**

4. **Do you think your BPCI approach is replicable?**

5. **Can you identify important lessons from your experiences to share with other BPCI participants?**

VII. Physician Leadership/Clinical Operations

A. BPCI Entry Decisions and Structure

1. **Would you please describe the decision making process that lead to your participation in BPCI? What information did you use to decide whether to participate?**

2. **Were you involved in the selection of BPCI Models and episode groups? If so, in what way?**

B. Care Redesign Approach

1. **What care process changes were informed by physician input?**
   a. E.g., Redesign care pathways, Enhancements in care delivery, Patient activation, engagement, and risk management, Care coordination, System changes to support care,
   b. Were any quality metrics used? How did you help select them?
   c. How did you inform data collection/ data tracking?

2. **How is your BPCI care redesign approach different from your prior service approaches?**
   a. E.g., new staff, new protocols, additional staff meetings, different case management activities, new relationships with others in the market, other activities?

3. ***Probe on what has been heard from executive leadership and others*—Are care redesign efforts that were planned happening in practice? If not, what are the barriers?**

4. **For those interventions that you adopted, how have they affected your staff? (E.g., nurses, case managers)**

5. **For those interventions that you adopted, how have they affected patients/ caregivers?**

C. Key Implementation Factors

1. **Can you identify key factors required for successful implementation of this initiative?**

2. **Can you describe how data collection *[As appropriate: using new data systems/generating and using actionable data across the clinical episode/calculating quality metrics]* has been going?**

3. **What new relationships either across system departments, or with others in the community, were needed to implement these changes?**
    a. Can you describe additional efforts to identify appropriate PAC settings for patients at discharge, if there are any?

4. **What would you do differently if you were starting again?**

D. Gainsharing

1. **Please discuss the impact of your gainsharing arrangements under BPCI on physician engagement and the success of this initiative.**
    a. What are your current expectations for the distribution of gainsharing funds?
    b. What is your experience to date with how this gainsharing has been implemented or the realization of internal costs savings?
    c. Have there been any challenges, or unplanned consequences to how gainsharing has been implemented?

E. Impacts of BPCI

1. **Do you think care management has affected patient outcomes? For example…**
    a. Patient flow
    b. Cost/case
    c. Length of stay (in multiple settings, if applicable)
    d. Types of services used
    e. Re-hospitalizations
    f. Re-admissions to PAC, if applicable
    g. Referral to home care, if applicable
        i. Have these outcomes aligned with expectations?
        ii. Over what time period have you observed changes? For how long? (E.g. three months, six months, years?)

2. **How has care management affected your organization's operations?**
    a. E.g., did you need new types of staff, new ways of thinking, new relationships to be established, or new areas of responsibility for patient discharge?

3. **How have care redesign approaches affected non-BPCI patients? (E.g., spillover, change in resource allocation)**

4. **How do you ensure that your care redesign approach does not produce unintended consequences?**
    a. Cherry picking (i.e. selecting low cost patients/ avoiding high cost patients)
    b. Reduction in quality of care or stinting in care

F. BPCI Success and Challenges

1. **What types of challenges have you had so far? How have you handled the challenges?**
   a. Were these challenges expected? If so, what steps (if any) did you take to prepare?
2. **Are you considering any changes in your approach in the near term?**
3. **Do you think your BPCI approach is replicable?**
4. **Can you identify important lessons from your experiences to share with other BPCI participants?**

Appendix F: Focus Group Protocols

BPCI Focus Group Interview Protocols

I. Topic 1 for BPCI Focus Groups

A. Summary

Topic 1: Care Redesign Implementation across Multiple BPCI Convener Sites

How is care redesign implemented across episode initiators under a common Designated Awardee Convener? What is the role of the Designated Awardee 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 Designated Awardee Convener and explore the role of the Designated 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

Care Redesign Implementation across Multiple BPCI Convener Sites

AC:
Sites:
Date:
Time:

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:

- Understand how care redesign is implemented across multiple sites under a common Designated Awardee Convener.
- Explain the role of the Designated Awardee Convener.

With that introduction, let's begin the discussion.

Introduce Lewin/Telligen Staff

Introduce Focus group participants on the call (if applicable)

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. One area that CMS would like to learn more about is the experience of sites that are operating under an Awardee Convener or under a Facilitator 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 an Awardee, [Awardee Convener]. We will be asking about how you are organized and to what extent you coordinate with [Awardee Convener] and other [Awardee Convener] initiators.

1. To what extent are you attempting to coordinate between other episode initiators under [Awardee Convener]? For example, you may have the same general approach or design of your care redesign efforts but be implementing them differently at individual sites, or you may be attempting to standardize your implementation in some areas but not others as compared to other participants under [Awardee Convener].
    a. What are some areas where you are attempting to coordinate or share resources within [Awardee Convener] BPCI providers in your redesign activities?
    b. Can you talk a little about how you made these choices about your coordination strategies within [Awardee Convener] and your experiences so far with your coordination efforts?

2. How do you monitor the implementation of care redesign processes? Does [Awardee Convener] give you any guidance on how to monitor?
    a. Do you periodically convene with [Awardee Convener] to discuss the implementation of care redesign? If so, how frequently?

3. What instructions/ information has [Awardee Convener] given to you on care redesign or how to modify your practices under BPCI? Have you made any adjustments to those instructions? Why?
    a. For example, if your site implemented device standardization, was this effort approached in the same manner across sites? Were the standardization lists and the process of determining and enforcing those lists done in a consistent way across sites? Similarly, if your site is focusing on improving coordination with post-acute care providers, are there differences in this interaction across sites?
    b. Are the criteria used for determining which post-acute care providers to target and same across each of your sites?
    c. Discuss how implementation procedures related to your various care resign efforts at one site compare to the other participants' sites.
4. Do your sites share best practices or staff as related to care redesign? 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 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 as related to care redesign? What was [Awardee Convener]'s role in helping you achieve those successes?
2. What challenges did you experience in implementing care redesign? What was [Awardee Convener]'s role in helping you address those challenges?
    a. What steps did you take to overcome these challenges? Did you consult other [Awardee Convener] sites?
    b. 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 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.

II. Topic 2 for BPCI Focus Groups

A. Summary

Topic: Managing the care of BPCI patients in the post-acute care (PAC) setting

Objective: The goals of this discussion group are to understand the working relationship between [ORGANIZATION NAME] 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: We will recruit three to six staff members (e.g., care coordinators, managers, navigators, clinical operations managers) from PAC providers that work closely with [ORGANIZATION NAME]. We are working with [ORGANIZATION NAME] to identify its closest PAC partners. 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 [ORGANIZATION NAME]. The PAC partners will serve a sufficient number of BPCI patients that they can speak to the impact of the initiative on their operations and care delivery.

B. Focus Group Protocol

Managing BPCI Patients in PAC Settings

Awardee:
Sites:
Date:
Time:

Introduction (10 minutes)

Thank you for taking the time to join us today. Abt Associates and Telligen are subcontractors to The Lewin Group, which is under contract with CMS to evaluate the Bundled Payments for Care Improvement (BPCI) initiative. (Describe BPCI generally.)

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. 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:

- Understand the relationship between [ORGANIZATION NAME] and the PAC providers that care for its patients
- Understand how [ORGANIZATION NAME] influences the care provided to its patients in PAC and how BPCI has changed the delivery of PAC

With that introduction, let's begin the discussion.

Introduce Abt/Telligen Staff

Introduce Focus group participants on the call (if applicable)

Topic #1: Collaboration with [ORGANIZATION NAME] (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. How do you first become aware that a patient is being cared for by an [ORGANIZATION NAME] surgeon and is under the BPCI initiative?
    a. Do you always know who the BPCI patients are?

Another important component of this partnership is the collaboration with [ORGANIZATION NAME] regarding patient care.

2. How has collaboration with [ORGANIZATION NAME] surgeons changed under BPCI?
    a. How do your staff and the [ORGANIZATION NAME] surgeons communicate about each patient's needs and care plan?
    b. How do your staff and the [ORGANIZATION NAME] surgeons determine the best discharge destination for each patient and create an effective transition plan?
    c. How do you communicate with the next care setting during transitions (e.g., SNF to HHA) to ensure that patients' needs are efficiently met by the next team of care providers?
    d. Who communicates the discharge and transition plan to the patients and their families? How are patients reacting to the discharge/transition plans?
    e. What happens if a patient or caregiver disagrees with the transition plan and discharge arrangements?
    f. Do any of these practices differ from the way things were done prior to [ORGANIZATION NAME]'s participation in BPCI?

3. Do you provide all of the same services to joint replacement patients as in the past, or are some services more intense? Less intense? For example, do you follow the same daily/weekly therapy schedules? Same therapeutic goals before discharge?
    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.?
    c. Did you make the same changes in services and transition planning for all patients (regardless of who their surgeons were), or only for [ORGANIZATION NAME] patients?
    d. What data do you collect about [ORGANIZATION NAME] patients, and is that practice different from other joint replacement patients?

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 [ORGANIZATION NAME] 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.

4. What care delivery successes have you experienced at your site in relation to [ORGANIZATION NAME]'s participation in BPCI? What was [ORGANIZATION NAME]'s role in those successes?

5. What care delivery challenges did you experience at your site? What was [ORGANIZATION NAME]'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?

6. 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 in partnership with [ORGANIZATION NAME]. 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. You have Laura Dummit's contact information should you have questions. Again, thank you for your time.

Appendix G: Expert Interview Protocols

BPCI Expert Interview Protocol

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 drop out 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?**

Appendix H: Awardee Interview Protocols

BPCI Awardee Interview Protocol

Q1 2014 Awardee Interviews

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 payor 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?

BPCI Awardee Interview Protocol

Q2 2014 Awardee Interviews

Objective: Understand the reasons why Awardees decided to join BPCI and how/why they made certain decisions regarding participation in BPCI.

C. 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?

D. 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 payor initiative? How did these experiences affect your decision to participate in BPCI?
   b. *(If participating in gainsharing)* Why did you decide to participate in gainsharing?
   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, 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?

BPCI Awardee Interview Protocol

Q3 and Q4 2014 Awardee Interviews

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 your episode patients?

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.

BPCI Awardee Interview Protocol

Q1 2015 Awardee Interviews (Facilitator Conveners)

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.

D. 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.

E. 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?

F. 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 episodes 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 organizations you would work with under BPCI?

G. Interaction 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 measured?

2. Describe your working relationship 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 is 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?

6. How does your interaction with Awardees differ from how you envisioned it? How has it evolved from your initial expectations?

Appendix I: Technical Expert Panel (TEP): Major Joint Replacement of the Hip and Knee

I. Summary Report

Date: May 6, 2015

Facilitator: Christine LaRocca, MD

Participants: James Cobey, MD; Joseph Ouslander, MD; Jennifer Stevens-Lapsley, PhD; Trudy Mallison, PhD; Tad Mabry, MD; Cindy Krafft, PT; Joan Marren, RN; Anne Deutsch, PhD

A. Key Takeaways:

- **Populations:** Outcomes and patterns of care are likely to differ for elective versus nonelective Total Hip Replacement (THR). Three populations must be considered: non-elective THR, elective THR, and elective Total Knee Replacement (TKR).
- **Additional analysis questions:** Panelists were interested in:
  - Whether "increased home health agency (HHA) use" refers to an increased number of visits, an extended length of time receiving home health, and/or an increased number of therapy visits.
  - 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, classification of visits as avoidable or unavoidable, and the timing of the ED visit post-discharge. They suggested distinguishing between ED visits occurring within 24-48 hours of discharge and those happening later in the episode.
- **Physical Therapy:** Typical practice—not limited to BPCI participants—was generally described as one to three PT sessions while in the hospital after elective primary THRs, with the vast majority of patients not receiving ongoing outpatient PT. This common practice is worth noting when evaluating the BPCI initiative. Multiple panelists championed the benefits and need for ongoing outpatient therapy (PT and/or OT) after hospital discharge for THR as necessary for a Medicare population.
- **Susceptible Populations:** Patients with comorbidities are particularly susceptible to suboptimal functional outcomes.
- **Functional status measures:** Gait distance is not a good measure of functional outcome. Mobility embedded in functional tasks and ability to perform self-care were favored. Self-care and mobility should be studied separately.
- **SNF v. IRF recommendation:** The decision between 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.

Topic / BPCI Finding	Questions to Panelists
SNF and HHA use: Relative to a comparison group, BPCI patients: ▪ were discharged less often to a SNF (Model 2). ▪ had shorter lengths of stay in SNF (Models 2 & 3). ▪ had increased use of HHA services (Model 2).	▪ Which patient populations may be particularly susceptible to suboptimal outcomes with these care patterns? ▪ What unintended consequences should we be aware of, and how might we measure them? ▪ What should we look for with respect to functional outcomes given the different capabilities of these settings?

Results

Susceptible patient populations and unintended consequences:

- The concern about cherry-picking is valid. Surgeons could stop doing surgery on higher risk, "more difficult," cases, such as patients with obesity or diabetes.
- Geographic factors influence SNF referral decisions. In some small communities, a SNF stay is a given. Coordinating care is challenging 1) if the orthopedic program cares for patients coming from far away for surgery and 2) if the hospital deals with hundreds of SNFs versus two or three.
- Patients without social support, although difficult to measure in claims, are particularly susceptible to suboptimal outcomes. Those who live alone or are unmarried may be at higher risk and are more likely to go to a SNF.
- Another relevant factor is comorbidities. Patients undergoing elective and non-elective hip replacement differ considerably.
  - Elective THRs and non-elective THRs as a result of a fracture are two different diseases. 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 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 readmission, ED visits, further falls with injury, and poorer functional outcomes.
  - Although difficult to measure 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 are examples of conditions that may require an inpatient post-acute setting.

Functional outcome measures by setting:

- It is important to look at a patient's function in their own home. The panel generally agreed 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 or cannot do at home. Examples given included meal preparation and the performance on stairs and steps at home.
- The data showed 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.
- An objective follow up measure of functional outcome after TKR is Range of Motion (ROM). Patients often need supervision to ensure they are moving the knee, and if ROM isn't restored in three to four weeks, the patient may never get it back. The group did not unanimously agree about using ROM as the sole point of emphasis; ROM does not predict long-term outcomes.
- Using an arbitrary gait distance as a primary outcome measure was not recommended. The Care Tool listed a gait distance of 150 feet; however, this distance is not a realistic for a patient to function well in the home or community environment.
- Gait speed was favored as an outcome measure across all facilities and was noted to predict mortality and institutionalization.

Topic / BPCI Finding	Questions to Panelists
SNF v. IRF recommendation	▪ What are the factors you consider when you recommend discharge to an IRF?

Results

- The quality of care in both SNFs and IRFs ranges widely. 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 Medicare Patient Advisory Committee report found comparable costs between IRFs and SNFs, largely due to shorter Length of Stay (LOS) in IRFs. Studies found comparable outcomes between IRFs and "good" SNFs. However, the literature does not represent the universe of SNFs. Many of the studies include data from self-selected SNFs.
- Many physicians and providers do not know the difference between SNFs and IRFs.
- TJR patients with complicating rehabilitation problems, such as preexisting stroke or coexisting rheumatoid arthritis, would potentially benefit 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 sometimes limit a patient's ability to participate in therapy in the IRF setting.

Given that IRFs have 24 hour per day physician coverage, patients who really need an IRF have complicated additional needs that require ongoing medical care.

Topic / BPCI Finding	Questions to Panelists
Physical Therapy: No physical therapy after hip replacement (Model 2)	▪ For which patients might this always or never result in a good outcome? ▪ What unintended consequences should we be aware of, and how might we measure them? ▪ 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?

Results

Outcomes and/or unintended consequences:

- Typical practice was generally described a one to three PT sessions while in the hospital after elective primary THRs, with the vast majority of patients not receiving ongoing outpatient PT. Patients with an elective primary THR (no including revisions or fractures) typically receive preoperative education, are seen multiple times by PT during their two to three nights in the hospital, receive a care plan upon discharge, and do not receive ongoing outpatient PT unless they request it or have safety issues. 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, who noted that education is important to encourage patients to move and to restore a normal movement pattern. 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 the difficulty for inpatient staff to anticipate needs in the home environment, one to two HH therapy visits were viewed as an "ounce of prevention" in order to identify problems and to provide baseline education related to red flags.

Less invasive procedures:

- 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.

Topic / BPCI Finding	Questions to Panelists
Preoperative programs: ■ Patients are encouraged to participate in a "Pre-hab" exercise program (Model 2). ■ Patients are required to attend mandatory total joint replacement education classes (Model 2).	■ Taken individually or in combination, are these exercises and educational programs important contributors to high quality outcomes? ■ Is the requirement to participate a subtle form of cherry picking?

Results

Contribution to outcomes:

- Preoperative education is an important contributor to high quality outcomes. It may be provided in a variety of formats: a 1:1 session, in a class, or via internet offerings. Kaiser Permanente's mandatory 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. Prehab or preoperative PT was not viewed as effective in patients with end stage osteoarthritis.
- 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.
- Presurgical PT for targeted strengthening can be valuable for selected patients. More complicated patients (such as those with multiple comorbidities, poor preop 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." Some patients benefit from education, some benefit from prehab, and some will not remember the instruction until it is offered postoperatively.

Cherry picking:

- While one panelist was aware of programs having a mandatory class attendance requirement before surgery could be scheduled, this probably occurs in a minority of programs. More commonly, the class is strongly suggested. Measuring the effect of the class itself is difficult. Some patient populations have challenges completing prehab exercise programs. Those with mobility issues and those who are homebound preoperatively would be unable to attend.

Topic / BPCI Finding	Questions to Panelists
ED visits: Increased ED visits without hospitalization within 30 days of discharge for BPCI patients (Model 2).	▪ It is possible that some of these visits are planned? ▪ What do you think about planned ED use as part of care redesign? ▪ How do you interpret this finding of increased ED visits?

Results

Planned ED use:

- Some programs try to drive down LOS with outpatient joint replacements by having the care plan instruct patients to go to the ED if they have a problem with pain. The ED visit is, therefore, partially planned. Patients having trouble with pain control can receive intravenous narcotics in the ED either after hours or even during business hours, since these medications cannot be given in clinic.
- Planned ED use might be also be appropriate for postoperative anemia, which is common in patients after nonelective hip replacement. Patients cannot always receive transfusions in outpatient clinics.

Interpreting ED findings:

- Panelists shared the view that ED use should be monitored in BPCI. A spike or increase in ED use may suggest that LOS has been lowered too much.
- The reasons and timing for the ED visit are important data element to capture. This information will assist the interpretation of the increased ED use seen in the early data.
- Classifying the reasons for the ED visit as avoidable or unavoidable was also suggested.
- In the HH setting, physicians still tend to send all patients to the ED upon being called by the HH nurse, described as a "knee jerk" response.
- A paper was cited indicating that HHAs with ready access during non-business 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.
- Payment issues for HHAs and SNFs related to long and complex observation stays were discussed.

II. Panelists 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

Appendix J: Comparison Group Standardized Difference Tables

Model 2, Acute Care Hospitals

Exhibit J.1: BPCI Participating & Comparison Hospital Characteristics, Orthopedic Surgery MS-DRG, Model 2

Characteristics	BPCI Participating Hospitals			Matched Comparison Hospitals			Standardized Difference
	N	Mean	Standard Deviation	N	Mean	Standard Deviation	
Ownership							
Non-Profit	82	0.82	0.39	1,230	0.82	0.39	0.00
Government	82	0.04	0.19	1,230	0.05	0.21	-0.04
For Profit	82	0.15	0.36	1,230	0.14	0.35	0.02
Urban/Rural							
Urban	82	0.95	0.22	1,230	0.95	0.22	0.01
Rural	82	0.05	0.22	1,230	0.05	0.22	-0.01
Part of Chain							
Yes	82	0.46	0.50	1,230	0.48	0.50	-0.02
IRF in CBSA							
Yes	82	0.52	0.50	1,230	0.49	0.50	0.06
Bed count	82	334	233	1,230	354	250	-0.08
Population	82	4,800,732	5,959,423	1,230	4,900,054	5,673,381	-0.02
Medicare Days Percent	82	0.37	0.12	1,230	0.37	0.12	-0.01
Resident-to-bed ratio	82	0.16	0.20	1,230	0.16	0.23	0.01
Teaching Status	82	0.63	0.48	1,230	0.64	0.48	-0.02
Disproportionate Share Percent	82	0.29	0.16	1,230	0.30	0.19	-0.03
Median Household Income	82	54,448	8,706	1,230	54,199	8,985	0.03
Medicare Advantage Penetration	82	26	11	1,230	26	11	0.04
PCPs per 10,000	82	8.258	1.592	1,230	8.220	1.845	0.02
SNF Beds Per 10,000	82	55	19	1,230	54	20	0.02
Hospital Penetration	81	0.149	0.219	1,230	0.145	0.215	0.02
Herfindahl Index - hospital	82	0.157	0.194	1,230	0.151	0.200	0.03

Characteristics	BPCI Participating Hospitals			Matched Comparison Hospitals			Standardized Difference
	N	Mean	Standard Deviation	N	Mean	Standard Deviation	
% of the hospitals' admissions that are the BPCI 48 clinical episodes	81	0.686	0.053	1,230	0.682	0.072	0.07
Number of Admissions for BPCI Episode MS-DRGs – 2011	82	496	558	1,230	458	394	0.08
Percentage of 2011 Episodes Discharged to Home	82	0.172	0.107	1,230	0.183	0.120	-0.10
Percentage of 2011 Episodes Discharged to IRF	82	0.138	0.109	1,230	0.132	0.139	0.05
Percentage of 2011 Episodes Discharged to SNF	82	0.453	0.178	1,230	0.455	0.183	-0.01
Percentage of 2011 Episodes Discharged to LTCH	82	0.008	0.015	1,230	0.012	0.027	-0.14
Percentage of 2011 Episodes Discharged to HH	82	0.228	0.129	1,230	0.218	0.131	0.08
Readmission Rate – 2011	82	0.111	0.047	1,230	0.113	0.060	-0.02
Medicare Part A Payment for hospitalization and 90-day post-discharge period, 2011	82	30,576	8,163	1,230	30,514	9,655	0.01

Exhibit J.2: BPCI Participating & Comparison Hospital Characteristics, Nonsurgical Other Medical MS-DRG, Model 2

Characteristics	BPCI Participating Hospitals			Matched Comparison Hospitals			Standardized Difference
	N	Mean	Standard Deviation	N	Mean	Standard Deviation	
Ownership							
Non-Profit	16	0.94	0.25	240	0.92	0.28	0.08
Government	16	0.00	0.00	240	0.00	0.00	0.00
For Profit	16	0.06	0.25	240	0.08	0.28	-0.08
Urban/Rural							
Urban	16	1.00	0.00	240	1.00	0.00	0.00
Rural	16	0.00	0.00	240	0.00	0.00	0.00
Part of Chain							
Yes	16	0.38	0.50	240	0.43	0.50	-0.10
IRF in CBSA							
Yes	16	0.50	0.52	240	0.62	0.49	-0.24

Characteristics	BPCI Participating Hospitals			Matched Comparison Hospitals			Standardized Difference
	N	Mean	Standard Deviation	N	Mean	Standard Deviation	
Bed count	16	344	194	240	338	188	0.03
Population	16	6,650,386	7,676,492	240	7,598,952	6,401,874	-0.13
Medicare Days Percent	16	0.37	0.14	240	0.37	0.11	0.01
Resident-to-bed ratio	16	0.17	0.16	240	0.18	0.23	-0.07
Teaching Status	16	0.75	0.45	240	0.70	0.46	0.10
Disproportionate Share Percent	16	0.31	0.21	240	0.35	0.23	-0.20
Median Household Income	16	57,762	7,113	240	57,364	6,318	0.06
Medicare Advantage Penetration	16	28	10	240	28	10	0.00
PCPs per 10,000	16	7.812	1.320	240	8.131	1.090	-0.26
SNF Beds Per 10,000	16	57	20	240	52	20	0.26
Hospital Penetration	16	0.068	0.063	240	0.074	0.122	-0.07
Herfindahl Index - hospital	16	0.084	0.063	240	0.084	0.124	-0.00
% of the hospitals' admissions that are the BPCI 48 clinical episodes	16	0.694	0.035	240	0.663	0.067	0.57
Number of Admissions for BPCI Episode MS-DRGs – 2011	16	941	486	240	881	489	0.12
Percentage of 2011 Episodes Discharged to Home	16	0.520	0.034	240	0.545	0.087	-0.38
Percentage of 2011 Episodes Discharged to IRF	16	0.010	0.010	240	0.010	0.013	-0.07
Percentage of 2011 Episodes Discharged to SNF	16	0.303	0.064	240	0.268	0.079	0.49
Percentage of 2011 Episodes Discharged to LTCH	16	0.023	0.045	240	0.026	0.048	-0.07
Percentage of 2011 Episodes Discharged to HH	16	0.144	0.037	240	0.151	0.042	-0.16
Readmission Rate – 2011	16	0.203	0.029	240	0.202	0.031	0.03
Medicare Part A Payment for hospitalization and 90-day post-discharge period, 2011	16	25,313	7,600	240	25,068	7,645	0.03

Exhibit J.3: BPCI Participating & Comparison Hospital Characteristics, Nonsurgical Neurovascular MS-DRG, Model 2

Characteristics	BPCI Participating Hospitals			Matched Comparison Hospitals			Standardized Difference
	N	Mean	Standard Deviation	N	Mean	Standard Deviation	
Ownership							
Non-Profit	15	1.00	0.00	225	1.00	0.00	0.00
Government	15	0.00	0.00	225	0.00	0.00	0.00
For Profit	15	0.00	0.00	225	0.00	0.00	0.00
Urban/Rural							
Urban	15	1.00	0.00	225	1.00	0.00	0.00
Rural	15	0.00	0.00	225	0.00	0.00	0.00
Part of Chain							
Yes	15	0.67	0.49	225	0.58	0.50	0.18
IRF in CBSA							
Yes	15	0.40	0.51	225	0.56	0.50	-0.32
Bed count	15	370	332	225	385	308	-0.05
Population	15	7,936,632	7,477,900	225	8,594,670	6,906,416	-0.09
Medicare Days Percent	15	0.36	0.15	225	0.35	0.11	0.12
Resident-to-bed ratio	15	0.23	0.22	225	0.22	0.25	0.04
Teaching Status	15	0.67	0.49	225	0.66	0.47	0.01
Disproportionate Share Percent	15	0.36	0.22	225	0.32	0.19	0.18
Median Household Income	15	57,895	6,844	225	57,895	6,795	0.00
Medicare Advantage Penetration	15	28	14	225	27	12	0.08
PCPs per 10,000	15	8.177	1.563	225	8.322	1.378	-0.10
SNF Beds Per 10,000	15	57	20	225	55	19	0.07
Hospital Penetration	15	0.083	0.131	225	0.072	0.126	0.08
Herfindahl Index - hospital	15	0.090	0.108	225	0.080	0.119	0.09
% of the hospitals' admissions that are the BPCI 48 clinical episodes	15	0.678	0.046	225	0.663	0.073	0.24
Number of Admissions for BPCI Episode MS-DRGs – 2011	15	186	138	225	191	151	-0.03

Characteristics	BPCI Participating Hospitals			Matched Comparison Hospitals			Standardized Difference
	N	Mean	Standard Deviation	N	Mean	Standard Deviation	
Percentage of 2011 Episodes Discharged to Home	15	0.434	0.082	225	0.459	0.071	-0.33
Percentage of 2011 Episodes Discharged to IRF	15	0.164	0.078	225	0.147	0.078	0.22
Percentage of 2011 Episodes Discharged to SNF	15	0.257	0.112	225	0.247	0.078	0.11
Percentage of 2011 Episodes Discharged to LTCH	15	0.012	0.024	225	0.010	0.024	0.09
Percentage of 2011 Episodes Discharged to HH	15	0.132	0.059	225	0.137	0.053	-0.09
Readmission Rate – 2011	15	0.142	0.043	225	0.139	0.048	0.08
Medicare Part A Payment for hospitalization and 90-day post-discharge period, 2011	15	25,670	5,789	225	24,813	5,771	0.15

Exhibit J.4: BPCI Participating & Comparison Hospital Characteristics, Nonsurgical Respiratory MS-DRG, Model 2

Characteristics	BPCI Participating Hospitals			Matched Comparison Hospitals			Standardized Difference
	N	Mean	Standard Deviation	N	Mean	Standard Deviation	
Ownership							
Non-Profit	33	0.94	0.24	495	0.95	0.22	-0.03
Government	33	0.03	0.17	495	0.00	0.00	0.25
For Profit	33	0.03	0.17	495	0.05	0.22	-0.11
Urban/Rural							
Urban	33	0.94	0.24	495	0.97	0.18	-0.12
Rural	33	0.06	0.24	495	0.03	0.18	0.12
Part of Chain							
Yes	33	0.52	0.51	495	0.53	0.50	-0.03
IRF in CBSA							
Yes	33	0.45	0.51	495	0.50	0.50	-0.09
Bed count	33	344	214	495	332	233	0.06
Population	33	7,195,573	7,435,737	495	7,118,505	7,008,024	0.01
Medicare Days Percent	33	0.38	0.12	495	0.37	0.14	0.06
Resident-to-bed ratio	33	0.19	0.20	495	0.17	0.24	0.06

Characteristics	BPCI Participating Hospitals			Matched Comparison Hospitals			Standardized Difference
	N	Mean	Standard Deviation	N	Mean	Standard Deviation	
Teaching Status	33	0.64	0.49	495	0.56	0.50	0.16
Disproportionate Share Percent	33	0.32	0.19	495	0.30	0.19	0.09
Median Household Income	33	56,615	7,480	495	56,194	7,900	0.05
Medicare Advantage Penetration	33	26	11	495	26	11	-0.02
PCPs per 10,000	33	8.219	1.858	495	8.172	1.443	0.03
SNF Beds Per 10,000	33	59	20	495	53	19	0.33
Hospital Penetration	33	0.138	0.248	495	0.133	0.226	0.02
Herfindahl Index - hospital	33	0.139	0.223	495	0.140	0.207	-0.00
% of the hospitals' admissions that are the BPCI 48 clinical episodes	33	0.679	0.053	495	0.671	0.076	0.12
Number of Admissions for BPCI Episode MS-DRGs – 2011	33	620	322	495	571	369	0.14
Percentage of 2011 Episodes Discharged to Home	33	0.571	0.070	494	0.607	0.091	-0.44
Percentage of 2011 Episodes Discharged to IRF	33	0.016	0.023	494	0.012	0.019	0.20
Percentage of 2011 Episodes Discharged to SNF	33	0.228	0.073	494	0.203	0.081	0.33
Percentage of 2011 Episodes Discharged to LTCH	33	0.014	0.030	494	0.015	0.023	-0.05
Percentage of 2011 Episodes Discharged to HH	33	0.171	0.046	494	0.163	0.051	0.16
Readmission Rate – 2011	33	0.210	0.029	494	0.207	0.038	0.10
Medicare Part A Payment for hospitalization and 90-day post-discharge period, 2011	33	22,842	5,477	494	22,459	5,622	0.07

Exhibit J.5: BPCI Participating & Comparison Hospital Characteristics, Nonsurgical Cardiovascular MS-DRG, Model 2

Characteristics	BPCI Participating Hospitals			Matched Comparison Hospitals			Standardized Difference
	N	Mean	Standard Deviation	N	Mean	Standard Deviation	
Ownership							
Non-Profit	41	0.95	0.22	615	0.92	0.27	0.12
Government	41	0.02	0.16	615	0.07	0.25	-0.20
For Profit	41	0.02	0.16	615	0.01	0.11	0.08

Characteristics	BPCI Participating Hospitals			Matched Comparison Hospitals			Standardized Difference
	N	Mean	Standard Deviation	N	Mean	Standard Deviation	
Urban/Rural							
Urban	41	0.95	0.22	615	0.95	0.21	-0.01
Rural	41	0.05	0.22	615	0.05	0.21	0.01
Part of Chain							
Yes	41	0.49	0.51	615	0.50	0.50	-0.02
IRF in CBSA							
Yes	41	0.46	0.50	615	0.52	0.50	-0.11
Bed count	41	346	235	615	357	251	-0.05
Population	41	6,791,566	7,150,925	615	7,316,977	7,351,173	-0.07
Medicare Days Percent	41	0.36	0.13	615	0.38	0.12	-0.17
Resident-to-bed ratio	41	0.18	0.19	615	0.18	0.25	0.01
Teaching Status	41	0.66	0.48	615	0.62	0.49	0.08
Disproportionate Share Percent	41	0.32	0.19	615	0.32	0.18	0.02
Median Household Income	41	57,579	8,119	615	56,337	8,279	0.15
Medicare Advantage Penetration	41	25	11	615	24	11	0.16
PCPs per 10,000	41	7.965	1.203	615	8.139	1.626	-0.12
SNF Beds Per 10,000	41	54	17	615	53	16	0.06
Hospital Penetration	41	0.141	0.240	615	0.164	0.248	-0.09
Herfindahl Index - hospital	41	0.141	0.219	615	0.161	0.226	-0.09
% of the hospitals' admissions that are the BPCI 48 clinical episodes	41	0.681	0.042	615	0.665	0.069	0.29
Number of Admissions for BPCI Episode MS-DRGs – 2011	41	770	518	615	723	473	0.10
Percentage of 2011 Episodes Discharged to Home	41	0.613	0.088	615	0.617	0.079	-0.04
Percentage of 2011 Episodes Discharged to IRF	41	0.013	0.012	615	0.013	0.014	-0.01
Percentage of 2011 Episodes Discharged to SNF	41	0.188	0.064	615	0.183	0.063	0.07
Percentage of 2011 Episodes Discharged to LTCH	41	0.005	0.009	615	0.006	0.013	-0.14
Percentage of 2011 Episodes Discharged to HH	41	0.182	0.061	615	0.181	0.057	0.02

Characteristics	BPCI Participating Hospitals			Matched Comparison Hospitals			Standardized Difference
	N	Mean	Standard Deviation	N	Mean	Standard Deviation	
Readmission Rate – 2011	41	0.214	0.029	615	0.207	0.036	0.20
Medicare Part A Payment for hospitalization and 90-day post-discharge period, 2011	41	19,914	4,716	615	19,595	4,559	0.07

Exhibit J.6: BPCI Participating & Comparison Hospital Characteristics, Nonsurgical & Surgical GI MS-DRG, Model 2

Characteristics	BPCI Participating Hospitals			Matched Comparison Hospitals			Standardized Difference
	N	Mean	Standard Deviation	N	Mean	Standard Deviation	
Ownership							
Non-Profit	17	0.94	0.24	255	0.96	0.20	-0.07
Government	17	0.00	0.00	255	0.00	0.00	0.00
For Profit	17	0.06	0.24	255	0.04	0.20	0.07
Urban/Rural							
Urban	17	1.00	0.00	255	1.00	0.00	0.00
Rural	17	0.00	0.00	255	0.00	0.00	0.00
Part of Chain							
Yes	17	0.41	0.51	255	0.46	0.50	-0.10
IRF in CBSA							
Yes	17	0.53	0.51	255	0.54	0.50	-0.02
Bed count	17	332	193	255	321	212	0.05
Population	17	6,251,815	6,617,667	255	6,182,830	6,485,220	0.01
Medicare Days Percent	17	0.37	0.14	255	0.38	0.11	-0.05
Resident-to-bed ratio	17	0.25	0.23	255	0.23	0.28	0.06
Teaching Status	17	0.82	0.39	255	0.62	0.49	0.45
Disproportionate Share Percent	17	0.32	0.19	255	0.33	0.18	-0.04
Median Household Income	17	56,425	5,528	255	56,548	10,381	-0.01
Medicare Advantage Penetration	17	26	10	255	25	10	0.17
PCPs per 10,000	17	7.983	1.320	255	8.283	1.267	-0.23

Characteristics	BPCI Participating Hospitals			Matched Comparison Hospitals			Standardized Difference
	N	Mean	Standard Deviation	N	Mean	Standard Deviation	
SNF Beds Per 10,000	17	63	20	255	60	20	0.16
Hospital Penetration	17	0.085	0.121	255	0.100	0.135	-0.12
Herfindahl Index - hospital	17	0.111	0.131	255	0.123	0.145	-0.09
% of the hospitals' admissions that are the BPCI 48 clinical episodes	17	0.673	0.064	255	0.661	0.074	0.17
Number of Admissions for BPCI Episode MS-DRGs – 2011	17	360	213	255	360	214	0.00
Percentage of 2011 Episodes Discharged to Home	17	0.624	0.052	255	0.664	0.064	-0.68
Percentage of 2011 Episodes Discharged to IRF	17	0.015	0.013	255	0.013	0.017	0.14
Percentage of 2011 Episodes Discharged to SNF	17	0.179	0.049	255	0.170	0.057	0.16
Percentage of 2011 Episodes Discharged to LTCH	17	0.008	0.014	255	0.009	0.016	-0.08
Percentage of 2011 Episodes Discharged to HH	17	0.174	0.060	255	0.144	0.048	0.55
Readmission Rate – 2011	17	0.199	0.034	255	0.194	0.044	0.13
Medicare Part A Payment for hospitalization and 90-day post-discharge period, 2011	17	21,107	4,606	255	20,558	5,213	0.11

Exhibit J.7: BPCI Participating & Comparison Hospital Characteristics, Cardiovascular Surgery MS-DRG, Model 2

Characteristics	BPCI Participating Hospitals			Matched Comparison Hospitals			Standardized Difference
	N	Mean	Standard Deviation	N	Mean	Standard Deviation	
Ownership							
Non-Profit	30	0.93	0.25	450	0.97	0.16	-0.19
Government	30	0.00	0.00	450	0.00	0.00	0.00
For Profit	30	0.07	0.25	450	0.03	0.16	0.19
Urban/Rural							
Urban	30	1.00	0.00	450	1.00	0.00	0.00
Rural	30	0.00	0.00	450	0.00	0.00	0.00
Part of Chain							
Yes	30	0.50	0.51	450	0.56	0.50	-0.12

Characteristics	BPCI Participating Hospitals			Matched Comparison Hospitals			Standardized Difference
	N	Mean	Standard Deviation	N	Mean	Standard Deviation	
IRF in CBSA							
Yes	30	0.43	0.50	450	0.51	0.50	-0.15
Bed count	30	463	284	450	450	336	0.00
Population	30	7,525,440	8,115,105	450	7,442,548	7,376,013	0.00
Medicare Days Percent	30	0.34	0.11	450	0.35	0.09	-0.12
Resident-to-bed ratio	30	0.30	0.22	450	0.30	0.27	-0.00
Teaching Status	30	0.90	0.31	450	0.83	0.38	0.20
Disproportionate Share Percent	30	0.34	0.17	450	0.35	0.18	-0.04
Median Household Income	30	58,082	9,793	450	57,997	8,453	0.01
Medicare Advantage Penetration	30	25	10	450	25	10	-0.03
PCPs per 10,000	30	8.629	1.652	450	8.480	1.535	0.09
SNF Beds Per 10,000	30	59	16	450	58	18	0.03
Hospital Penetration	30	0.165	0.203	450	0.136	0.193	0.15
Herfindahl Index - hospital	30	0.139	0.149	450	0.120	0.160	0.12
% of the hospitals' admissions that are the BPCI 48 clinical episodes	30	0.661	0.054	450	0.651	0.063	0.16
Number of Admissions for BPCI Episode MS-DRGs – 2011	30	675	524	450	636	831	0.06
Percentage of 2011 Episodes Discharged to Home	30	0.591	0.102	450	0.610	0.114	-0.18
Percentage of 2011 Episodes Discharged to IRF	30	0.041	0.042	450	0.031	0.039	0.24
Percentage of 2011 Episodes Discharged to SNF	30	0.164	0.098	450	0.162	0.085	0.03
Percentage of 2011 Episodes Discharged to LTCH	30	0.005	0.006	450	0.008	0.018	-0.26
Percentage of 2011 Episodes Discharged to HH	30	0.199	0.072	450	0.188	0.069	0.16
Readmission Rate – 2011	30	0.173	0.037	450	0.175	0.053	-0.06
Medicare Part A Payment for hospitalization and 90-day post-discharge period, 2011	30	37,060	7,237	450	37,189	9,963	-0.01

Exhibit J.8: BPCI Participating & Comparison Hospital Characteristics, Spinal Surgery MS-DRG, Model 2

Characteristics	BPCI Participating Hospitals			Matched Comparison Hospitals			Standardized Difference
	N	Mean	Standard Deviation	N	Mean	Standard Deviation	
Ownership							
Non-Profit	20	0.85	0.37	300	0.86	0.35	-0.03
Government	20	0.00	0.00	300	0.00	0.00	0.00
For Profit	20	0.15	0.37	300	0.14	0.35	0.03
Urban/Rural							
Urban	20	1.00	0.00	300	1.00	0.00	0.00
Rural	20	0.00	0.00	300	0.00	0.00	0.00
Part of Chain							
Yes	20	0.30	0.47	300	0.39	0.49	-0.19
IRF in CBSA							
Yes	20	0.45	0.51	300	0.53	0.50	-0.15
Bed count	20	367	190	300	354	242	0.06
Population	20	4,625,150	6,571,777	300	4,689,273	5,661,574	-0.01
Medicare Days Percent	20	0.37	0.13	300	0.37	0.10	0.02
Resident-to-bed ratio	20	0.17	0.18	300	0.16	0.22	0.06
Teaching Status	20	0.80	0.41	300	0.69	0.46	0.25
Disproportionate Share Percent	20	0.26	0.13	300	0.28	0.17	-0.09
Median Household Income	20	57,960	9,997	300	56,124	9,757	0.19
Medicare Advantage Penetration	20	26	9	300	25	11	0.08
PCPs per 10,000	20	8.203	0.995	300	8.150	1.441	0.04
SNF Beds Per 10,000	20	55	16	300	51	17	0.25
Hospital Penetration	20	0.113	0.105	300	0.122	0.140	-0.07
Herfindahl Index - hospital	20	0.124	0.091	300	0.130	0.127	-0.05
% of the hospitals' admissions that are the BPCI 48 clinical episodes	20	0.682	0.040	300	0.670	0.084	0.19
Number of Admissions for BPCI Episode MS-DRGs – 2011	20	136	129	300	117	108	0.16

Characteristics	BPCI Participating Hospitals			Matched Comparison Hospitals			Standardized Difference
	N	Mean	Standard Deviation	N	Mean	Standard Deviation	
Percentage of 2011 Episodes Discharged to Home	20	0.528	0.171	300	0.553	0.173	-0.15
Percentage of 2011 Episodes Discharged to IRF	20	0.155	0.116	300	0.136	0.134	0.15
Percentage of 2011 Episodes Discharged to SNF	20	0.181	0.128	300	0.160	0.115	0.17
Percentage of 2011 Episodes Discharged to LTCH	20	0.002	0.008	300	0.004	0.021	-0.13
Percentage of 2011 Episodes Discharged to HH	20	0.134	0.093	300	0.147	0.089	-0.14
Readmission Rate – 2011	20	0.098	0.066	300	0.087	0.050	0.20
Medicare Part A Payment for hospitalization and 90-day post-discharge period, 2011	20	29,715	8,427	300	30,184	12,432	-0.04

Model 3, Skilled Nursing Facilities (SNF)

Exhibit J.9: BPCI Participating & Comparison SNF Characteristics, Orthopedic Surgery MS-DRG, Model 3

Characteristics	BPCI Participating SNFs			Matched Comparison SNFs			Standardized Difference
	N	Mean	Standard Deviation	N	Mean	Standard Deviation	
Ownership							
Non-Profit	58	0.19	0.40	870	0.17	0.37	0.06
Government	58	0	0	870	0	0	0.00
For Profit	58	0.81	0.40	870	0.83	0.37	-0.06
Urban/Rural							
Urban	58	1	0	870	1	0	0.00
Rural	58	0	0	870	0	0	0.00
Part of Chain							
Yes	58	0.19	0.40	870	0.17	0.38	0.05
IRF in CBSA							
Yes	58	0.52	0.50	870	0.50	0.50	0.04
SNF in Hospital							
Yes	58	0.03	0.18	870	0.02	0.15	0.08
Bed count	58	141	51	870	135	49	0.13
NH Compare Overall Rating	58	3.6	1.1	870	3.5	1.3	0.02
Population	58	4,437,478	3,160,456	870	4,870,958	5,410,373	-0.10
Median Household Income	58	54,069	5,996	870	53,570	7,147	0.08
Medicare Advantage Penetration	58	23.2	10.1	870	23.7	10.0	-0.05
SNF Beds Per 10,000	58	55.1	14.2	870	53.9	13.6	0.08
SNF Market Share	58	0.04	0.05	870	0.03	0.05	0.08
Herfindahl Index - SNF	58	0.02	0.03	870	0.03	0.04	-0.17
Herfindahl Index - ACH	58	0.12	0.17	870	0.15	0.18	-0.17
% of the hospitals' admissions that are the BPCI 48 clinical episodes	58	0.70	0.08	870	0.71	0.07	-0.17

Characteristics	BPCI Participating SNFs			Matched Comparison SNFs			Standardized Difference
	N	Mean	Standard Deviation	N	Mean	Standard Deviation	
Number of Admissions for BPCI Episode MS-DRGs – 2011	58	63	69	870	52	54	0.18
Readmission Rate – 2011	58	0.264	0.119	870	0.269	0.136	-0.05
Institutional LOS – 2011	58	55.6	8.8	870	55.0	9.8	0.07
SNF LOS – 2011	58	36.3	7.7	870	36.3	9.1	0.00

Exhibit J.10: BPCI Participating & Comparison SNF Characteristics, Nonsurgical Respiratory MS-DRG, Model 3

Characteristics	BPCI Participating SNFs			Matched Comparison SNFs			Standardized Difference
	N	Mean	Standard Deviation	N	Mean	Standard Deviation	
Ownership							
Non-Profit	50	0.00	0.00	750	0.00	0.00	0.00
Government	50	0	0	750	0	0	0.00
For Profit	50	1.00	0.00	750	1.00	0.00	0.00
Urban/Rural							
Urban	50	1	0	750	1	0	0.00
Rural	50	0	0	750	0	0	0.00
Part of Chain							
Yes	50	0.10	0.30	750	0.09	0.28	0.05
IRF in CBSA							
Yes	50	0.64	0.48	750	0.60	0.49	0.07
SNF in Hospital							
Yes	50	0.02	0.14	750	0.00	0.04	0.18
Bed count	50	158	57	750	152	53	0.12
NH Compare Overall Rating	50	3.5	1.1	750	3.5	1.3	0.04
Population	50	5,272,195	2,963,504	750	7,034,827	6,400,099	-0.35
Median Household Income	50	54,484	6,185	750	55,035	7,163	-0.08
Medicare Advantage Penetration	50	22.5	8.5	750	20.5	9.0	0.23

Characteristics	BPCI Participating SNFs			Matched Comparison SNFs			Standardized Difference
	N	Mean	Standard Deviation	N	Mean	Standard Deviation	
SNF Beds Per 10,000	50	53.8	11.5	750	54.9	14.1	-0.09
SNF Market Share	50	0.03	0.05	750	0.03	0.06	0.03
Herfindahl Index - SNF	50	0.02	0.04	750	0.03	0.05	-0.08
Herfindahl Index - ACH	50	0.10	0.17	750	0.11	0.17	-0.07
% of the hospitals' admissions that are the BPCI 48 clinical episodes	50	0.67	0.05	750	0.69	0.08	-0.24
Number of Admissions for BPCI Episode MS-DRGs – 2011	50	50	31	750	44	30	0.20
Readmission Rate – 2011	50	0.564	0.157	750	0.534	0.160	0.19
Institutional LOS – 2011	50	50.5	5.8	750	51.5	7.3	-0.14
SNF LOS – 2011	50	33.3	5.4	750	34.3	8.6	-0.14

Exhibit J.11: BPCI Participating & Comparison SNF Characteristics, Nonsurgical Cardiovascular MS-DRG, Model 3

Characteristics	BPCI Participating SNFs			Matched Comparison SNFs			Standardized Difference
	N	Mean	Standard Deviation	N	Mean	Standard Deviation	
Ownership							
Non-Profit	50	0.00	0.00	750	0.00	0.00	0.00
Government	50	0	0	750	0	0	0.00
For Profit	50	1.00	0.00	750	1.00	0.00	0.00
Urban/Rural							
Urban	61	1	0	915	1	0	0.00
Rural	61	0	0	915	0	0	0.00
Part of Chain							
Yes	61	0.16	0.37	915	0.15	0.36	0.03
IRF in CBSA							
Yes	61	0.56	0.50	915	0.52	0.50	0.07
SNF in Hospital							
Yes	61	0.02	0.13	915	0.01	0.11	0.03

Characteristics	BPCI Participating SNFs			Matched Comparison SNFs			Standardized Difference
	N	Mean	Standard Deviation	N	Mean	Standard Deviation	
Bed count	61	152	58	915	142	52	0.18
NH Compare Overall Rating	61	3.6	1.1	915	3.5	1.3	0.01
Population	61	4,665,824	3,053,177	915	4,207,011	3,401,616	0.14
Median Household Income	61	54,670	6,003	915	53,344	6,281	0.22
Medicare Advantage Penetration	61	23.6	9.9	915	23.8	11.2	-0.02
SNF Beds Per 10,000	61	55.7	13.7	915	54.5	15.1	0.08
SNF Market Share	61	0.03	0.05	915	0.03	0.04	0.04
Herfindahl Index - SNF	61	0.02	0.03	915	0.03	0.03	-0.11
Herfindahl Index - ACH	61	0.11	0.17	915	0.13	0.17	-0.11
% of the hospitals' admissions that are the BPCI 48 clinical episodes	61	0.69	0.08	915	0.72	0.06	-0.56
Number of Admissions for BPCI Episode MS – DRGs - 2011	61	54	42	915	50	38	0.10
Readmission Rate – 2011	61	0.503	0.133	915	0.481	0.157	0.15
Institutional LOS – 2011	61	51.3	8.7	915	51.7	8.8	-0.04
SNF LOS – 2011	61	33.4	6.5	915	32.7	8.1	0.10

Model 3, Home Health Agencies (HHA)

Exhibit J.12: BPCI Participating & Comparison HHA Characteristics, Nonsurgical Respiratory MS-DRG, Model 3

Characteristics	BPCI Participating HHAs			Matched Comparison HHAs			Standardized Difference
	N	Mean	Standard Deviation	N	Mean	Standard Deviation	
Ownership							
Non-Profit	22	0.00	0.00	330	0.00	0.00	0.00
Government	22	0.00	0.00	330	0.00	0.00	0.00
For Profit	22	1.00	0.00	330	1.00	0.00	0.00
Urban/Rural							
Urban	22	0.77	0.43	330	0.79	0.41	-0.04
Rural	22	0.23	0.43	330	0.21	0.41	0.04
Number of Employed Nurses in HHA	22	17	14	330	19	24	-0.13
Population	22	2,433,399	2,763,081	329	2,416,341	3,596,429	0.01
% of the hospitals' admissions that are the BPCI 48 clinical episodes	22	0.74	0.05	330	0.73	0.04	0.15
Number of Admissions for BPCI Episode MS-DRGs – 2011	22	121	99	330	117	90	0.05
Readmission Rate – 2011	22	0.23	0.06	330	0.23	0.05	0.01
HHA LOS – 2011	22	49.1	3.9	330	49.1	4.7	0.01

Exhibit J.13: BPCI Participating & Comparison HHA Characteristics, Nonsurgical Cardiovascular MS-DRG, Model 3

Characteristics	BPCI Participating HHAs			Matched Comparison HHAs			Standardized Difference
	N	Mean	Standard Deviation	N	Mean	Standard Deviation	
Ownership							
Non-Profit	27	0.04	0.19	405	0.02	0.16	0.07
Government	27	0.00	0.00	405	0.00	0.00	0.00
For Profit	27	0.96	0.19	405	0.98	0.16	-0.07

Characteristics	BPCI Participating HHAs			Matched Comparison HHAs			Standardized Difference
	N	Mean	Standard Deviation	N	Mean	Standard Deviation	
Urban/Rural							
Urban	27	0.78	0.42	405	0.78	0.42	0.00
Rural	27	0.22	0.42	405	0.22	0.42	0.00
Number of Employed Nurses in HHA	27	72	297	405	20	28	0.25
Population	27	3,004,745	4,177,533	405	2,730,090	3,715,128	0.07
% of the hospitals' admissions that are the BPCI 48 clinical episodes	27	0.73	0.05	405	0.73	0.05	0.10
Number of Admissions for BPCI Episode MS-DRGs – 2011	27	330	1,143	405	132	194	0.24
Readmission Rate – 2011	27	0.22	0.08	405	0.22	0.08	0.00
HHA LOS – 2011	27	49.3	4.5	405	49.2	4.6	0.03

Model 4, Acute Care Hospitals

Exhibit J.14: BPCI Participating & Comparison Hospital Characteristics, Orthopedic Surgery MS-DRG, Model 4

Characteristics	BPCI Participating Hospitals			Matched Comparison Hospitals			Standardized Difference
	N	Mean	Standard Deviation	N	Mean	Standard Deviation	
Ownership							
Non-Profit	14	0.64	0.50	210	0.64	0.48	0.00
Government	14	0.00	0.00	210	0.00	0.00	0.00
For Profit	14	0.36	0.50	210	0.36	0.48	0.00
Urban/Rural							
Urban	14	1.00	0.00	210	1.00	0.00	0.00
Rural	14	0.00	0.00	210	0.00	0.00	0.00
IRF in CBSA							
Yes	14	0.57	0.51	210	0.43	0.50	0.29
Bed count	14	331	153	210	299	186	0.19
Population	14	3,875,571	4,215,543	210	3,937,499	5,141,973	-0.01
Medicare Days Percent	14	0.26	0.12	210	0.38	0.12	-0.98
Resident-to-bed ratio	14	0.10	0.20	210	0.06	0.11	0.22
Disproportionate Share Percent	14	0.32	0.14	210	0.28	0.15	0.32
Median Household Income	14	53,846	10,059	210	52,805	9,194	0.11
Medicare Advantage Penetration	14	36	9	210	29	13	0.68
PCPs per 10,000	14	7.76	1.97	210	7.82	1.46	-0.03
SNF Beds Per 10,000	14	37	16	210	46	18	-0.54
Hospital Penetration	14	0.183	0.235	210	0.174	0.232	0.04
Herfindahl Index - hospital	14	0.180	0.202	210	0.200	0.222	-0.09
% of the hospitals' admissions that are the BPCI 48 clinical episodes	14	0.682	0.061	210	0.688	0.065	-0.09
Number of Admissions for BPCI Episode MS-DRGs – 2011	14	381	305	210	386	304	-0.02
Percentage of 2011 Episodes Discharged to Home	14	0.262	0.160	210	0.234	0.138	0.19

Characteristics	BPCI Participating Hospitals			Matched Comparison Hospitals			Standardized Difference
	N	Mean	Standard Deviation	N	Mean	Standard Deviation	
Percentage of 2011 Episodes Discharged to IRF	14	0.086	0.097	210	0.107	0.114	-0.20
Percentage of 2011 Episodes Discharged to SNF	14	0.415	0.138	210	0.431	0.151	-0.12
Percentage of 2011 Episodes Discharged to LTCH	14	0.010	0.009	210	0.008	0.020	0.08
Percentage of 2011 Episodes Discharged to HH	14	0.228	0.097	210	0.220	0.121	0.08
Readmission Rate – 2011	14	0.094	0.032	210	0.101	0.038	-0.19
Medicare Part A Payment for hospitalization and 90-day post-discharge period, 2011	14	27,826	7,382	210	27,934	6,265	-0.02

Exhibit J.15: BPCI Participating & Comparison Hospital Characteristics, Cardiovascular Surgery MS-DRG, Model 4

Characteristics	BPCI Participating Hospitals			Matched Comparison Hospitals			Standardized Difference
	N	Mean	Standard Deviation	N	Mean	Standard Deviation	
Ownership							
Non-Profit	10	0.60	0.52	150	0.59	0.49	0.01
Government	10	0.00	0.00	150	0.00	0.00	0.00
For Profit	10	0.40	0.52	150	0.41	0.49	-0.01
Urban/Rural							
Urban	10	1.00	0.00	150	1.00	0.00	0.00
Rural	10	0.00	0.00	150	0.00	0.00	0.00
IRF in CBSA							
Yes	10	0.70	0.48	150	0.51	0.50	0.39
Bed count	10	511	521	150	397	240	0.28
Population	10	4,917,648	6,217,770	150	3,274,788	4,346,795	0.31
Medicare Days Percent	10	0.33	0.11	150	0.39	0.11	-0.64
Resident-to-bed ratio	10	0.09	0.11	150	0.10	0.18	-0.07
Disproportionate Share Percent	10	0.32	0.10	150	0.27	0.13	0.41
Median Household Income	10	51,097	5,832	150	51,489	9,163	-0.05
Medicare Advantage Penetration	10	36	8	150	27	14	0.78

Characteristics	BPCI Participating Hospitals			Matched Comparison Hospitals			Standardized Difference
	N	Mean	Standard Deviation	N	Mean	Standard Deviation	
PCPs per 10,000	10	7.50	1.01	150	7.67	1.93	-0.11
SNF Beds Per 10,000	10	46	21	150	49	17	-0.16
Hospital Penetration	10	0.222	0.256	150	0.250	0.260	-0.11
Herfindahl Index - hospital	10	0.195	0.198	150	0.231	0.236	-0.17
% of the hospitals' admissions that are the BPCI 48 clinical episodes	10	0.694	0.030	150	0.670	0.056	0.54
Number of Admissions for BPCI Episode MS – DRGs - 2011	10	826	847	150	713	598	0.15
Percentage of 2011 Episodes Discharged to Home	10	0.666	0.098	150	0.659	0.094	0.08
Percentage of 2011 Episodes Discharged to IRF	10	0.040	0.041	150	0.034	0.030	0.16
Percentage of 2011 Episodes Discharged to SNF	10	0.113	0.048	150	0.120	0.046	-0.14
Percentage of 2011 Episodes Discharged to LTCH	10	0.013	0.015	150	0.011	0.019	0.12
Percentage of 2011 Episodes Discharged to HH	10	0.167	0.073	150	0.176	0.073	-0.12
Readmission Rate – 2011	10	0.173	0.021	150	0.161	0.025	0.53
Medicare Part A Payment for hospitalization and 90-day post-discharge period, 2011	10	30,947	4,443	150	30,866	6,946	0.01

Appendix K: Aggregation of Clinical Episodes

Episode Name	Episode #	Aggregate Level #3	Aggregate Level 3 Name	Aggregate Level #4	Aggregate Level 4 Name	Aggregate Level #5	Aggregate Level 5 Name
Major joint replacement of the upper extremity	1	1	surgical: Ortho, joint replacement and hip, femur or lower extremity procedure	1	Surgical: ortho excluding spine	1	Surgical: All
Amputation	2	2	Surgical: Ortho, other	1	Surgical: ortho excluding spine	1	Surgical: All
Urinary tract infection	4	3	non-surgical: metabolic disorders	2	Non-surgical: other medical	4	Non-surgical: Other
Stroke	5	6	Non-surgical: neurovascular	3	Non-surgical: neurovascular	2	Non-surgical: cardio and neurovascular
Chronic obstructive pulmonary disease, bronchitis, asthma	6	7	Chronic obstructive pulmonary disease, bronchitis, asthma	4	Non-surgical: respiratory	3	Non-surgical: respiratory and GI and surgical: GI
Coronary artery bypass graft	7	13	Surgical: Cardiac Non-Devices	7	Surgical: cardiovascular	1	Surgical: All
Major joint replacement of the lower extremity	8	18	Surgical: major joint replacement of lower extremity	1	Surgical: ortho excluding spine	1	Surgical: All
Percutaneous coronary intervention	9	14	Surgical: Cardiac Devices	7	Surgical: cardiovascular	1	Surgical: All
Pacemaker	10	14	Surgical: Cardiac Devices	7	Surgical: cardiovascular	1	Surgical: All
Cardiac defibrillator	11	14	Surgical: Cardiac Devices	7	Surgical: cardiovascular	1	Surgical: All
Pacemaker device replacement or revision	12	14	Surgical: Cardiac Devices	7	Surgical: cardiovascular	1	Surgical: All
AICD generator or lead	13	14	Surgical: Cardiac Devices	7	Surgical: cardiovascular	1	Surgical: All
Congestive heart failure	14	9	Non-surgical: congestive heart failure	5	Non-surgical: cardiovascular	2	Non-surgical: cardio and neurovascular
Acute myocardial infarction	15	10	Non-surgical: Major cardiovascular	5	Non-surgical: cardiovascular	2	Non-surgical: cardio and neurovascular
Cardiac arrhythmia	16	10	Non-surgical: Major cardiovascular	5	Non-surgical: cardiovascular	2	Non-surgical: cardio and neurovascular

Episode Name	Episode #	Aggregate Level #3	Aggregate Level 3 Name	Aggregate Level #4	Aggregate Level 4 Name	Aggregate Level #5	Aggregate Level 5 Name
Cardiac valve	17	13	Surgical: Cardiac Non-Devices	7	Surgical: cardiovascular	1	Surgical: All
Other vascular surgery	18	13	Surgical: Cardiac Non-Devices	7	Surgical: cardiovascular	1	Surgical: All
Major cardiovascular procedure	19	13	Surgical: Cardiac Non-Devices	7	Surgical: cardiovascular	1	Surgical: All
Gastrointestinal hemorrhage	20	12	Non-surgical and surgical: GI	6	Non-surgical and surgical: GI	3	Non-surgical: respiratory and GI and surgical: GI
Major bowel procedure	21	12	Non-surgical and surgical: GI	6	Non-surgical and surgical: GI	3	Non-surgical: respiratory and GI and surgical: GI
Fractures of the femur and hip or pelvis	22	15	Non-surgical: ortho	8	Non-surgical: ortho	4	Non-surgical: Other
Medical non-infectious orthopedic	23	15	Non-surgical: ortho	8	Non-surgical: ortho	4	Non-surgical: Other
Double joint replacement of the lower extremity	24	1	Surgical: Ortho, joint replacement and hip, femur or lower extremity procedure	1	Surgical: ortho excluding spine	1	Surgical: All
Revision of the hip or knee	25	2	Surgical: Ortho, other	1	Surgical: ortho excluding spine	1	Surgical: All
Spinal fusion (non-cervical)	26	17	Surgical: Non-cervical spinal fusion	9	Surgical: spinal	1	Surgical: All
Hip & femur procedures except major joint	27	1	surgical: Ortho, joint replacement and hip, femur or lower extremity procedure	1	Surgical: ortho excluding spine	1	Surgical: All
Cervical spinal fusion	28	16	Surgical: Fusion-cervical spinal/ back/neck	9	Surgical: spinal	1	Surgical: All
Other knee procedures	29	2	Surgical: Ortho, other	1	Surgical: ortho excluding spine	1	Surgical: All
Complex non-cervical spinal fusion	30	17	Surgical: Non-cervical spinal fusion	9	Surgical: spinal	1	Surgical: All
Combined anterior posterior spinal fusion	31	16	Surgical: Fusion-cervical spinal/ back/neck	9	Surgical: spinal	1	Surgical: All
Back & neck except spinal fusion	32	16	Surgical: Fusion-cervical spinal/ back/neck	9	Surgical: spinal	1	Surgical: All

Episode Name	Episode #	Aggregate Level #3	Aggregate Level 3 Name	Aggregate Level #4	Aggregate Level 4 Name	Aggregate Level #5	Aggregate Level 5 Name
Lower extremity and humerus procedure except hip, foot, femur	33	1	surgical: Ortho, joint replacement and hip, femur or lower extremity procedure	1	Surgical: ortho excluding spine	1	Surgical: All
Removal of orthopedic devices	34	2	Surgical: Ortho, other	1	Surgical: ortho excluding spine	1	Surgical: All
Sepsis	35	4	non-surgical: infection/sepsis	2	Non-surgical: other medical	4	Non-surgical: Other
Diabetes	36	3	non-surgical: metabolic disorders	2	Non-surgical: other medical	4	Non-surgical: Other
Simple pneumonia and respiratory infections	37	8	Non-surgical: Respiratory	4	Non-surgical: respiratory	3	Non-surgical: respiratory and GI and surgical: GI
Other respiratory	38	8	Non-surgical: Respiratory	4	Non-surgical: respiratory	3	Non-surgical: respiratory and GI and surgical: GI
Chest pain	39	11	Non-surgical: Minor cardiovascular	5	Non-surgical: cardiovascular	2	Non-surgical: cardio and neurovascular
Medical peripheral vascular disorders	40	11	Non-surgical: Minor cardiovascular	5	Non-surgical: cardiovascular	2	Non-surgical: cardio and neurovascular
Atherosclerosis	41	11	Non-surgical: Minor cardiovascular	5	Non-surgical: cardiovascular	2	Non-surgical: cardio and neurovascular
Gastrointestinal obstruction	42	12	Non-surgical and surgical: GI	6	Non-surgical and surgical: GI	3	Non-surgical: respiratory and GI and surgical: GI
Syncope & collapse	43	11	Non-surgical: Minor cardiovascular	5	Non-surgical: cardiovascular	2	Non-surgical: cardio and neurovascular
Renal failure	44	5	Non-surgical: Renal failure or Red blood cell disorders	2	Non-surgical: other medical	4	Non-surgical: Other
Nutritional and metabolic disorders	45	3	non-surgical: metabolic disorders	2	Non-surgical: other medical	4	Non-surgical: Other
Cellulitis	46	4	non-surgical: infection/sepsis	2	Non-surgical: other medical	4	Non-surgical: Other
Red blood cell disorders	47	5	Non-surgical: Renal failure or Red blood cell disorders	2	Non-surgical: other medical	4	Non-surgical: Other

Episode Name	Episode #	Aggregate Level #3	Aggregate Level 3 Name	Aggregate Level #4	Aggregate Level 4 Name	Aggregate Level #5	Aggregate Level 5 Name
Transient ischemia	48	6	Non-surgical: neurovascular	3	Non-surgical: neurovascular	2	Non-surgical: cardio and neurovascular
Esophagitis, gastroenteritis and other digestive disorders	49	12	Non-surgical and surgical: GI	6	Non-surgical and surgical: GI	3	Non-surgical: respiratory and GI and surgical: GI

Appendix L: Claim-based and Assessment-based Outcome Definitions

We evaluate the impact of BPCI on the utilization of health care services, payment, quality of care, and unintended consequences by measuring a number of outcomes within each of these domains. **Exhibit L.1** includes the complete list of claim-based outcomes included in our analysis, which includes the outcome name and description, organized by domain.

Exhibit L.1: Claim-based Outcomes Definitions

Domain	Outcome Name	Definition/ Description	Measurement period(s)	Technical Definition	Eligible Sample
Quality	Unplanned Readmission Rate following inpatient hospital discharge (Models 2 & 4)	Episodes with one or more unplanned, all-cause readmissions after inpatient discharge for any eligible condition	30-day Post-discharge, 60-day Post-discharge, 90-day Post-discharge	Binary outcome (1= at least one readmission during measurement period; 0= no eligible readmissions during measurement period). Eligible readmissions inpatient prospective payment system claims with a DRG not on the list of excluded DRGs for the given clinical episode. Measure was based on specifications for the NQF-endorsed all-cause unplanned readmission measure (NQF measure 1789). Similar to the NQF-endorsed measure, we excluded planned admissions, based on AHRQ Clinical Classification System Procedure and Diagnoses codes.	Beneficiaries who: 1) have a complete FFS enrollment history six months prior to admission; 2) have non-missing age & gender data; 3) maintain FFS A&B enrollment throughout the measurement period or until death; 4) are discharged from the anchor hospital stay in accordance with medical advice); 5) have a measurement period that ends on or before December 31, 2014.
Quality	Unplanned Readmission Rate during first 30 days of the episode (Model 3)	Episodes with one or more unplanned, all-cause readmissions within first 30 days of the Model 3 PAC admission date for any eligible condition	First 30 days of the Model 3 episode	Binary outcome (1= at least one readmission during measurement period; 0= no eligible readmissions during measurement period). Eligible readmissions are inpatient prospective payment system claims with a DRG not on the list of excluded DRGs for the given clinical episode. Readmissions must be unplanned, based on AHRQ Clinical Classification System Procedure and Diagnoses codes.	Beneficiaries who: 1) have a complete FFS enrollment history six months prior to admission; 2) have non-missing age & gender data; 3) are discharged from the anchor hospital in accordance with medical advice; 4) have a measurement period that ends on or before December 31, 2014.

Domain	Outcome Name	Definition/ Description	Measurement period(s)	Technical Definition	Eligible Sample
Quality	Emergency Department (ED) use without hospitalization following inpatient hospital stay (Models 2 & 4)	Episodes with one or more ED visit for which the beneficiary requires medical treatment but is not admitted to the hospital after discharge from an inpatient hospital stay	30-day Post-discharge, 60-day Post-discharge, 90-day Post-discharge	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) have a complete FFS enrollment history six months prior to admission; 2) have non-missing age & gender data; 3) maintain FFS A&B enrollment throughout the measurement period or until death; 4) are discharged from the anchor hospital in accordance with medical advice; 5) are living at the time of discharge; 6) have a measurement period that ends on or before December 31, 2014.
Quality	Emergency Department (ED) use without hospitalization during first 30 days of the episode (Model 3)	Episodes with one or more ED visit for which the beneficiary requires medical treatment but is not admitted to the hospital within first 30 days of the Model 3 PAC admission date	First 30 days of the Model 3 episode	Binary outcome (1= at least one ED visit without hospital readmission during measurement period; 0= no eligible ED visits without hospital 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) have a complete FFS enrollment history six months prior to admission; 2) have complete demographic data; 3) are discharged from the anchor hospital in accordance with medical advice; 4) have a measurement period that ends on or before December 31, 2014.
Quality	Acute hospital all-cause inpatient mortality (Model 4)	Death from any cause during anchor hospital stay (rate)	Acute	If date of death is on or before discharge date from the anchor hospital stay (including transfers), then mortality outcome =1.	Beneficiaries who: 1) have complete FFS enrollment history six months prior to admission; 2) were not enrolled in the Medicare Hospice program in the six months prior to the index admission; 3) have consistent, reliable and known mortality status data. *For beneficiaries with multiple anchor hospitalizations, one hospitalization per quarter is randomly selected for inclusion in this measure.*

Domain	Outcome Name	Definition/ Description	Measurement period(s)	Technical Definition	Eligible Sample
Quality	All-cause mortality (Models 2 and 4)	Death from any cause during measurement period	30-day Post-discharge	If date of death occurs during measurement period, then mortality outcome =1.	Beneficiaries who: 1) have complete FFS enrollment history six months prior to admission; 2) were not enrolled in the Medicare Hospice program in the six months prior to the index admission; 3) have consistent, reliable and known mortality status data. *For beneficiaries with multiple anchor hospitalizations, one hospitalization per quarter is randomly selected for inclusion in this measure.*
Quality	All-cause mortality (Model 3)	Death from any cause during measurement period	Episode start +30, episode start + 60, episode start +90	If date of death occurs during measurement period, then mortality outcome =1.	Beneficiaries who: 1) have complete FFS enrollment history six months prior to admission; 2) were not enrolled in the Medicare Hospice program in the six months prior to the index admission; 3) have consistent, reliable and known mortality status data. *For beneficiaries with multiple anchor hospitalizations, one hospitalization per quarter is randomly selected for inclusion in this measure.*
Utilization	Acute Inpatient Length of Stay (All Models)	Total number of inpatient days during the anchor stay (Models 2 and 4) or qualifying stay (Model 3)	Acute	For Model 2 and Model 4, the number of days between the anchor admission date and the anchor discharge date (including any transfer stays). For Model 3, the number of days between the qualifying admission date and the qualifying stay discharge date (including any transfer stays).	Beneficiaries who have: 1) complete FFS enrollment history six months prior to admission 2) consistent, reliable and known mortality status data

Domain	Outcome Name	Definition/ Description	Measurement period(s)	Technical Definition	Eligible Sample
Utilization	Post-Acute Care Number of days (various settings) (All Models)	Total number of institutional days of care per institutional setting	30-day Post-discharge, 60-day Post-discharge, 90-day Post-discharge	The total number of days of care (not necessarily consecutive) during the measurement period in each of the following PAC settings: skilled nursing facility (SNF), long-term care hospital (LTCH), inpatient rehabilitation facility (IRF), and inpatient (readmissions). The outcome for each setting is limited to patients who had at least one day in the setting during the post -discharge period.	Beneficiaries who: 1) are alive at the time of discharge; 2) have a complete FFS enrollment history six months prior to admission; 3) maintain FFS A&B enrollment throughout the measurement period or until death; 4) have consistent, reliable and known mortality status data; 5) have a measurement period that ends on or before December 31, 2014.
Utilization	Post-Acute Care Total Number of Days in an Institutional Setting (All Models)	Total number of days of institutional care in any institutional setting (SNF, IRF, LTCH, inpatient)	30-day Post-discharge, 60-day Post-discharge, 90-day Post-discharge	The sum of the total number of days of care (not necessarily consecutive) during the measurement period in all of the following PAC settings: skilled nursing facility (SNF), long-term care hospital (LTCH), inpatient rehabilitation facility (IRF), and inpatient. The outcome is limited to patients who had at least one day of institutional care during the post-discharge period.	Beneficiaries who: 1) are alive at the time of discharge; 2) have a complete FFS enrollment history six months prior to admission; 3) maintain FFS A&B enrollment throughout the measurement period or until death; 4) have consistent, reliable and known mortality status data; 5) have a measurement period that ends on or before December 31, 2014.
Utilization	Number of Home Health visits	Total number of home health visits	90-day post-discharge	The sum of the total number of home health visits on home health claims during the period of observation. The outcome is limited to patients who had at least one home health visit during the post-discharge period.	Beneficiaries who: 1) are alive at the time of discharge; 2) have a complete FFS enrollment history six months prior to admission; 3) maintain FFS A&B enrollment throughout the measurement period or until death; 4) have consistent, reliable and known mortality status data; 5) have a measurement period that ends on or before December 31, 2014.

Domain	Outcome Name	Definition/ Description	Measurement period(s)	Technical Definition	Eligible Sample
Utilization	First PAC setting following inpatient discharge (Models 2 & 4)	The first PAC setting following inpatient discharge. Institutional PAC use must have started within 5 days of discharge or home health must have started within 14 days of discharge.	Admission to an IRF (freestanding facility or distinct unit within acute hospital), LTCH, or SNF within 5 days of discharge from an acute hospital. HHA within 14 days of discharge from an acute hospital. All other patient discharges are classified as discharges to a residential care setting, without home health.	The first PAC setting following inpatient discharge. Identified as: ▪ The first institutional PAC setting used within 5 days of hospital discharge (SNF, LTCH, or IRF) or HHA use if started within 14 days of discharge. If none of these conditions were met, the patient was defined as "home with none" ▪ Possible outcomes include SNF, LTCH, IRF, HHA, or home with none.	Beneficiaries who have: 1) complete FFS enrollment history six months prior to admission; 2) consistent, reliable and known mortality status data; 3) are alive at the time of discharge; 4) maintain FFS A&B enrollment throughout the measurement period or until death; 5) have a measurement period that ends on or before December 31, 2014.
Utilization	Discharged to any PAC (including HHA)	The proportion of BPCI episodes that were discharged to any PAC, including HHA.	14 days of discharge from an acute hospital	The proportion of episodes where the first PAC setting (defined above) was equal to SNF, LTCH, IRF, or HHA. The denominator includes all episodes.	Beneficiaries who have: 1) complete FFS enrollment history six months prior to admission; 2) consistent, reliable and known mortality status data; 3) are alive at the time of discharge; 4) maintain FFS A&B enrollment throughout the measurement period or until death; 5) have a measurement period that ends on or before December 31, 2014.

Domain	Outcome Name	Definition/ Description	Measurement period(s)	Technical Definition	Eligible Sample
Utilization	Discharged to institution relative to discharged home with home health	The proportion of BPCI episodes who were discharged to an institutional PAC among BPCI episodes who were discharged to any PAC (including HHA).	14 days of discharge from an acute hospital	The proportion of episodes where the first PAC setting (defined above) was equal to SNF, LTCH, IRF. The denominator includes episodes where first PAC setting was equal to SNF, LTCH, IRF, or HHA.	Beneficiaries who have: 1) complete FFS enrollment history six months prior to admission; 2) consistent, reliable and known mortality status data; 3) are alive at the time of discharge; 4) maintain FFS A&B enrollment throughout the measurement period or until death; 5) have a measurement period that ends on or before December 31, 2014.
Patient Mix/Shifting	MS-DRG case-mix index (Models 2 & 4)	Weighted relative value of MS-DRG for clinical episode	N/A	Cross walks from MS-DRG weights were used to assign weights to anchor stays by linking by MS-DRG and fiscal year. The geometric mean of the weights of all anchor MS-DRGs of episodes was computed for each provider, DRG group, and quarter.	All patients
Patient Mix/Shifting	Home Health Agency case-mix index (Models 2 & 3)	Weighted relative value of Home Health Resource Groups across HHA users.	N/A	Cross walks from HHA RUG weights and HIPPS Code were used to assign weights to HHA PAC stays by linking to the PAC claim by RUG and year. The geometric mean of the weights of all HHA episodes was computed for each provider (episode initiator), DRG group, and quarter.	Patients with a HHA episode as the first PAC setting for Model 2; all patients in a HHA episode initiator for Model 3
Patient Mix/Shifting	Skilled Nursing Facility case-mix index (Models 2 & 3)	Weighted relative value of Resource Use Groups IV across SNF users.	N/A	Cross walks from SNF RUG IV weights were used to assign weights to SNF PAC stays by linking by SNF RUG IV and fiscal year. The simple mean, weighted by units of each RUG, of the weights of all SNF RUGs for a SNF stay was computed for each episode. The geometric mean of the weights of all SNF episodes was computed for each provider (episode initiator), DRG group, and quarter.	Patients with a SNF episode as the first PAC setting for Model 2; all patients in a SNF episode initiator for Model 3

Domain	Outcome Name	Definition/ Description	Measurement period(s)	Technical Definition	Eligible Sample
Patient Mix/Shifting	Long-term Care Hospital case-mix index (Models 2 & 3)	Weighted relative value of Long-term Care Diagnosis Related Groups (MS-LTC-DRGs) of LTCH users	N/A	Cross walks from LTC DRG weights were used to assign weights to LTC PAC stays by linking to the PAC claim by DRG and fiscal year. The geometric mean of the weights of all LTC episodes was computed for each provider (episode initiator), DRG group, and quarter.	Patients with a LTCH episode as the first PAC setting for Model 2; all patients in a LTCH episode initiator for Model 3
Patient Mix/Shifting	Inpatient Rehabilitation Facility case-mix index (Models 2 & 3)	Weighted relative value of Case-Mix Groups (CMGs) across IRF users	N/A	Cross walks from IRF RUG weights and HCPCS codes were used to assign weights to IRF PAC stays by linking to the PAC claim by RUG and fiscal year. Comorbidity tier was determined from the first character of the HCPCS code. The geometric mean of the weights of all IRF episodes was computed for each provider (episode initiator), DRG group, and quarter.	Patients with an IRF episode as the first PAC setting for Model 2; all patients in an IRF episode initiator for Model 3
Patient Mix/Shifting	Rate of outpatient APCs of Similar BPCI Episodes (Models 2 & 4)	Rate of outpatient APCs similar to BPCI episodes per hospital	Claims finishing within quarter	The number of claims with a related APC was calculated per provider (episode initiator), and divided by the sum of the number of claims with related APC and number of BPCI episodes.	Patients with an inpatient admission included in BPCI or patients with an outpatient visit related to providers' selected MS-DRGs
Patient Mix/Shifting	Rate of Inpatient Admissions of Related but Non-BPCI MS-DRGs (Models 2 & 4)	Proportion of admissions in BPCI MS-DRGs and related MS-DRGs that are for the related MS-DRGs per hospital	Claims finishing within quarter	The number of discharges with a related MS-DRG to the providers' selected BPCI MS-DRGs was summed per provider (episode initiator), DRG group, quarter, and divided by the sum of the number of discharges with related MS-DRGs and number of discharges with BPCI MS-DRGs selected by the provider.	Patients with an inpatient admission included in BPCI or patients with an inpatient admission related to providers' selected BPCI MS-DRGs

Domain	Outcome Name	Definition/ Description	Measurement period(s)	Technical Definition	Eligible Sample
Payment	Medicare Part A Standardized Allowed Amount (various settings)	Average Medicare Part A standardized allowed amount, converted to 2014 dollars using Medical CPI, across various settings and totaled within the measurement period.	Model 2: anchor stay, within bundle period excluding anchor stay, 90-day Post-discharge Models 3 & 4: within bundle period, 90-day post qualifying stay discharge	The sum of Medicare payment and beneficiary out-of-pocket amounts for Part A health care services provided during the anchor stay, readmissions, SNF, HHA, IRF, LTCH, and hospice, trended to 2014. Payment in the lower/upper ends are winsorized[1].	Beneficiaries who: 1) have a complete FFS enrollment history six months prior to admission; 2) have non-missing age & gender data; 3) maintain FFS A&B enrollment throughout the measurement period or until death; 4) have a measurement period that ends on or before December 31, 2014; 5) do not have missing data for any Part A category.
Payment	Medicare Part B Standardized Allowed Amount (various service categories)	Average Medicare Part B standardized allowed amount, converted to 2014 dollars using Medical CPI, across various service categories and totaled within the measurement period.	Model 2: anchor stay, within bundle period excluding anchor stay, 90-day Post-discharge Model 3: within bundle period, 90-day post qualifying stay discharge Model 4: within bundle period. Stratified by during inpatient stay vs. outside inpatient stay.	The sum of Medicare payment and beneficiary out-of-pocket amounts for Part B 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 trended to 2014. Payment in the lower/upper ends are winsorized.	Beneficiaries who: 1) have a complete FFS enrollment history six months prior to admission; 2) have non-missing age & gender data; 3) maintain FFS A&B enrollment throughout the measurement period or until death; 4) have a measurement period that ends on or before December 31, 2014; 5) do not have missing data for any Part B category.

[1] Except for Part A acute, all payments are winsorized by quarter at the 1st and 99th percentiles. Part A acute payments are winsorized by quarter and by MS DRG, at the 2nd and 98th percentiles.

Domain	Outcome Name	Definition/ Description	Measurement period(s)	Technical Definition	Eligible Sample
Payment	Medicare Total Part A and Part B Standardized Allowed Amount Included in the Bundle Definition (all Models)	Average total Medicare Part A and Part B standardized allowed amount, converted to 2014 dollars using Medical CPI, included in the definition of the bundle	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 Payment in the lower/upper ends are winsorized. For Model 2, this outcome is stratified by whether or not there was any PAC use during the episode period.	Beneficiaries who: 1) have a complete FFS enrollment history six months prior to admission; 2) have non-missing age & gender data; 3) maintain FFS A&B enrollment throughout the measurement period or until death; 4) have a measurement period that ends on or before December 31, 2014; 5) do not have missing data for any Part A or Part B category.
Payment	Medicare Total Part A and Part B Standardized Allowed Amount Not Included in the Bundle Definition (Models 2 & 3)	Average total Medicare Part A and Part B standardized allowed amount, converted to 2014 dollars using Medical CPI, not included in the definition of the bundle	Bundle period	The sum of Medicare payment and beneficiary out-of-pocket amounts for all Part A and Part B services that are NOT included in the bundle definition. Payment in the lower/upper ends are winsorized. For Model 2, this outcome is stratified by whether or not there was any PAC use during the episode period.	Beneficiaries who: 1) have a complete FFS enrollment history six months prior to admission; 2) have non-missing age & gender data; 3) maintain FFS A&B enrollment throughout the measurement period or until death; 4) have a measurement period that ends on or before December 31, 2014; 5) do not have missing data for any Part A or Part B category.
Payment	Total readmissions not included in bundle definition (Model 4)	Average total Medicare Part A and B standardized allowed amount, converted to 2014 dollars using Medical CPI, for readmissions excluded from bundle definition.	Bundle period	The sum of Medicare payment and beneficiary out-of-pocket amounts for health care services rendered during readmissions that are excluded from the bundle definition. Payments in the lower/upper ends are winsorized.	Beneficiaries who: 1) have a complete FFS enrollment history six months prior to admission; 2) have non-missing age & gender data; 3) maintain FFS A&B enrollment throughout the measurement period or until death; 4) have a measurement period that ends on or before December 31, 2014; 5) do not have missing data for any Part A or Part B category.

Domain	Outcome Name	Definition/ Description	Measurement period(s)	Technical Definition	Eligible Sample
Payment	Other Part A and Part B not included in the bundle definition (Model 4)	Average total Medicare Part A and B standardized allowed amount, converted to 2014 dollars using Medical CPI, for health care services not included in the bundle definition.	Bundle period	The sum of Medicare Part A and Part B payment and beneficiary out-of-pocket amounts for health care services not included in the bundle definition (does not include costs related to BPCI-excluded readmissions). Payments in the lower/upper ends are winsorized.	Beneficiaries who: 1) have a complete FFS enrollment history six months prior to admission; 2) have non-missing age & gender data; 3) maintain FFS A&B enrollment throughout the measurement period or until death; 4) have a measurement period that ends on or before December 31, 2014; 5) do not have missing data for any Part A or Part B category.
Payment	Part B, 30-day pre-bundle period (Models 2 & 4)	Average total Medicare Part B standardized allowed amount, converted to 2014 dollars using Medical CPI.	30 days prior to anchor stay admission (Models 2 & 4)	The sum of Medicare Part B payment and beneficiary out-of-pocket amounts for all health care services. Payments in the lower/upper ends are winsorized.	Beneficiaries who: 1) have a complete FFS enrollment history six months prior to admission; 2) have non-missing age & gender data; 3) maintain FFS A&B enrollment throughout the measurement period or until death; 4) have a measurement period that ends on or before December 31, 2014; 5) do not have missing data for any Part A or Part B category.
Payment	Part A and B, 30 –day pre-bundle period (Model 3)	Average total Medicare Part A and B standardized allowed amount, converted to 2014 dollars using Medical CPI.	30 day pre-bundle (Period between qualifying inpatient discharge date and episode-initiating PAC admission date)	The sum of Medicare payment and beneficiary out-of-pocket amounts for all health care services. Payments in the lower/upper ends are winsorized.	Beneficiaries who: 1) have a complete FFS enrollment history six months prior to admission; 2) have non-missing age & gender data; 3) maintain FFS A&B enrollment throughout the measurement period or until death; 4) have a measurement period that ends on or before December 31, 2014; 5) do not have missing data for any Part A or Part B category.

Domain	Outcome Name	Definition/ Description	Measurement period(s)	Technical Definition	Eligible Sample
Payment	Part A and Part B (Models 2 and 3)	Average total Medicare Part A and B standardized allowed amount, converted to 2014 dollars using Medical CPI.	Days 1-30 post bundle; days 31-60 post bundle	The sum of Medicare payment and beneficiary out-of-pocket amounts for all health care services. Payments in the lower/upper ends are winsorized.	Beneficiaries who: 1) have a complete FFS enrollment history six months prior to admission; 2) have non-missing age & gender data; 3) maintain FFS A&B enrollment throughout the measurement period or until death; 4) have a measurement period that ends on or before December 31, 2014; 5) do not have missing data for any Part A or Part B category.
Payment	Part A and Part B, inpatient hospital (Model 4)	Average total Medicare Part A and B standardized allowed amount, converted to 2014 dollars using Medical CPI, for health care services during an inpatient stay.	Days 1 to 30 following the end of the bundle period; days 31 to 60 following end of the bundle period.	The sum of Medicare payment and beneficiary out-of-pocket amounts for health care services rendered during an inpatient hospital stay. Payments in the lower/upper ends are winsorized.	Beneficiaries who: 1) have a complete FFS enrollment history six months prior to admission; 2) have non-missing age & gender data; 3) maintain FFS A&B enrollment throughout the measurement period or until death; 4) have a measurement period that ends on or before December 31, 2014; 5) do not have missing data for any Part A or Part B category.
Payment	Other Part A and Part B not included in the bundle definition (Model 4)	Average total Medicare Part A and B standardized allowed amount, converted to 2014 dollars using Medical CPI, for health care services not included in the bundle definition (does not include costs related to BPCI-excluded readmissions).	Days 1 to 30 following the end of the bundle period; days 31 to 60 following end of the bundle period.	The sum of Medicare Part A and Part B payment and beneficiary out-of-pocket amounts for health care services not included in the bundle definition (does not include costs related to BPCI-excluded readmissions). Payments in the lower/upper ends are winsorized.	Beneficiaries who: 1) have a complete FFS enrollment history six months prior to admission; 2) have non-missing age & gender data; 3) maintain FFS A&B enrollment throughout the measurement period or until death; 4) have a measurement period that ends on or before December 31, 2014; 5) do not have missing data for any Part A or Part B category.

Exhibit L.2 includes the complete list of patient assessment-based outcomes included in the OY1 annual report. We reviewed salient literature and chose ten validated measures to serve our purpose; two pertaining to IRF, three for SNF, and five for HHA. For each PAC setting, we chose at least one measure for each of two domains: self-care function and mobility. These measures were selected because they were either endorsed by National Quality Forum (NQF) or validated in previous studies with demonstrated statistical performance.

In selecting measures of physical functioning, we relied on Katz's ADL hierarchy, which categorized ADLs as bathing, dressing, toileting, transferring, continence, and eating, listed in order of increasing severity of disability. Katz and subsequent researchers generally group ADLs into "early-loss" ADLs, which include the tasks of dressing and personal hygiene that represent higher levels of physical functioning, "mid-loss" ADLs (transfer and locomotion), and "late loss" ADLs (i.e. eating) . Functional measures based upon these groups of ADL items attempt to assess the ability of PAC providers to assist patients to improve (or in many cases, regain) functioning that may have been lost or weakened by surgery, a lengthy illness or hospitalization, stroke, or other impediment to their usual ability to perform these various ADLs.[2]

To measure functional improvement for IRF patients, we used measures and accompanying risk adjustment methods described in the report "Draft Specifications for the Functional Status Quality Measures for Inpatient Rehabilitation Facilities (Version 2).[3]" To measure functional improvement at SNFs, we used the MDS-based short-stay quality measures and their risk adjustment methods described in the study "Design and Validation of Post-Acute Care Quality Measures: Final Report.[4]" To measure functional improvement at HHAs, we used the NQF measure #0174 (Improvement in Bathing), #0167 (Improvement in Ambulation/Locomotion), #175 (Improvement in Bed Transferring) and the associated risk adjustment methods endorsed by NQF. We also used two home health quality measures reported in the CMS Home Health Quality Reporting Program: (1) improvement in upper body dressing and (2) improvement in lower body dressing. [5]

[2] Moore et al. Design and Validation of Post-Acute Care Quality Measures. Final Report submitted to CMS January 31, 2005. URL http://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/NursingHomeQualityInits/NHQIQualityMeasures.html accessed 09 September 2014.

[3] RTI International. April 2014. http://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/IRF-Quality-Reporting/Downloads/Draft-Specifications-for-the-Functional-Status-Quality-Measures-for-Inpatient-Rehabilitation-Facilities-Version-2.pdf

[4] Abt Associates. Jan 2005. See Appendix 1 and 2 for details. Available at http://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/NursingHomeQualityInits/NHQIQualityMeasures.html

[5] The technical specification and risk adjustment method for these two HHA measures are available on CMS website at: https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/HomeHealthQualityInits/HHQIQualityMeasures.html

Exhibit L.2: Patient Assessment-based Outcome Definitions

PAC Setting	Measure Name	ADL Items Included
IRF	Average Changes in Self-Care Score (a positive value indicates improvement)	Eating, grooming, toileting, bathing, upper body dressing, lower body dressing
IRF	Average Changes in Mobility Score (a positive value indicates improvement)	Transfer-bed, chair, wheelchair, transfer-toilet, locomotion-walk, locomotion-stairs
SNF	% of SNF patients who improve status or remain completely independent in long-form ADL function (a measure of overall function)	Bed mobility, transfer, locomotion on unit, dressing, eating, toilet use, personal hygiene
SNF	% of SNF patients who improve status or remain completely independent in early-loss ADL function (a measure of self-care function)	Dressing, personal hygiene
SNF	% of SNF patients who improve status or remain completely independent on mid-loss ADL function (a measure of mobility)	Transfer, locomotion on unit, walk in corridor
HHA	% of HHA patients who improve status or remain completely independent in bathing	Bathing
HHA	% of HHA patients who improve status or remain completely independent in upper body dressing	Upper body dressing
HHA	% of HHA patients who improve status or remain completely independent in lower body dressing	Lower body dressing
HHA	% of HHA patients who improve status or remain completely independent in ambulation/locomotion	Ambulation/locomotion
HHA	% of HHA patients who improve status or remain completely independent in bed transferring	Bed transferring

Appendix M: Risk Adjust Model Specifications

Exhibit M.1: Risk Adjust Model Specifications for Model 2 and Model 4

Outcome Group	Model Specification	Model 2	Model 4
Mortality	Logistic regression	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ MS-DRG or MS-DRG combining with and without complications ▪ RV-HCC: aggregated HCC indicators or HCC index ▪ Indicators for having used ANY prior care use during the year prior to the start of the episode ▪ Provider size, ownership status, Census region	▪ Age, gender, Medicare status ▪ 48 MS-DRG clinical episode groups ▪ HCC case-weight ▪ Indicators for having used any inpatient, HH services in the last month, or any NF/SNF ▪ Provider size, ownership status, Census region
Readmissions	Logistic regression	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ MS-DRG or MS-DRG combining with and without complications ▪ RV-HCC: aggregated HCC indicators or HCC index ▪ Indicators for prior care utilization in 6 months preceding the start of the episode ▪ Provider size, ownership status, Census region	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Anchor MS-DRG ▪ RV-HCC: aggregated HCC indicators ▪ Indicators for utilization of HHA, ED services in **6 months** preceding the start of the episode ▪ Provider size, ownership status, Census region
Emergency Department use	Logistic regression	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ MS-DRG group: anchor MS-DRG grouped with and without complications together or 48 MS-DRG clinical episode groups ▪ RV-HCC: aggregated HCC indicators or HCC index ▪ Indicators for having used ANY prior care use during the year prior to the start of the episode ▪ Provider size, ownership status, Census region	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ 48 MS-DRG clinical episode groups or Anchor MS-DRG ▪ RV-HCC: aggregated HCC indicators or HCC case-weight ▪ Indicators for having used any HH, ED services in the last month ▪ Provider size, ownership status, Census region

Outcome Group	Model Specification	Model 2	Model 4
Discharge by Setting	Multinomial regression	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ MS-DRG or MS-DRG combining with and without complications ▪ HCC indicators, RV-HCC: aggregated HCC indicators or HCC case-weight ▪ Indicators for having used ANY prior care use during the year prior to the start of the episode ▪ State indicators	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Anchor MS-DRG ▪ HCC case-weight ▪ Indicators for having used any inpatient, NF, SNF, LTCH, IRF, hospice, HH, PSYCH, ED services ▪ State indicators
Discharge to Institution vs Home Health/Discharged to Institution vs none	Logistic regression	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ MS-DRG group: anchor MS-DRG grouped with and without complications together or 48 MS-DRG clinical episode groups ▪ RV-HCC: aggregated HCC indicators or HCC index ▪ Indicators for having used ANY prior care use during the year prior to the start of the episode ▪ Provider size, ownership status, Census region	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ MS-DRG group: anchor MS-DRG grouped with and without complications together ▪ RV-HCC: aggregated HCC indicators ▪ Indicators for having used any inpatient, IRF, ED services in the last 6 months
Duration Inpatient Stay	Duration models	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ MS-DRG group: anchor MS-DRG grouped with and without complications together ▪ HCC index (lvl 4=1 only) or HCC case-weight ▪ Indicators for having used ANY inpatient, LTCH, IRF, hospice, or HH ▪ Provider size, ownership status, Census region	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ MS-DRG group: anchor MS-DRG grouped with and without complications together or 48 MS-DRG clinical episode groups ▪ RV-HCC: aggregated HCC indicators or HCC case-weight ▪ Indicators for utilization of HH, PSCYH, ED services in **6 months** preceding the start of the episode ▪ Provider size, ownership status, Census region
Number of Days in HHA/HH Visits	OLS regression	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Anchor MS-DRG ▪ HCC indicators ▪ Indicators for utilization of hospice, SNF, LTCH, HHA services in **6 months** preceding the start of the episode ▪ State indicators	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ MS-DRG group: anchor MS-DRG grouped with and without complications together ▪ HCC case-weight ▪ Indicators for utilization of SNF services in **6 months** preceding the start of the episode ▪ Provider size, ownership status, Census region

Outcome Group	Model Specification	Model 2	Model 4
Number of Days in IPPS	OLS regression	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Anchor MS-DRG ▪ RV-HCC: aggregated HCC indicators or HCC index or HCC case-weight ▪ Indicators for utilization of inpatient, SNF, LTCH, IRF, hospice, HHA, PSYCH or ED services in the **month** preceding the start of the episode ▪ State indicators OR Provider size, ownership status, Census region	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ MS-DRG group: anchor MS-DRG grouped with and without complications together or Anchor MS-DRG ▪ HCC case-weight ▪ Indicators for utilization of IRF, PSYCH services in **6 months** preceding the start of the episode ▪ Provider size, ownership status, Census region
Number of Days in IRF	OLS regression	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Anchor MS-DRG ▪ HCC indicators ▪ Indicators for utilization of inpatient, SNF, LTCH, IRF, hospice, HHA, PSYCH or ED services in the **month** preceding the start of the episode ▪ State indicators	
Number of Days in LTCH	OLS regression	▪ Age, gender, Medicare status, disability status (no ESRD), prior SNF use ▪ MS-DRG group: anchor MS-DRG grouped with and without complications together ▪ HCC case-weight ▪ Indicators for utilization of LTCH, HHA, or IRF services in the **month** preceding the start of the episode ▪ State indicators	

Outcome Group	Model Specification	Model 2		Model 4	
Number of Days in SNF	OLS regression	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Anchor MS-DRG ▪ HCC indicators ▪ Indicators for having used ANY inpatient, SNF, HHA, or ED services ▪ State indicators		▪ Age, gender, Medicare status, disability status (no ESRD) ▪ 48 MS-DRG clinical episode groups or Anchor MS-DRG ▪ HCC case-weight ▪ Indicators for utilization of inpatient, SNF, IRF, hospice services in **6 months** preceding the start of the episode ▪ Provider size, ownership status, Census region	
Duration Total Institutional Stay	OLS regression	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Anchor MS-DRG ▪ HCC indicators ▪ Indicators for having used ANY inpatient, SNF, LTCH, IRF, HHA, or PSYCH services ▪ State indicators		▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Anchor MS-DRG ▪ HCC case-weight ▪ Indicators for utilization of inpatient, SNF, hospice, PSYCH services in **6 months** preceding the start of the episode ▪ Provider size, ownership status, Census region	
Part A Payment, Inpatient Acute Stay	OLS regression	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Anchor MS-DRG ▪ Prior SNF use		▪ Age, gender, Medicare status, disability status (no ESRD) ▪ MS-DRG group: anchor MS-DRG grouped with and without complications together ▪ Prior SNF use	
Part A Payment, Readmissions	**Two part model**	**Part 1: Probit** ▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Prior SNF use ▪ Anchor MS-DRG ▪ HCC index	**Part 2: OLS** ▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Prior SNF use ▪ Anchor MS-DRG ▪ HCC index	**Part 1: Probit** ▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Prior SNF use ▪ 48 MS-DRG clinical episode groups ▪ HCC case-weight ▪ State indicators	**Part 2: OLS** ▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Prior SNF use ▪ 48 MS-DRG clinical episode groups ▪ HCC case-weight ▪ State indicators

Outcome Group	Model Specification	Model 2		Model 4	
Part A Payment, Home Health	Two part model	**Lvl 4= 3 Only** **Part 1: Probit** ▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Prior SNF use ▪ Anchor MS-DRG ▪ HCC indicators ▪ State indicators		**Part 1: Probit** ▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Prior SNF use ▪ Anchor MS-DRG ▪ HCC case-weight ▪ Provider size, ownership status, Census region	**Part 2: OLS** ▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Prior SNF use ▪ Anchor MS-DRG ▪ HCC case-weight ▪ Provider size, ownership status, Census region
Part A Payment, Skilled Nursing Facility	Two part model			**Part 1: Probit** ▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Prior SNF use ▪ 48 MS-DRG clinical episode groups ▪ RV-HCC: aggregated HCC indicators ▪ Provider size, ownership status, Census region	**Part 2: OLS** ▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Prior SNF use ▪ 48 MS-DRG clinical episode groups ▪ RV-HCC: aggregated HCC indicators ▪ Provider size, ownership status, Census region
Total payment, covered, with PAC	OLS regression	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Anchor MS-DRG ▪ HCC indicators ▪ Prior SNF use ▪ State indicators			

Outcome Group	Model Specification	Model 2		Model 4
Total payment, covered, without PAC	OLS regression	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Anchor MS-DRG ▪ HCC indicators ▪ Prior SNF use ▪ State indicators		▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Anchor MS-DRG ▪ HCC index ▪ Prior SNF use ▪ State indicators
Total payment, post-bundle, day 1-30, with PAC	OLS regression and two part models	**Part 1: Probit** ▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Anchor MS-DRG ▪ Prior SNF use ▪ HCC indicators ▪ State indicators	**Part 2: OLS** ▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Anchor MS-DRG ▪ Prior SNF use ▪ HCC indicators ▪ State indicators	
Total payment, post-bundle, day 1-30, without PAC	Two part model	**Part 1: Probit** ▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Prior SNF use ▪ Anchor MS-DRG ▪ HCC indicators ▪ State indicators	**Part 2: OLS** ▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Prior SNF use ▪ Anchor MS-DRG ▪ HCC indicators ▪ State indicators	
Total payment, post-bundle, day 31-60, with PAC	Two part model	**Part 1: Probit** ▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Prior SNF use ▪ Anchor MS-DRG ▪ HCC indicators ▪ State indicators	**Part 2: OLS** ▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Prior SNF use ▪ Anchor MS-DRG ▪ HCC indicators ▪ State indicators	

Outcome Group	Model Specification	Model 2		Model 4
Total payment, post-bundle, day 31-60, without PAC	Two part model	**Part 1: Probit** ▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Prior SNF use ▪ Anchor MS-DRG ▪ RV-HCC: Aggregate HCC indicators ▪ State indicators	**Part 2: OLS** ▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Prior SNF use ▪ Anchor MS-DRG ▪ RV-HCC: Aggregate HCC indicators ▪ State indicators	
Part B payment, anchor stay procedures	OLS regression and two part models	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Anchor MS-DRG or MS-DRG group: anchor MS-DRG grouped with and without complications together ▪ RV-HCC: aggregated HCC indicators ▪ Prior SNF use ▪ State Indicators		
Part B payment, anchor stay evaluation and management	Two part model	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Anchor MS-DRG ▪ HCC indicators or RV-HCC: aggregated HCC indicators ▪ Prior SNF use ▪ State Indicators		
Part B payment, anchor stay other	Two part model	**Part 1: Probit** ▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Prior SNF use ▪ Anchor MS-DRG ▪ HCC index ▪ State indicators	**Part 2: OLS** ▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Prior SNF use ▪ Anchor MS-DRG ▪ HCC index ▪ State indicators	

Outcome Group	Model Specification	Model 2	Model 4	
Part B payment, PAC outpatient therapy	Two part model	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Anchor MS-DRG ▪ HCC indicators ▪ Prior SNF use ▪ State Indicators	**Part 1: Probit** ▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Prior SNF use ▪ Anchor MS-DRG ▪ HCC index ▪ State indicators	**Part 2: OLS** ▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Prior SNF use ▪ Anchor MS-DRG ▪ HCC index ▪ State indicators
Part B payment, PAC imaging and lab	Two part model	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ MS-DRG group: anchor MS-DRG grouped with and without complications together or 48 MS-DRG clinical episode groups ▪ HCC case-weight ▪ Prior SNF use ▪ State Indicators	**Part 1: Probit** ▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Prior SNF use ▪ Anchor MS-DRG ▪ HCC index ▪ State indicators	**Part 2: OLS** ▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Prior SNF use ▪ Anchor MS-DRG ▪ HCC index ▪ State indicators
Part B payment, PAC procedures	Two part model	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Anchor MS-DRG ▪ RV-HCC: aggregated HCC indicators ▪ Prior SNF use	**Part 1: Probit** ▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Prior SNF use ▪ 48 MS-DRG clinical episode groups ▪ HCC index ▪ State indicators	**Part 2: OLS** ▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Prior SNF use ▪ 48 MS-DRG clinical episode groups ▪ HCC index ▪ State indicators

Outcome Group	Model Specification	Model 2	Model 4	
Part B payment, PAC evaluation and management	Two part model	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Anchor MS-DRG or MS-DRG group: anchor MS-DRG grouped with and without complications together ▪ HCC indicators ▪ Prior SNF use ▪ State Indicators	***Excludes PAC*** **Part 1: Probit** ▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Prior SNF use ▪ Anchor MS-DRG ▪ HCC index ▪ State indicators	**Part 2: OLS** ▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Prior SNF use ▪ Anchor MS-DRG ▪ HCC index ▪ State indicators
Part B payment, PAC all other noninstitutional	Two part model	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Anchor MS-DRG ▪ HCC indicators ▪ Prior SNF use ▪ State Indicators	**Part 1: Probit** ▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Prior SNF use ▪ Anchor MS-DRG ▪ HCC index ▪ State indicators	**Part 2: OLS** ▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Prior SNF use ▪ Anchor MS-DRG ▪ HCC index ▪ State indicators
Part B payment, PAC all other institutional	Two part model	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Anchor MS-DRG ▪ HCC indicators ▪ Prior SNF use ▪ State Indicators	**Part 1: Probit** ▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Prior SNF use ▪ 48 MS-DRG clinical episode groups ▪ RV-HCC: aggregated HCC indicators ▪ State indicators	**Part 2: OLS** ▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Prior SNF use ▪ 48 MS-DRG clinical episode groups ▪ RV-HCC: aggregated HCC indicators ▪ State indicators

Outcome Group	Model Specification	Model 2	Model 4
Part B payment, outpatient therapy, excluded from bundle	Two part model	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Anchor MS-DRG ▪ HCC indicators ▪ Prior SNF use ▪ State Indicators	

Exhibit M.2: Risk Adjust Model Specification for Model 3 HHA and SNF Episodes

Outcome Group	Model Specification	M3 HH episodes	M3 SNF episodes
Mortality	Logistic regression	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ 48 MS-DRG clinical episode groups ▪ RV-HCC: aggregated HCC indicators ▪ Indicators for utilization of inpatient, LTCH services in the month preceding the start of the episode ▪ Ownership status, Census region	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ MS-DRG group: anchor MS-DRG grouped with and without complications together or 48 MS-DRG clinical episode groups ▪ HCC case-weight or RV-HCC: aggregated HCC indicators ▪ Indicators for utilization of inpatient, NF, SNF, ED services in **6 months** preceding the start of the episode ▪ Ownership status, Census region
Readmissions	Logistic regression	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ MS-DRG group: anchor MS-DRG grouped with and without complications together ▪ RV-HCC: aggregated HCC indicators ▪ Indicators for utilization of inpatient, ED services in **6 months** preceding the start of the episode ▪ State indicators	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Anchor MS-DRG or MS-DRG group: anchor MS-DRG grouped with and without complications together ▪ RV-HCC: aggregated HCC indicators ▪ Indicators for utilization of inpatient services in **6 months** preceding the start of the episode ▪ State indicators
ED Use	Logistic regression	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Anchor MS-DRG ▪ RV-HCC: aggregated HCC indicators ▪ Indicators for having used any inpatient, ED services in the last month ▪ State indicators	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Anchor MS-DRG ▪ HCC case-weight ▪ Indicators for having used any ED services in the last month ▪ State indicators
Number of Days in HH/ HH visits	OLS regression	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Anchor MS-DRG ▪ HCC case-weight ▪ Indicators for having used any hospice, SNF, HH services in the last 6 months ▪ Ownership status, Census region	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Anchor MS-DRG ▪ HCC case-weight ▪ Indicators for having used any hospice, HH services in the last 6 months ▪ State indicators

Outcome Group	Model Specification	M3 HH episodes	M3 SNF episodes
Number of Days in IPPS	OLS regression	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Anchor MS-DRG ▪ HCC case-weight ▪ Indicators for having used any inpatient, IRF services in the last 6 months ▪ Ownership status, Census region	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ MS-DRG group: anchor MS-DRG grouped with and without complications together or 48 MS-DRG clinical episode groups ▪ HCC case-weight or RV-HCC: aggregated HCC indicators ▪ Indicators for having used any hospice, PSYCH services in the last 6 months ▪ State indicators
Number of Days in IRF	OLS regression	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Anchor MS-DRG ▪ HCC case-weight ▪ Indicators for having used any SNF, IRF, HH services ▪ Ownership status, Census region	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ 48 MS-DRG clinical episode groups ▪ HCC case-weight ▪ Indicators for having used any ED services in the last 6 months ▪ State indicators
Number of Days in SNF	OLS regression	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ MS-DRG group: anchor MS-DRG grouped with and without complications together ▪ HCC case-weight ▪ Indicators for having used any NF, SNF services in the last 6 months ▪ State indicators	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ MS-DRG group: anchor MS-DRG grouped with and without complications together ▪ HCC case-weight or RV-HCC: aggregated HCC indicators ▪ Indicators for having used any NF, inpatient, LTCH, HH services in the last 6 months ▪ Ownership status, Census region
Total institutional length of stay	OLS regression	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ MS-DRG group: anchor MS-DRG grouped with and without complications together ▪ HCC case-weight ▪ Indicators for utilization of LTCH, IRF, hospice services in the month preceding the start of the episode ▪ Ownership status, Census region	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ MS-DRG group: anchor MS-DRG grouped with and without complications together ▪ RV-HCC: aggregated HCC indicators ▪ Indicators for utilization of HHA, PSYCH services in **6 months** preceding the start of the episode ▪ State indicators

Outcome Group	Model Specification	M3 HH episodes	M3 SNF episodes
Duration Inpatient Stay	Duration models	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Anchor MS-DRG ▪ HCC case-weight ▪ Indicators for utilization of inpatient, SNF, HHA, PSCYH, ED services in **6 months** preceding the start of the episode ▪ State indicators	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ MS-DRG group: anchor MS-DRG grouped with and without complications together ▪ RV-HCC: aggregated HCC indicators ▪ Indicators for utilization of HHA services in **6 months** preceding the start of the episode ▪ State indicators
Part A Payment, Inpatient Acute Stay	OLS regression	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Anchor MS-DRG ▪ Prior SNF use	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Anchor MS-DRG or MS-DRG group: anchor MS-DRG grouped with and without complications together ▪ Prior SNF use
Part A Payment, Readmissions	Two part model	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ 48 MS-DRG clinical episode groups ▪ HCC case-weight ▪ Prior SNF use ▪ Ownership status, Census region	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ MS-DRG group: anchor MS-DRG grouped with and without complications together ▪ HCC case-weight ▪ Prior SNF use ▪ Ownership status, Census region
Part A Payment, Skilled Nursing Facility	OLS regression (for SNF episodes) Two part model (for HHA episodes)	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ 48 MS-DRG clinical episode groups ▪ HCC case-weight ▪ Prior SNF use ▪ State indicators	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ MS-DRG group: anchor MS-DRG grouped with and without complications together ▪ RV-HCC: aggregated HCC indicators ▪ Prior SNF use ▪ State indicators
Part A Payment, Home Health	OLS regression (for HHA episodes) Two part model (for SNF episodes)	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Anchor MS-DRG ▪ HCC case-weight ▪ Prior SNF use ▪ Ownership status, Census region	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ 48 MS-DRG clinical episode groups ▪ HCC case-weight ▪ Prior SNF use ▪ State indicators

Outcome Group	Model Specification	M3 HH episodes	M3 SNF episodes	
Part B payment, Evaluation and Management	OLS regress	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Anchor MS-DRG ▪ RV-HCC: aggregated HCC indicators ▪ Prior SNF use ▪ State indicators	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ MS-DRG group: anchor MS-DRG grouped with and without complications together ▪ RV-HCC: aggregated HCC indicators ▪ Prior SNF use ▪ State indicators	
Total payment, covered	OLS regression	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Anchor MS-DRG ▪ HCC case-weight ▪ Prior SNF use ▪ State indicators	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ MS-DRG group: anchor MS-DRG grouped with and without complications together ▪ RV-HCC: aggregated HCC indicators ▪ Prior SNF use ▪ State indicators	
Total payment, not covered	OLS regression	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Anchor MS-DRG ▪ HCC indicators ▪ Provider size, ownership status, Census region	▪ Age, gender, Medicare status, disability status (no ESRD) ▪ 48 MS-DRG clinical episode groups ▪ RV-HCC: aggregated HCC indicators ▪ Provider size, ownership status, Census region	
Total payment, post-bundle, day 1-30	Two part model		**Part 1: Probit** ▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Prior SNF use ▪ Anchor MS-DRG ▪ HCC index ▪ State indicators	**Part 2: OLS** ▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Prior SNF use ▪ Anchor MS-DRG ▪ HCC index ▪ State indicators

Outcome Group	Model Specification	M3 HH episodes	M3 SNF episodes	
Total payment, post-bundle, day 31-60	Two part model		**Part 1: Probit** ▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Prior SNF use ▪ Anchor MS-DRG ▪ HCC index ▪ State indicators	**Part 2: OLS** ▪ Age, gender, Medicare status, disability status (no ESRD) ▪ Prior SNF use ▪ Anchor MS-DRG ▪ HCC index ▪ State indicators

Appendix N: Additional Variable Definitions

Exhibit N.1: Market Characteristic Variable Definitions

Variable Name	Definition	Model(s)	Source
BPCI Market Penetration - ACH	% of 48 clinical episode inpatient admissions in a given CBSA that correspond to a BPCI ACH participating provider.	2, 3, 4	2011 Medicare claims
Herfindahl Index - ACH	Sum of the square market shares (i.e., Market Penetration) of all ACH providers (BPCI and non-BPCI). The Herfindahl Index values can range from 0 to 1, where values closer to zero signify a higher degree of competition among providers and values closer to 1 signify less competition (i.e. one or few providers dominate the market)	2, 3, 4	2011 Medicare claims
BPCI Market Penetration - SNF	% of 48 clinical episode SNF admissions in a given CBSA that correspond to a BPCI SNF participating provider.	2, 3, 4	2011 Medicare claims
Herfindahl Index - SNF	Sum of the square market shares (i.e., Market Penetration) of all SNF providers (BPCI and non-BPCI). The Herfindahl Index values can range from 0 to 1, where values closer to zero signify a higher degree of competition among providers and values closer to 1 signify less competition (i.e. one or few providers dominate the market)	2, 3, 4	2011 Medicare claims
BPCI Market Penetration - HHA	% of 48 clinical episode HHA episodes in a given CBSA that correspond to a BPCI HHA participating provider.	2, 3, 4	2011 Medicare claims
Herfindahl Index - HHA	Sum of the square market shares (i.e., Market Penetration) of all HHA providers (BPCI and non-BPCI). The Herfindahl Index values can range from 0 to 1, where values closer to zero signify a higher degree of competition among providers and values closer to 1 signify less competition (i.e. one or few providers dominate the market)	2, 3, 4	2011 Medicare claims
BPCI Market Penetration - IRF	% of 48 clinical episode IRF admissions in a given CBSA that correspond to a BPCI IRF participating provider.	2, 3, 4	2011 Medicare claims
Herfindahl Index - IRF	Sum of the square market shares (i.e., Market Penetration) of all IRF providers (BPCI and non-BPCI). The Herfindahl Index values can range from 0 to 1, where values closer to zero signify a higher degree of competition among providers and values closer to 1 signify less competition (i.e. one or few providers dominate the market)	2, 3, 4	2011 Medicare claims
Medicare Advantage Penetration	% of Medicare beneficiaries enrolled in Medicare Advantage in a given CBSA	2, 3, 4	2011 AHRF county-level data
Population	Census Population Estimates for a given CBSA	2, 3, 4	2011 AHRF county-level data
Median Household Income	Median household income in a given CBSA	2, 3, 4	2011 AHRF county-level data
% Age 65+	Population estimate ages 65+ over total population estimate for a given CBSA	2, 3, 4	2011 AHRF county-level data

Variable Name	Definition	Model(s)	Source
PCP Per 10,000	Number of primary care providers per 10,000 residents in a given CBSA	2, 3, 4	2011 AHRF county-level data
Specialist Per 10,000	Number of specialists per 10,000 residents in a given CBSA	2, 3, 4	2011 AHRF county-level data
PA/NPs Per 10,000	Number of physician assistants/nurse practitioners per 10,000 residents in a given CBSA	2, 3, 4	2011 AHRF county-level data
SNF Beds Per 10,000	Number of skilled nursing facility beds per 10,000 residents in a given CBSA	2, 3, 4	2011 AHRF county-level data

Exhibit N.2: Provider Characteristic Variable Definitions

Variable Name	Definition	Model(s)	Source
Ownership	The ownership type of a provider (e.g. for-profit, non-profit, government)	2, 3, 4	2013 POS file
Urban/Rural	CBSA Urban/Rural Indicator	2, 3, 4	2013 POS file
Region	US Region (Midwest, Northeast, South, or West); derived from the Census Bureau using state to region crosswalk	2, 3, 4	US Census Bureau
Bed Count	Number of Beds	2, 3, 4	2013 POS file
Surgical ICU Services	Indicator of whether or not surgical ICU services are provided	2, 4	2013 POS file
ICU Services	Indicator of whether or not ICU services are provided	2, 4	2013 POS file
Coronary Care Services	Indicator of whether or not coronary care services are provided	2, 4	2013 POS file
BPCI Discharges	Number of hospital discharges for any of the 48 BPCI clinical episode groups in 2013	2, 3, 4	2011 Medicare claims
Average Spend	Total average spending per episode	2, 3, 4	Hospital Compare
Occupancy Rate (%)	The efficiency of providers regarding how full they keep their beds. Calculated by taking the average daily census divided by the number of beds according to CMS IPPS data.	2, 3, 4	CMS IPPS annual files
Medicare Days	Medicare days as a percent of total inpatient days according to CMS IPPS data	2, 3, 4	CMS IPPS annual files
Resident-bed ratio	Average number of residents assigned per bed according to CMS IPPS Data	2, 3, 4	CMS IPPS annual files
IRF in CBSA	Indicator of whether or not there is an IRF in the CBSA.	3	2011 AHRF County-level data
Speech Pathology onsite	Indicator of whether or not speech pathology services are provided onsite, according to the 2013 POS file.	3	2013 POS file

Variable Name	Definition	Model(s)	Source
Mental health onsite	Indicator of whether or not mental health services are provided onsite, according to the 2013 POS file.	3	2013 POS file
High quality score	4 or 5 out of 5 possible points in quality rating	3	Nursing Home Compare
High survey score	4 or 5 out of 5 possible points in survey rating	3	Nursing Home Compare
SNF in Hospital	Indicator of whether or not a SNF is part of a hospital	3	Nursing Home Compare
Number of aides	Number of home health aides employed by a home health agency	3	2013 POS file
Number of nurses	Number of nurses employed by a home health agency	3	2013 POS file
Nurse hours	Average number of nurse hours per day per resident, Nursing Home compare	3	Nursing Home Compare
Market share squared	CBSA-level market share of provider (number of provider MS-DRGs divided by all MS-DRGS in the CBSA) squared, using BPCI DRG related cases from GDIT	3	2011 Medicare claims

Exhibit N.3: Patient Characteristic Variable Definitions

Variable Name	Definition	Model(s)	Source
Age	Percent of patients by age category; 20 to 64, 65 to 79, and 80+	2, 3, 4	2010-2014 Medicare Enrollment Database (EDB)
Gender	Percent of female patients	2, 3, 4	2010-2014 EDB
Eligible for Medicaid	Medicaid eligibility according to the Medicare Enrollment file	2, 3, 4	2010-2014 EDB
Disabled	Percent of patients who are disabled (not including ESRD), based on Medicare eligibly status from the Medicare Enrollment file	2, 3, 4	2010-2014 EDB
Average HCC Case Index	Portion of the CMS-HCC community risk score that corresponds to the HCCs present during the six months prior to the anchor admission (Models 2 & 4) or qualifying hospital stay (Model 3)	2, 3, 4	2010-2014 Medicare Claims
Utilization-Inpatient acute care hospitalization	Percent of patients with one or more inpatient acute care hospitalization during the six months prior to anchor (models 2 & 4) or qualifying (model 3) inpatient stay	2, 3, 4	2010-2014 Medicare Claims
Utilization- Home health use	Percent of patients with one or more instances of home health use during the six months prior to anchor (models 2 & 4) or qualifying (model 3) inpatient stay	2, 3, 4	2010-2014 Medicare Claims
Utilization- Inpatient rehabilitation facility stay	Percent of patients with one or more inpatient rehabilitation facility stay during the six months prior to anchor (models 2 & 4) or qualifying (model 3) inpatient stay	2, 3, 4	2010-2014 Medicare Claims
Utilization- Skilled nursing facility stay	Percent of patients with one or more skilled nursing facility stay during the six months prior to anchor (models 2 & 4) or qualifying (model 3) inpatient stay	2, 3, 4	2010-2014 Medicare Claims
Utilization- Psychiatric hospital stay	Percent of patients with one or more psychiatric hospital stay during the six months prior to anchor (models 2 & 4) or qualifying (model 3) inpatient stay	2, 3, 4	2010-2014 Medicare Claims
Utilization- Long-term care hospital stay	Percent of patients with one or more long-term care hospital stay during the six months prior to anchor (models 2 & 4) or qualifying (model 3) inpatient stay	2, 3, 4	2010-2014 Medicare Claims
No Institutional use	Percent of patients with no institutional use (inpatient, skilled nursing facility, inpatient rehabilitation, or long-term care hospital) during the six months prior to anchor (models 2 & 4) or qualifying (model 3) stay	2, 3, 4	2010-2014 Medicare Claims
Past ED Visits	Average number of emergency department (ED) visits by patients during the six months prior to anchor (models 2 & 4) or qualifying (model 3) stay	2, 3, 4	2010-2014 Medicare Claims
Past Hospitalization	Average number of hospitalizations by patients during the six months prior to anchor (models 2 & 4) or qualifying (model 3) stay	2, 3, 4	2010-2014 Medicare Claims

Exhibit N.4 – Crosswalk HCC Indicators to Risk Variable Group HCC (RV HCC)

Risk variable group label	CMS-CCs[40]	Description	Not adjusted for if only present on index admission (complication)
rv1	**1, 3-5**	**Severe infection**	
	1	HIV/AIDS	
	3	Central nervous system infection	
	4	Tuberculosis	
	5	Opportunistic infections	
rv2	**6, 111-113**	**Other infectious disease & pneumonias**	
	6	Other infectious disease	x
	111	Aspiration and specified bacterial pneumonias	x
	112	Pneumococcal pneumonia, emphysema, lung abscess	x
	113	Viral and unspecified pneumonia, pleurisy	x
rv3	**7**	**Metastatic cancer/acute leukemia**	
rv4	**8, 9**	**Severe cancer**	
	8	Lung, upper digestive tract, and other severe cancers	
	9	Other major cancers	
rv6	**10, 11, 12**	**Other major cancers**	
	10	Breast, prostate, colorectal and other cancers and tumors	
	11	Other respiratory and heart neoplasms	
	12	Other digestive and urinary neoplasms	
rv9	**15-20, 119, 120**	**Diabetes mellitus**	
	15	Diabetes with renal manifestation	
	16	Diabetes with neurologic or peripheral circulatory manifestation	
	17	Diabetes with acute complications	x
	18	Diabetes with ophthalmologic manifestation	
	19	Diabetes with no or unspecified complications	
	20	Type I diabetes mellitus	
	119	Proliferative diabetic retinopathy and vitreous hemorrhage	
	120	Diabetic and other vascular retinopathies	
rv10	**21**	**Protein-calorie malnutrition**	
rv11	**25, 26**	**End-Stage liver disease**	
	25	End-Stage Liver Disease	
	26	Cirrhosis of Liver	
rv12	**44**	**Other hematologoical disorders**	
rv14	**51-52**	**Drug and Alcohol disorders**	
	51	Drug/alcohol psychosis	
	52	Drug/alcohol dependence	

Risk variable group label	CMS-CCs[40]	Description	Not adjusted for if only present on index admission (complication)
rv15	**54-56, 58, 60**	**Psychiatric comorbidity**	
	54	Schizophrenia	
	55	Major depressive, bipolar, and paranoid disorders	
	56	Reactive and unspecified psychosis	
	58	Depression	
	60	Other psychiatric disorders	
rv18	**67-69, 100- 102, 177, 178**	**Hemiplegia, paraplegia, paralysis, functional disability**	
	67	Quadriplegia, other extensive paralysis	
	68	Paraplegia	
	69	Spinal Cord Disorders/Injuries	
	100	Hemiplegia/hemiparesis	
	101	Diplegia (upper), monoplegia, and other paralytic syndromes	
	102	Speech, language, cognitive, perceptual	
	177	Amputation status, lower limb/amputation	
	178	Amputation status, upper limb	
rv19	**74**	**Seizure disorders and convulsions**	
rv20	**80**	**CHF**	x
rv21	**81-84, 89, 98, 99, 103- 106**	**Coronary atherosclerosis or angina, cerebrovascular disease**	
	81	Acute myocardial infarction	x
	82	Unstable angina and other acute ischemic heart disease	x
	83	Angina pectoris/old myocardial infarction	
	84	Coronary atherosclerosis/other chronic ischemic heart disease	
	89	Hypertensive heart and renal disease or encephalopathy	
	98	Cerebral atherosclerosis and aneurysm	
	99	Cerebrovascular disease, unspecified	
	103	Cerebrovascular disease late effects, unspecified	
	104	Vascular disease with complications	x
	105	Vascular disease	x
	106	Other circulatory disease	x
rv24	**92, 93**	**Specified arrhythmias**	
	92	Specified heart arrhythmias	
	93	Other heart rhythm and conduction disorders	
rv26	**108**	**Chronic obstructive pulmonary disease**	
rv27	**109**	**Fibrosis of lung or other chronic lung disorders**	
rv29	**130**	**Dialysis Status**	x

Risk variable group label	CMS-CCs[40]	Description	Not adjusted for if only present on index admission (complication)
rv30	**148-149**	**Ulcers**	
	148	Decubitus ulcer	x
	149	Decubitus ulcer or chronic skin ulcer	
rv31	**2**	**Septicemia/shock**	x
rv32	**22-23**	**Disorders of fluid, electrolyte, acid-base**	
	22	Other significant endocrine and metabolic disorders	x
	23	Disorders of fluid/electrolyte/acid-base	x
rv33	**47**	**Iron deficiency**	x
rv34	**79**	**Cardio-respiratory failure or cardio-respiratory shock**	x
rv39	**131**	**Acute Renal failure**	x
rv40	**32**	**Pancreatic disease**	
rv41	**38**	**Rheumatoid arthritis and inflammatory connective tissue disease**	
rv42	**77**	**Respirator dependence/tracheostomy status**	
rv43	**128, 174**	**Transplants**	
	128	Kidney transplant status	
	174	Major organ transplant status	
rv44	**46**	**Coagulation defects and other specified hematological disorders**	
rv45	**158**	**Hip fracture/dislocation**	

Hospital-wide Readmission Measure, ***HWR Tech Report,*** July 2012

Appendix O: Beneficiary Survey Results

Exhibit O.1: Risk-Adjusted Rates of Functional Improvement Measures for Model 2 Respondents

Functional Improvement Measures	Wave and Strata	BPCI Group Sample Size	Comparison Group Sample Size	BPCI Group Rate	Comparison Group Rate	Difference in Rate (Treatment Effect)
Improvement in bathing, dressing, using the toilet, or eating	Wave 1 - Overall	712	708	72.6%	73.2%	-0.5 [-4.8, 3.7]
	Wave 1 - MCC	278	296	59.7%	60.5%	-0.9 [-8.1, 6.4]
	Wave 1 - non-MCC	434	412	81.9%	82.4%	-0.5 [-5.6, 4.6]
	Wave 2 - MJRLE	353	373	85.0%	84.5%	0.5 [-4.3, 5.2]
	Wave 2 – Cardio	347	342	60.7%	57.2%	3.5 [-2.5, 9.4]
	Wave 2 – Respiratory	266	271	60.3%	59.7%	0.6 [-6.2, 7.4]
Improvement in walking	Wave 1 - Overall	711	721	82.0%	80.3%	1.7 [-2.1, 5.4]
	Wave 1 - MCC	278	303	73.0%	70.8%	2.2 [-4.4, 8.8]
	Wave 1 - non-MCC	433	418	88.3%	87.6%	0.7 [-3.4, 4.9]
	Wave 2 - MJRLE	351	374	65.7%	57.5%	8.2* [1.6, 14.8]
	Wave 2 – Cardio	342	347	27.4%	27.2%	0.2 [-5.6, 6.0]
	Wave 2 – Respiratory	262	269	30.8%	29.2%	1.6 [-5.1, 8.2]

Functional Improvement Measures	Wave and Strata	BPCI Group Sample Size	Comparison Group Sample Size	BPCI Group Rate	Comparison Group Rate	Difference in Rate (Treatment Effect)
Improvement in use of mobility device (i.e., less frequent)	Wave 1 - Overall	714	716	83.3%	85.2%	-1.9 [-5.6, 1.7]
	Wave 1 - MCC	280	297	74.0%	77.8%	-3.8 [-10.1, 2.4]
	Wave 1 - non-MCC	434	419	90.2%	90.4%	-0.2 [-4.4, 4.0]
	Wave 2 - MJRLE	354	373	60.82%	63.53%	-2.7 [-9.2, 3.8]
	Wave 2 – Cardio	345	349	37.76%	40.23%	-2.5 [-7.7, 2.8]
	Wave 2 – Respiratory	268	270	41.70%	44.19%	-2.5 [-7.4, 2.4]
Improvement in using stairs	Wave 1 - Overall	717	718	61.3%	55.3%	6.0* [1.8, 10.2]
	Wave 1 - MCC	282	302	46.0%	42.4%	3.6 [-3.1, 10.4]
	Wave 1 - non-MCC	435	416	72.7%	64.4%	8.3* [3.0, 13.5]
	Wave 2 - MJRLE	353	366	65.4%	57.9%	7.5* [0.9, 14.1]
	Wave 2 – Cardio	335	333	26.8%	29.4%	-2.5 [-8.5, 3.4]
	Wave 2 – Respiratory	261	265	28.2%	24.4%	3.9 [-3.2, 11.0]

Functional Improvement Measures	Wave and Strata	BPCI Group Sample Size	Comparison Group Sample Size	BPCI Group Rate	Comparison Group Rate	Difference in Rate (Treatment Effect)
Improvement in planning regular tasks	Wave 1 - Overall	721	711	63.5%	67.2%	-3.7 [-8.0, 0.7]
	Wave 1 - MCC	284	295	50.0%	54.4%	-4.4 [-11.6, 2.8]
	Wave 1 - non-MCC	437	416	73.3%	76.4%	-3.2 [-8.5, 2.2]
	Wave 2 - MJRLE	355	377	76.0%	80.0%	-4.0 [-9.4, 1.4]
	Wave 2 – Cardio	345	353	46.4%	47.7%	-1.3 [-7.4, 4.8]
	Wave 2 – Respiratory	267	274	44.8%	44.4%	0.5 [-6.8, 7.7]
Improvement in physical/emotional problems limiting social activities (i.e., less frequent)	Wave 2 - MJRLE	348	372	75.8%	72.0%	3.8 [-2.4, 10.0]
	Wave 2 – Cardio	337	342	45.3%	51.0%	-5.6 [-13.0, 1.6]
	Wave 2 – Respiratory	271	273	45.1%	45.8%	-0.7 [-8.6, 7.2]
Improvement in pain limiting regular activities (i.e., less frequent)	Wave 2 - MJRLE	355	378	81.9%	77.9%	4.0 [-1.6, 9.7]
	Wave 2 – Cardio	338	349	45.4%	46.6%	-1.2 [-8.0, 5.6]
	Wave 2 – Respiratory	266	272	44.0%	42.7%	1.3 [-6.6, 9.2]

* $p < 0.05$; treatment effects reported in percentage points
"MJRLE" refers to the "major joint replacement of lower extremity" episode; "cardio" refers to a group of 7 BPCI episodes classified as "non-surgical: cardiovascular"; "respiratory" refers to a group of 3 BPCI episodes classified as "non-surgical: respiratory".
95% confidence interval of the treatment effect reported in brackets

Exhibit O.2: Risk-Adjusted Rates of Functional Deterioration Measures for Model 2 Respondents

Functional Deterioration Measures	Wave and Strata	BPCI Group Sample Size	Comparison Group Sample Size	BPCI Group Rate	Comparison Group Rate	Difference in Rate (Treatment Effect)
Deterioration in bathing, dressing, using the toilet, or eating	Wave 1 - Overall	712	708	16.0%	15.1%	0.9 [-2.8, 4.6]
	Wave 1 - MCC	278	296	24.5%	25.5%	-1.0 [-8.0, 6.1]
	Wave 1 - non-MCC	434	412	9.7%	7.7%	2.0 [-2.3, 6.2]
	Wave 2 - MJRLE	353	373	8.2%	8.4%	-0.1 [-3.9, 3.7]
	Wave 2 – Cardio	344	340	19.8%	22.3%	-2.5 [-8.6, 3.6]
	Wave 2 – Respiratory	266	271	18.1%	21.1%	-3.0 [-9.4, 3.4]
Deterioration in walking	Wave 1 - Overall	643	657	8.2%	8.5%	-0.3 [-3.5, 2.9]
	Wave 1 - MCC	238	260	12.4%	14.4%	-2.0 [-8.2, 4.2]
	Wave 1 - non-MCC	390	381	5.5%	5.1%	0.4 [-2.8, 3.6]
	Wave 2 - MJRLE	351	374	14.4%	15.7%	-1.3 [-6.2, -3.5]
	Wave 2 – Cardio	342	347	37.4%	37.0%	0.4 [-5.6, 6.3]
	Wave 2 – Respiratory	262	269	27.9%	34.9%	-7.1* [-13.5, -0.6]

Functional Deterioration Measures	Wave and Strata	BPCI Group Sample Size	Comparison Group Sample Size	BPCI Group Rate	Comparison Group Rate	Difference in Rate (Treatment Effect)
Deterioration in use of mobility device (i.e., more frequent)	Wave 1 - Overall	714	716	12.1%	11.0%	1.1 [-2.2, 4.5]
	Wave 1 - MCC	280	297	19.0%	15.6%	3.4 [-2.5, 9.2]
	Wave 1 - non-MCC	434	419	7.0%	7.7%	-0.6 [-4.5, 3.2]
	Wave 2 - MJRLE	354	373	26.7%	24.2%	2.5 [-3.3, 8.3]
	Wave 2 – Cardio	345	349	48.3%	44.5%	3.8 [-2.1,9.7]
	Wave 2 – Respiratory	268	270	42.5%	40.1%	2.4 [-3.5, 8.2]
Deterioration in using stairs	Wave 1 - Overall	717	718	31.5%	37.2%	-5.6* [-9.6, -1.7]
	Wave 1 - MCC	282	302	46.7%	50.7%	-4.0 [-10.7, 2.8]
	Wave 1 - non-MCC	435	416	20.2%	27.6%	-7.4* [-12.0, -2.9]
	Wave 2 - MJRLE	353	366	15.4%	16.7%	-1.3 [-6.0, 3.4]
	Wave 2 – Cardio	335	333	42.0%	43.7%	-1.7 [-7.8, 4.5]
	Wave 2 – Respiratory	261	265	38.5%	42.9%	-4.4 [-10.4, 1.6]

Functional Deterioration Measures	Wave and Strata	BPCI Group Sample Size	Comparison Group Sample Size	BPCI Group Rate	Comparison Group Rate	Difference in Rate (Treatment Effect)
Deterioration in planning regular tasks	Wave 1 - Overall	632	631	14.8%	12.5%	2.4 [-1.6, 6.4]
	Wave 1 - MCC	230	243	20.5%	19.3%	1.2 [-6.4, 8.8]
	Wave 1 - non-MCC	397	383	11.2%	8.4%	2.8 [-1.5, 7.1]
	Wave 2 - MJRLE	355	377	13.7%	9.5%	4.2 [-0.1, 8.54]
	Wave 2 – Cardio	342	351	27.5%	30.1%	-2.7 [-9.0, 3.7]
	Wave 2 – Respiratory	267	274	25.6%	25.7%	-0.1 [-6.6, 6.3]
Deterioration in physical/emotional problems limiting social activities (i.e., more frequent)	Wave 2 - MJRLE	348	372	10.09%	12.40%	-2.3 [-6.0, 3.4]
	Wave 2 – Cardio	330	334	27.84%	27.50%	0.3 [-6.4, 7.0]
	Wave 2 – Respiratory	271	273	27.92%	30.45%	-2.5 [-9.8, 4.7]
Deterioration in pain limiting regular activities (i.e., more frequent)	Wave 2 - MJRLE	355	378	7.04%	8.49%	-1.5 [-5.4, 2.5]
	Wave 2 – Cardio	338	349	20.77%	21.70%	-0.9 [-6.8, 5.0]
	Wave 2 – Respiratory	266	272	24.17%	24.63%	-0.5 [-7.2, 6.3]

* $p < 0.05$; treatment effects reported in percentage points
"MJRLE" refers to the "major joint replacement of lower extremity" episode; "cardio" refers to a group of 7 BPCI episodes classified as "non-surgical: cardiovascular"; "respiratory" refers to a group of 3 BPCI episodes classified as "non-surgical: respiratory".
95% confidence interval of the treatment effect reported in brackets

Exhibit O.3: Risk-Adjusted Rates of Additional Heath Status Measures for Model 2 Respondents

Additional Health Status Measures	Wave and Strata	BPCI Group Sample Size	Comparison Group Sample Size	BPCI Group Rate	Comparison Group Rate	Difference in Rate (Treatment Effect)
During the past two days, have you limited your normal activities because of pain? 1[response = yes]	Wave 1 - Overall	729	730	54.4%	52.7%	1.6 [-3.3, 6.5]
	Wave 1 - MCC	289	309	43.0%	44.4%	-1.5 [-9.1, 6.2]
	Wave 1 - non-MCC	440	421	62.8%	58.9%	4.0 [-2.4, 10.3]
Composite Depression Indicator 1[PHQ-2 Score >=3]	Wave 1 - Overall	721	717	18.4%	19.5%	-1.1 [-5.3, 3.0]
	Wave 1 - MCC	283	301	25.1%	24.9%	0.2 [-7.0, 7.4]
	Wave 1 - non-MCC	438	416	13.7%	15.2%	-1.5 [-6.2, 3.2]
	Wave 2 - MJRLE	340	356	11.2%	9.6%	1.7 [-2.5, 5.8]
	Wave 2 – Cardio	341	343	28.5%	26.6%	2.0 [-4.7, 8.6]
	Wave 2 – Respiratory	272	267	29.4%	33.3%	-3.9 [11.4, 3.6]
During the past two days, have you limited your normal activities because of pain? 1[response = yes]	Wave 1 - Overall	729	718	35.8%	41.2%	-5.5* [-10.4, -0.5]
	Wave 1 - MCC	289	302	34.3%	40.8%	-6.5 [-14.2, 1.1]
	Wave 1 - non-MCC	440	416	36.9%	41.6%	-4.7 [-11.1, 1.8]

Additional Health Status Measures	Wave and Strata	BPCI Group Sample Size	Comparison Group Sample Size	BPCI Group Rate	Comparison Group Rate	Difference in Rate (Treatment Effect)
In general, how would you rate your physical health? 1[response = excellent/very good/good]	Wave 1 - Overall	734	730	62.5%	63.2%	-0.7 [-5.3, 3.9]
	Wave 1 - MCC	293	307	48.7%	49.2%	-0.6 [-8.3, 7.1]
	Wave 1 - non-MCC	441	423	73.2%	73.2%	0.0 [-5.6, 5.6]
	Wave 2 - MJRLE	360	381	82.58%	82.74%	-0.2 [-5.3,5.0]
	Wave 2 – Cardio	352	357	42.72%	43.83%	-1.1 [-7.8, 5.6]
	Wave 2 – Respiratory	281	280	33.97%	35.13%	-1.2 [8.2, 5.9]
In general, how would you rate your mental health today, including your mood and ability to think? 1[response = excellent/very good/good]	Wave 1 - Overall	735	730	79.0%	79.6%	-0.6 [-4.7, 3.4]
	Wave 1 - MCC	292	306	72.3%	71.6%	0.7 [-6.4, 7.9]
	Wave 1 - non-MCC	443	424	83.6%	85.7%	-2.1 [-6.6, 2.4]
	Wave 2 - MJRLE	359	381	90.87%	90.22%	0.7 [-3.4, 4.7]
	Wave 2 – Cardio	354	358	74.84%	75.89%	-1.0 [-7.0,4.9]
	Wave 2 – Respiratory	281	279	67.83%	61.68%	6.2 [-1.2, 13.5]

* $p < 0.05$; treatment effects reported in percentage points
"MJRLE" refers to the "major joint replacement of lower extremity" episode; "cardio" refers to a group of 7 BPCI episodes classified as "non-surgical: cardiovascular"; "respiratory" refers to a group of 3 BPCI episodes classified as "non-surgical: respiratory".
95% confidence interval of the treatment effect reported in brackets

Exhibit O.4: Unadjusted Rates of Healthcare Experience Measures for Model 2 Respondents

Healthcare Experience Measures	Wave and Strata	BPCI Group Sample Size	Comparison Group Sample Size	BPCI Group Rate	Comparison Group Rate	Difference in Rate (Treatment Effect)
Thinking about all the care you received in the hospital before and afterwards, how often did you, your family, or your caregiver get conflicting advice from medical staff about your treatment? 1[response = Never]	Wave 1 - Overall	730	724	75.5%	71.2%	4.3 [-0.2, 8.8]
	Wave 1 - MCC	291	304	69.4%	63.4%	6.1 [-1.7, 13.8]
	Wave 1 - non-MCC	439	420	80.0%	77.1%	2.8 [-2.6, 8.2]
	Wave 2 MJRLE	357	379	81.2%	83.0%	-1.9 [-7.5, 3.8]
	Wave 2 – Cardio	341	352	65.5%	70.3%	-4.8 [11.9, 2.3]
	Wave 2 – Respiratory	274	274	65.3%	69.0%	-3.7 [11.8, 4.4]
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? 1[response = Always]	Wave 1 - Overall	717	713	65.5%	61.8%	3.7 [-1.3, 8.8]
	Wave 1 - MCC	285	302	58.7%	55.2%	3.5 [-4.7, 11.7]
	Wave 1 - non-MCC	432	411	70.5%	66.9%	3.7 [-2.7, 10.0]
	Wave 2 - MJRLE	358	378	67.6%	70.1%	-2.4 [-9.2, 4.4]
	Wave 2 – Cardio	343	356	55.9%	63.1%	-7.2 [-14.6, 0.2]
	Wave 2 – Respiratory	273	271	55.6%	58.5%	-2.9 [-11.5, 5.7]

Healthcare Experience Measures	Wave and Strata	BPCI Group Sample Size	Comparison Group Sample Size	BPCI Group Rate	Comparison Group Rate	Difference in Rate (Treatment Effect)
What is your preferred language? 1[response = Spanish/other]	Wave 1 - Overall	716	714	4.3%	2.1%	2.2* [0.3, 4.1]
	Wave 1 - MCC	286	301	5.8%	3.0%	2.8 [-0.5, 6.2]
	Wave 1 - non-MCC	430	413	3.2%	1.5%	1.7 [-0.4, 3.9]
	Wave 2 - MJRLE	359	377	2.2%	1.7%	0.6 [-1.5, 2.6]
	Wave 2 – Cardio	348	358	4.4%	3.0%	1.5 [-1.3, 4.3]
	Wave 2 – Respiratory	274	276	7.1%	2.5%	4.6* [0.9, 8.3]
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? 1[response = Always]	Wave 1 - Overall	718	718	91.2%	93.2%	-2.0 [-4.9, 0.8]
	Wave 1 - MCC	286	303	88.0%	92.8%	-4.8 [-9.5, 0.0]
	Wave 1 - non-MCC	432	415	93.5%	93.5%	-0.1 [-3.5, 3.3]
	Wave 2 - MJRLE	355	379	94.3%	96.6%	-2.3 [-5.4, 0.7]
	Wave 2 – Cardio	348	353	89.7%	92.7%	-3.0 [-7.4, 1.3]
	Wave 2 – Respiratory	273	277	86.6%	92.1%	-5.6* [-11.0, -0.2]

Healthcare Experience Measures	Wave and Strata	BPCI Group Sample Size	Comparison Group Sample Size	BPCI Group Rate	Comparison Group Rate	Difference in Rate (Treatment Effect)
Thinking about when you left the hospital, were you discharged at the right time? 1[response = Yes]	Wave 1 - Overall	719	715	89.5%	88.3%	1.2 [-2.2, 4.6]
	Wave 1 - MCC	284	299	87.2%	86.0%	1.2 [-4.6, 7.0]
	Wave 1 - non-MCC	435	416	91.2%	90.0%	1.1 [-2.9, 5.2]
	Wave 2 - MJRLE	358	377	89.9%	93.3%	-3.4 [-7.4, 0.7]
	Wave 2 – Cardio	348	355	86.3%	86.0%	0.3 [-5.0, 5.5]
	Wave 2 – Respiratory	274	272	86.7%	83.0%	3.7 [-2.8, 10.1]
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. 1[response = Agree/Strongly Agree]	Wave 1 - Overall	640	610	93.5%	93.2%	0.2 [-2.5, 3.0]
	Wave 1 - MCC	251	257	95.4%	92.9%	2.4 [-1.7, 6.6]
	Wave 1 - non-MCC	389	353	92.1%	93.5%	-1.3 [-5.0, 2.3]
	Wave 2 - MJRLE	334	354	95.9%	95.0%	0.8 [-2.4, 4.0]
	Wave 2 – Cardio	307	308	92.4%	95.7%	-3.7 [-7.3, 0.5]
	Wave 2 – Respiratory	226	236	92.1%	90.8%	1.3 [3.7, 6.2]

Healthcare Experience Measures	Wave and Strata	BPCI Group Sample Size	Comparison Group Sample Size	BPCI Group Rate	Comparison Group Rate	Difference in Rate (Treatment Effect)
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. 1[response = Agree/Strongly Agree]	Wave 1 - Overall	649	640	94.7%	95.0%	-0.2 [-2.7, 2.2]
	Wave 1 - MCC	235	257	93.8%	95.4%	-1.6 [-5.7, 2.4]
	Wave 1 - non-MCC	414	383	95.3%	94.7%	0.7 [-2.4, 3.7]
	Wave 2 - MJRLE	342	357	96.5%	96.6%	-0.2 [-2.9, 2.6]
	Wave 2 – Cardio	297	315	95.2%	96.9%	-1.7 [-5.0, 1.6]
	Wave 2 – Respiratory	238	227	95.3%	94.7%	0.6 [-3.6, 4.8]
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. 1[response = Agree/Strongly Agree]	Wave 1 - Overall	644	616	95.4%	94.0%	1.4 [-1.1, 3.9]
	Wave 1 - MCC	240	254	92.8%	94.8%	-2.0 [-6.3, 2.3]
	Wave 1 - non-MCC	404	362	97.2%	93.4%	3.8* [0.7, 6.8]
	Wave 2 - MJRLE	330	350	95.1%	96.0%	-1.0 [-4.1, 2.2]
	Wave 2 – Cardio	297	306	95.8%	93.7%	2.1 [-1.8, 5.9]
	Wave 2 – Respiratory	236	222	96.5%	93.9%	2.7 [-1.3, 6.6]

Healthcare Experience Measures	Wave and Strata	BPCI Group Sample Size	Comparison Group Sample Size	BPCI Group Rate	Comparison Group Rate	Difference in Rate (Treatment Effect)
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 1[response = Agree/Strongly Agree]	Wave 1 - Overall	663	639	96.4%	95.0%	1.4 [-0.9, 3.6]
	Wave 1 - MCC	246	258	94.8%	94.5%	0.3 [-3.6, 4.3]
	Wave 1 - non-MCC	417	381	97.4%	95.4%	2.0% [-0.7, 4.8]
	Wave 2 - MJRLE	332	341	96.9%	99.7%	-2.8 [-4.7, 0.8]
	Wave 2 – Cardio	293	310	93.7%	95.5%	-1.8 [-5.5, 2.0]
	Wave 2 – Respiratory	225	226	95.4%	97.4%	-2.0 [-5.4, 1.3]
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. 1[response = Agree/Strongly Agree]	Wave 1 - Overall	660	648	96.0%	96.2%	-0.2 [-2.3, 1.9]
	Wave 1 - MCC	242	265	95.4%	94.6%	0.8 [-2.9, 4.6]
	Wave 1 - non-MCC	418	383	96.4%	97.4%	-1.0 [-3.5, 1.5]
	Wave 2 - MJRLE	331	352	99.7%	98.6%	1.0 [-0.3, 2.4]
	Wave 2 – Cardio	300	311	92.2%	96.7%	-4.5* [-8.4, -0.6]
	Wave 2 – Respiratory	230	230	92.8%	94.6%	-1.8 [-6.7, 3.0]

Healthcare Experience Measures	Wave and Strata	BPCI Group Sample Size	Comparison Group Sample Size	BPCI Group Rate	Comparison Group Rate	Difference in Rate (Treatment Effect)
Overall, how satisfied are you with your recovery since you left the hospital? 1[response = Extremely/Quite a Bit]	Wave 1 - Overall	719	699	69.9%	69.6%	0.3 [-4.7, 5.2]
	Wave 1 - MCC	285	291	61.4%	64.7%	-3.3 [-11.4, 4.9]
	Wave 1 - non-MCC	434	408	76.0%	73.3%	2.7 [-3.4, 8.8]
	Wave 2 - MJRLE	341	363	82.8%	82.9%	-0.1 [-5.8, 5.6]
	Wave 2 – Cardio	326	332	61.4%	66.7%	-5.4 [-12.9, 2.1]
	Wave 2 – Respiratory	259	257	61.9%	63.6%	-1.8 [10.2, 6.7]

* $p < 0.05$; treatment effects reported in percentage points
"MJRLE" refers to the "major joint replacement of lower extremity" episode; "cardio" refers to a group of 7 BPCI episodes classified as "non-surgical: cardiovascular"; "respiratory" refers to a group of 3 BPCI episodes classified as "non-surgical: respiratory".
95% confidence interval of the treatment effect reported in brackets

Exhibit O.5: Risk-Adjusted Rates of Functional Improvement Measures for Model 3 Respondents

Functional Improvement Measures	Wave and Strata	BPCI Group Sample Size	Comparison Group Sample Size	BPCI Group Rate	Comparison Group Rate	Difference in Rate (Treatment Effect)
Improvement in bathing, dressing, using the toilet, or eating	Wave 1 - Overall	585	852	53.7%	56.2%	-2.5 [-7.6, 2.5]
	Wave 1 - MCC	303	331	49.6%	51.7%	-2.1 [-9.6, 5.5]
	Wave 1 - non-MCC	282	521	59.1%	61.0%	-1.9 [-8.5, 4.6]
	Wave 2 - Overall	467	466	49.9%	55.1%	-5.2 [-10.9, 0.5]
Improvement in walking	Wave 1 - Overall	594	863	68.1%	69.2%	-1.2 [-5.9, 3.6]
	Wave 1 - MCC	310	337	64.0%	65.9%	-2.0 [-9.1, 5.2]
	Wave 1 - non-MCC	284	526	72.9%	73.4%	-0.5 [-6.5, 5.5]
	Wave 2 - Overall	464	461	24.4%	24.6%	-0.2 [-5.4, 4.9]
Improvement in use of mobility device (i.e., less frequent)	Wave 1 - Overall	597	864	72.9%	72.7%	0.2 [-4.3, 4.7]
	Wave 1 - MCC	311	336	69.2%	69.0%	0.2 [-6.6, 7.1]
	Wave 1 - non-MCC	286	528	78.4%	76.5%	1.9 [-3.4, 7.3]
	Wave 2 - Overall	471	467	28.0%	28.7%	-0.7 [-5.6,4.1]

Functional Improvement Measures	Wave and Strata	BPCI Group Sample Size	Comparison Group Sample Size	BPCI Group Rate	Comparison Group Rate	Difference in Rate (Treatment Effect)
Improvement in using stairs	Wave 1 - Overall	603	859	35.7%	34.6%	1.1 [-3.4, 5.5]
	Wave 1 - MCC	315	335	32.5%	31.7%	0.9 [-5.6, 7.3]
	Wave 1 - non-MCC	288	524	39.4%	38.1%	1.3 [-4.6, 7.1]
	Wave 2 - Overall	451	440	24.9%	28.1%	-3.2 [-8.6, 2.2]
Improvement in planning regular tasks	Wave 1 - Overall	588	846	40.8%	47.0%	-6.2* [-10.9, -1.5]
	Wave 1 - MCC	305	327	34.9%	43.3%	-8.4* [-15.2, -1.5]
	Wave 1 - non-MCC	283	519	49.5%	50.8%	-1.4 [-7.6, 4.9]
	Wave 2 - Overall	471	473	36.3%	39.6%	-3.3 [-8.7, 2.0]
Improvement in physical/emotional problems limiting social activities (i.e., less frequent)	Wave 2 - Overall	466	461	44.33%	48.69%	-4.4 [-10.7, 2.0]
Improvement in pain limiting regular activities (i.e., less frequent)	Wave 2 - Overall	467	459	47.37%	51.37%	-4.0 [-10.1, 2.1]

* $p < 0.05$; treatment effects reported in percentage points
95% confidence interval of the treatment effect reported in brackets

Exhibit O.6: Risk-Adjusted Rates of Functional Deterioration Measures for Model 3 Respondents

Functional Deterioration Measures	Wave and Strata	BPCI Group Sample Size	Comparison Group Sample Size	BPCI Group Rate	Comparison Group Rate	Difference in Rate (Treatment Effect)
Deterioration in bathing, dressing, using the toilet, or eating	Wave 1 - Overall	585	852	27.8%	25.1%	2.7 [-2.0, 7.4]
	Wave 1 - MCC	303	331	31.1%	30.6%	0.6 [-6.5, 7.6]
	Wave 1 - non-MCC	282	521	23.4%	19.5%	3.9 [-2.1, 9.8]
	Wave 2 - Overall	467	466	26.9%	25.0%	1.9 [-3.3, 7.1]
Deterioration in walking	Wave 1 - Overall	493	731	19.7%	16.4%	3.3 [-1.5, 8.1]
	Wave 1 - MCC	251	275	22.6%	20.0%	2.6 [-5.0, 10.1]
	Wave 1 - non-MCC	242	456	17.0%	12.3%	4.7 [-1.1, 10.6]
	Wave 2 - Overall	464	461	43.3%	44.1%	-0.8 [-6.5, 4.9]
Deterioration in use of mobility device (i.e. more frequent)	Wave 1 - Overall	597	864	18.9%	19.8%	-0.8 [-5.0, 3.3]
	Wave 1 - MCC	311	336	21.7%	23.3%	-1.6 [-7.9, 4.7]
	Wave 1 - non-MCC	286	528	15.2%	16.0%	-0.8 [-5.7, 4.0]
	Wave 2 - Overall	471	467	56.4%	53.6%	2.8 [-2.5, 8.1]

Functional Deterioration Measures	Wave and Strata	BPCI Group Sample Size	Comparison Group Sample Size	BPCI Group Rate	Comparison Group Rate	Difference in Rate (Treatment Effect)
Deterioration in using stairs	Wave 1 - Overall	603	859	55.8%	57.0%	-1.2 [-5.6, 3.2]
	Wave 1 - MCC	315	335	57.6%	58.3%	-0.7 [-7.2, 5.8]
	Wave 1 - non-MCC	288	524	53.4%	55.5%	-2.0 [-7.7, 3.6]
	Wave 2 - Overall	451	440	54.5%	50.7%	3.8 [-1.6, 9.2]
Deterioration in planning regular tasks	Wave 1 - Overall	448	674	25.4%	23.8%	1.6 [-3.8, 6.9]
	Wave 1 - MCC	224	244	30.0%	26.8%	3.1 [-5.5, 11.8]
	Wave 1 - non-MCC	224	430	19.5%	20.6%	-1.1 [-7.4, 5.1]
	Wave 2 - Overall	471	473	36.8%	35.6%	1.2 [-4.4, 6.8]
Deterioration in physical/emotional problems limiting social activities (i.e., more frequent)	Wave 2 - Overall	466	461	32.9%	30.5%	2.4 [-3.7, 8.5]
Deterioration in pain limiting regular activities (i.e., more frequent	Wave 2 - Overall	467	459	23.4%	24.1%	-0.7 [-6.2, 4.8]

* $p < 0.05$; treatment effects reported in percentage points
95% confidence interval of the treatment effect reported in brackets

Exhibit O.7: Risk-Adjusted Rates of Additional Heath Status Measures for Model 3 Respondents

Additional Health Status Measures	Wave and Strata	BPCI Group Sample Size	Comparison Group Sample Size	BPCI Group Rate	Comparison Group Rate	Difference in Rate (Treatment Effect)
During the past two days, have you limited your normal activities because of pain? 1[response = yes]	Wave 1 - Overall	615	886	35.4%	38.7%	-3.3 [-8.2, 1.6]
	Wave 1 - MCC	318	346	31.0%	36.2%	-5.3 [-12.4, 1.9]
	Wave 1 - non-MCC	297	540	41.3%	41.7%	-0.4 [-7.1, 6.3]
Composite Depression Indicator 1[PHQ-2 Score >=3]	Wave 1 - Overall	601	861	29.6%	30.8%	-1.2 [-6.0, 3.6]
	Wave 1 - MCC	315	329	31.2%	31.4%	-0.2 [-7.1,6.8]
	Wave 1 - non-MCC	286	532	28.5%	29.5%	-1.0 [-7.5, 5.4]
	Wave 2 - Overall	464	465	32.4%	31.5%	0.9 [-5.0, 6.7]
During the past two days, have you limited your normal activities because of pain? 1[response = yes]	Wave 1 - Overall	613	873	41.5%	40.9%	0.6 [-4.7, 5.8]
	Wave 1 - MCC	319	336	38.7%	40.4%	-1.7 [-9.3, 5.9]
	Wave 1 - non-MCC	294	537	45.8%	41.6%	4.1 [-2.8, 11.1]
In general, how would you rate your physical health? 1[response = excellent/very good/good]	Wave 1 - Overall	621	881	48.5%	50.1%	-1.6% [-6.4, 3.3]
	Wave 1 - MCC	320	343	44.0%	45.0%	-1.0 [-8.1, 6.2]
	Wave 1 - non-MCC	301	538	52.8%	56.4%	-3.6 [-10.2, 3.0]
	Wave 2 - Overall	481	481	39.4%	46.0%	-6.5* [-12.2, -0.9]

Additional Health Status Measures	Wave and Strata	BPCI Group Sample Size	Comparison Group Sample Size	BPCI Group Rate	Comparison Group Rate	Difference in Rate (Treatment Effect)
In general, how would you rate your mental health today, including your mood and ability to think? 1[response = excellent/very good/good]	Wave 1 - Overall	618	879	67.0%	70.2%	-3.2 [-8.0, 1.5]
	Wave 1 - MCC	319	342	67.5%	69.0%	-1.5 [-8.4, 5.5]
	Wave 1 - non-MCC	299	537	65.3%	71.9%	-6.6* [-12.9, -0.3]
	Wave 2 - Overall	481	481	68.2%	69.5%	-1.3 [-7.0, 4.5]

* $p < 0.05$; treatment effects reported in percentage points
95% confidence interval of the treatment effect reported in brackets

Exhibit O.8: Unadjusted Rates of Healthcare Experience Measures for Model 3 Respondents

Healthcare Experience Measures	Wave and Strata	BPCI Group Sample Size	Comparison Group Sample Size	BPCI Group Rate	Comparison Group Rate	Difference in Rate (Treatment Effect)
Thinking about all the care you received in the hospital before and afterwards, how often did you, your family, or your caregiver get conflicting advice from medical staff about your treatment? 1[response = Never]	Wave 1 - Overall	616	875	56.9%	60.5%	-3.6 [-8.9, 1.7]
	Wave 1 - MCC	317	337	54.3%	57.8%	-3.6 [-11.3, 4.2]
	Wave 1 - non-MCC	299	538	61.2%	63.0%	-1.8 [-8.7, 5.1]
	Wave 2 - Overall	473	479	62.1%	66.5%	-4.4 [-10.9, 2.2]
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? 1[response = Always]	Wave 1 - Overall	606	869	48.2%	47.6%	0.7 [-4.7, 6.1]
	Wave 1 - MCC	312	335	46.2%	47.6%	-1.4 [-9.2, 6.4]
	Wave 1 - non-MCC	294	534	51.4%	47.5%	3.9 [-3.4, 11.3]
	Wave 2 - Overall	480	478	48.8%	51.0%	-2.2 [-8.9, 4.5]
What is your preferred language? 1[response = Spanish/other]	Wave 1 - Overall	608	876	3.7%	3.4%	0.3 [-1.7, 2.3]
	Wave 1 - MCC	315	344	3.8%	2.9%	0.9 [-1.9, 3.7]
	Wave 1 - non-MCC	293	532	3.6%	3.9%	-0.3 [-3.1, 2.5]
	Wave 2 - Overall	476	479	3.8%	2.6%	1.3 [-1.0, 3.5]
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? 1[response = Always]	Wave 1 - Overall	613	885	88.5%	88.1%	0.4 [-3.2, 4.1]
	Wave 1 - MCC	318	348	88.3%	88.6%	-0.3 [-5.5, 4.8]
	Wave 1 - non-MCC	295	537	88.9%	87.5%	1.3 [-3.7, 6.3]
	Wave 2 - Overall	471	476	91.0%	93.0%	-2.1 [-5.7, 1.5]

Healthcare Experience Measures	Wave and Strata	BPCI Group Sample Size	Comparison Group Sample Size	BPCI Group Rate	Comparison Group Rate	Difference in Rate (Treatment Effect)
Thinking about when you left the hospital, were you discharged at the right time? 1[response = Yes]	Wave 1 - Overall	606	871	82.7%	84.8%	-2.1 [-6.2, 2.1]
	Wave 1 - MCC	315	339	79.1%	83.9%	-4.8 [-11.0, 1.4]
	Wave 1 - non-MCC	291	532	88.6%	85.6%	3.1 [-2.0, 8.2]
	Wave 2 - Overall	478	477	85.8%	85.1%	0.7 [-4.4, 5.8]
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. 1[response = Agree/Strongly Agree]	Wave 1 - Overall	546	794	90.3%	89.6%	0.7 [-2.8, 4.2]
	Wave 1 - MCC	281	309	90.1%	89.7%	0.3 [-4.8, 5.5]
	Wave 1 - non-MCC	265	485	90.7%	89.5%	1.2 [-3.6, 5.9]
	Wave 2 - Overall	431	440	91.3%	90.7%	0.7 [-3.3, 4.6]
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. 1[response = Agree/Strongly Agree]	Wave 1 - Overall	519	723	92.0%	92.4%	-0.4 [-3.7, 2.9]
	Wave 1 - MCC	257	271	93.4%	92.8%	0.6 [-4.0, 5.2]
	Wave 1 - non-MCC	262	452	90.0%	92.1%	-2.1 [-7.0, 2.8]
	Wave 2 - Overall	419	420	91.5%	95.3%	-3.7* [-7.4, -0.1]
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. 1[response = Agree/Strongly Agree]	Wave 1 - Overall	500	679	89.5%	88.6%	0.9 [-3.1, 4.9]
	Wave 1 - MCC	256	261	88.3%	88.4%	-0.1 [-5.9, 5.8]
	Wave 1 - non-MCC	244	418	91.5%	88.8%	2.6 [-2.4, 7.7]
	Wave 2 - Overall	417	409	90.5%	89.8%	0.7 [-3.5, 5.0]

Healthcare Experience Measures	Wave and Strata	BPCI Group Sample Size	Comparison Group Sample Size	BPCI Group Rate	Comparison Group Rate	Difference in Rate (Treatment Effect)
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 1[response = Agree/Strongly Agree]	Wave 1 - Overall	517	724	92.0%	90.7%	1.3 [-2.2, 4.8]
	Wave 1 - MCC	261	278	90.6%	91.3%	-0.8 [-6.0, 4.5]
	Wave 1 - non-MCC	256	446	94.3%	90.1%	4.2 [-0.1, 8.4]
	Wave 2 - Overall	394	394	92.2%	93.8%	-1.6 [-5.2, 2.1]
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. 1[response = Agree/Strongly Agree]	Wave 1 - Overall	531	754	92.6%	94.4%	-1.8 [-5.0, 1.3]
	Wave 1 - MCC	267	291	92.9%	94.8%	-1.9 [-6.3, 2.5]
	Wave 1 - non-MCC	264	463	92.2%	94.1%	-1.9 [-6.3, 2.5]
	Wave 2 - Overall	409	405	96.7%	97.2%	-0.5 [-2.9, 1.9]
Overall, how satisfied are you with your recovery since you left the hospital? 1[response = Extremely/Quite a Bit]	Wave 1 - Overall	601	860	55.0%	58.1%	-3.1 [-8.5, 2.3]
	Wave 1 - MCC	314	337	52.9%	57.8%	-4.9 [-12.7, 2.8]
	Wave 1 - non-MCC	287	523	58.4%	58.4%	0.1 [-7.3, 7.4]
	Wave 2 - Overall	456	459	59.1%	62.0%	-3.0 [-9.7, 3.8]

* $p < 0.05$; treatment effects reported in percentage points
95% confidence interval of the treatment effect reported in brackets

Appendix P: Market Analysis Results: Referral Concentration & Market Share

A. Provider Referral and Market Share (Model 2)

1. PAC referral network concentration index for Model 2 EIs

Exhibit P.1: Average Hospital-to-SNFs concentration index for CHF episodes, Model 2 EIs, Q2 2011-Q3 2014

Market	Values	Baseline			Intervention		
		Q4 2011 / Q1 2012	Q2 2012 / Q3 2012	Q4 2012 / Q1 2013	Q2 2013 / Q3 2013	Q4 2013 / Q1 2014*	Q2 2014 / Q3 2014
All (98 EIs)	Hospital-to-SNFs concentration index mean	0.23	0.23	0.23	0.22	0.22	0.25
	Hospital-to-SNFs concentration index median	0.18	0.16	0.18	0.16	0.16	0.18
	Hospital-to-SNFs concentration index 25th pctl	0.11	0.12	0.11	0.11	0.12	0.12
	Hospital-to-SNFs concentration index 75th pctl	0.31	0.26	0.29	0.26	0.25	0.29
	Mean number of SNFs receiving patients, per Model 2	9.9	9.8	10.6	10.2	10.3	9.7
	Highest mean percent of patients to one SNF mean	33.9%	33.5%	33.8%	31.2%	32.0%	35.5%
New York (10 EIs)	Mean concentration	0.21	0.20	0.24	0.24	0.26	0.24
	SD	0.16	0.13	0.15	0.17	0.21	0.18
	Mean number of SNFs receiving patients, per Model 2 EI	13.7	12.9	12.8	12.6	11.9	12.0
	Highest mean percent of patients to one SNF	32.5%	30.9%	38.5%	35.8%	38.8%	36.2%
	Total number of SNFs receiving patients in the market	269	272	263	260	259	248
Phoenix (6 EIs)	Mean concentration	0.29	0.35	0.23	0.32	0.25	0.30
	SD	0.09	0.32	0.08	0.33	0.15	0.09
	Mean number of SNFs receiving patients, per Model 2 EI	5.5	5.2	7.2	6.0	7.0	5.2
	Highest mean percent of patients to one SNF	40.7%	44.4%	36.9%	39.8%	35.4%	44.4%
	Total number of SNFs receiving patients in the market	72	62	65	63	63	55
Providence (4 EIs)	Mean concentration	0.17	0.15	0.14	0.14	0.09	0.1
	SD	0.17	0.15	0.13	0.1	0.06	0.07
	Mean number of SNFs receiving patients, per Model 2 EI	13.0	14.5	17.5	16.3	18.0	18.0
	Highest mean percent of patients to one SNF	26.5%	23.9%	21.7%	22.7%	14.3%	14.9%
	Total number of SNFs receiving patients in the market	86	95	101	95	98	98

Note: rates were calculated based on 98 Model 2 EIs with patients going to SNFs over all six periods. *A majority of Model 2 EIs joined BPCI in Q1 2014. *New York*: One Model 2 EI with patients going to SNFs joined BPCI in Q4 2013, 9 joined in Q1 2014. *Phoenix* and *Providence*: All Model 2 EIs in this table joined BPCI in Q1 2014.

Source: Lewin analysis of Medicare claims and enrollment data for episodes that began Q4 2011 through Q3 2014 for BPCI participants.

Exhibit P.2: Average Hospital-to-HHAs referral network concentration index for CHF episodes, Model 2 EIs, Q2 2011-Q3 2014

Market	Values	Baseline			Intervention		
		Q4 2011 / Q1 2012	Q2 2012 / Q3 2012	Q4 2012 / Q1 2013	Q2 2013 / Q3 2013	Q4 2013 / Q1 2014*	Q2 2014 / Q3 2014
All Markets (101 EIs)	Hospital-to-HHAs concentration index mean	0.37	0.38	0.35	0.37	0.37	0.37
	Hospital-to-HHAs concentration index median	0.31	0.31	0.34	0.34	0.32	0.34
	Hospital-to-HHAs concentration index 25th pctl	0.18	0.17	0.19	0.2	0.22	0.2
	Hospital-to-HHAs concentration index 75th pctl	0.53	0.52	0.47	0.48	0.48	0.49
	Mean number of HHAs receiving patients, per Model 2 EI	8.9	8.8	9.2	8.9	9.1	8.2
	Highest mean percent of patients to one HHA	50.1%	51.1%	49.1%	50.7%	51.0%	50.3%
New York (10 EIs)	Mean concentration	0.56	0.56	0.46	0.53	0.58	0.55
	SD	0.16	0.19	0.13	0.12	0.23	0.21
	Mean number of HHAs receiving patients, per Model 2 EI	6.1	5.5	6.0	6.2	5.0	5.0
	Highest mean percent of patients to one HHA	70.3%	68.9%	61.7%	69.0%	70.7%	66.8%
	Total number of HHAs receiving patients in the market	73	62	70	65	61	56
Phoenix (7 EIs)	Mean concentration	0.3	0.38	0.41	0.47	0.27	0.33
	SD	0.15	0.22	0.14	0.3	0.12	0.16
	Mean number of HHAs receiving patients, per Model 2 EI	7.9	6.3	6.7	5.4	8.6	5.6
	Highest mean percent of patients to one HHA	44.7%	51.6%	58.4%	58.7%	43.1%	46.5%
	Total number of HHAs receiving patients in the market	55	45	50	48	50	42
Providence (4 EIs)	Mean concentration	0.42	0.46	0.42	0.36	0.32	0.42
	SD	0.33	0.4	0.34	0.28	0.27	0.36
	Mean number of HHAs receiving patients, per Model 2 EI	9.0	10.5	11.5	10.3	13.5	12.0
	Highest mean percent of patients to one HHA	58.3%	59.3%	55.1%	53.0%	47.2%	55.4%
	Total number of HHAs receiving patients in the market	37	38	38	39	39	36

Note: rates were calculated based on 101 Model 2 EIs with patients going to HHAs over all six periods. *A majority of Model 2 EIs joined BPCI in Q1 2014. *New York*: One Model 2 EI with patients going to HHAs joined BPCI in Q4 2013, 4 joined in Q1 2014. *Phoenix* and *Providence*: All Model 2 EIs in this table joined BPCI in Q1 2014.

Source: Lewin analysis of Medicare claims and enrollment data for episodes that began Q4 2011 through Q3 2014 for BPCI participants.

Exhibit P.3: Average Hospital-to-SNFs concentration index for Sepsis episodes, Model 2 EIs, Q2 2011-Q3 2014

Market	Values	Baseline				Intervention	
		Q4 2011 / Q1 2012	Q2 2012 / Q3 2012	Q4 2012 / Q1 2013	Q2 2013 / Q3 2013	Q4 2013 / Q1 2014*	Q2 2014 / Q3 2014
All Markets (100 EIs)	Hospital-to-SNFs concentration index mean	0.20	0.19	0.18	0.19	0.17	0.18
	Hospital-to-SNFs concentration index median	0.15	0.14	0.13	0.14	0.13	0.13
	Hospital-to-SNFs concentration index 25th pctl	0.09	0.1	0.09	0.09	0.09	0.09
	Hospital-to-SNFs concentration index 75th pctl	0.23	0.22	0.21	0.25	0.2	0.2
	Mean number of SNFs receiving patients, per Model 2 EI	12.3	12.7	14.1	13.6	14.5	14.0
	Highest mean percent of patients to one SNF	29.6%	29.4%	27.6%	30.3%	26.9%	27.7%
New York (10 EIs)	Mean concentration	0.16	0.18	0.14	0.19	0.16	0.14
	SD	0.09	0.13	0.07	0.12	0.13	0.08
	Mean number of SNFs receiving patients, per Model 2 EI	17.8	17.2	18.3	17.5	18.5	17.6
	Highest mean percent of patients to one SNF	26.9%	29.8%	25.8%	32.2%	26.3%	25.4%
	Total number of SNFs receiving patients in the market	300	310	326	318	320	318
Phoenix (7 EIs)	Mean concentration	0.42	0.37	0.28	0.32	0.31	0.37
	SD	0.34	0.30	0.11	0.32	0.31	0.30
	Mean number of SNFs receiving patients, per Model 2 EI	7.4	6.4	7.7	8.1	9.6	8.3
	Highest mean percent of patients to one SNF	53.9%	48.1%	41.1%	42.1%	44.2%	48.7%
	Total number of SNFs receiving patients in the market	77	76	75	78	80	79
Providence (4 EIs)	Mean concentration	0.15	0.12	0.08	0.12	0.10	0.09
	SD	0.11	0.09	0.05	0.10	0.07	0.07
	Mean number of SNFs receiving patients, per Model 2 EI	13.5	16	21.3	19.3	26.8	22.5
	Highest mean percent of patients to one SNF	25.4%	19.2%	14.4%	21.4%	18.6%	16.0%
	Total number of SNFs receiving patients in the market	91	103	110	100	111	105

Note: rates were calculated based on 100 Model 2 EIs with patients going to SNFs over all six periods. *A majority of Model 2 EIs joined BPCI in Q1 2014. *New York*: One Model 2 EI with patients going to SNFs joined BPCI in Q4 2013, 9 joined in Q1 2014. *Phoenix* and *Providence*: All Model 2 EIs in this table joined BPCI in Q1 2014.

Source: Lewin analysis of Medicare claims and enrollment data for episodes that began Q4 2011 through Q3 2014 for BPCI participants.

Exhibit P.4: Average Hospital-to-HHAs concentration index for Sepsis episodes, Model 2 EIs, Q2 2011-Q3 2014

Market	Values	Baseline			Intervention		
		Q4 2011 / Q1 2012	Q2 2012 / Q3 2012	Q4 2012 / Q1 2013	Q2 2013 / Q3 2013	Q4 2013 / Q1 2014*	Q2 2014 / Q3 2014
All Markets (98 EIs)	Hospital-to-HHAs concentration index mean	0.36	0.36	0.36	0.36	0.33	0.36
	Hospital-to-HHAs concentration index median	0.33	0.36	0.32	0.31	0.28	0.3
	Hospital-to-HHAs concentration index 25th pctl	0.19	0.18	0.2	0.2	0.17	0.21
	Hospital-to-HHAs concentration index 75th pctl	0.5	0.5	0.45	0.46	0.44	0.46
	Mean number of HHAs receiving patients, per Model 2 EI	7.1	7.5	7.9	7.9	8.2	7.8
	Highest mean percent of patients to one HHA	48.6%	49.0%	49.3%	49.0%	45.9%	49.6%
New York (10 EIs)	Mean concentration	0.50	0.56	0.56	0.46	0.53	0.6
	SD	0.14	0.21	0.18	0.11	0.21	0.24
	Mean number of HHAs receiving patients, per Model 2 EI	4.9	5.3	4.9	5.4	4.8	4.5
	Highest mean percent of patients to one HHA	64.3%	70.3%	69.7%	61.1%	66.2%	71.2%
	Total number of HHAs receiving patients in the market	63	63	60	58	54	49
Phoenix (6 EIs)	Mean concentration	0.27	0.36	0.3	0.29	0.2	0.26
	SD	0.08	0.13	0.06	0.15	0.04	0.05
	Mean number of HHAs receiving patients, per Model 2 EI	6.7	6.5	7.8	8.2	11.7	8.7
	Highest mean percent of patients to one HHA	42.1%	51.9%	49.7%	44.6%	38.2%	43.6%
	Total number of HHAs receiving patients in the market	53	52	53	59	57	55
Providence (4 EIs)	Mean concentration	0.33	0.41	0.35	0.39	0.25	0.27
	SD	0.16	0.41	0.32	0.42	0.21	0.18
	Mean number of HHAs receiving patients, per Model 2 EI	8.0	8.5	10.3	10.3	11.3	10.3
	Highest mean percent of patients to one HHA	50.2%	52.0%	47.8%	49.3%	39.8%	40.9%
	Total number of HHAs receiving patients in the market	31	36	32	37	36	35

Note: rates were calculated based on 98 Model 2 EIs with patients going to HHAs over all six periods. *A majority of Model 2 EIs joined BPCI in Q1 2014. *New York*: One Model 2 EI with patients going to HHAs joined BPCI in Q4 2013, 4 joined in Q1 2014. *Phoenix* and *Providence*: All Model 2 EIs in this table joined BPCI in Q1 2014.

Source: Lewin analysis of Medicare claims and enrollment data for episodes that began Q4 2011 through Q3 2014 for BPCI participants.

2. Market Share of Model 2 EIs

Exhibit P.5: Average CHF market share of Model 2 EIs, Q2 2011-Q3 2014

Market	Values	Baseline				Intervention	
		Q4 2011 / Q1 2012	Q2 2012 / Q3 2012	Q4 2012 / Q1 2013	Q2 2013 / Q3 2013	Q4 2013 / Q1 2014*	Q2 2014 / Q3 2014
All Markets (103 EIs)	Mean EI Market Share	15.1%	15.2%	15.1%	15.4%	15.3%	15.3%
	EI Market Share SD	17.8%	17.6%	17.5%	18.2%	17.8%	17.7%
	Median EI Market Share	7.8%	7.0%	8.0%	7.4%	7.7%	8.2%
	EI Market Share 25th pctl	3.6%	3.5%	3.6%	3.5%	3.2%	3.6%
	EI Market Share 75th pctl	21.1%	20.4%	20.0%	18.8%	20.5%	21.3%
	Mean number of CHF episodes per EI	127.1	120.1	133.2	123.2	130.3	122.1
New York (10 EIs)	Mean EI Market Share	2.4%	2.3%	2.1%	2.3%	2.3%	2.4%
	EI Market Share SD	1.9%	1.7%	1.6%	1.8%	1.6%	1.7%
	Mean number of CHF episodes per EI	181.5	160.9	159.4	152.5	153.7	152.9
	Total number of hospitals with CHF admissions in the market	65	64	64	63	63	62
Phoenix (8 EIs)	Mean EI Market Share	5.2%	4.6%	4.9%	4.7%	4.6%	4.5%
	EI Market Share SD	2.6%	2.0%	2.7%	2.4%	2.5%	2.4%
	Mean number of CHF episodes per EI	97.6	68.1	87	63.8	76.3	57.4
	Total number of hospitals with CHF admissions in the market	31	31	31	31	30	30
Providence (4 EIs)	Mean EI Market Share	7.4%	8.3%	8.2%	8.1%	9.0%	9.2%
	EI Market Share SD	1.9%	4.2%	3.7%	4.0%	4.1%	4.4%
	Mean number of CHF episodes per EI	98.5	105	122.3	109.5	143.8	144.5
	Total number of hospitals with CHF admissions in the market	15	14	15	14	14	14

* A majority of Model 2 EIs joined BPCI in Q1 2014. *New York*: One Model 2 EI joined BPCI in Q4 2013, 9 joined in Q1 2014. *Phoenix* and *Providence*: All Model 2 EIs joined BPCI in Q1 2014.

Source: Abt Associates analysis of Medicare market share data from Q4 2011-Q3 2014

Exhibit P.6: Average Sepsis market share of Model 2 EIs, Q2 2011-Q3 2014

Market	Values	Baseline				Intervention	
		Q4 2011 / Q1 2012	Q2 2012 / Q3 2012	Q4 2012 / Q1 2013	Q2 2013 / Q3 2013	Q4 2013 / Q1 2014*	Q2 2014 / Q3 2014
All Markets (103 EIs)	Mean EI Market Share	15.6%	15.7%	15.4%	15.4%	15.8%	16.3%
	EI Market Share SD	18.8%	18.9%	18.4%	18.4%	19.3%	19.7%
	Median EI Market Share	8.0%	8.4%	8.1%	8.2%	7.4%	8.3%
	EI Market Share 25th pctl	2.7%	3.1%	2.8%	2.7%	2.6%	2.7%
	EI Market Share 75th pctl	18.5%	19.1%	19.1%	20.9%	20.4%	23.9%
	Mean number of Sepsis episodes per EI	141.1	149.8	166.5	159.7	178	179.4
New York (10 EIs)	Mean EI Market Share	2.3%	2.5%	2.2%	2.3%	2.2%	2.1%
	EI Market Share SD	1.9%	2.1%	2.1%	2.1%	1.8%	1.7%
	Mean number of Sepsis episodes per EI	225.5	246.8	248.5	236.9	247.7	230
	Total number of hospitals with Sepsis admissions in the market	66	64	64	64	62	62
Phoenix (8 EIs)	Mean EI Market Share	3.7%	3.8%	3.6%	3.6%	3.5%	3.6%
	EI Market Share SD	2.3%	2.5%	2.3%	2.4%	2.2%	2.5%
	Mean number of Sepsis episodes per EI	96.6	86.6	104.6	93.3	122.5	107.4
	Total number of hospitals with Sepsis admissions in the market	31	31	32	32	31	30
Providence (4 EIs)	Mean EI Market Share	8.4%	8.6%	8.7%	8.3%	8.9%	7.7%
	EI Market Share SD	2.8%	3.9%	4.1%	4.7%	5.5%	4.4%
	Mean number of Sepsis episodes per EI	95.5	117	131.5	132	173	157.8
	Total number of hospitals with Sepsis admissions in the market	15	15	15	15	15	15

* A majority of Model 2 EIs in this table joined BPCI in Q1 2014. *New York*: One Model 2 EI joined BPCI in Q4 2013, 9 joined in Q1 2014. *Phoenix* and *Providence*: All Model 2 EIs joined BPCI in Q1 2014.

Source: Abt Associates analysis of Medicare market share data from Q4 2011-Q3 2014

B. Provider Referral and Market Share (Model 3)

1. Hospital referral network concentration index for Model 3 EIs

Exhibit P.7: Average SNF-from-Hospitals concentration index for CHF episodes, Model 3 EIs, Q2 2011-Q3 2014

Market	Values	Baseline			Intervention		
		Q4 2011 / Q1 2012	Q2 2012 / Q3 2012	Q4 2012 / Q1 2013	Q2 2013 / Q3 2013	Q4 2013 / Q1 2014*	Q2 2014 / Q3 2014
All Markets (54 SNF EIs)	SNF-from-Hospitals concentration index mean	0.54	0.50	0.51	0.52	0.56	0.56
	SNF-from-Hospitals concentration index median	0.50	0.41	0.43	0.49	0.50	0.50
	SNF-from-Hospitals concentration index 25th Pctl	0.33	0.32	0.33	0.36	0.36	0.36
	SNF-from-Hospitals concentration index 75th Pctl	0.66	0.56	0.63	0.56	0.68	0.76
	Mean number of hospitals patients were received from, per Model 3 EI	3.0	3.3	3.4	3.3	3.0	2.9
	Highest mean percent of patients from one hospital	63.6%	59.5%	62.1%	61.3%	64.6%	63.3%
Chicago (10 SNF EIs)	Mean concentration	0.54	0.58	0.51	0.46	0.59	0.6
	SD	0.27	0.25	0.24	0.24	0.3	0.27
	Mean number of hospitals patients were received from, per SNF EI	3.5	3.4	3.9	4.6	3.2	3.2
	Highest mean percent of patients from one hospital	65.4%	69.0%	64.7%	60.4%	69.2%	70.0%
	Total number of hospitals in market with patients admitted to SNFs	70	74	72	78	68	70
Suburban Detroit (4 SNF EIs)	Mean concentration	0.42	0.34	0.3	0.49	0.39	0.45
	SD	0.17	0.09	0.09	0.06	0.11	0.24
	Mean number of hospitals patients were received from, per SNF EI	3.3	4.8	5.8	4.0	4.5	4.0
	Highest mean percent of patients from one hospital	53.8%	48.1%	42.8%	64.2%	53.3%	57.9%
	Total number of hospitals in market with patients admitted to SNFs	31	30	31	30	27	27

Note: rates were calculated based on 54 Model 3 SNF EIs with patients from hospitals over all six periods. * A majority of Model 3 SNF EIs joined BPCI in Q1 2014. *Chicago* and *Suburban Detroit*: All Model 3 SNF EIs joined BPCI in Q1 2014.
Source: Lewin analysis of Medicare claims and enrollment data for episodes that began Q4 2011 through Q3 2014 for BPCI participants.

Exhibit P.8: Average HHA-from-Hospitals concentration index for CHF episodes, Model 3 EIs, Q2 2011-Q3 2014

Market	Values	Baseline			Intervention		
		Q4 2011 / Q1 2012	Q2 2012 / Q3 2012	Q4 2012 / Q1 2013	Q2 2013 / Q3 2013	Q4 2013 / Q1 2014*	Q2 2014 / Q3 2014
All Markets (26 HHA EIs)	HHA-from-Hospitals concentration index mean	0.35	0.37	0.33	0.37	0.35	0.39
	HHA-from-Hospitals concentration index median	0.32	0.36	0.31	0.34	0.35	0.32
	HHA-from-Hospitals concentration index 25th Pctl	0.17	0.18	0.16	0.23	0.20	0.20
	HHA-from-Hospitals concentration index 75th Pctl	0.50	0.50	0.48	0.49	0.51	0.56
	Mean number of hospitals patients were received from, per Model 3 EI	8.0	7.3	7.7	7.0	7.4	6.8
	Highest mean percent of patients from one hospital	45.4%	46.6%	44.8%	48.5%	45.8%	49.6%
Charleston (2 HHA EIs)	Mean concentration	0.30	0.32	0.31	0.38	0.42	0.37
	SD	0.09	0.13	0.17	0.31	0.31	0.18
	Mean number of hospitals patients were received from, per HHA EI	5.5	6.5	6.5	6.5	6.0	6.0
	Highest mean percent of patients from one hospital	42.9%	45.6%	46.0%	50.0%	54.2%	53.9%
	Total number of hospitals in market with patients admitted to HHAs	7	10	9	13	10	9
Jacksonville (1 HHA EI)	Mean concentration	0.19	0.21	0.23	0.26	0.19	0.22
	Mean number of hospitals patients were received from, per HHA EI	8	9	7	7	8	6
	Highest mean percent of patients from one hospital	26.5%	31.0%	35.3%	44.4%	25.8%	33.3%
	Total number of hospitals in market with patients admitted to HHAs	13	16	12	12	12	13

Note: rates were calculated based on 26 Model 3 HHA EIs with patients from hospitals over all six periods. *A majority of Model 3 HHA EIs joined BPCI in Q1 2014. *Chicago* and *Suburban Detroit*: All Model 3 SNF EIs joined BPCI in Q1 2014.
Source: Lewin analysis of Medicare claims and enrollment data for episodes that began Q4 2011 through Q3 2014 for BPCI participants.

Exhibit P.9: Average SNF-from-Hospitals concentration index for Sepsis episodes, Model 3 EIs, Q2 2011-Q3 2014

Market	Values	Baseline				Intervention	
		Q4 2011 / Q1 2012	Q2 2012 / Q3 2012	Q4 2012 / Q1 2013	Q2 2013 / Q3 2013	Q4 2013 / Q1 2014*	Q2 2014 / Q3 2014
All Markets (60 SNF EIs)	SNF-from-Hospitals concentration index mean	0.52	0.53	0.52	0.48	0.47	0.50
	SNF-from-Hospitals concentration index median	0.50	0.46	0.48	0.44	0.46	0.44
	SNF-from-Hospitals concentration index 25th pctl	0.36	0.34	0.33	0.33	0.33	0.33
	SNF-from-Hospitals concentration index 75th pctl	0.63	0.65	0.64	0.56	0.59	0.62
	Mean Number of hospitals patients were received from, per Model 3 EI	3.2	3.6	3.5	3.6	3.7	3.7
	Highest mean percent of patients from one hospital	61.4%	63.0%	62.6%	58.5%	58.6%	61.5%
Chicago (11 SNF EIs)	Mean concentration	0.54	0.52	0.53	0.52	0.54	0.54
	SD	0.24	0.18	0.25	0.25	0.15	0.23
	Mean number of hospitals patients were received from, per SNF EI	3.5	3.6	3.9	4.2	3.5	4.3
	Highest mean percent of patients from one hospital	66.4%	65.6%	64.0%	63.3%	69.3%	68.5%
	Total number of hospitals in market with patients admitted to SNFs	71	68	77	75	72	77
Suburban Detroit (4 SNF EIs)	Mean concentration	0.30	0.29	0.33	0.33	0.35	0.33
	SD	0.13	0.08	0.09	0.13	0.15	0.06
	Mean number of hospitals patients were received from, per SNF EI	6.3	7.0	5.3	5.5	6.3	6.0
	Highest mean percent of patients from one hospital	42.5%	44.4%	45.9%	46.8%	51.8%	49.3%
	Total number of hospitals in market with patients admitted to SNFs	29	31	34	31	33	31

Note: rates were calculated based on 60 Model 3 SNF EIs with patients from hospitals over all six periods. * A majority of Model 3 SNF EIs joined BPCI in Q1 2014. *Chicago* and *Suburban Detroit*: All Model 3 SNF EIs joined BPCI in Q1 2014.
Source: Lewin analysis of Medicare claims and enrollment data for episodes that began Q4 2011 through Q3 2014 for BPCI participants.

Exhibit P.10: Average HHA-from-Hospitals concentration index for Sepsis episodes, Model 3 EIs, Q2 2011-Q3 2014

Market	Values	Baseline				Intervention	
		Q4 2011 / Q1 2012	Q2 2012 / Q3 2012	Q4 2012 / Q1 2013	Q2 2013 / Q3 2013	Q4 2013 / Q1 2014*	Q2 2014 / Q3 2014
All Markets (24 HHA EIs)	HHA-from-Hospitals concentration index mean	0.35	0.43	0.43	0.48	0.43	0.38
	HHA-from-Hospitals concentration index median	0.29	0.34	0.34	0.44	0.36	0.36
	HHA-from-Hospitals concentration index 25th pctl	0.21	0.22	0.28	0.30	0.23	0.22
	HHA-from-Hospitals concentration index 75th pctl	0.50	0.49	0.57	0.54	0.59	0.51
	Mean number of hospitals patients were received from, per Model 3 EI	6.7	6.5	6.2	5.8	6.8	7.1
	Highest mean percent of patients from one hospital	42.9%	52.5%	52.7%	55.2%	53.3%	49.5%
Charleston Market (2 HHA EIs)	Mean concentration	0.29	0.31	0.29	0.38	0.35	0.51
	SD	0.03	0.19	0.07	0.05	0.06	0.04
	Mean number of hospitals patients were received from, per HHA EI	4.5	5.0	5.5	4.0	6.0	4.0
	Highest mean percent of patients from one hospital	40.5%	41.0%	41.0%	55.4%	53.1%	67.7%
	Total number of hospitals in market with patients admitted to HHAs	6	7	8	8	11	7
Jacksonville (1 HHA EI)	Mean concentration	0.20	0.22	0.29	0.43	0.32	0.53
	Mean number of hospitals patients were received from, per HHA EI	6	6	7	7	7	7
	Highest mean percent of patients from one hospital	100.0%	80.0%	100.0%	66.7%	62.5%	64.3%
	Total number of hospitals in market with patients admitted to HHAs	11	13	11	12	12	12

Note: rates were calculated based on 24 Model 3 HHA EIs with patients from hospitals over all six periods. *A majority of Model 3 HHA EIs joined BPCI in Q1 2014. Charleston: All Model 3 HHA EIs joined BPCI in Q1 2014. Jacksonville: All Model 3 HHA EIs joined BPCI in Q4 2013.

Source: Lewin analysis of Medicare claims and enrollment data for episodes that began Q4 2011 through Q3 2014 for BPCI participants.

2. Market share of Model 3 EIs

Exhibit P.11: Average CHF market share of Model 3 SNF EIs, Q2 2011-Q3 2014

Market	Values	Baseline				Intervention	
		Q4 2011 / Q1 2012	Q2 2012 / Q3 2012	Q4 2012 / Q1 2013	Q2 2013 / Q3 2013	Q4 2013 / Q1 2014*	Q2 2014 / Q3 2014
All Markets (54 SNF EIs)	Mean SNF EI Market Share	4.1%	4.1%	4.1%	4.2%	3.8%	3.8%
	SNF EI Market Share SD	6.5%	6.2%	6.4%	6.4%	5.9%	5.9%
	Median SNF EI Market Share	1.6%	1.4%	1.5%	1.5%	1.3%	1.4%
	SNF EI Market Share 25th Pctl	0.9%	0.8%	0.8%	0.8%	0.8%	0.7%
	SNF EI Market Share 75th Pctl	4.3%	4.7%	4.4%	4.5%	3.9%	4.1%
	Mean number of CHF episodes per SNF EI	8.9	9.0	9.7	9.4	8.8	8.6
Chicago (10 SNF EIs)	Mean SNF EI Market Share	0.9%	0.8%	0.8%	0.9%	0.8%	0.7%
	SNF EI Market Share SD	0.4%	0.4%	0.4%	0.4%	0.4%	0.5%
	Mean number of CHF episodes per SNF EI	13.9	11.5	11.9	13.8	11.1	10.9
	Total number of SNFs with CHF admissions in the market	228	235	248	238	236	245
Suburban Detroit (4 SNF EIs)	Mean SNF EI Market Share	1.8%	2.7%	2.7%	2.8%	2.6%	2.9%
	SNF EI Market Share SD	0.7%	1.5%	1.4%	2.2%	1.2%	1.2%
	Mean number of CHF episodes per SNF EI	7.8	14.3	16.8	13.3	14.3	15.3
	Total number of SNFs with CHF admissions in the market	62	65	67	65	67	64

* A majority of Model 3 SNF EIs joined BPCI in Q1 2014. Chicago and Suburban Detroit: All Model 3 SNF EIs joined BPCI in Q1 2014.

Source: Abt Associates analysis of Medicare market share data from Q4 2011-Q3 2014

Exhibit P.12: Average CHF market share of Model 3 HHA EIs, Q2 2011-Q3 2014

Market	Values	Baseline				Intervention	
		Q4 2011 / Q1 2012	Q2 2012 / Q3 2012	Q4 2012 / Q1 2013	Q2 2013 / Q3 2013	Q4 2013 / Q1 2014*	Q2 2014 / Q3 2014
All Markets (26 HHA EIs)	Mean HHA EI Market Share	9.9%	9.5%	9.3%	9.3%	8.6%	9.0%
	HHA EI Market Share SD	9.8%	10.8%	10.1%	9.5%	8.9%	8.7%
	Median HHA EI Market Share	7.9%	6.4%	4.4%	7.5%	5.5%	6.3%
	HHA EI Market Share 25th Pctl	1.9%	1.5%	1.9%	1.6%	2.3%	2.4%
	HHA EI Market Share 75th Pctl	14.1%	13.0%	13.3%	12.8%	11.9%	14.5%
	Mean number of CHF episodes per HHA EI	53.9	48.3	52.6	48.9	49.1	42.6
Charleston (2 HHA EIs)	Mean HHA EI Market Share	23.1%	24.6%	24.6%	24.0%	17.2%	17.5%
	HHA EI Market Share SD	1.4%	11.0%	0.8%	2.8%	3.5%	1.6%
	Mean number of CHF episodes per HHA EI	35.5	35.0	41.0	30.5	28.0	31.0
	Total number of HHAs with CHF admissions in the market	7	6	7	8	9	9
Jacksonville (1 HHA EI)	Mean HHA EI Market Share	14.1%	17.2%	10.6%	12.8%	12.6%	10.7%
	Mean number of CHF episodes per HHA EI	63	64	44	46	42	29
	Total number of HHAs with CHF admissions in the market	39	39	35	37	36	38

* A majority of Model 3 HHA EIs joined BPCI in Q1 2014. *Charleston*: All Model 3 HHA EIs joined BPCI in Q1 2014. *Jacksonville*: All Model 3 HHA EIs joined BPCI in Q4 2013.

Source: Abt Associates analysis of Medicare market share data from Q4 2011-Q3 2014

Exhibit P.13: Average Sepsis market share of Model 3 SNF EIs, Q2 2011-Q3 2014

Market	Values	Baseline				Intervention	
		Q4 2011 / Q1 2012	Q2 2012 / Q3 2012	Q4 2012 / Q1 2013	Q2 2013 / Q3 2013	Q4 2013 / Q1 2014*	Q2 2014 / Q3 2014
All Markets (60 SNF EIs)	Mean SNF EI Market Share	3.8%	3.5%	3.5%	3.2%	3.2%	3.4%
	SNF EI Market Share SD	5.7%	5.0%	5.5%	4.6%	4.8%	5.0%
	Median SNF EI Market Share	1.3%	1.6%	1.4%	1.2%	1.3%	1.3%
	SNF EI Market Share 25th Pctl	0.8%	0.7%	0.6%	0.6%	0.7%	0.7%
	SNF EI Market Share 75th Pctl	3.5%	4.1%	3.0%	3.7%	3.6%	3.3%
	Mean number of Sepsis episodes per SNF EI	9.7	11.6	12.0	11.5	12.1	12.4
Chicago (11 SNF EIs)	Mean SNF EI Market Share	0.6%	0.7%	0.6%	0.7%	0.6%	0.7%
	SNF EI Market Share SD	0.3%	0.5%	0.4%	0.4%	0.3%	0.3%
	Mean number of Sepsis episodes per SNF EI	13.2	15.0	14.4	16.3	14.2	15.3
	Total number of SNFs with Sepsis admissions in the market	263	257	267	264	263	263
Suburban Detroit (4 SNF EIs)	Mean SNF EI Market Share	2.4%	3.3%	2.4%	2.6%	2.7%	2.5%
	EI Market Share SD	0.4%	0.9%	0.5%	1.1%	0.9%	0.9%
	Mean number of Sepsis episodes per SNF EI	16.5	28.3	24.8	24.0	25.0	23.0
	Total number of SNFs with Sepsis admissions in the market	66	70	69	72	72	72

* A majority of Model 3 SNF EIs joined BPCI in Q1 2014. *Chicago* and *Suburban Detroit*: All Model 3 SNF EIs joined BPCI in Q1 2014.

Source: Abt Associates analysis of Medicare market share data from Q4 2011-Q3 2014

Exhibit P.14: Average Sepsis market share of Model 3 HHA EIs, Q2 2011-Q3 2014

Market	Values	Baseline				Intervention	
		Q4 2011 / Q1 2012	Q2 2012 / Q3 2012	Q4 2012 / Q1 2013	Q2 2013 / Q3 2013	Q4 2013 / Q1 2014*	Q2 2014 / Q3 2014
All Markets (25 HHA EIs)	Mean HHA EI Market Share	10.2%	9.7%	9.4%	8.5%	9.2%	9.9%
	HHA EI Market Share SD	10.6%	9.6%	10.2%	9.5%	10.1%	10.4%
	Median HHA EI Market Share	5.5%	6.2%	4.5%	4.7%	5.3%	5.1%
	HHA EI Market Share 25th Pctl	1.9%	1.9%	2.2%	1.8%	1.6%	2.5%
	HHA EI Market Share 75th Pctl	15.9%	14.8%	11.1%	11.8%	12.8%	14.2%
	Mean number of Sepsis episodes per HHA EI	35.2	40.2	42.3	40.8	45.9	46.8
Charleston (2 HHA EIs)	Mean HHA EI Market Share	21.8%	23.5%	23.5%	20.6%	20.7%	21.5%
	HHA EI Market Share SD	7.1%	3.7%	0.9%	3.5%	3.0%	0.0%
	Mean number of Sepsis episodes per HHA EI	26.0	27.0	36.0	29.5	34.5	37.0
	Total number of HHAs with Sepsis admissions in the market	8	6	9	8	9	10
Jacksonville (1 HHA EI)	Mean HHA EI Market Share	14.6%	14.8%	9.3%	11.8%	15.9%	14.2%
	Mean number of Sepsis episodes per HHA EI	41	45	37	43	51	47
	Total number of HHAs with Sepsis admissions in the market	33	35	38	40	36	31

* A majority of Model 3 HHA EIs joined BPCI in Q1 2014. *Charleston*: All Model 3 HHA EIs joined BPCI in Q1 2014. *Jacksonville*: All Model 3 HHA EIs joined BPCI in Q4 2013.

Source: Abt Associates analysis of Medicare market share data from Q4 2011-Q3 2014

C. Provider Referral and Market Share (Model 4)

1. Market share of Model 4 EIs

Exhibit P.15: Average CHF market share of Model 4 EIs, Q2 2011-Q3 2014

Market	Values	Baseline				Intervention	
		Q4 2011 / Q1 2012	Q2 2012 / Q3 2012	Q4 2012 / Q1 2013	Q2 2013 / Q3 2013	Q4 2013 / Q1 2014*	Q2 2014 / Q3 2014
All Markets (20 EIs)	Mean EI Market Share	18.5%	19.1%	19.6%	18.5%	19.4%	19.3%
	EI Market Share SD	20.3%	20.9%	21.8%	19.9%	20.9%	20.3%
	Median EI Market Share	10.4%	10.5%	11.3%	10.0%	9.9%	12.3%
	EI Market Share 25th Pctl	2.9%	2.7%	2.3%	3.0%	2.4%	2.7%
	EI Market Share 75th Pctl	33.9%	33.8%	36.8%	32.7%	36.8%	29.3%
	Mean number of CHF episodes per EI	143.4	126.5	141.4	120.9	135.4	129.1
Orlando (1 EI)	Mean EI Market Share	41.7%	41.2%	41.2%	40.7%	41.8%	42.6%
	Mean number of CHF episodes per EI	808	676	812	673	803	723
	Total number of hospitals with CHF admissions in the market	9	9	9	9	9	9
Kalamazoo (1 EI)	Mean EI Market Share	48.9%	45.2%	52.0%	42.2%	52.9%	50.8%
	Mean number of CHF episodes per EI	171	133	180	128	166	180
	Total number of hospitals with CHF admissions in the market	3	3	3	3	3	3

* One Model 4 hospital EI joined BPCI in Q4 2013. All others joined in Q1 2014. *Orlando* and *Kalamazoo*: Both Model 4 hospital EIs joined BPCI in Q1 2014.

Exhibit P.16: Average Sepsis market share of Model 4, Q2 2011-Q3 2014

Market	Values	Baseline				Intervention	
		Q4 2011 / Q1 2012	Q2 2012 / Q3 2012	Q4 2012 / Q1 2013	Q2 2013 / Q3 2013	Q4 2013 / Q1 2014*	Q2 2014 / Q3 2014
All Markets (20 EIs)	Mean EI Market Share	18.8%	18.0%	19.4%	20.5%	20.1%	20.1%
	EI Market Share SD	21.6%	21.1%	23.2%	23.6%	22.9%	22.4%
	Median EI Market Share	7.2%	8.2%	7.0%	7.6%	9.2%	11.1%
	EI Market Share 25th Pctl	3.2%	2.7%	2.8%	2.7%	3.1%	2.9%
	EI Market Share 75th Pctl	35.1%	32.8%	36.7%	35.6%	35.0%	33.2%
	Mean number of Sepsis episodes per EI	136	129.2	159.6	159.5	170.8	185.3
Orlando (1 EI)	Mean EI Market Share	35.1%	35.8%	36.2%	34.2%	28.3%	33.4%
	Mean number of Sepsis episodes per EI	476	457	559	496	440	582
	Total number of hospitals with Sepsis admissions in the market	9	9	9	9	9	9
Kalamazoo (1 EI)	Mean EI Market Share	46.1%	44.9%	44.3%	47.9%	48.4%	43.4%
	Mean number of Sepsis episodes per EI	158	164	175	174	187	199
	Total number of hospitals with Sepsis admissions in the market	3	3	3	3	3	3

* One Model 4 hospital EI joined BPCI in Q4 2013. All others joined in Q1 2014. *Orlando* and *Kalamazoo*: Both Model 4 hospital EIs joined BPCI in Q1 2014.

Appendix Q: Growth of BPCI Initiative

The BPCI initiative has grown substantially since the first year, which is reflected in this report. Between April and October of 2015, in particular, there has been an influx of Awardees and EIs as well as an expansion in episode types. In this appendix, we present information about the Awardees and EIs that joined during the second year of the initiative (Q4 2014 to Q3 2015) and characterize the key differences between year 1 entrants, all year 1 and year 2 entrants combined, and the remaining nonparticipating providers eligible for BPCI.

As CMS expected, participation in the BPCI initiative continued to expand during its second year. New entrants joined during the 2014 Winter Open Period. Starting January 2015, these new Awardees and EIs could enter Phase 2 by transitioning at least one clinical episode into the risk-bearing phase. All new Awardees and each EI had to enter at least one BPCI clinical episode into Phase 2 by July 2015. In addition, a large count of the existing Phase 1 Awardees and EIs transitioned to the risk-bearing Phase 2 during year two. Active Phase 2 Awardees and EIs have until October 2015 to finish transitioning additional clinical episodes from Phase 1 to Phase 2 which marks the end of Phase 1.

Exhibit Q.1 presents the total number of Awardees and EIs that had joined BPCI by the end of each year of the initiative by Model. The number of Awardees increased nearly fourfold from 102 in year 1 to 382 in year 2. The number of EIs also increased nearly tenfold in from 227 to 2,096 over this period. The largest increase occurred in Model 3. Participation in Model 4 grew little, with three additional Awardees and EIs joining in the second year of the initiative.

Exhibit Q.1 also presents the growth in EIs that had joined over the two years of the BPCI initiative by provider type within Model. From Year 1 to Year 2, the greatest increase in participation occurred among Model 3 skilled nursing facilities (SNFs; 63 to 1,075 EIs), physician group practices[1] (PGPs) in Model 2 (3 to 292 EIs) and Model 3 (1 to 146 EIs), and Model 3 home health agencies (HHAs; 28 to 116 EIs). The number of participating acute care hospitals (ACH) also more than tripled from 130 to 447 EIs. Inpatient rehabilitation facilities (IRF) increased from one participant facility in year 1 to nine in year 2. Only one long term care hospital (LTCH) has participated in BPCI since it began.[2]

[1] Because of the limited PGP participation in year 1, i.e. through Q3 2014, and because of the limited availability of public data on them, characteristic tables for PGPs were not created for this Appendix.

[2] Given these small participant counts, provider and market characteristics have not been highlighted for IRFs and LTCHs in this Appendix.

Exhibit Q.1: Models 2-4 Awardees and Episode Initiators by Provider Type in the First and Second Years of the BPCI Initiative

Model	Participant Role and Type of Episode Initiators	Count of participants as of Q3 2014	Count of participants as of Q3 2015
		N	N
Model 2	**Awardees**	**61**	**225**
	Episode initiators	**113**	**718**
	Acute care hospitals	100	426
	Physician Group Practices	3	292
Model 3	**Awardees**	**20**	**138**
	Episode initiators	**94**	**1,347**
	Skilled nursing facilities	63	1,075
	Home health agencies	28	116
	Inpatient rehabilitation facilities	1	9
	Long term care hospitals	1	1
	Physician Group Practices	1	146
Model 4	**Awardees**	**13**	**19**
	Episode initiators	**20**	**23**
	Acute care hospitals	20	23
All Models	**Awardees**	**94**	**382**
	Episode initiators	**227**	**2,088**

Source: Count of Awardees and EIs based on Lewin analysis of Salesforce data, May and August 2015.

Notes: In Q3 2015, one ACH Single Awardee is counted in both Model 2 and Model 4, because it switched models during the initiative. The counts include Awardees and EIs who have terminated their participation in the program prior to October 2015 given our analysis is cumulative and includes providers during the time in which they were participating in BPCI.

As a result of this considerable growth, the year 2 BPCI participating hospitals, SNFs, and HHAs have become more similar to—but still do not fully represent—the much larger population of non-participating providers, with respect to organizational characteristics, market characteristics, and episode volume. (See **Exhibits Q.2-Q.4** for comparisons of year 1 and year 2 providers to all non-participating providers for hospitals, SNFs, and HHAs.) Compared with year 1, year 2 hospitals, SNFs, and HHAs participating in BPCI, in general, have lower capacity and operate in markets with smaller populations and less competition.

The three types of participant providers in Year 2, however, differ in their levels of similarity to the broader group of non-participating providers. Year 2 BPCI participating hospitals remained considerably more likely to be non-profits, to be in an urban setting, to have a higher capacity, to train more residents, and to operate in markets with larger populations and more competition than the broader group of non-participating hospitals (**Exhibit Q.2**).

Exhibit Q.2: Characteristics of BPCI Models 2 and 4 Acute Care Hospital (ACH) Episode Initiators (EIs) joining the First and Second Years of the Initiative compared to Non-participating Hospitals

Provider Characteristics	Percent of Model 2 and 4 ACHs who joined as of Q3 2014 (N=130)	Percent of Model 2 and 4 ACHs who joined as of Q3 2015 (N=447)	Non-participating Hospitals as of Q3 2015* (N=2,808)
	%	%	%
Ownership			
For profit	15%	17%	23%
Government	4%	7%	20%
Non-profit	82%	74%	57%
Urban/Rural			
Rural	5%	8%	31%
Urban	95%	92%	69%
Bed Count			
0 to 99 beds	3%	8%	40%
100 to 249 beds	34%	41%	36%
250 or more beds	63%	51%	24%
Medicare days as a percent of total days	36%	39%	41%
Resident-bed ratio	0.18	0.12	0.06
Disproportionate share percent	30%	27%	29%
Market characteristics	**Mean / %**	**Mean / %**	**Mean / %**
Population in market	5,007,241	3,829,096	2,530,459
Median household income	$54,217	$53,277	$48,679
Medicare Advantage penetration	28%	25%	23.5%
SNF beds per 10,000 in CBSA	54.1	53.3	61.7
Herfindahl index	18%	22%	34%
Episode volume	**Mean (%)**	**Mean (%)**	**Mean (%)**
Admissions for BPCI Episode MS-DRGs, 2011	4,130 (68%)	3,694 (69%)	2,030 (71%)

Source: Count of EIs based on Lewin analysis of Salesforce data, May and August 2015. The provider and market characteristics are based on Lewin analysis of 2013 Provider of Service (POS), 2014 CMS Prospective Payment System (PPS) Public Use Files, 2014 Area Health Resource File (AHRF), and 2011 Medicare claims.

*Non-participating hospital group excludes those with missing Inpatient Prospective Payment System data, in Maryland, and Indian and Essential Access Community Hospitals.

On provider characteristics, year 2 SNFs, despite their growth, remained more likely to be for-profits, more likely to be in urban settings, and still had a higher capacity than the non-participating providers (**Exhibit Q.3**). On market characteristics, however, year 2 SNFs began to serve similarly sized markets, with similar median household incomes and levels of competition as non-participating hospitals.

Exhibit Q.3: Characteristics of BPCI Model 3 Skilled Nursing Facilities (SNFs) EIs joining the First and Second Years of the Initiative compared to Non-participating SNFs

Provider Characteristics	Percent of Model 3 SNFs who joined as of Q3 2014 (N=63)	Percent of Model 3 SNFs who joined as of Q3 2015 (N=1,075)	Non-participating SNFs as of Q3 2015 (N=13,958)
	%	%	%
Ownership			
For profit	83%	88%	69%
Government	0%	0%	5%
Non-profit	17%	11%	26%
Urban/Rural			
Rural	0%	17%	31%
Urban	100%	83%	69%
Part of Chain			
Yes	17%	15%	23%
Bed Count			
0 to 82 beds	10%	22%	35%
83 to 142 beds	41%	53%	45%
143 or more beds	49%	24%	20%
Market characteristics	**Mean / %**	**Mean / %**	**Mean / %**
Population in market	4,560,885	2,915,318	2,448,318
Median household income	$54,527	$51,386	$49,418
Medicare Advantage penetration	23%	26%	23%
SNF beds per 10,000 in CBSA	55.4	61.1	71.8
IRF in CBSA	56%	32%	27%
Herfindahl index	2%	7%	9%
Episode volume	**Mean (%)**	**Mean / %**	**Mean / %**
Admissions for BPCI Episode MS-DRGs, 2011	318 (69%)	152 (71%)	100 (73%)

Source: Count of EIs based on Lewin analysis of Salesforce data, May and August 2015. The provider and market characteristics are based on Lewin analysis of 2013 Provider of Service (POS), 2014 Nursing Home Compare, 2014 CMS Prospective Payment System (PPS) Public Use Files, 2014 Area Health Resource File (AHRF), and 2011 Medicare claims.

*Non-participating SNF group excludes those with missing Nursing Home Compare data.

On provider characteristics, Year 2 HHAs were more likely to be non-profit and part of a chain but equally likely to be in an urban setting compared with non-participating HHAs (**Exhibit Q.4**). Unlike hospitals and SNFs, Year 2 HHAs still serve markets with smaller populations and less market competition than non-participating HHAs.

Exhibit Q.4: Characteristics of BPCI Model 3 Home Health Agencies (HHAs) EIs joining the First and Second Years of the Initiative compared to Non-participating HHAs

Provider Characteristics	Percent of Model 3 HHAs who joined as of Q3 2014 (N=28)	Percent of Model 3 HHAs who joined as of Q3 2015 (N=116)	Non-participating HHAs as of Q3 2015* (N=12,083)
	Mean / %	Mean / %	Mean / %
Ownership			
For profit	93%	80%	79%
Government	0%	0%	5%
Non-profit	7%	20%	15%
Urban/Rural			
Rural	21%	22%	17%
Urban	79%	78%	83%
Part of Chain			
Yes	86%	73%	28%
Number of nurses	71	29	8
Market characteristics	Mean / %	Mean / %	Mean / %
Population in market	2,946,013	1,746,994	3,718,699
Herfindahl index	16%	20%	14%
Episode volume	*Mean (%)*	*Mean (%)*	*Mean (%)*
Admissions for BPCI Episode MS-DRGs, 2011	1,729 (73%)	875 (74%)	198 (71%)

Source: Count of EIs based on Lewin analysis of Salesforce data, May and August 2015. The provider and market characteristics are based on Lewin analysis of 2013 Provider of Service (POS), 2014 CMS Prospective Payment System (PPS) Public Use Files, 2014 Area Health Resource File (AHRF), and 2011 Medicare claims.

*Non-participating HHA group excludes those in Maryland.

The percent of episodes eligible for BPCI during 2011 measures the level of opportunity that each hospital has for participation in BPCI. On average, year 2 participating hospitals (**Exhibit Q.2**), SNFs (**Exhibit Q.3**), and HHAs (**Exhibit Q.4**) treated lower *counts* of BPCI episodes in 2011 compared with year 1 likely due to the lower capacity and smaller market populations; still, these more recently joining facilities served much greater *counts* of BPCI-eligible patients than non-participating facilities. The baseline *percent* of hospital, SNF, and HHA episodes eligible for BPCI per facility however, did not change between years and was similar to each setting's respective non-participating population. These results indicate the proportion of eligible patients among BPCI participants remained steady and similar to non-BPCI populations.

Appendix R: Model 2, Factors Contributing to Differences across BPCI Providers

I. Preliminary and Supplemental Analysis Findings

A. Model 2

This analysis sought to determine what beneficiary, program, provider, and environmental factors contributed to the various results of the BPCI initiative. A multilevel regression model was used to evaluate clinical episode groups meeting the minimum sample criteria of a minimum of 20 EIs with a minimum of 25 episodes in the baseline and intervention periods. To support the multilevel regression analysis, an evaluation was conducted of the distribution of savings, cross-tabulation analysis of factors contributing to BPCI results, and correlation analysis between beneficiary, program, provider, and environmental factors and the differences in outcomes from before to after BPCI implementation. The results of these analyses were used to inform the decision of variable selection for inclusion into the multilevel model as detailed in the Methods Section of the full report. While only multilevel model results from the Model 2 orthopedic surgery clinical episode group were found to be statistically significant, the results from the supporting analyses for each clinical episode group are all included here in the appendix.

B. Distribution of Savings

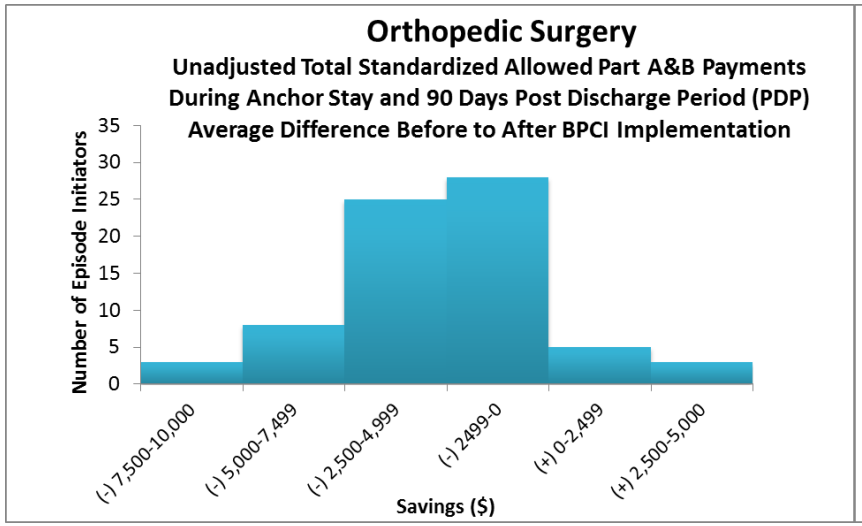
The objective of the distribution of savings analysis was to evaluate the differences in the performance of episode initiators (EI) before and after BPCI implementation. **Exhibits R.1 and R.2** show the unadjusted distribution of the differences in total institutional payments from before to after BPCI implementation by each clinical group. Next to it, we also show the risk-adjusted distribution of the differences in total institutional payments for each clinical group based on the following equation.

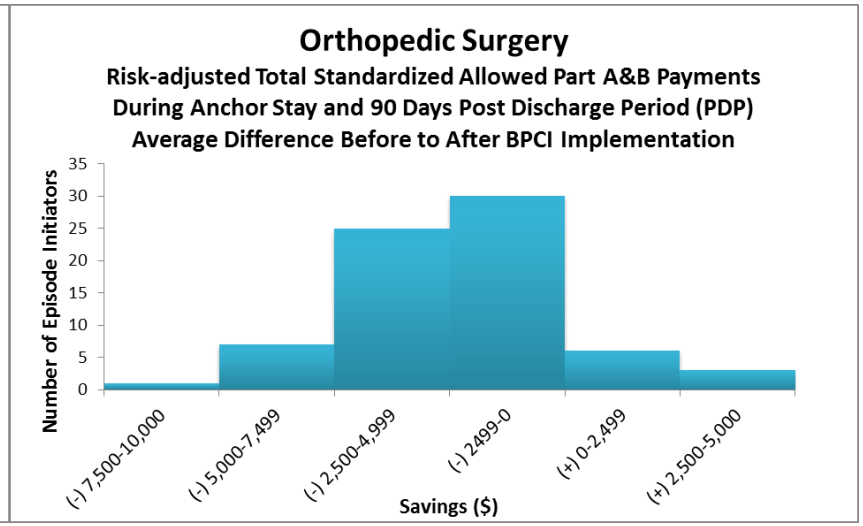
$$Y_i = \alpha + \boldsymbol{X}_i'\beta + \varepsilon_i$$

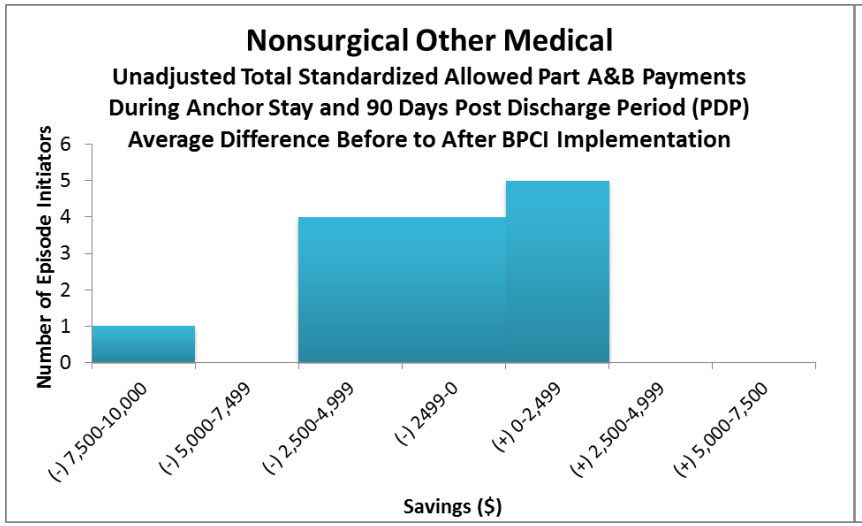
where Y_i represented the payment associated with episode i, α is an intercept, ε_i is an episode-level random error, while the vector $\boldsymbol{X}$ included risk adjustment for patient-level characteristics, such as the patient's age, HCC, DRG mix, and county median income. Comparing the two distributions for each clinical group illustrated the degree of correlation between the two. A high degree of correlation indicates that the amount of variation in total payments that is explained by the patient-level variables in equation 1 may potentially be relatively low. Overall, the distribution of savings comparing the unadjusted results to the residuals was similar across all clinical episode groups.

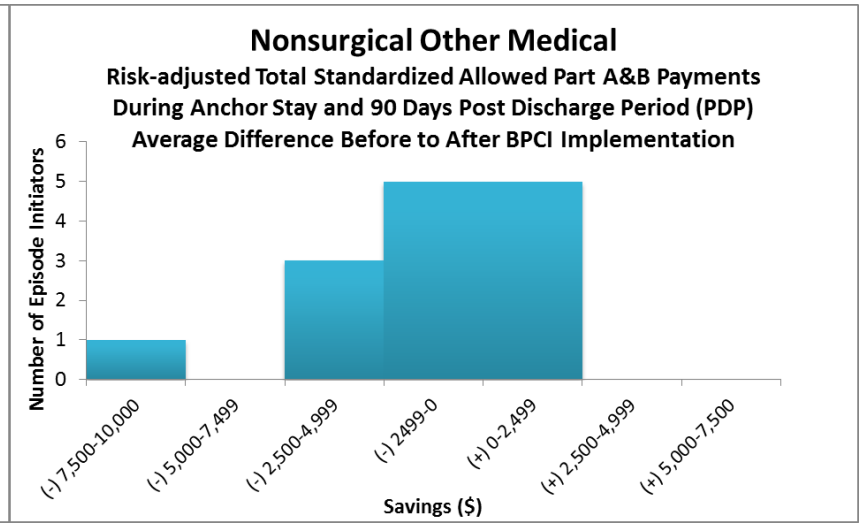
We therefore later expanded our framework not only to account for patient-level characteristics, but also to measure the extent to which variation in payments is due to provider-level characteristics for clinical episode groups meeting the minimum inclusion criteria of a minimum of 20 EIs with a minimum of 25 episodes in the baseline and intervention periods. The final equation and results appear in the full report.

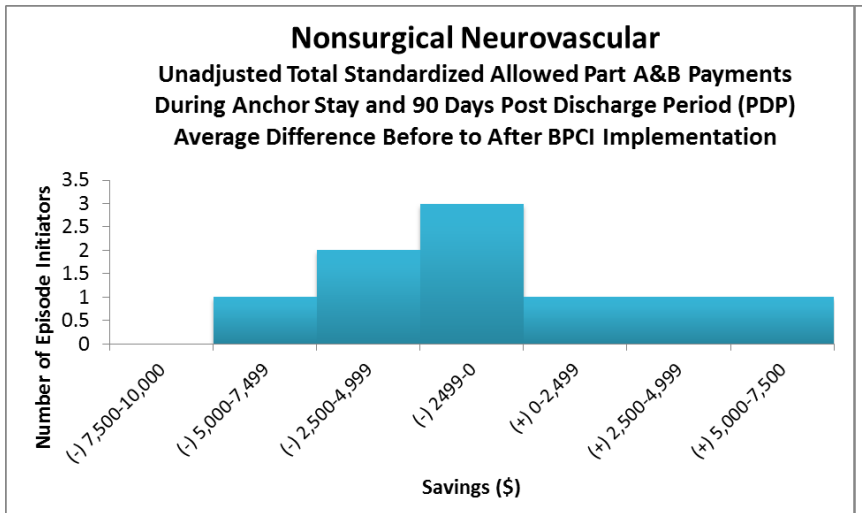
Exhibit R.1: Model 2 Distribution of Savings: Average Difference from Before to After BPCI Implementation for Total Standardized Allowed Part A&B Payments during Anchor Stay and 90 Days Post Discharge Period

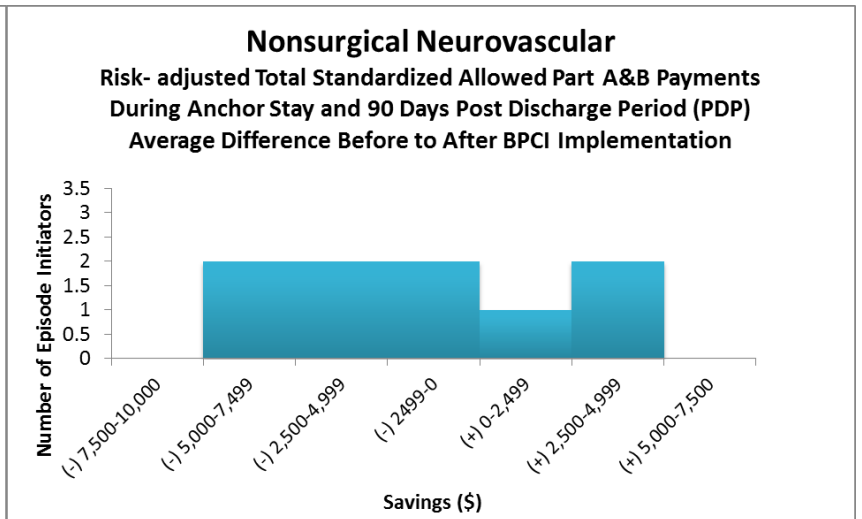


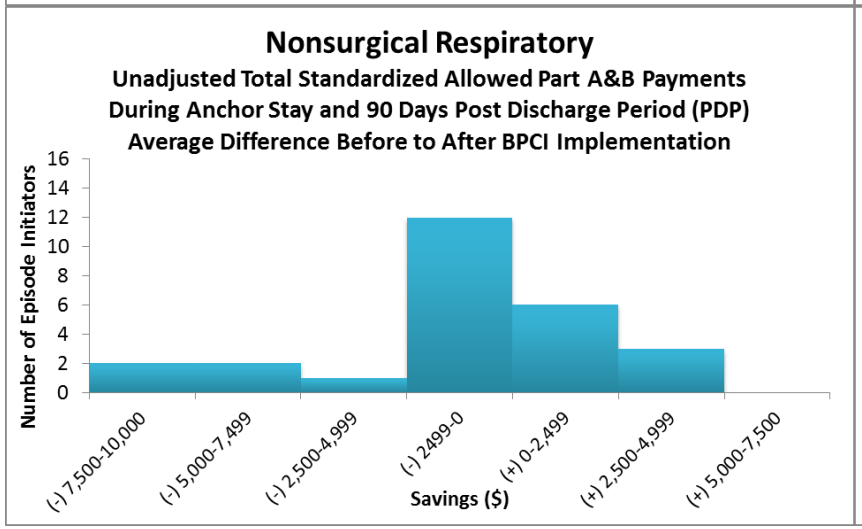


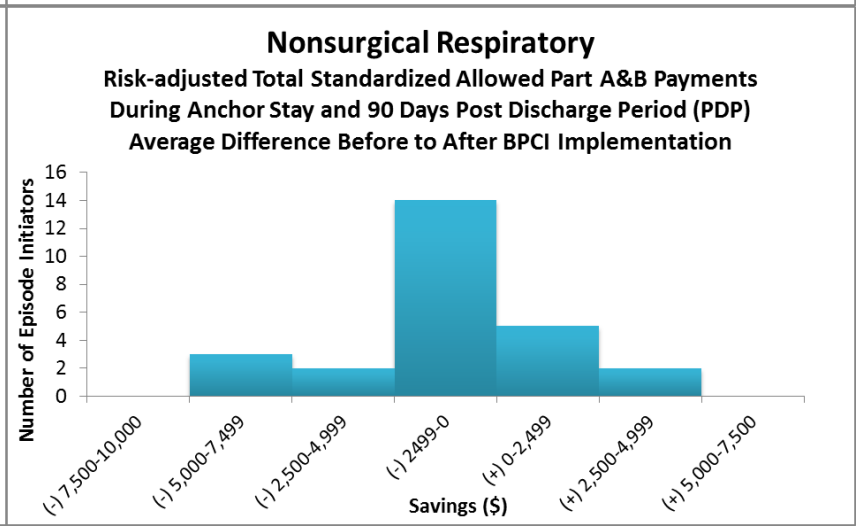


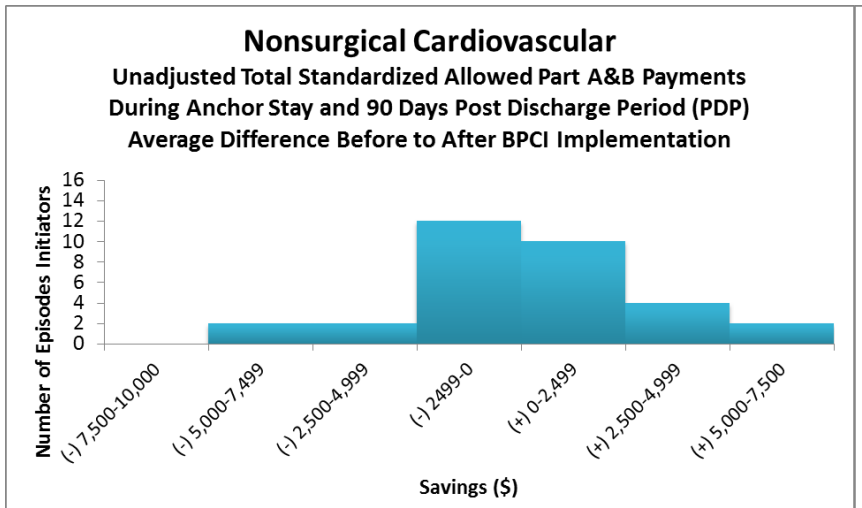


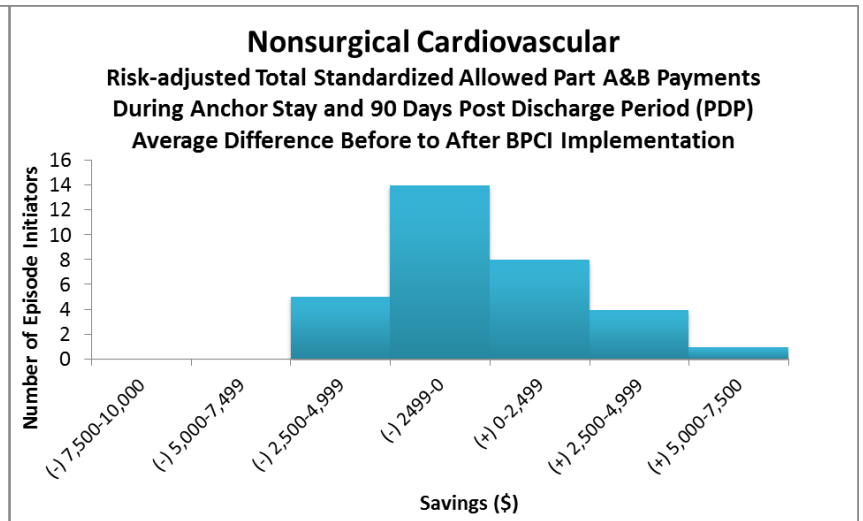

Nonsurgical Neurovascular
Unadjusted Total Standardized Allowed Part A&B Payments
During Anchor Stay and 90 Days Post Discharge Period (PDP)
Average Difference Before to After BPCI Implementation
Number of Episode Initiators
3.5
3
2.5
2
1.5
1
0.5
0
(-) 7,500-10,000
(-) 5,000-7,499
(-) 2,500-4,999
(-) 2499-0
(+) 0-2,499
(+) 2,500-4,999
(+) 5,000-7,500
Savings ($)

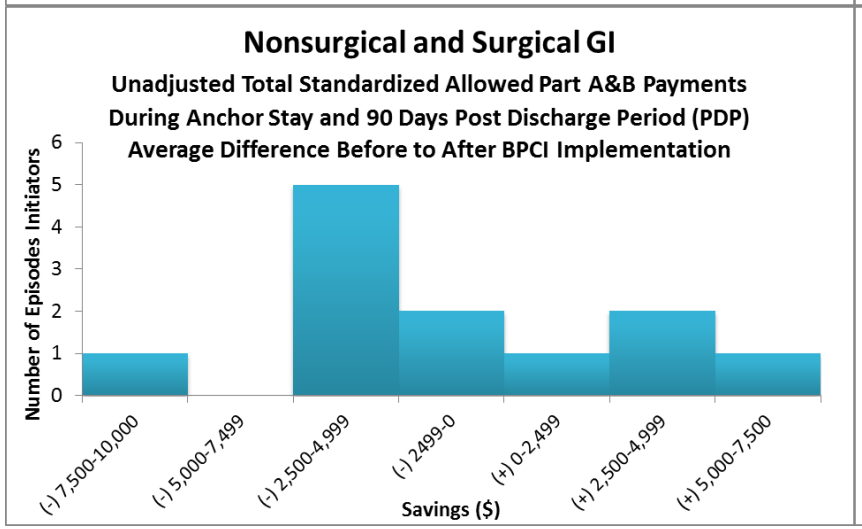

Nonsurgical Neurovascular
Risk- adjusted Total Standardized Allowed Part A&B Payments
During Anchor Stay and 90 Days Post Discharge Period (PDP)
Average Difference Before to After BPCI Implementation
Number of Episode Initiators
3.5
3
2.5
2
1.5
1
0.5
0
(-) 7,500-10,000
(-) 5,000-7,499
(-) 2,500-4,999
(-) 2499-0
(+) 0-2,499
(+) 2,500-4,999
(+) 5,000-7,500
Savings ($)

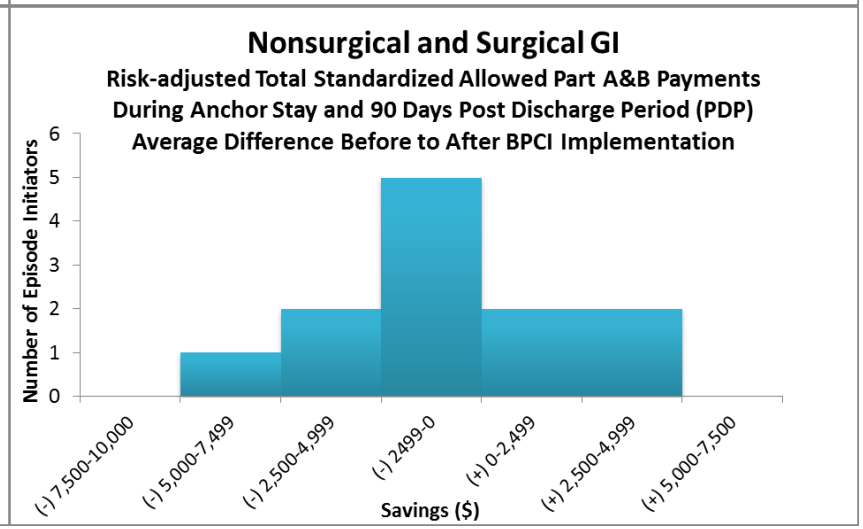

Nonsurgical Respiratory
Unadjusted Total Standardized Allowed Part A&B Payments
During Anchor Stay and 90 Days Post Discharge Period (PDP)
Average Difference Before to After BPCI Implementation
Number of Episode Initiators
16
14
12
10
8
6
4
2
0
(-) 7,500-10,000
(-) 5,000-7,499
(-) 2,500-4,999
(-) 2499-0
(+) 0-2,499
(+) 2,500-4,999
(+) 5,000-7,500
Savings ($)

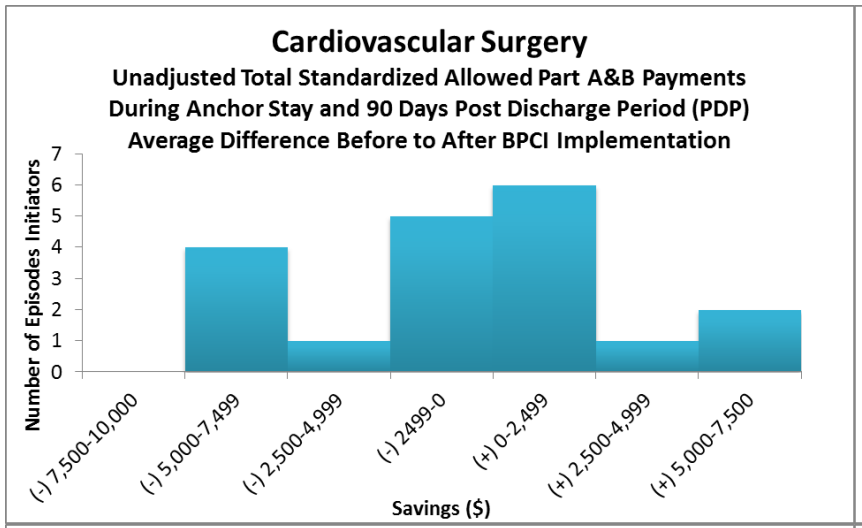

Nonsurgical Respiratory
Risk-adjusted Total Standardized Allowed Part A&B Payments
During Anchor Stay and 90 Days Post Discharge Period (PDP)
Average Difference Before to After BPCI Implementation
Number of Episode Initiators
16
14
12
10
8
6
4
2
0
(-) 7,500-10,000
(-) 5,000-7,499
(-) 2,500-4,999
(-) 2499-0
(+) 0-2,499
(+) 2,500-4,999
(+) 5,000-7,500
Savings ($)

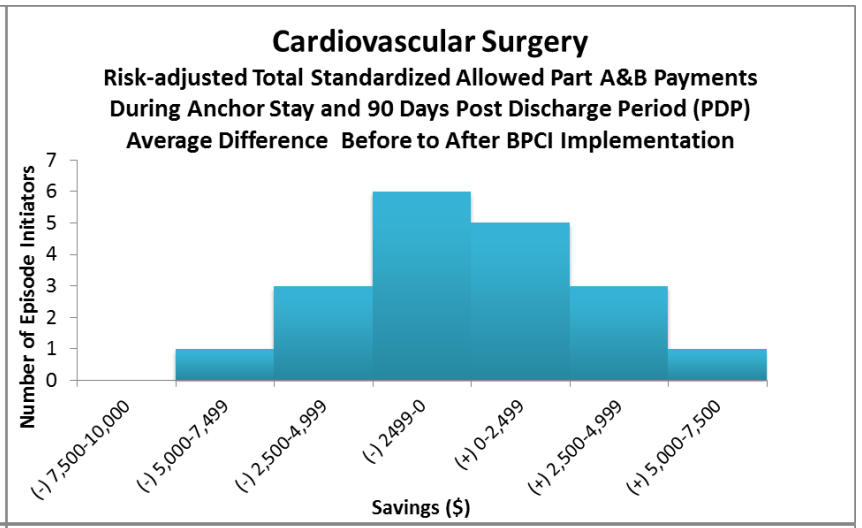

Nonsurgical Cardiovascular
Unadjusted Total Standardized Allowed Part A&B Payments
During Anchor Stay and 90 Days Post Discharge Period (PDP)
Average Difference Before to After BPCI Implementation
Number of Episodes Initiators
16
14
12
10
8
6
4
2
0
(-) 7,500-10,000
(-) 5,000-7,499
(-) 2,500-4,999
(-) 2499-0
(+) 0-2,499
(+) 2,500-4,999
(+) 5,000-7,500
Savings ($)

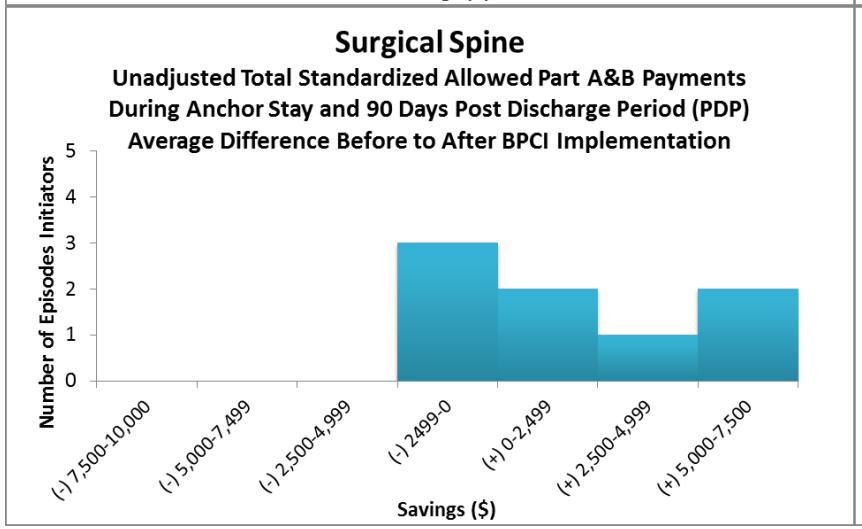

Nonsurgical Cardiovascular
Risk-adjusted Total Standardized Allowed Part A&B Payments
During Anchor Stay and 90 Days Post Discharge Period (PDP)
Average Difference Before to After BPCI Implementation
Number of Episode Initiators
16
14
12
10
8
6
4
2
0
(-) 7,500-10,000
(-) 5,000-7,499
(-) 2,500-4,999
(-) 2499-0
(+) 0-2,499
(+) 2,500-4,999
(+) 5,000-7,500
Savings ($)


Nonsurgical and Surgical GI
Unadjusted Total Standardized Allowed Part A&B Payments
During Anchor Stay and 90 Days Post Discharge Period (PDP)
Average Difference Before to After BPCI Implementation
Number of Episodes Initiators
6
5
4
3
2
1
0
(-) 7,500-10,000
(-) 5,000-7,499
(-) 2,500-4,999
(-) 2499-0
(+) 0-2,499
(+) 2,500-4,999
(+) 5,000-7,500
Savings ($)


Nonsurgical and Surgical GI
Risk-adjusted Total Standardized Allowed Part A&B Payments
During Anchor Stay and 90 Days Post Discharge Period (PDP)
Average Difference Before to After BPCI Implementation
Number of Episode Initiators
6
5
4
3
2
1
0
(-) 7,500-10,000
(-) 5,000-7,499
(-) 2,500-4,999
(-) 2499-0
(+) 0-2,499
(+) 2,500-4,999
(+) 5,000-7,500
Savings ($)


Cardiovascular Surgery
Unadjusted Total Standardized Allowed Part A&B Payments
During Anchor Stay and 90 Days Post Discharge Period (PDP)
Average Difference Before to After BPCI Implementation
Number of Episodes Initiators
0
1
2
3
4
5
6
7
(-) 7,500-10,000
(-) 5,000-7,499
(-) 2,500-4,999
(-) 2499-0
(+) 0-2,499
(+) 2,500-4,999
(+) 5,000-7,500
Savings ($)


Cardiovascular Surgery
Risk-adjusted Total Standardized Allowed Part A&B Payments
During Anchor Stay and 90 Days Post Discharge Period (PDP)
Average Difference Before to After BPCI Implementation
Number of Episode Initiators
0
1
2
3
4
5
6
7
(-) 7,500-10,000
(-) 5,000-7,499
(-) 2,500-4,999
(-) 2499-0
(+) 0-2,499
(+) 2,500-4,999
(+) 5,000-7,500
Savings ($)


Surgical Spine
Unadjusted Total Standardized Allowed Part A&B Payments
During Anchor Stay and 90 Days Post Discharge Period (PDP)
Average Difference Before to After BPCI Implementation
Number of Episodes Initiators
0
1
2
3
4
5
(-) 7,500-10,000
(-) 5,000-7,499
(-) 2,500-4,999
(-) 2499-0
(+) 0-2,499
(+) 2,500-4,999
(+) 5,000-7,500
Savings ($)

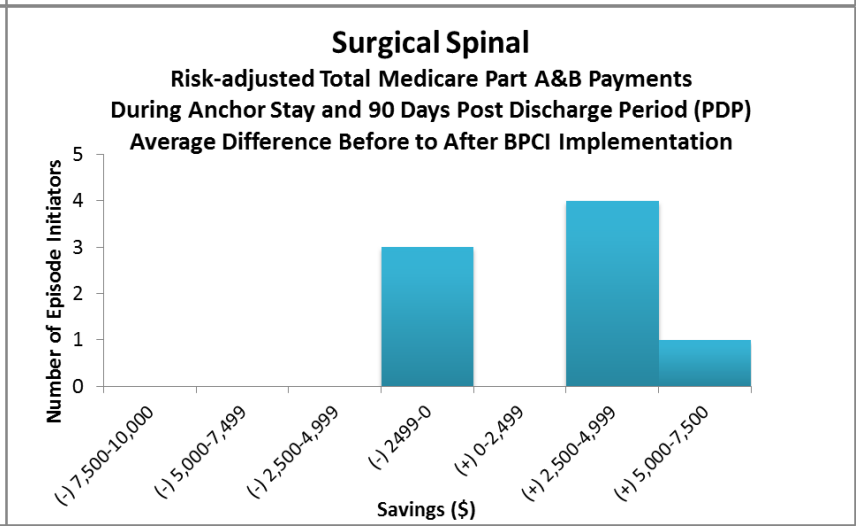
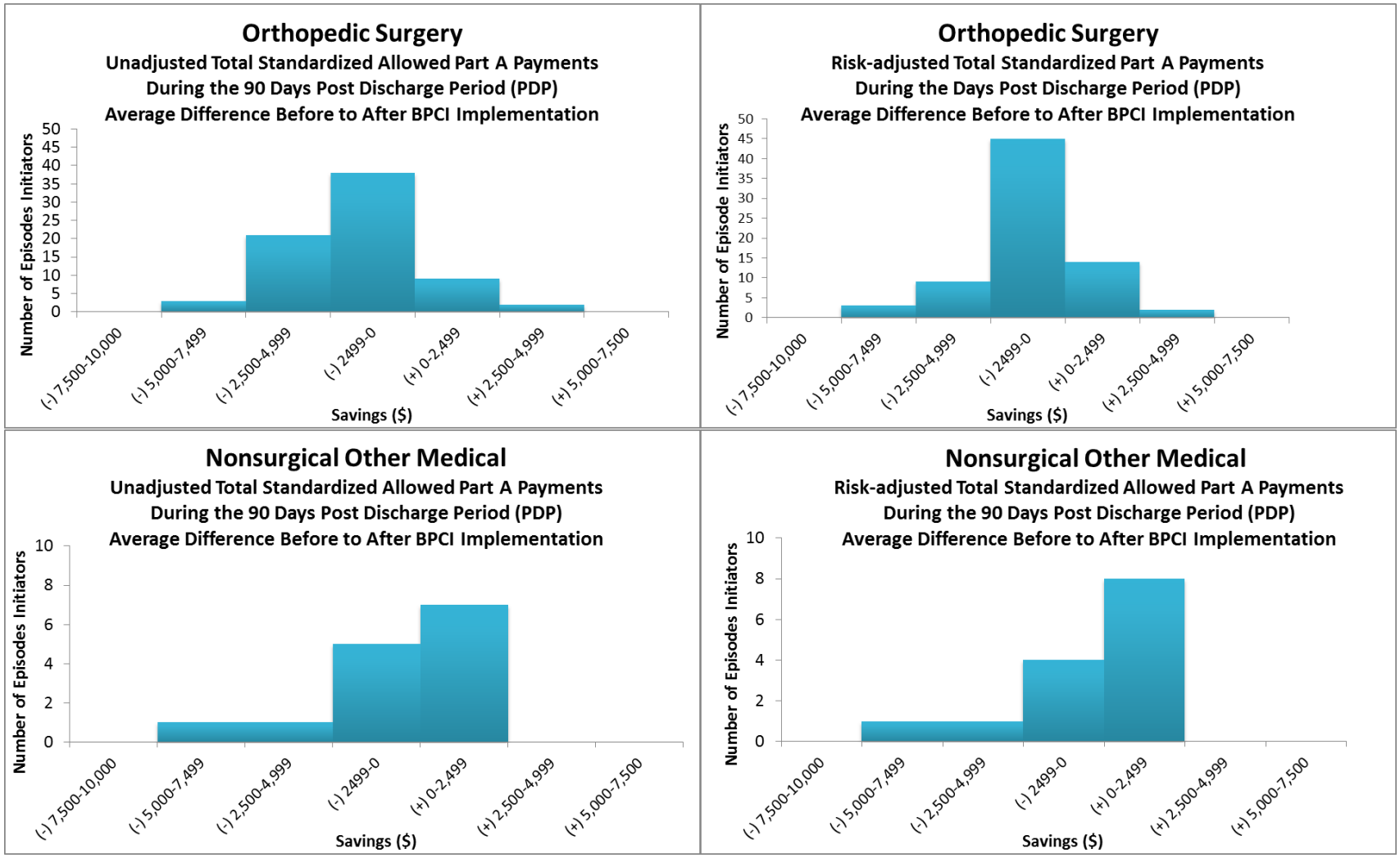
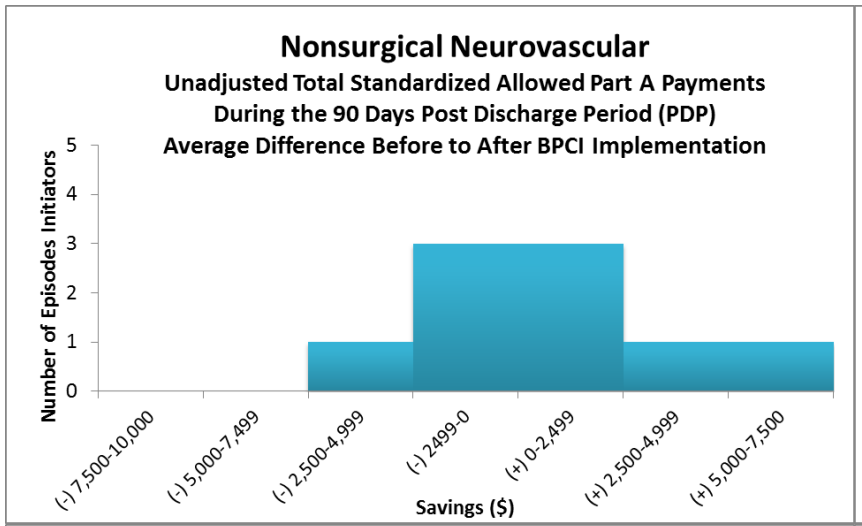
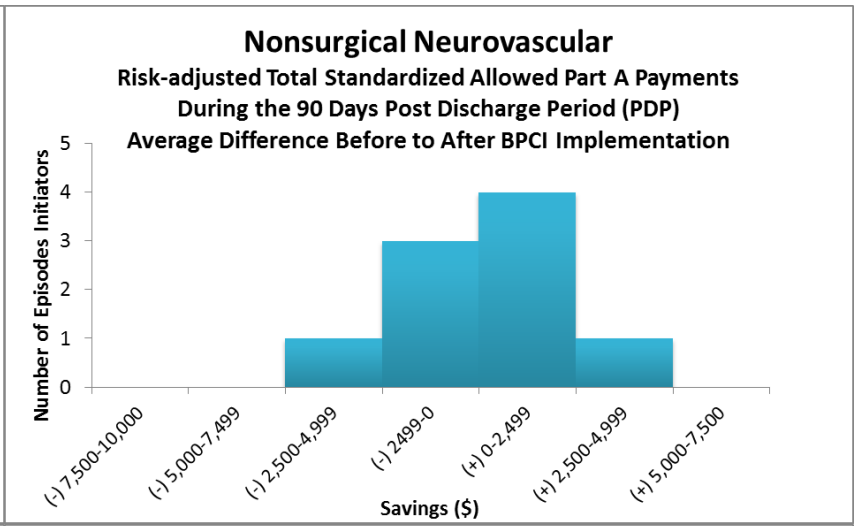
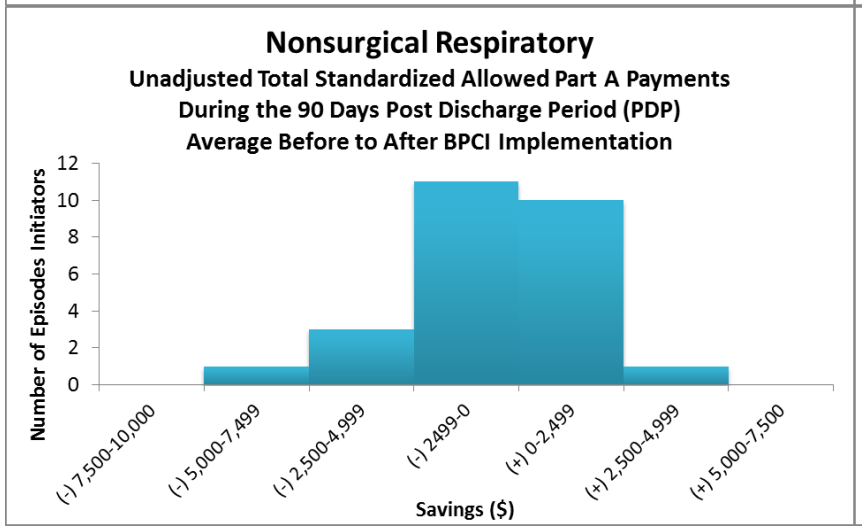

Surgical Spinal
Risk-adjusted Total Medicare Part A&B Payments
During Anchor Stay and 90 Days Post Discharge Period (PDP)
Average Difference Before to After BPCI Implementation
Number of Episode Initiators
0
1
2
3
4
5
(-) 7,500-10,000
(-) 5,000-7,499
(-) 2,500-4,999
(-) 2499-0
(+) 0-2,499
(+) 2,500-4,999
(+) 5,000-7,500
Savings ($)

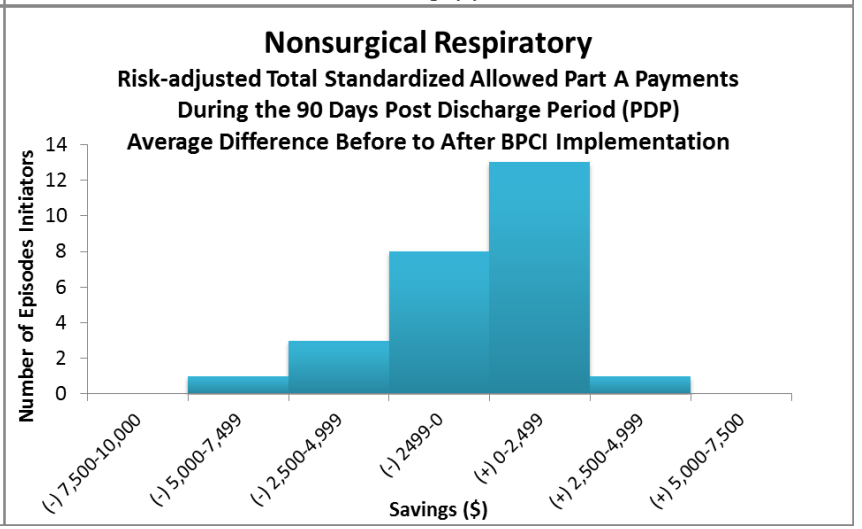
Exhibit R.2: Model 2 Distribution of Savings: Average Difference from Before to After BPCI Implementation for Total Standardized Allowed Part A Payments During the 90-Day Post Discharge Period

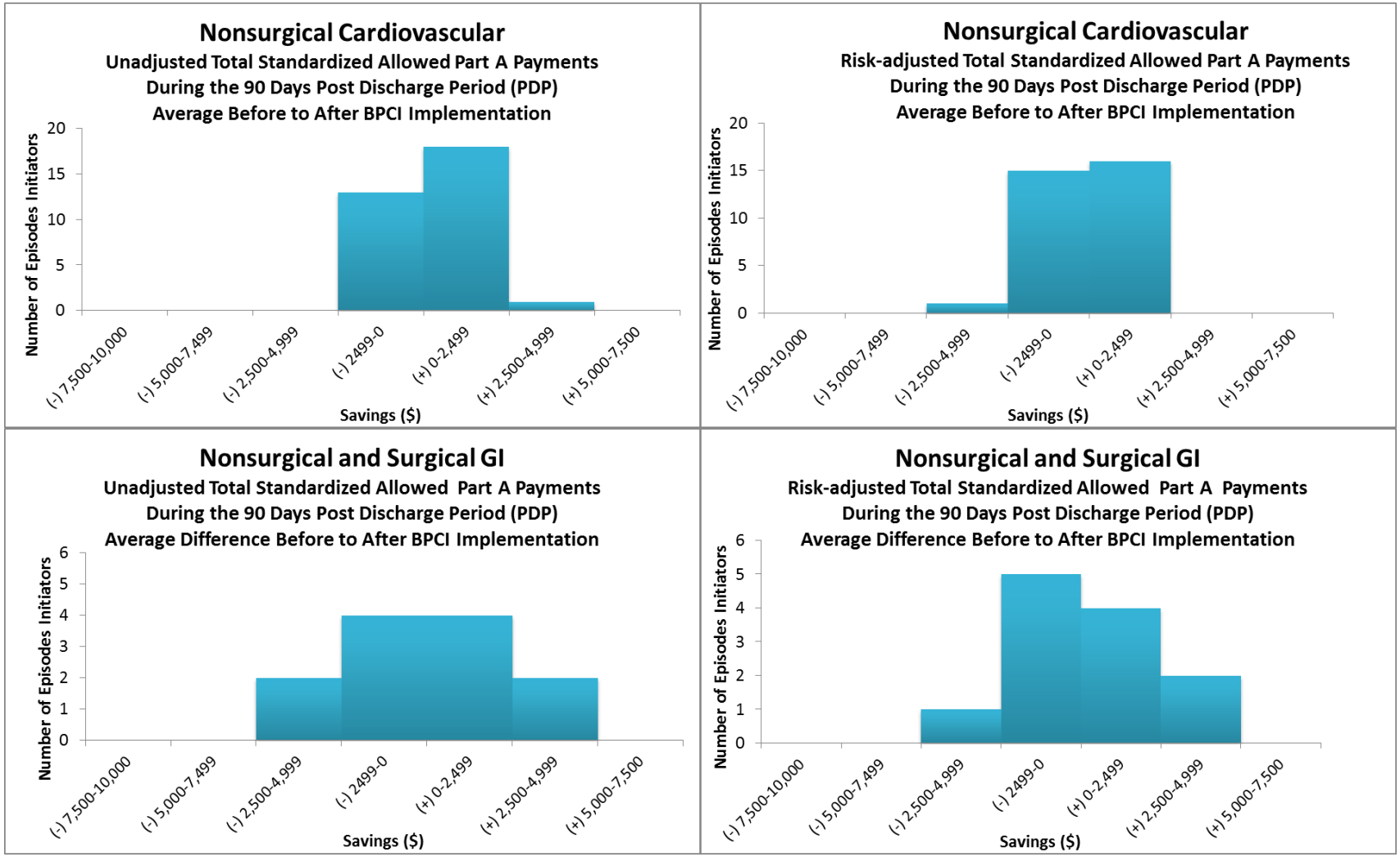


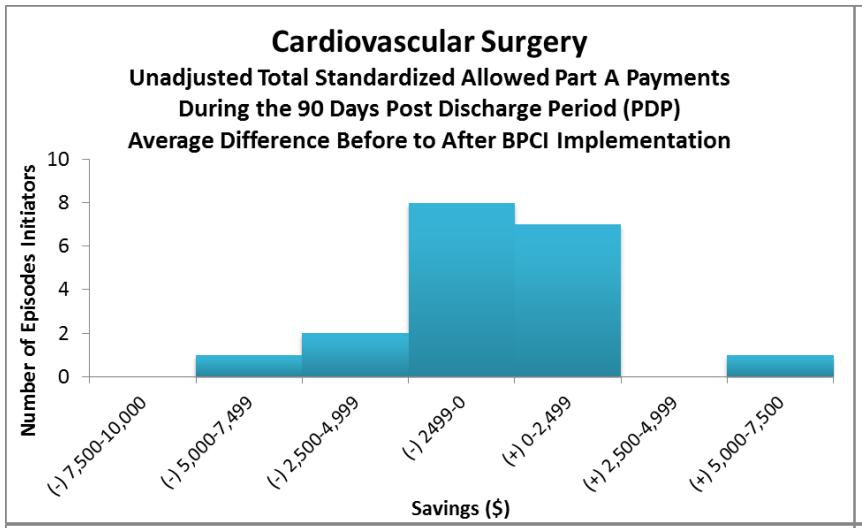

Nonsurgical Neurovascular
Unadjusted Total Standardized Allowed Part A Payments
During the 90 Days Post Discharge Period (PDP)
Average Difference Before to After BPCI Implementation
Number of Episodes Initiators
0
1
2
3
4
5
(-) 7,500-10,000
(-) 5,000-7,499
(-) 2,500-4,999
(-) 2499-0
(+) 0-2,499
(+) 2,500-4,999
(+) 5,000-7,500
Savings ($)

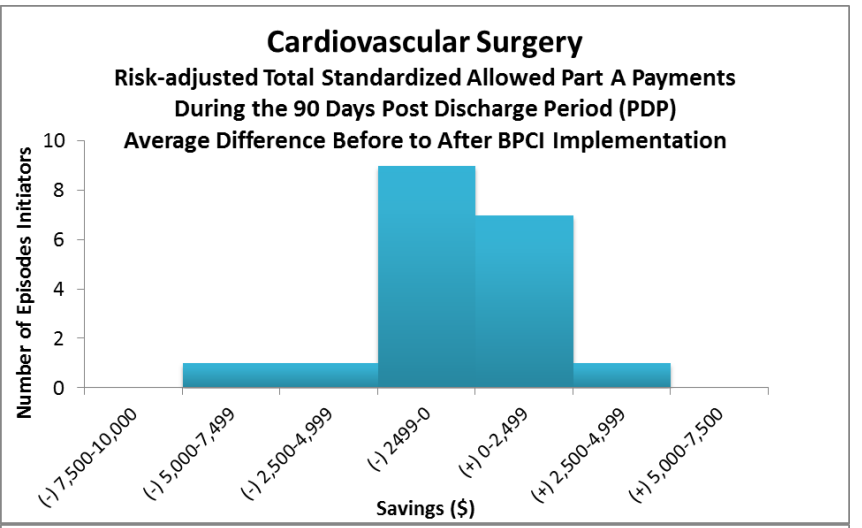

Nonsurgical Neurovascular
Risk-adjusted Total Standardized Allowed Part A Payments
During the 90 Days Post Discharge Period (PDP)
Average Difference Before to After BPCI Implementation
Number of Episodes Initiators
0
1
2
3
4
5
(-) 7,500-10,000
(-) 5,000-7,499
(-) 2,500-4,999
(-) 2499-0
(+) 0-2,499
(+) 2,500-4,999
(+) 5,000-7,500
Savings ($)

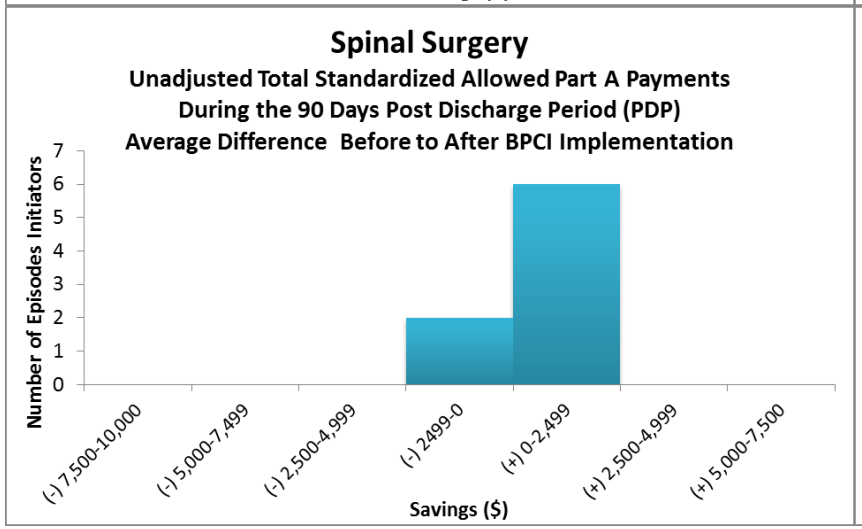

Nonsurgical Respiratory
Unadjusted Total Standardized Allowed Part A Payments
During the 90 Days Post Discharge Period (PDP)
Average Before to After BPCI Implementation
Number of Episodes Initiators
0
2
4
6
8
10
12
(-) 7,500-10,000
(-) 5,000-7,499
(-) 2,500-4,999
(-) 2499-0
(+) 0-2,499
(+) 2,500-4,999
(+) 5,000-7,500
Savings ($)

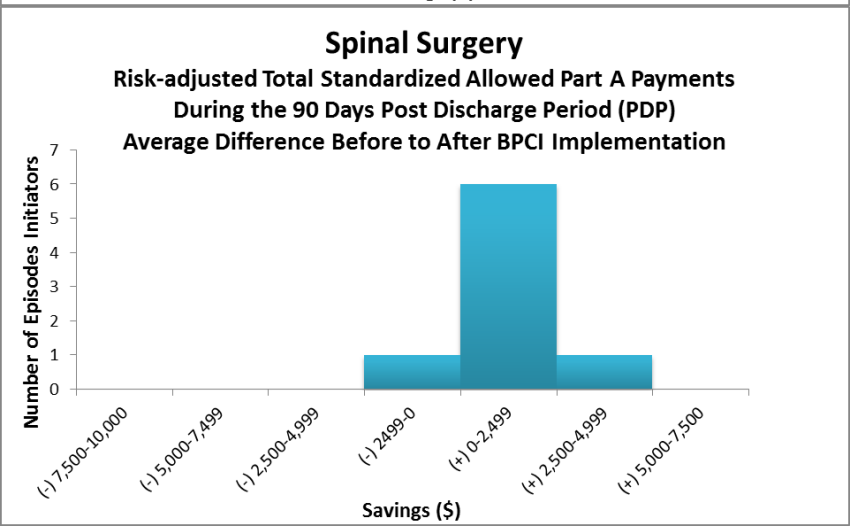

Nonsurgical Respiratory
Risk-adjusted Total Standardized Allowed Part A Payments
During the 90 Days Post Discharge Period (PDP)
Average Difference Before to After BPCI Implementation
Number of Episodes Initiators
0
2
4
6
8
10
12
14
(-) 7,500-10,000
(-) 5,000-7,499
(-) 2,500-4,999
(-) 2499-0
(+) 0-2,499
(+) 2,500-4,999
(+) 5,000-7,500
Savings ($)


Nonsurgical Cardiovascular
Unadjusted Total Standardized Allowed Part A Payments
During the 90 Days Post Discharge Period (PDP)
Average Before to After BPCI Implementation
Number of Episodes Initiators
0
5
10
15
20
(-) 7,500-10,000
(-) 5,000-7,499
(-) 2,500-4,999
(-) 2499-0
(+) 0-2,499
(+) 2,500-4,999
(+) 5,000-7,500
Savings ($)
Nonsurgical Cardiovascular
Risk-adjusted Total Standardized Allowed Part A Payments
During the 90 Days Post Discharge Period (PDP)
Average Before to After BPCI Implementation
Number of Episodes Initiators
0
5
10
15
20
(-) 7,500-10,000
(-) 5,000-7,499
(-) 2,500-4,999
(-) 2499-0
(+) 0-2,499
(+) 2,500-4,999
(+) 5,000-7,500
Savings ($)
Nonsurgical and Surgical GI
Unadjusted Total Standardized Allowed Part A Payments
During the 90 Days Post Discharge Period (PDP)
Average Difference Before to After BPCI Implementation
Number of Episodes Initiators
0
1
2
3
4
5
6
(-) 7,500-10,000
(-) 5,000-7,499
(-) 2,500-4,999
(-) 2499-0
(+) 0-2,499
(+) 2,500-4,999
(+) 5,000-7,500
Savings ($)
Nonsurgical and Surgical GI
Risk-adjusted Total Standardized Allowed Part A Payments
During the 90 Days Post Discharge Period (PDP)
Average Difference Before to After BPCI Implementation
Number of Episodes Initiators
0
1
2
3
4
5
6
(-) 7,500-10,000
(-) 5,000-7,499
(-) 2,500-4,999
(-) 2499-0
(+) 0-2,499
(+) 2,500-4,999
(+) 5,000-7,500
Savings ($)


Cardiovascular Surgery
Unadjusted Total Standardized Allowed Part A Payments
During the 90 Days Post Discharge Period (PDP)
Average Difference Before to After BPCI Implementation
Number of Episodes Initiators
0
2
4
6
8
10
(-) 7,500-10,000
(-) 5,000-7,499
(-) 2,500-4,999
(-) 2499-0
(+) 0-2,499
(+) 2,500-4,999
(+) 5,000-7,500
Savings ($)


Cardiovascular Surgery
Risk-adjusted Total Standardized Allowed Part A Payments
During the 90 Days Post Discharge Period (PDP)
Average Difference Before to After BPCI Implementation
Number of Episodes Initiators
0
2
4
6
8
10
(-) 7,500-10,000
(-) 5,000-7,499
(-) 2,500-4,999
(-) 2499-0
(+) 0-2,499
(+) 2,500-4,999
(+) 5,000-7,500
Savings ($)


Spinal Surgery
Unadjusted Total Standardized Allowed Part A Payments
During the 90 Days Post Discharge Period (PDP)
Average Difference Before to After BPCI Implementation
Number of Episodes Initiators
0
1
2
3
4
5
6
7
(-) 7,500-10,000
(-) 5,000-7,499
(-) 2,500-4,999
(-) 2499-0
(+) 0-2,499
(+) 2,500-4,999
(+) 5,000-7,500
Savings ($)


Spinal Surgery
Risk-adjusted Total Standardized Allowed Part A Payments
During the 90 Days Post Discharge Period (PDP)
Average Difference Before to After BPCI Implementation
Number of Episodes Initiators
0
1
2
3
4
5
6
7
(-) 7,500-10,000
(-) 5,000-7,499
(-) 2,500-4,999
(-) 2499-0
(+) 0-2,499
(+) 2,500-4,999
(+) 5,000-7,500
Savings ($)

C. Results: Cross-tabulation Analysis of Factors Contributing to Differences across BPCI Providers

Among BPCI participants, we were interested in determining what BPCI provider and market characteristics were associated with a decrease in total Medicare standardized payments and readmission rates after joining BPCI. Due to limited sample size of Model 2 participating hospitals, we were unable to assess the potential associations in the context of a regression model for seven clinical groups: 1) non-surgical other medical, 2) non-surgical neurovascular, 3) non-surgical respiratory, 4) non-surgical cardiovascular episodes, 5) non-surgical and surgical GI, 6) cardiovascular surgery, and 7) spinal surgery clinical episode groups. Instead, we calculated the risk-adjusted relative cost-savings and change in utilization by the categorical provider, program, and market characteristics of interest. The risk-adjusted relative cost savings represents the difference in average payments from the baseline to the intervention period for providers that were in a given category relative to providers that were not in a given category. These results are based upon cross-tabulations between categorical provider and program characteristics with the change in total standardized allowed payment for 1) Part A and B services during the anchor hospitalization and the 90-day PDP, 2) total standardized allowed payments for Part A institutional services during 90-day PDP, and 3) 30-day unplanned readmission rates from before to after BPCI. These results, while adjusted for patient characteristics, do not adjust for the other provider or market characteristics.

Results for risk-adjusted relative savings are shown in **Exhibits R.3 and R.4**; positive point estimates indicate a decline in cost and utilization. Statistically significant results at a minimum of 5% are described in the narrative below. The text reframes some variable descriptions to consistently describe declines in cost and utilization. Finally, the inability to detect significant associations may be due to limited sample size and power. We will expand these analyses to include a regression analysis as the volume of participants reaches the appropriate sample size.

Exhibit R.3: Model 2 Risk-Adjusted Relative Savings (in dollars) in Total Standardized Allowed Payments Post-BPCI, by Variables of Interest

Variables	Orthopedic Surgery		Nonsurgical Other Medical		Nonsurgical Neurovascular		Nonsurgical Respiratory	
	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP
Number of Episode Initiators	**72**		**14**		**9**		**26**	
% of patients between Age 65-79 > Median	-65	-230	-1754	-1025	749	1385	-2470*	-1111
% of patients Age 80+ > Median	401	673#	1541	739	1358	-194	2695**	1369*
% of Dual Eligible > Median	-879#	-582	-1580	-1476	-264	456	-1862#	-1362#
% Disabled, No ESRD, > Median	-1041#	-932*	-1821	-1141	-988	-725	-3248**	-2105**
% with HCC Case Weight > Median	365	347	-1319	-1027	1847	-35	826	452
Gainsharing	-180	-739	.	.	2	-1180	1020	780
SNF 3-Day Waiver	534	453	.	.	-53	495	-449	-668
Beneficiary Incentives	-25	-202	2868#	1725	3	-1604	1685	1022
Facilitator Convener	-648	-231	.	.	2258	1591	2375	180
EI under Awardee Convener or Designated AC	29	-362	.	.	-2258	-1591	27	78
Awardee	-29	362	.	.	2258	1591	-27	-78
Facilitator Convener and Awardee	-1435	-1414	.	.	.	.	.	.
Prior Bundle	-276	-357	1673	-135	-176	1631	-434	-164
Prior Pay for Performance	1174*	726#	3750#	3241#	-5661	-4599*	2570#	1723*
Prior Shared Savings	706	126	1347	1442	540	417	1475	884
Prior Other	-72	-33	1187	1247	-585	-943	697	144
Electronic Health Record	134	-1414	8458#	7106#	.	.	-492	-366
Health Information Exchange	-444	-213	1023	759	-1637	-700	-1256	-1813
Beds 0-99	-433	117	.	.	-4381	-1887	3926	1619
Beds 100-249	-1119*	-821	2272	1381	-3593	-2040	312	-148
Beds 250 Plus	891	552	-2272	-1381	4742	2425	-912	-112
Ownership Government	2074	1693#	.	.	.	.	-389	221
Ownership Non-Profit	1041	572	.	.	.	.	389	-221
Ownership For Profit	-2127**	-1365**	.	.	.	.	.	.
% Medicaid Admits >Median	-778	-182	-2176	-1681	-852	-1439	-433	-938

Variables	Orthopedic Surgery		Nonsurgical Other Medical		Nonsurgical Neurovascular		Nonsurgical Respiratory	
	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP
% Medicare Admits >Median	498	299	-365	-527	-1887	295	2249*	1625*
Part A Payment during Baseline >25th%tile	-2	194	567	-263#	-2501	-2595	201	129
Part A Payment during Baseline >Median	277	478	-95	-456	1972	-269	-1308	-1310#
Part A Payment during Baseline >75th%tile	1098#	978*	-2268	-2035	-2374	-1265	-907	-1116
Volume of Episodes during Baseline >25th%tile	-929	-640	2540	2430	4381	1887	1551	1087
Volume of Episodes during Baseline >50th%tile	-46	-150	3471*	2691*	5217*	2688*	632	186
Volume of Episodes during Baseline >75th%tile	169	25	1861	1032	944	-417	214	418
% Medicare Days >Median	260	214	1918	1386	-1943	-1048	2858**	1599*
Resident to Bed Ratio >75th%tile	-318	-446	78	650	3155	-54	-502	-346
SNF Beds per 10,000 > Median	-998#	-1035**	1164	782	4723*	3262**	648	783
Herfindahl Index >Median	-1216*	-793*	278	736	3518	1859	2019*	1481*
Hospital Market Share, >75th %tile	-589	-113	939	907	5856**	2904*	184	-17
Median Income > Median	533	171	1541	739	-3518	-1859	-672	-415
Medicare Advantage Penetration >Median	-205	-19	-1541	-739	-237	-402	-746	-746
First PAC home >Median	-279	-237	-763	-37	952	-1197	546	383
First PAC IRF > Median	194	37	-1431	-1383	2374	885	-1082	-1011
First PAC SNF > Median	765	544	2508	1346	-2374	-885	1258	1204
Readmission Rate during Baseline >Median	52	-104	1818	1520	-710	-1978	-844	-38
Disproportionate Share >Median	-245	-144	-2296	-2119#	-443	-90	-2276*	-1552*
BPCI Market Penetration-Hospital Level>Median	108	40	-809	-861	-1582	-421	469	170
BPCI Market Penetration-Market Level>Median	149	12	278	736	2556	119	1180	1087
Population in Market>Median	1108*	764#	-278	-736	-3518	-1859	-1393	-746

* Statistically significant at the 5% level. **Statistically significant at the 1%. # Statistically significant at the 10% level. Missing values indicate no variation across EIs.

Exhibit R3: Continued for Additional Clinical Groups

Variables	Nonsurgical Cardiovascular		Nonsurgical and Surgical GI		Cardiovascular Surgery		Spinal Surgery	
	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP
Number of Episode Initiators	**32**		**12**		**19**		**7**	
% of patients between Age 65-79 > Median	-651	-253	-2818#	-2078#	402	-9	2051	-708
% of patients Age 80+ > Median	652	79	1882	1269	-1301	-77	632	-1337
% of Dual Eligible > Median	-757	-173	-2911#	-2077*	2100	2006*	-2051	708
% Disabled, No ESRD, > Median	-321	-3	-2748#	-1903	5	1116	564	2132*
% with HCC Case Weight > Median	-661	-208	-604	-1016	12	374	1301	-349
Gainsharing	451	-120	.	.	1778	178	.	.
SNF 3-Day Waiver	-993	-9	-1269	392	-1950	-1706#	691	-1882#
Beneficiary Incentives	-1379	-151	1049	538	-1607	136	-1991	163
Facilitator Convener	-568	-398	-1269	392	210	-877	2636	-2710#
EI under Awardee Convener or Designated AC	-282	-304	1269	-392	-957	728	-2636	2710#
Awardee	282	304	-1269	392	957	-728	2636	-2710#
Facilitator Convener and Awardee	.	.	.	.	-3166	-937	.	.
Prior Bundle	-725	-366	929	2091	1578	1728	-824	-91
Prior Pay for Performance	-518	-614	2608	2951#	1348	229	824	91
Prior Shared Savings	167	-127	656	1196	-1442	-1772#	824	91
Prior Other	-1210	-261	1399	1894	-1656	-575	-56	-606
Electronic Health Record	-3191	910	334	2571	-3300	-2535	.	.
Health Information Exchange	-282	218	1459	1890	-843	-1836	2728	-1672
Beds 0-99	-784	-582	.	.	.	.	.	.
Beds 100-249	-664	451	2469	1946#	824	-436	-2509	-841
Beds 250 Plus	805	-268	-2469	-1946#	-824	436	2509	841
Ownership Government	-4735*	-1641	.	.	.	.	.	.
Ownership Non-Profit	4735*	1641	.	.	-3206	-837	-1137	-685
Ownership For Profit	.	.	.	.	3206	837	1137	685
% Medicaid Admits >Median	721	531	-2903#	-1872	-279	1317	1137	1960#
% Medicare Admits >Median	70	-76	2469	1946#	134	-91	56	-764
Part A Payment during Baseline >25th%tile	-876	-61	1432	193	-286	-275	1991	-163

Variables	Nonsurgical Cardiovascular		Nonsurgical and Surgical GI		Cardiovascular Surgery		Spinal Surgery	
	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP
Part A Payment during Baseline >Median	248	68	-2120	-1461	-666	333	76	-409
Part A Payment during Baseline >75th%tile	642	590	-1599	-1448	-912	-76	2636	-20
Volume of Episodes during Baseline >25th%tile	268	86	-61	44	-2100	-1264	.	.
Volume of Episodes during Baseline >50th%tile	14	-6	1718	1286	-1328	-816	-126	583
Volume of Episodes during Baseline >75th%tile	172	145	-2681	-2014	347	-1230	1259	-1465
% Medicare Days >Median	-246	-202	2469	1946	-1947	-759	-522	-1016
Resident to Bed Ratio >75th%tile	-1061	-347	-1834	-920	573	-441	2636	-2710#
SNF Beds per 10,000 > Median	-302	-240	-89	429	1093	-62	-955	1375
Herfindahl Index >Median	741	303	-89	429	1103	728	-3213#	90
Hospital Market Share, >75th %tile	-551	1	-1485	-410	240	23	-1083	337
Median Income > Median	-1155	-104	-589	-520	-1702	-1469	-56	-606
Medicare Advantage Penetration >Median	440	-4	-179	-463	-2200	-1376	1991	-163
First PAC home >Median	399	-210	-935	-1339	-305	-276	-1083	1608
First PAC IRF > Median	1128	202	-1049	-538	-1479	-1175	-1843	-1220
First PAC SNF > Median	404	747*	1198	514	-380	872	963	1506
Readmission Rate during Baseline >Median	-408	-97	-92	-21	-1529	-181	-333	-1148
Disproportionate Share >Median	-1185	-213	-568	218	2898*	2388*	1137	1960#
BPCI Market Penetration-Hospital Level>Median	819	364	1725	89	-881	206	2793	826
BPCI Market Penetration-Market Level>Median	816	260	-89	429	944	790	-1259	1465
Population in Market>Median	-741	-303	89	-429	-1103	-728	3213#	-90

* Statistically significant at the 5% level. **Statistically significant at the 1%. # Statistically significant at the 10% level. Missing values indicate no variation across EIs.

Exhibit R.4: Model 2 Risk-Adjusted Relative Difference in Medicare 30-Day Unplanned Readmissions (%) Post-BPCI, by Variables of Interest

Variables	Orthopedic Surgery	Nonsurgical Other Medical	Nonsurgical Neurovascular	Nonsurgical Respiratory	Nonsurgical Cardio	Nonsurgical & Surgical GI	Cardiovascular Surgery	Spinal Surgery
Number of Episode Initiators	**72**	**14**	**9**	**26**	**32**	**12**	**19**	**7**
% of patients between Age 65-79 > Median	0.4#	0.4	0.1	0.5	-0.3	0.8	0.2	-0.1
% of patients Age 80+ > Median	-0.4	0.3	0.3	-0.7	0.2	-0.5	-0.6	-0.4
% of Dual Eligible > Median	0.0	-0.6	-0.2	0.2	0.3	-1	0.6	0.1
% Disabled, No ESRD, > Median	0.4*	-0.3	-0.4	0.4	-0.2	0.2	0.6	0.9
% with HCC Case Weight > Median	-0.2	0.3	0.1	-0.7	-0.7	-2.3*	-0.8*	-1.1#
Gainsharing	0.1	.	-0.3	-1.1*	-1.0	.	-0.2	.
SNF 3-Day Waiver	0.1	.	0.2	0.4	0.3	-0.5	0.3	-0.6
Beneficiary Incentives	0.2	-0.3	-0.9	-0.3	0.7	0.7	-0.9*	-0.1
Facilitator Convener	0.2	.	0.2	1.0	0.1	-0.5	0.7#	0.5
EI under Awardee Convener or Designated AC	0.0	.	-0.2	-1.3**	0.6	0.5	-0.6	-0.5
Awardee	0.0	.	0.2	1.3**	-0.6	-0.5	0.6	0.5
Facilitator Convener and Awardee	0.0	.	.	.	.	.	0.7	.
Prior Bundle	-0.3	-0.1	1.0#	-1.0	-0.3	-0.3	0.6	-0.9
Prior Pay for Performance	0.0	0.1	0.0	-0.6	0.0	0.9	-0.5	0.9
Prior Shared Savings	0.1	-0.4	0.5	-0.7#	0.7	-0.7	-0.1	0.9
Prior Other	-0.1	-0.5	-0.6	-1.0*	-0.5	-0.4	-0.5	1.1#
Electronic Health Record	-0.5	0.8	.	0.2	2.2	-0.7	0.3	0.2
Health Information Exchange	0.2	0.2	-0.2	1.0	-0.3	-2.2	-1.0	-1.5#
Beds 0-99	-0.1	.	0.0	-0.2	0.5	.	.	.
Beds 100-249	0.3	0.7	0.6	0.6	-0.2	-0.6	0.4	-0.6
Beds 250 Plus	-0.2	-0.7	-0.4	-0.6	0.1	0.6	-0.4	0.6
Ownership Government	0.5	.	.	2.5*	-0.6	.	.	.
Ownership Non-Profit	-0.6*	.	.	-2.5*	0.6	.	-0.1	0.8
Ownership For Profit	0.5	.	.	.	.	.	0.1	-0.8
% Medicaid Admits >Median	-0.1	-0.2	-0.7#	-0.1	1.0#	-0.9	-0.5	0.2
% Medicare Admits >Median	-0.5*	-0.8	0.6	0.5	-0.9#	-0.6	0.0	-1.5**
Part A Payment during Baseline >25th%tile	0.0	-0.3	-0.5	-0.6	0.0	-0.7	-1.0**	0.1
Part A Payment during Baseline >Median	-0.1	-0.5	-0.8#	-0.8#	0.6	0.2	-0.5	0.4

Variables	Orthopedic Surgery	Nonsurgical Other Medical	Nonsurgical Neurovascular	Nonsurgical Respiratory	Nonsurgical Cardio	Nonsurgical & Surgical GI	Cardiovascular Surgery	Spinal Surgery
Part A Payment during Baseline >75th%tile	-0.2	0.2	-1.4*	-1.0#	0.7	1.2	-0.2	0.9
Volume of Episodes during Baseline >25th%tile	0.0	0.0	0.0	-0.1	-0.3	0.9	1.1#	.
Volume of Episodes during Baseline >50th%tile	-0.2	-0.6	0.2	0.1	-0.5	0.6	0.1	0.3
Volume of Episodes during Baseline >75th%tile	-0.2	-1.1#	-0.1	-0.7	-0.2	1.1	0.2	-0.9
% Medicare Days >Median	-0.3	-0.6	0.1	0.1	-1.1*	-0.6	0.0	-1.0#
Resident to Bed Ratio >75th%tile	-0.1	-1.0	-0.3	-0.7	0.4	0.7	-0.1	0.5
SNF Beds per 10,000 > Median	0.1	-0.6	0.6	-0.4	-1.0#	-0.5	0.6	0.5
Herfindahl Index >Median	0.1	-0.3	-0.2	0.5	-0.7	-0.5	0.9**	-0.7
Hospital Market Share, >75th %tile	-0.4	-1.2*	-0.2	1.0#	-1.1#	0.1	0.8*	-0.5
Median Income > Median	0.0	0.3	0.2	-0.2	0.6	1.4	-0.9*	1.1#
Medicare Advantage Penetration >Median	-0.1	-0.3	-0.5	-0.5	1.0#	-2.6**	-0.7	0.1
First PAC home >Median	0.4#	0.6	-0.2	0.3	0.3	1.4	-0.3	-0.1
First PAC IRF > Median	-0.1	0.1	0.5	-0.4	-0.8	-0.7	0.8*	0.4
First PAC SNF > Median	-0.1	0.5	-0.5	-0.3	-0.7	1.2	-0.4	0.6
Readmission Rate during Baseline >Median	0.1	0.6	-0.7#	-0.1	0.6	0.2	-0.6#	0.1
Disproportionate Share >Median	-0.1	-0.1	-0.4	-0.4	0.3	0.2	-0.6#	0.2
BPCI Market Penetration-Hospital Level>Median	-0.2	0.7	0.0	0.7	0.2	-0.8	0.2	-0.1
BPCI Market Penetration-Market Level>Median	0.0	-0.3	-0.8#	-0.2	-0.8	-0.5	0.9*	0.9
Population in Market>Median	-0.2	0.3	0.2	-0.4	0.7	0.5	-0.9**	0.7

* Statistically significant at the 5% level. **Statistically significant at the 1%. # Statistically significant at the 10% level. Missing values indicate no variation across EIs.

1. Cardiovascular surgery

BPCI hospitals that had greater than the median disproportionate share of patients, indicating a greater proportion of patients eligible for Medicare Supplemental Security Income, Medicaid, or other low-income populations, had a significantly greater decline in total standardized allowed payment for Part A and B services during the anchor hospitalization and the 90-day PDP ($2,898) and total standardized allowed payments for Part A institutional services during 90-day PDP $2,388; Table A.19). In addition, BPCI hospitals with greater than the median proportions of dual eligible patients were found to have a significantly greater decline in total standardized allowed payments for Part A institutional services during 90-day PDP ($2,006).

Multiple factors were associated with a significantly greater decline in unplanned hospital readmissions during the 30 day PDP (Table A.20). BPCI hospitals that had lower than median patient HCC case weight (0.8 pp), were not participating in the beneficiary incentive waiver (0.9), had Part A payment during the baseline lower than the 25th percentile (1.0), greater than the median Herfindahl index (0.9 pp), greater than the 75th percentile hospital market share (0.8 pp), median annual incomes lower than the median income in the market, sent a greater than the median proportion of patients to an inpatient rehabilitation facility as their first site of post-acute care (0.8), greater than the median BPCI market penetration at the market level (0.9 pp), and lower than the median population in the market (0.9 pp) had a significantly greater decline in unplanned hospital readmissions during the 30 day post-discharge period.

2. Spinal surgery

No characteristics were associated with a significant decline in total standardized allowed payment for Part A and B services during the anchor hospitalization and the 90-day PDP (Table A.19). BPCI hospitals that had greater than the median percent of disabled beneficiaries experienced a decline in total standardized allowed payments for Part A institutional services during 90-day PDP ($2,132). BPCI hospitals with lower than the median proportion of Medicare admissions had a significantly greater decline in unplanned hospital readmissions than BPCI hospitals with greater than the median proportion of Medicare admissions during the 30 day post-discharge period (1.5 pp; **Exhibit R.4**).

3. Non-surgical and surgical GI

No characteristics were associated with a significant decline in total standardized allowed payment for Part A and B services during the anchor hospitalization and the 90-day PDP (Table A.19). BPCI hospitals that had lower than the median proportions of dual eligible patients had a significantly greater decline than BPCI government hospitals in total standardized allowed payments for Part A institutional services during 90-day PDP ($2,077).

In addition, BPCI hospitals that had lower than the median patient HCC case weight (2.3 pp) and lower than the median proportion of Medicare advantage penetration (2.6 pp) experienced a significantly greater decline in unplanned hospital readmissions during the 30 day post-discharge period (Table A.20).

4. Non-surgical cardiovascular

Non-profit BPCI hospitals had a significantly greater decline than BPCI government hospitals in total standardized allowed payment for Part A and B services during the anchor hospitalization

and the 90-day PDP ($4,735; Table A.19). In addition, BPCI hospitals that had greater than the median proportion of patients whose first PAC stay was at a SNF had a significantly greater decline in total standardized allowed payment for Part A and B services during the anchor hospitalization and the 90-day PDP ($747). BPCI hospitals with lower than the median proportion of Medicare days had a significantly greater decline in unplanned hospital readmissions during the 30 day post-discharge period than BPCI hospitals with greater than the median proportion of Medicare days (1.1 pp; Table A.20).

5. Non-surgical other medical

We found that BPCI hospitals with greater than the median baseline episode volume had a significantly greater decline in total standardized allowed payment for Part A and B services during the anchor hospitalization and the 90-day PDP ($3,471) and total standardized allowed payments for Part A institutional services during 90-day PDP ($2,691; Table A.19).We found that BPCI hospitals with less than the 75th percentile of market share had a significantly greater decline in unplanned hospital readmissions during the 30 day post-discharge period (1.2 pp; Table A.20).

6. Non-surgical neurovascular

BPCI hospitals that were not previously participating in Pay-for-Performance initiatives had a significantly greater decline in total standardized allowed payments for Part A institutional services during 90-day PDP ($4,599). BPCI hospitals that had greater than the median baseline episode volume had a significantly greater decline in total standardized allowed payment for Part A and B services during the anchor hospitalization and the 90-day PDP ($5,217 and total standardized allowed payments for Part A institutional services during 90-day PDP ($2,688). In addition, BPCI hospitals that had greater than the median proportion of SNF beds per 10,000 in the market were found to have a significantly greater decline in total standardized allowed payment for Part A and B services during the anchor hospitalization and the 90-day PDP ($4,723) and total standardized allowed payments for Part A institutional services during 90-day PDP ($3,262; Table A.19). BPCI hospitals with a hospital market share greater than the 75th percentile were found to have a significantly greater decline in both total standardized allowed payment for Part A and B services during the anchor hospitalization and the 90-day PDP ($5,856) and total standardized allowed payments for Part A institutional services during 90-day PDP ($2,904; **Exhibit R.4**).

In addition, BPCI hospitals that had a lower than the 75th percentile Part A payments during baseline had a significantly greater decline in unplanned hospital readmissions during the 30 day post-discharge period (1.4 pp).

7. Non-surgical respiratory

BPCI hospitals that had a higher than the median proportion of patients 80 years of age or above were found to have a significantly greater decline in both total standardized allowed payment for Part A and B services during the anchor hospitalization and the 90-day PDP ($2,695) and total standardized allowed payments for Part A institutional services during 90-day PDP ($1,369; Table A.19). BPCI hospitals that had a lower than the median proportion of disabled patients were found to have a significantly greater decline in both total standardized allowed payment for Part A and B services during the anchor hospitalization and the 90-day PDP ($3248) and total standardized allowed payments for Part A institutional services during 90-day PDP ($2,105). BPCI hospitals that had prior Pay for Performance experience were found to have a significantly

greater decline in total standardized allowed payment for Part A institutional services during the anchor hospitalization and the 90-day PDP ($1,723). BPCI hospitals that had a proportion of Medicare admissions greater than the median had a significantly greater decline in both total standardized allowed payment for Part A and B services during the anchor hospitalization and the 90-day PDP ($2,249) and total standardized allowed payments for Part A institutional services during 90-day PDP ($1,625). This finding was reinforced by the declines observed among BPCI patients with a higher than median proportion of Medicare days ($2,858 for Parts A and B; $1,599 for Part A) BPCI hospitals that had a Herfindahl index greater than the median had a significantly greater decline in both total standardized allowed payment for Part A and B services during the anchor hospitalization and the 90-day PDP ($2,019) total standardized allowed payments for Part A institutional services during 90-day PDP ($1,481). BPCI hospitals that had smaller than the median disproportionate share of patients were found to have a significantly greater decline in both total standardized allowed payment for Part A and B services during the anchor hospitalization and the 90-day PDP ($2,276) and total standardized allowed payments for Part A institutional services during 90-day PDP ($1,552).

BPCI hospitals that did not participate in gainsharing had a significantly greater decline in 30-day unplanned readmissions than those that did participate in gainsharing (1.1pp; **Exhibit R.4**). BPCI hospitals that were designated as awardees had a significantly greater decline in 30-day unplanned readmissions than non-Awardees (1.3pp). BPCI hospitals that had no prior experience participating in other incentive programs had a significantly greater decline in 30-day unplanned readmissions than those hospitals with prior incentive program experience (1.0 pp). Finally, government-owned BPCI hospitals had a significantly greater decline in 30-day unplanned readmissions than for-profit hospitals (2.5 pp).

D. Correlation Tables

One of the criterions we used to determine the final model specification was the value of each variable's Pearson coefficient of correlation with the dependent variables. We gave priority to variables for which Pearson's r was 0.15 or greater, and the p-value (of the Pearson's r statistic) was 0.10 or smaller.

Exhibit R.5: Model 2 Pearson's Coefficient of Correlation between Risk-Adjusted Total Standardized Allowed Payment Variables and Variables of Interest

Variables	Orthopedic Surgery		Nonsurgical Other Medical		Nonsurgical Neurovascular		Nonsurgical Respiratory	
	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP
Number of Episode Initiators	**72**	**73**	**14**	**14**	**9**	**9**	**26**	**26**
% of patients between Age 65-79, > Median	0.01	0.07	-0.31	-0.24	0.12	0.35	-0.48*	-0.32
	(0.90)	(0.56)	(0.28)	(0.42)	(0.77)	(0.36)	(0.01)	(0.11)
% of patients Age 80+, > Median	-0.09	-0.20#	0.28	0.17	0.17	-0.04	0.52**	0.40*
	(0.45)	(0.09)	(0.34)	(0.56)	(0.65)	(0.92)	(0.01)	(0.04)
% of patients Dual Eligible, > Median	0.20#	0.17	-0.28	-0.34	-0.04	0.11	-0.35#	-0.39#
	(0.10)	(0.14)	(0.33)	(0.24)	(0.92)	(0.78)	(0.08)	(0.05)
% patients Disabled, No ESRD, > Median	0.23#	0.28*	-0.33	-0.26	-0.15	-0.18	-0.56**	-0.54**
	(0.05)	(0.02)	(0.25)	(0.36)	(0.70)	(0.64)	(0.00)	(0.00)
% patients with HCC Case Weight > Median	-0.08	-0.10	-0.24	-0.24	0.27	-0.01	0.15	0.13
	(0.49)	(0.38)	(0.42)	(0.42)	(0.48)	(0.98)	(0.46)	(0.54)
Gainsharing	0.03	0.16	.	.	0.00	-0.28	0.17	0.19
	(0.81)	(0.19)	.	.	(1.00)	(0.47)	(0.42)	(0.35)
SNF 3-Day Waiver	-0.12	-0.13	.	.	-0.01	0.12	-0.08	-0.19
	(0.33)	(0.27)	.	.	(0.98)	(0.75)	(0.69)	(0.37)
Beneficiary Incentives	0.01	0.06	0.50#	0.38	0.00	-0.25	0.30	0.28
	(0.96)	(0.62)	(0.07)	(0.18)	(1.00)	(0.51)	(0.14)	(0.17)
Facilitator Convenor	0.13	0.06	.	.	0.35	0.40	0.24	0.03
	(0.29)	(0.62)	.	.	(0.36)	(0.29)	(0.23)	(0.89)
EI is under Awardee Convenor or Designated AC	-0.01	0.10	.	.	-0.35	-0.40	0.00	0.02
	(0.96)	(0.39)	.	.	(0.36)	(0.29)	(0.98)	(0.92)
Awardee	0.01	-0.10	.	.	0.35	0.40	0.00	-0.02
	(0.96)	(0.39)	.	.	(0.36)	(0.29)	(0.98)	(0.92)
Facilitator Convenor and Awardee	0.13	0.17	.	.	.	.	.	.
	(0.28)	(0.16)	.	.	.	.	.	.

Variables	Orthopedic Surgery		Nonsurgical Other Medical		Nonsurgical Neurovascular		Nonsurgical Respiratory	
	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP
Prior Bundle	0.05	0.08	0.16	-0.02	-0.02	0.26	-0.04	-0.03
	(0.68)	(0.48)	(0.60)	(0.96)	(0.97)	(0.54)	(0.83)	(0.90)
Prior Pay for Performance	0.24*	-0.20#	0.47#	0.53#	-0.55	-0.72*	0.39#	0.40*
	(0.04)	(0.10)	(0.09)	(0.05)	(0.16)	(0.04)	(0.05)	(0.05)
Prior Shared Savings	-0.16	-0.04	0.24	0.33	0.08	0.10	0.28	0.25
	(0.19)	(0.76)	(0.41)	(0.25)	(0.86)	(0.82)	(0.18)	(0.22)
Prior Other	0.01	0.01	0.19	0.26	-0.08	-0.22	0.12	0.04
	(0.92)	(0.95)	(0.51)	(0.37)	(0.84)	(0.61)	(0.57)	(0.86)
Electronic Health Record	-0.01	0.10	0.79**	0.85**	.	.	-0.04	-0.04
	(0.95)	(0.41)	(0.00)	(0.00)	.	.	(0.86)	(0.84)
Health Information Exchange	0.06	0.04	0.21	0.23	-0.16	-0.11	-0.13	-0.28
	(0.65)	(0.77)	(0.50)	(0.45)	(0.71)	(0.80)	(0.55)	(0.18)
Beds 0-99	0.05	-0.02	.	.	-0.43	-0.30	0.29	0.18
	(0.68)	(0.88)	.	.	(0.25)	(0.44)	(0.15)	(0.37)
Beds 100-249	0.24*	0.23*	0.37	0.29	-0.46	-0.43	0.06	-0.04
	(0.04)	(0.05)	(0.19)	(0.32)	(0.21)	(0.25)	(0.78)	(0.84)
Beds 250 Plus	-0.19	-0.16	-0.37	-0.29	0.69*	0.57	-0.17	-0.03
	(0.10)	(0.18)	(0.19)	(0.32)	(0.04)	(0.11)	(0.40)	(0.88)
Ownership Government	-0.19	-0.20#	.	.	.	.	-0.03	0.02
	(0.12)	(0.09)	.	.	.	.	(0.89)	(0.90)
Ownership Non-Profit	-0.17	-0.13	.	.	.	.	0.03	-0.02
	(0.14)	(0.29)	.	.	.	.	(0.89)	(0.90)
Ownership For Profit	0.33**	0.28*	.	.	.	.	.	.
	(0.00)	(0.02)	.	.	.	.	.	.
% Medicaid Admits >Median	0.18	0.05	-0.39	-0.39	-0.13	-0.34	-0.08	-0.27
	(0.14)	(0.66)	(0.17)	(0.17)	(0.77)	(0.41)	(0.70)	(0.19)
% Medicare Admits >Median	-0.11	-0.09	-0.07	-0.12	-0.28	0.07	0.43*	0.47*
	(0.35)	(0.46)	(0.82)	(0.68)	(0.51)	(0.87)	(0.03)	(0.02)

Variables	Orthopedic Surgery		Nonsurgical Other Medical		Nonsurgical Neurovascular		Nonsurgical Respiratory	
	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP
Part A Payment during Baseline >25th%tile	0.00	-0.05	0.09	-0.06	-0.32	-0.54	0.03	0.03
	(1.00)	(0.67)	(0.75)	(0.85)	(0.40)	(0.13)	(0.87)	(0.87)
Part A Payment during Baseline >Median	-0.06	-0.14	-0.02	-0.11	0.30	-0.07	-0.25	-0.38#
	(0.60)	(0.23)	(0.95)	(0.72)	(0.43)	(0.86)	(0.22)	(0.06)
Part A Payment during Baseline >75th%tile	-0.21#	-0.25*	-0.37	-0.43	-0.23	-0.20	-0.16	-0.29
	(0.07)	(0.03)	(0.19)	(0.13)	(0.55)	(0.61)	(0.45)	(0.15)
Volume of Episodes during Baseline >25th%tile	0.18	0.16	0.38	0.46#	0.43	0.30	0.27	0.28
	(0.14)	(0.17)	(0.19)	(0.10)	(0.25)	(0.44)	(0.19)	(0.16)
Volume of Episodes during Baseline >50th%tile	0.01	0.04	0.62*	0.62*	0.80*	0.67*	0.12	0.05
	(0.93)	(0.71)	(0.02)	(0.02)	(0.01)	(0.05)	(0.55)	(0.79)
Volume of Episodes during Baseline >75th%tile	-0.03	-0.01	0.30	0.22	0.12	-0.09	0.03	0.10
	(0.78)	(0.96)	(0.29)	(0.46)	(0.76)	(0.82)	(0.87)	(0.62)
% Medicare Days, >Median	-0.06	-0.06	0.34	0.32	-0.29	-0.25	0.54**	0.46*
	(0.63)	(0.61)	(0.23)	(0.27)	(0.49)	(0.55)	(0.01)	(0.02)
Resident to Bed Ratio, >75th%tile	0.06	0.11	0.01	0.12	0.41	-0.01	-0.08	-0.09
	(0.61)	(0.33)	(0.97)	(0.67)	(0.28)	(0.98)	(0.69)	(0.68)
SNF Beds per 10000, >Median	0.22#	0.31**	0.20	0.17	0.73*	0.81**	0.12	0.22
	(0.06)	(0.01)	(0.49)	(0.55)	(0.03)	(0.01)	(0.55)	(0.28)
Herfindahl Index, >Median	0.27*	0.24*	0.05	0.17	0.54	0.46	0.39*	0.43*
	(0.02)	(0.04)	(0.87)	(0.56)	(0.13)	(0.21)	(0.05)	(0.03)
Hospital Market Share, >75th %tile	0.12	0.03	0.15	0.19		0.69*	0.03	0.00
	(0.32)	(0.80)	(0.60)	(0.52)	(0.00)	(0.04)	(0.89)	(0.99)
Median Income > Median	-0.12	-0.05	0.28	0.17	-0.54	-0.46	-0.13	-0.12
	(0.32)	(0.67)	(0.34)	(0.56)	(0.13)	(0.21)	(0.53)	(0.56)
Medicare Advantage Penetration >Median	0.05	0.01	-0.28	-0.17	-0.03	-0.08	-0.11	-0.17
	(0.70)	(0.96)	(0.34)	(0.56)	(0.94)	(0.83)	(0.58)	(0.40)
First PAC home >Median	0.06	0.07	-0.14	-0.01	0.15	-0.30	0.11	0.11
	(0.60)	(0.55)	(0.64)	(0.98)	(0.71)	(0.44)	(0.61)	(0.59)

Variables	Orthopedic Surgery		Nonsurgical Other Medical		Nonsurgical Neurovascular		Nonsurgical Respiratory	
	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP
First PAC IRF, > Median	-0.04	-0.01	-0.26	-0.32	0.36	0.22	-0.21	-0.29
	(0.72)	(0.93)	(0.37)	(0.26)	(0.33)	(0.57)	(0.31)	(0.15)
First PAC SNF, > Median	-0.17	-0.16	0.45	0.31	-0.36	-0.22	0.24	0.35#
	(0.15)	(0.17)	(0.11)	(0.28)	(0.33)	(0.57)	(0.23)	(0.08)
Readmission Rate during Baseline, >Median	-0.01	0.03	0.33	0.35	-0.11	-0.49	-0.16	-0.01
	(0.92)	(0.80)	(0.25)	(0.22)	(0.78)	(0.18)	(0.43)	(0.96)
Disproportionate Share >Median	0.06	0.04	-0.41	-0.49#	-0.07	-0.02	-0.44*	-0.45*
	(0.65)	(0.72)	(0.14)	(0.07)	(0.86)	(0.95)	(0.02)	(0.02)
BPCI Market Penetration-Hospital Level>Median	-0.02	-0.01	-0.14	-0.19	-0.23	-0.10	0.09	0.05
	(0.84)	(0.92)	(0.63)	(0.51)	(0.55)	(0.80)	(0.67)	(0.82)
BPCI Market Penetration-Market Level>Median	-0.03	0.00	0.05	0.17	0.37	0.03	0.20	0.28
	(0.79)	(0.98)	(0.87)	(0.56)	(0.32)	(0.94)	(0.32)	(0.16)
Population in Market>Median	-0.25*	-0.23#	-0.05	-0.17	-0.54	-0.46	-0.27	-0.21
	(0.04)	(0.05)	(0.87)	(0.56)	(0.13)	(0.21)	(0.19)	(0.29)

* Statistically significant at the 5% level. **Statistically significant at the 1%. # Statistically significant at the 10% level. Missing values indicate no variation across EI.

Exhibit R.5: Continued for Additional Clinical Groups

Variables	Nonsurgical Cardiovascular		Nonsurgical and Surgical GI		Cardiovascular Surgery		Spinal Surgery	
	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP
Number of Episode Initiators	**32**	**32**	**12**	**12**	**19**	**19**	**7**	**7**
% of patients between Age 65-79, > Median	-0.14	-0.12	-0.54#	-0.53#	0.07	0.00	0.48	-0.25
	(0.44)	(0.52)	(0.07)	(0.08)	(0.78)	(0.99)	(0.28)	(0.55)
% of patients Age 80+, > Median	0.14	0.04	0.34	0.31	-0.23	-0.02	0.15	-0.48
	(0.44)	(0.84)	(0.28)	(0.33)	(0.35)	(0.94)	(0.75)	(0.23)

Variables	Nonsurgical Cardiovascular		Nonsurgical and Surgical GI		Cardiovascular Surgery		Spinal Surgery	
	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP
% of patients Dual Eligible, > Median	-0.16	-0.08	-0.56#	-0.53*	0.36	0.49*	-0.48	0.25
	(0.37)	(0.66)	(0.06)	(0.08)	(0.13)	(0.03)	(0.28)	(0.55)
% patients Disabled, No ESRD, > Median	-0.07	0.00	-0.52#	-0.48	0.00	0.27	0.13	0.78*
	(0.70)	(0.99)	(0.08)	(0.11)	(1.00)	(0.26)	(0.78)	(0.02)
% patients with HCC Case Weight > Median	-0.14	-0.10	-0.11	-0.26	0.00	0.09	0.30	-0.13
	(0.43)	(0.59)	(0.72)	(0.42)	(0.99)	(0.71)	(0.51)	(0.76)
Gainsharing	0.08	-0.05	.	.	0.23	0.03	.	.
	(0.66)	(0.80)	.	.	(0.37)	(0.90)	.	.
SNF 3-Day Waiver	-0.21	0.00	-0.18	0.07	-0.33	-0.41#	0.16	-0.67#
	(0.24)	(0.98)	(0.57)	(0.82)	(0.18)	(0.09)	(0.73)	(0.07)
Beneficiary Incentives	-0.30	-0.07	0.19	0.13	-0.27	0.03	-0.46	0.06
	(0.10)	(0.70)	(0.56)	(0.69)	(0.28)	(0.90)	(0.30)	(0.89)
Facilitator Convenor	-0.08	-0.13	-0.18	0.07	0.04	-0.21	0.43	-0.66#
	(0.65)	(0.50)	(0.57)	(0.82)	(0.89)	(0.39)	(0.33)	(0.08)
EI is under Awardee Convenor or Designated AC	-0.06	-0.13	0.18	-0.07	-0.15	0.17	-0.43	0.66#
	(0.76)	(0.48)	(0.57)	(0.82)	(0.53)	(0.50)	(0.33)	(0.08)
Awardee	0.06	0.13	-0.18	0.07	0.15	-0.17	0.43	-0.66#
	(0.76)	(0.48)	(0.57)	(0.82)	(0.53)	(0.50)	(0.33)	(0.08)
Facilitator Convenor and Awardee	.	.	.	.	-0.25	-0.10	.	.
	.	.	.	.	(0.31)	(0.68)	.	.
Prior Bundle	-0.08	-0.08	0.13	0.40	0.24	0.37	-0.17	-0.03
	(0.67)	(0.65)	(0.68)	(0.20)	(0.32)	(0.12)	(0.71)	(0.95)
Prior Pay for Performance	-0.11	-0.27	0.37	0.56#	0.22	0.05	0.17	0.03
	(0.56)	(0.14)	(0.23)	(0.06)	(0.37)	(0.83)	(0.71)	(0.95)
Prior Shared Savings	0.04	-0.06	0.12	0.30	-0.25	-0.43#	0.17	0.03
	(0.85)	(0.76)	(0.70)	(0.34)	(0.30)	(0.06)	(0.71)	(0.95)
Prior Other	-0.13	-0.06	0.27	0.48	-0.28	-0.14	-0.01	-0.19
	(0.48)	(0.75)	(0.40)	(0.11)	(0.24)	(0.57)	(0.98)	(0.65)

Variables	Nonsurgical Cardiovascular		Nonsurgical and Surgical GI		Cardiovascular Surgery		Spinal Surgery	
	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP
Electronic Health Record	-0.25	0.15	0.04	0.36	-0.26	-0.28	.	.
	(0.17)	(0.42)	(0.91)	(0.25)	(0.29)	(0.25)	.	.
Health Information Exchange	-0.03	0.05	0.21	0.38	-0.07	-0.21	0.45	-0.41
	(0.87)	(0.79)	(0.54)	(0.24)	(0.79)	(0.40)	(0.31)	(0.32)
Beds 0-99	-0.08	-0.13	.	.	.	.	.	.
	(0.65)	(0.47)	.	.	.	.	.	.
Beds 100-249	-0.13	0.20	0.47	0.50#	0.10	-0.08	-0.41	-0.20
	(0.46)	(0.28)	(0.12)	(0.10)	(0.67)	(0.75)	(0.36)	(0.63)
Beds 250 Plus	0.17	-0.12	-0.47	-0.50#	-0.10	0.08	0.41	0.20
	(0.35)	(0.50)	(0.12)	(0.10)	(0.67)	(0.75)	(0.36)	(0.63)
Ownership Government	-0.36*	-0.27	.	.	.	.	.	.
	(0.04)	(0.13)	.	.	.	.	.	.
Ownership Non-Profit	0.36*	0.27	.	.	-0.25	-0.09	-0.19	-0.17
	(0.04)	(0.13)	.	.	(0.30)	(0.71)	(0.69)	(0.69)
Ownership For Profit	.	.	.	.	0.25	0.09	0.19	0.17
	.	.	.	.	(0.30)	(0.71)	(0.69)	(0.69)
% Medicaid Admits >Median	0.16	0.25	-0.56#	-0.48	-0.05	0.32	0.19	0.62#
	(0.39)	(0.18)	(0.06)	(0.12)	(0.84)	(0.18)	(0.69)	(0.10)
% Medicare Admits >Median	0.02	-0.04	0.47	0.50#	0.02	-0.02	0.01	-0.27
	(0.93)	(0.85)	(0.12)	(0.10)	(0.92)	(0.93)	(0.98)	(0.52)
Part A Payment during Baseline >25th%tile	-0.17	-0.03	0.24	0.04	-0.05	-0.06	0.46	-0.06
	(0.36)	(0.89)	(0.46)	(0.89)	(0.85)	(0.80)	(0.30)	(0.89)
Part A Payment during Baseline >Median	0.05	0.03	-0.40	-0.37	-0.12	0.08	0.02	-0.15
	(0.77)	(0.86)	(0.20)	(0.24)	(0.64)	(0.74)	(0.97)	(0.73)
Part A Payment during Baseline >75th%tile	0.12	0.24	-0.26	-0.32	-0.14	-0.02	0.43	-0.01
	(0.51)	(0.18)	(0.41)	(0.31)	(0.57)	(0.95)	(0.33)	(0.99)
Volume of Episodes during Baseline >25th%tile	0.05	0.04	-0.01	0.01	-0.22	-0.19	.	.
	(0.77)	(0.84)	(0.98)	(0.98)	(0.36)	(0.43)	.	.

Variables	Nonsurgical Cardiovascular		Nonsurgical and Surgical GI		Cardiovascular Surgery		Spinal Surgery	
	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP
Volume of Episodes during Baseline >50th%tile	0.00	0.00	0.32	0.32	-0.23	-0.20	-0.03	0.19
	(0.99)	(0.99)	(0.30)	(0.30)	(0.35)	(0.42)	(0.95)	(0.66)
Volume of Episodes during Baseline >75th%tile	0.03	0.06	-0.44	-0.45	0.05	-0.27	0.29	-0.54
	(0.87)	(0.76)	(0.15)	(0.15)	(0.83)	(0.27)	(0.52)	(0.17)
% Medicare Days, >Median	-0.06	-0.09	0.47	0.50#	-0.34	-0.19	-0.12	-0.37
	(0.77)	(0.61)	(0.12)	(0.10)	(0.16)	(0.45)	(0.80)	(0.36)
Resident to Bed Ratio, >75th%tile	-0.19	-0.14	-0.30	-0.20	0.09	-0.10	0.43	-0.66#
	(0.29)	(0.46)	(0.34)	(0.53)	(0.72)	(0.70)	(0.33)	(0.08)
SNF Beds per 10000, >Median	-0.07	-0.11	-0.02	0.11	0.18	-0.01	-0.20	0.44
	(0.72)	(0.54)	(0.96)	(0.74)	(0.47)	(0.95)	(0.66)	(0.28)
Herfindahl Index, >Median	0.16	0.14	-0.02	0.11	0.19	0.18	-0.68#	0.03
	(0.38)	(0.43)	(0.96)	(0.74)	(0.44)	(0.47)	(0.09)	(0.94)
Hospital Market Share, >75th %tile	-0.10	0.00	-0.25	-0.09	0.04	0.00	-0.25	0.12
	(0.57)	(1.00)	(0.44)	(0.78)	(0.88)	(0.98)	(0.59)	(0.77)
Median Income > Median	-0.25	-0.05	-0.11	-0.13	-0.30	-0.36	-0.01	-0.19
	(0.16)	(0.79)	(0.73)	(0.68)	(0.22)	(0.13)	(0.98)	(0.65)
Medicare Advantage Penetration >Median	0.09	0.00	-0.03	-0.12	-0.31	-0.28	0.46	-0.06
	(0.62)	(0.99)	(0.92)	(0.71)	(0.19)	(0.25)	(0.30)	(0.89)
First PAC home >Median	0.09	-0.10	-0.18	-0.34	-0.05	-0.07	-0.25	0.57
	(0.64)	(0.59)	(0.58)	(0.28)	(0.83)	(0.78)	(0.59)	(0.14)
First PAC IRF, > Median	0.25	0.10	-0.19	-0.13	-0.26	-0.29	-0.39	-0.43
	(0.17)	(0.60)	(0.56)	(0.69)	(0.29)	(0.23)	(0.39)	(0.28)
First PAC SNF, > Median	0.09	0.35*	0.23	0.13	-0.06	0.21	0.22	0.55
	(0.63)	(0.05)	(0.48)	(0.69)	(0.80)	(0.40)	(0.63)	(0.16)
Readmission Rate during Baseline, >Median	-0.09	-0.05	-0.02	-0.01	-0.26	-0.04	-0.08	-0.42
	(0.63)	(0.80)	(0.96)	(0.99)	(0.28)	(0.86)	(0.87)	(0.30)
Disproportionate Share >Median	-0.26	-0.10	-0.11	0.05	0.50*	0.58*	0.19	0.62#
	(0.15)	(0.58)	(0.74)	(0.87)	(0.03)	(0.01)	(0.69)	(0.10)

Variables	Nonsurgical Cardiovascular		Nonsurgical and Surgical GI		Cardiovascular Surgery		Spinal Surgery	
	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP
BPCI Market Penetration-Hospital Level>Median	0.17	0.17	0.33	0.02	-0.14	0.04	0.59	0.29
	(0.34)	(0.36)	(0.29)	(0.94)	(0.58)	(0.86)	(0.16)	(0.48)
BPCI Market Penetration-Market Level>Median	0.18	0.12	-0.02	0.11	0.16	0.19	-0.29	0.54
	(0.33)	(0.50)	(0.96)	(0.74)	(0.51)	(0.43)	(0.52)	(0.17)
Population in Market>Median	-0.16	-0.14	0.02	-0.11	-0.19	-0.18	0.68#	-0.03
	(0.38)	(0.43)	(0.96)	(0.74)	(0.44)	(0.47)	(0.09)	(0.94)

* Statistically significant at the 5% level. **Statistically significant at the 1%. # Statistically significant at the 10% level. Missing values indicate no variation across EIs.

Exhibit R.6: Model 2 Pearson's Coefficient of Correlation between Risk-Adjusted 30-Day Readmission Rate and Variables of Interest

Variables	Orthopedic Surgery	Nonsurgical Other Medical	Nonsurgical Neurovascular	Nonsurgical Respiratory	Nonsurgical Cardio	Nonsurgical & Surgical GI	Cardiovascular Surgery	Spinal Surgery
Number of Episode Initiators	**72**	**14**	**9**	**26**	**32**	**12**	**19**	**8**
% of patients between Age 65-79 > Median	-0.22#	-0.23	-0.11	-0.21	0.09	-0.24	-0.10	0.04
	(0.06)	(0.44)	(0.77)	(0.30)	(0.64)	(0.45)	(0.67)	(0.93)
% of patients Age 80+ > Median	0.19	-0.17	-0.19	0.31	-0.07	0.15	0.34	0.26
	(0.12)	(0.56)	(0.62)	(0.13)	(0.70)	(0.65)	(0.15)	(0.53)
% of Dual Eligible > Median	0.01	0.29	0.15	-0.09	-0.12	0.29	-0.37	-0.04
	(0.96)	(0.31)	(0.70)	(0.65)	(0.51)	(0.35)	(0.12)	(0.93)
% Disabled, No ESRD, > Median	-0.25*	0.16	0.30	-0.15	0.08	-0.06	-0.33	-0.51
	(0.03)	(0.57)	(0.44)	(0.47)	(0.68)	(0.85)	(0.16)	(0.20)
% with HCC Case Weight > Median	0.12	-0.17	-0.11	0.30	0.27	0.69*	0.51*	0.69#
	(0.32)	(0.56)	(0.78)	(0.13)	(0.14)	(0.01)	(0.03)	(0.06)
Gainsharing	-0.04	.	0.27	0.41*	0.27	.	0.09	.
	(0.72)	.	(0.48)	(0.04)	(0.14)	.	(0.72)	.
SNF 3-Day Waiver	-0.04	.	-0.16	-0.20	-0.10	0.10	-0.13	0.36
	(0.71)	.	(0.68)	(0.34)	(0.57)	(0.76)	(0.61)	(0.38)
Beneficiary Incentives	-0.09	0.15	0.51	0.11	-0.24	-0.22	0.57*	0.06
	(0.44)	(0.62)	(0.17)	(0.59)	(0.19)	(0.49)	(0.01)	(0.89)
Facilitator Convener	-0.06	.	-0.16	-0.24	-0.01	0.10	-0.43#	-0.19
	(0.64)	.	(0.68)	(0.24)	(0.97)	(0.76)	(0.07)	(0.65)
EI under Awardee Convener or Designated AC	-0.00	.	0.16	0.54**	-0.20	-0.10	0.35	0.19
	(0.98)	.	(0.68)	(0.00)	(0.26)	(0.76)	(0.15)	(0.65)
Awardee	0.00	.	-0.16	-0.54**	0.20	0.10	-0.35	-0.19
	(0.98)	.	(0.68)	(0.00)	(0.26)	(0.76)	(0.15)	(0.65)
Facilitator Convener and Awardee	-0.00	.	.	.	.	.	-0.20	.
	(0.99)	.	.	.	.	.	(0.41)	.
Prior Bundle	0.13	0.01	-0.65#	0.25	0.05	0.07	-0.29	0.44
	(0.28)	(0.97)	(0.08)	(0.23)	(0.79)	(0.84)	(0.22)	(0.27)
Prior Pay for Performance	0.01	-0.02	0.02	0.22	-0.01	-0.21	0.28	-0.44
	(0.97)	(0.95)	(0.96)	(0.29)	(0.94)	(0.51)	(0.24)	(0.27)

Variables	Orthopedic Surgery	Nonsurgical Other Medical	Nonsurgical Neurovascular	Nonsurgical Respiratory	Nonsurgical Cardio	Nonsurgical & Surgical GI	Cardiovascular Surgery	Spinal Surgery
Prior Shared Savings	-0.06	0.18	-0.44	0.33#	-0.23	0.23	0.08	-0.44
	(0.60)	(0.54)	(0.28)	(0.10)	(0.21)	(0.47)	(0.74)	(0.27)
Prior Other	0.04	0.27	0.55	0.44*	0.08	0.12	0.28	-0.63#
	(0.70)	(0.35)	(0.16)	(0.03)	(0.67)	(0.71)	(0.24)	(0.09)
Electronic Health Record	0.07	-0.23	.	-0.02	-0.27	0.11	-0.08	.
	(0.56)	(0.42)	.	(0.92)	(0.15)	(0.73)	(0.75)	.
Health Information Exchange	-0.04	-0.07	0.11	-0.26	0.06	0.49	0.26	0.64#
	(0.75)	(0.83)	(0.80)	(0.22)	(0.74)	(0.12)	(0.29)	(0.09)
Beds 0-99	0.03	.	0.02	0.03	-0.07	.	.	.
	(0.79)	.	(0.95)	(0.88)	(0.69)	.	.	.
Beds 100-249	-0.14	-0.33	-0.45	-0.25	0.06	0.19	-0.19	0.24
	(0.24)	(0.24)	(0.22)	(0.23)	(0.73)	(0.56)	(0.44)	(0.56)
Beds 250 Plus	0.13	0.33	0.38	0.23	-0.02	-0.19	0.19	-0.24
	(0.26)	(0.24)	(0.31)	(0.26)	0.90	(0.56)	(0.44)	(0.56)
Ownership Government	-0.11	.	.	-0.41*	0.07	.	.	.
	(0.36)	.	.	(0.04)	(0.71)	.	.	.
Ownership Non-Profit	0.24*	.	.	0.41*	-0.07	.	0.04	-0.33
	(0.04)	.	.	(0.04)	(0.71)	.	(0.88)	(0.42)
Ownership For Profit	-0.18	.	.	.	.	.	-0.04	0.33
	(0.12)	.	.	.	.	.	(0.88)	(0.42)
% Medicaid Admits >Median	0.05	0.11	0.65#	0.05	-0.32#	0.28	0.32	-0.09
	(0.66)	(0.72)	(0.08)	(0.80)	(0.08)	(0.38)	(0.19)	(0.83)
% Medicare Admits >Median	0.27*	0.43	-0.61	-0.24	0.34#	0.19	-0.01	0.88**
	(0.02)	(0.13)	(0.11)	(0.26)	(0.06)	(0.56)	(0.96)	(0.00)
Part A Payment during Baseline >25th%tile	0.02	0.15	0.33	0.25	0.00	0.20	0.59**	-0.06
	(0.86)	(0.61)	(0.39)	(0.22)	(0.99)	(0.54)	(0.00)	(0.89)
Part A Payment during Baseline >Median	0.04	0.25	0.66#	0.39#	-0.21	-0.08	0.29	-0.28
	(0.77)	(0.40)	(0.05)	(0.05)	(0.25)	(0.80)	(0.24)	(0.51)
Part A Payment during Baseline >75th%tile	0.08	-0.07	0.76*	0.37#	-0.22	-0.32	0.15	-0.50
	(0.48)	(0.81)	(0.02)	(0.06)	(0.23)	(0.32)	(0.53)	(0.21)
Volume of Episodes during Baseline	0.03	0.03	-0.02	0.02	0.11	-0.24	-0.41#	.

Variables	Orthopedic Surgery	Nonsurgical Other Medical	Nonsurgical Neurovascular	Nonsurgical Respiratory	Nonsurgical Cardio	Nonsurgical & Surgical GI	Cardiovascular Surgery	Spinal Surgery
>25th%tile	(0.82)	(0.93)	(0.95)	(0.93)	(0.56)	(0.45)	(0.08)	.
Volume of Episodes during Baseline >50th%tile	0.12	0.32	-0.12	-0.03	0.17	-0.19	-0.08	-0.18
	(0.33)	(0.27)	(0.76)	(0.88)	(0.35)	(0.56)	(0.74)	(0.68)
Volume of Episodes during Baseline >75th%tile	0.08	0.50#	0.09	0.27	0.06	-0.30	-0.07	0.57
	(0.50)	(0.07)	(0.81)	(0.19)	(0.73)	(0.35)	(0.76)	(0.14)
% Medicare Days >Median	0.19	0.31	-0.11	-0.05	0.39*	0.19	0.03	0.63#
	(0.12)	(0.28)	(0.80)	(0.83)	(0.03)	(0.56)	(0.91)	(0.10)
Resident to Bed Ratio >75th%tile	0.06	0.40	0.24	0.28	-0.13	-0.19	0.07	-0.19
	(0.61)	(0.16)	(0.54)	(0.17)	(0.48)	(0.55)	(0.78)	(0.65)
SNF Beds per 10,000 > Median	-0.05	0.31	-0.52	0.14	0.32#	0.16	-0.35	-0.23
	(0.71)	(0.28)	(0.16)	(0.50)	(0.07)	(0.62)	(0.14)	(0.58)
Herfindahl Index >Median	-0.04	0.15	0.12	-0.24	0.25	0.16	-0.59**	0.45
	(0.72)	(0.61)	(0.76)	(0.24)	(0.17)	(0.62)	(0.01)	(0.26)
Hospital Market Share, >75th %tile	0.17	0.57*	0.11	-0.33#	0.33#	-0.04	-0.46*	0.32
	(0.14)	(0.03)	(0.78)	(0.10)	(0.07)	(0.91)	(0.05)	(0.44)
Median Income > Median	0.02	-0.17	-0.12	0.10	-0.20	-0.45	0.53*	-0.63#
	(0.89)	(0.56)	(0.76)	(0.62)	(0.27)	(0.15)	(0.02)	(0.09)
Medicare Advantage Penetration >Median	0.07	0.17	0.38	0.18	-0.33#	0.78**	0.33	-0.06
	(0.54)	(0.56)	(0.31)	(0.37)	(0.06)	(0.00)	(0.17)	(0.89)
First PAC home >Median	-0.22#	-0.29	0.10	-0.16	-0.10	-0.42	0.18	0.02
	(0.06)	(0.31)	(0.80)	(0.44)	(0.58)	(0.18)	(0.47)	(0.97)
First PAC IRF > Median	0.05	-0.04	-0.44	0.20	0.28	0.22	-0.53*	-0.29
	(0.65)	(0.89)	(0.23)	(0.32)	(0.12)	(0.49)	(0.02)	(0.49)
First PAC SNF > Median	0.04	-0.26	0.44	0.11	0.22	-0.35	0.22	-0.37
	(0.76)	(0.38)	(0.23)	(0.60)	(0.22)	(0.26)	(0.37)	(0.36)
Readmission Rate during Baseline >Median	-0.04	-0.31	0.60#	0.02	-0.21	-0.05	0.41#	-0.03
	(0.71)	(0.27)	(0.09)	(0.91)	(0.25)	(0.88)	(0.09)	(0.94)
Disproportionate Share >Median	0.06	0.07	0.27	0.19	-0.12	-0.07	0.39#	-0.09
	(0.62)	(0.80)	(0.47)	(0.36)	(0.51)	(0.82)	(0.10)	(0.83)
BPCI Market Penetration-Hospital Level>Median	0.09	-0.34	-0.04	-0.29	-0.05	0.27	-0.11	0.05
	(0.43)	(0.23)	(0.92)	(0.15)	(0.77)	(0.40)	(0.67)	(0.91)

Variables	Orthopedic Surgery	Nonsurgical Other Medical	Nonsurgical Neurovascular	Nonsurgical Respiratory	Nonsurgical Cardio	Nonsurgical & Surgical GI	Cardiovascular Surgery	Spinal Surgery
BPCI Market Penetration-Market Level>Median	0.03	0.15	0.64#	0.08	0.26	0.16	-0.52*	-0.57
	(0.81)	(0.61)	(0.07)	(0.69)	(0.15)	(0.62)	(0.02)	(0.14)
Population in Market>Median	0.10	-0.15	-0.12	0.20	-0.25	-0.16	0.59**	-0.45
	(0.38)	(0.61)	(0.76)	(0.32)	(0.17)	(0.62)	(0.01)	(0.26)

* Statistically significant at the 5% level. **Statistically significant at the 1%. # Statistically significant at the 10% level. Missing values indicate no variation across EIs.

Appendix S: Model 3, Factors Contributing to Differences across BPCI Providers

I. Preliminary and Supplemental Analysis Findings

A. Model 3

This analysis sought to determine what beneficiary, program, provider, and environmental factors contributed to the various results of the BPCI initiative. A multilevel regression model was used to evaluate clinical episode groups meeting the minimum sample criteria of a minimum of 20 EIs with a minimum of 25 episodes in the baseline and intervention periods. To support the multilevel regression analysis, an evaluation was conducted of the distribution of savings, cross-tabulation analysis of factors contributing to BPCI results, and correlation analysis between beneficiary, program, provider, and environmental factors and the differences in outcomes from before to after BPCI implementation. The results of these analyses were used to inform the decision of variable selection for inclusion into the multilevel model as detailed in the Methods Section of the full report. While only multilevel model results from the Model 2 orthopedic surgery clinical episode group were found to be statistically significant, the results from the supporting analyses for each clinical episode group are all included here in the appendix.

B. Distribution of Savings

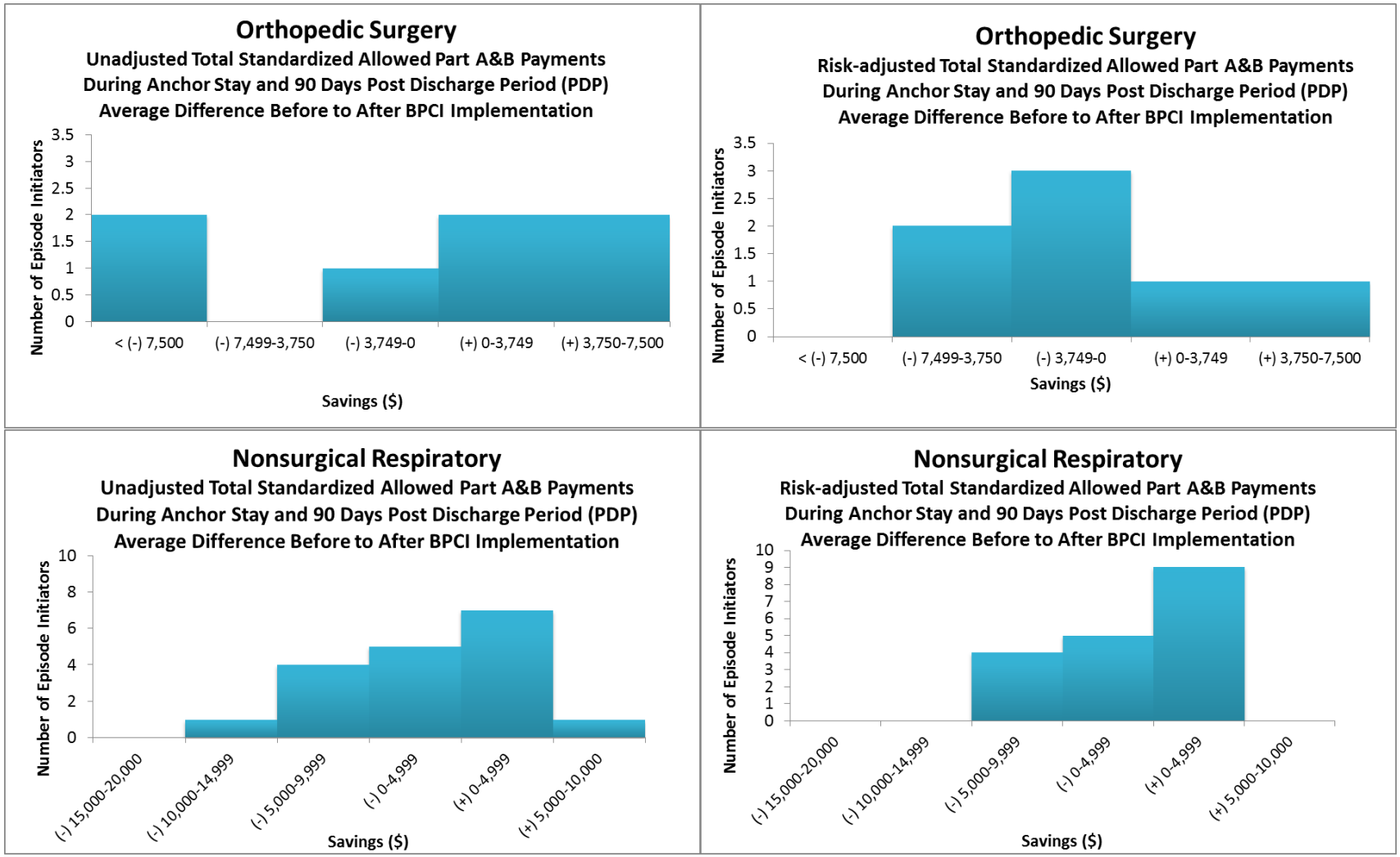
The objective of the distribution of savings analysis was to evaluate the differences in the performance of episode initiators (EI) before and after BPCI implementation. **Exhibits S.1 and S.2** show the unadjusted distribution of the differences in total institutional payments from before to after BPCI implementation by each clinical group. Next to it, we also show the risk-adjusted distribution of the differences in total institutional payments for each clinical group based on the following equation.

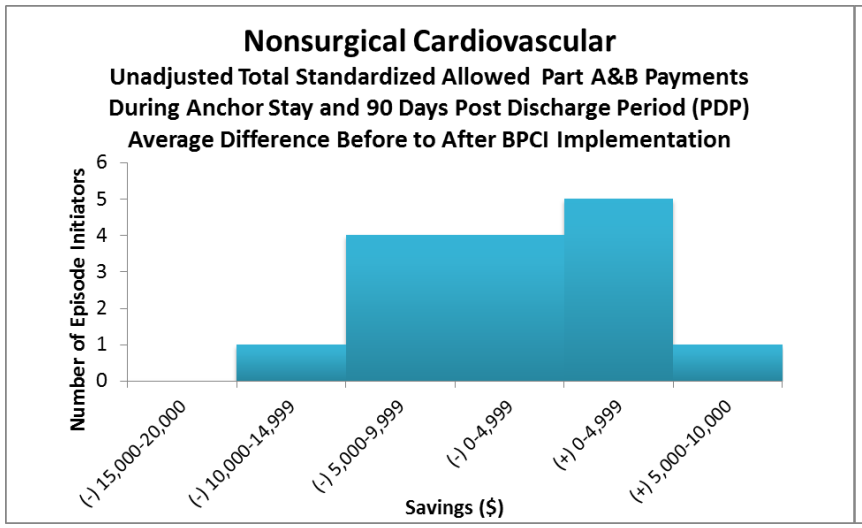
$$Y_i = \alpha + \boldsymbol{X}_i'\beta + \varepsilon_i$$

where Y_i represented the payment associated with episode i, α is an intercept, ε_i is an episode-level random error, while the vector $\boldsymbol{X}$ included risk-adjustment for patient-level characteristics, such as the patient's age, HCC, DRG mix, and county median income. Comparing the two distributions for each clinical group, illustrated the degree of correlation between the two. A high degree of correlation indicates that the amount of variation in total payments that is explained by the patient-level variables in equation 1 may potentially be relatively low. Overall, the distribution of savings comparing the unadjusted results to the residuals was similar across all clinical episode groups.

We therefore later expanded our framework not only to account for patient-level characteristics, as well as to measure the extent to which variation in payments is due to provider-level characteristics for clinical episode groups meeting the minimum inclusion criteria of a minimum of 20 EIs with a minimum of 25 episodes in the baseline and intervention periods. There were no Model 3 clinical episode groups that met the inclusion criteria for the expanded analysis.

Exhibit S.1: Model 3 Distribution of Savings: Average Difference from Before to After BPCI Implementation for Total Standardized Allowed Part A&B Payments during Anchor Stay and 90 Days Post Discharge Period




Nonsurgical Cardiovascular
Unadjusted Total Standardized Allowed Part A&B Payments
During Anchor Stay and 90 Days Post Discharge Period (PDP)
Average Difference Before to After BPCI Implementation
Number of Episode Initiators
0
1
2
3
4
5
6
(-) 15,000-20,000
(-) 10,000-14,999
(-) 5,000-9,999
(-) 0-4,999
(+) 0-4,999
(+) 5,000-10,000
Savings ($)

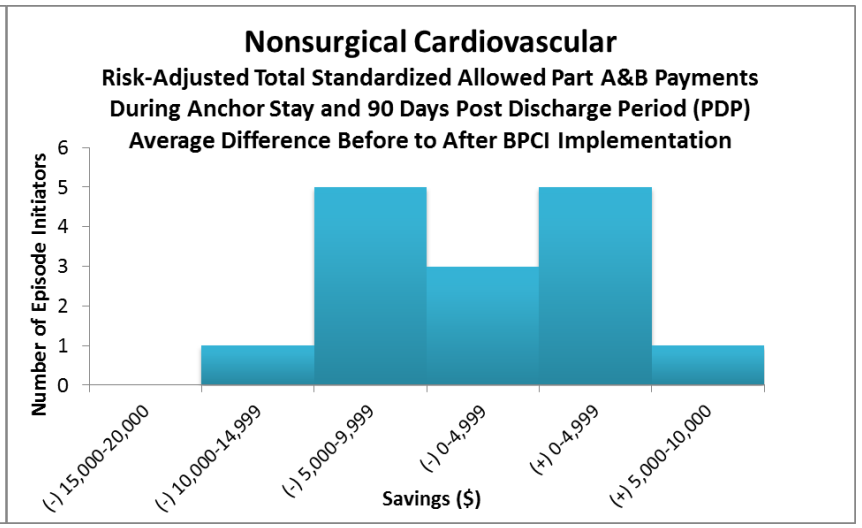
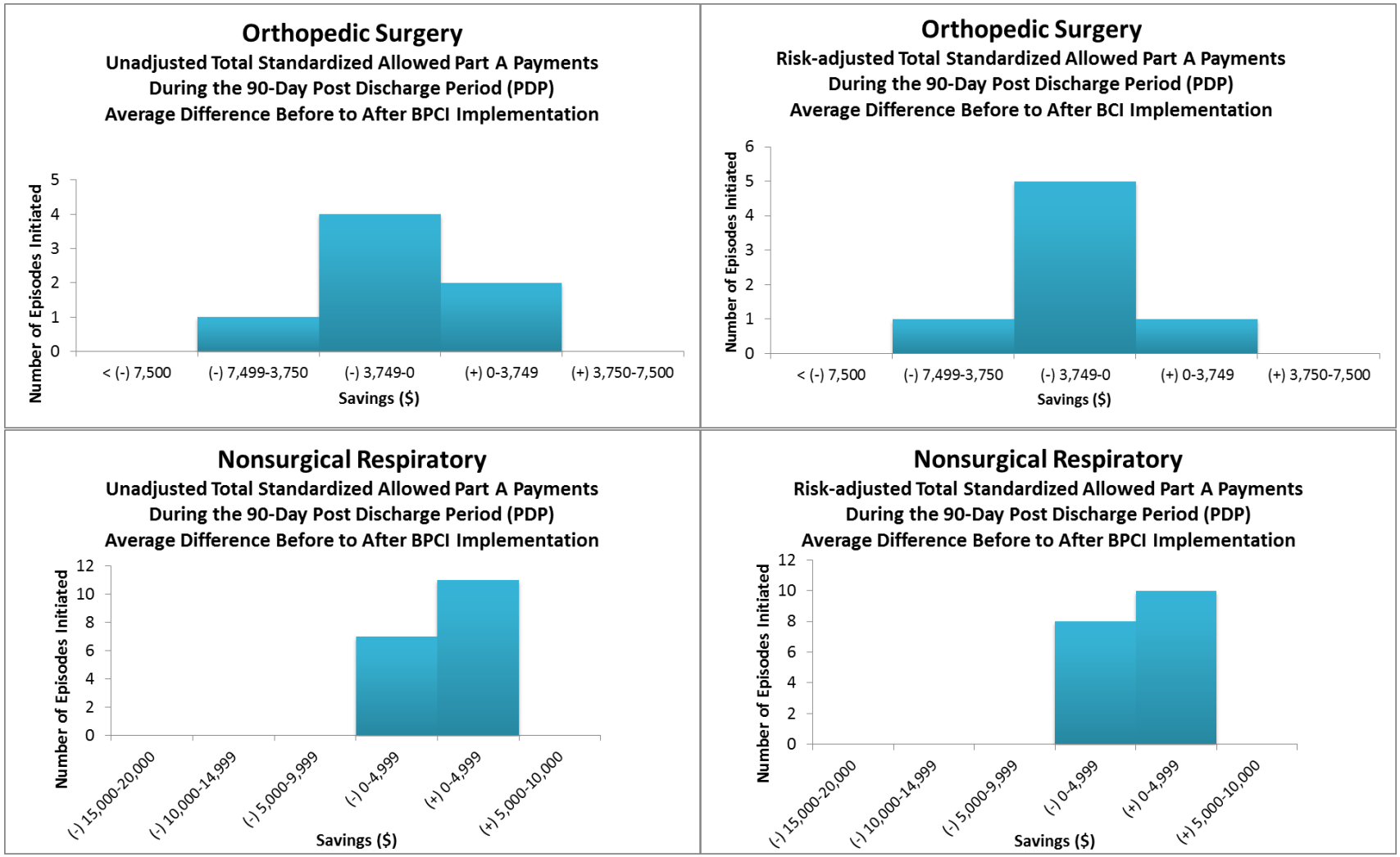
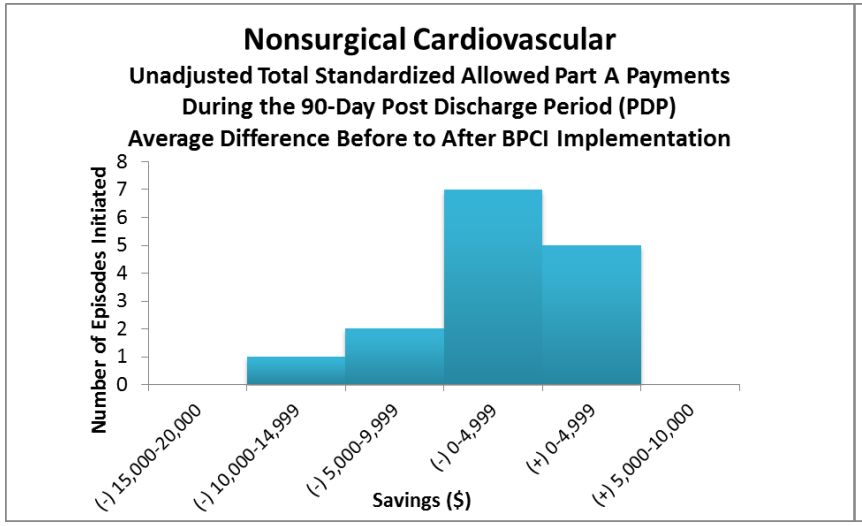
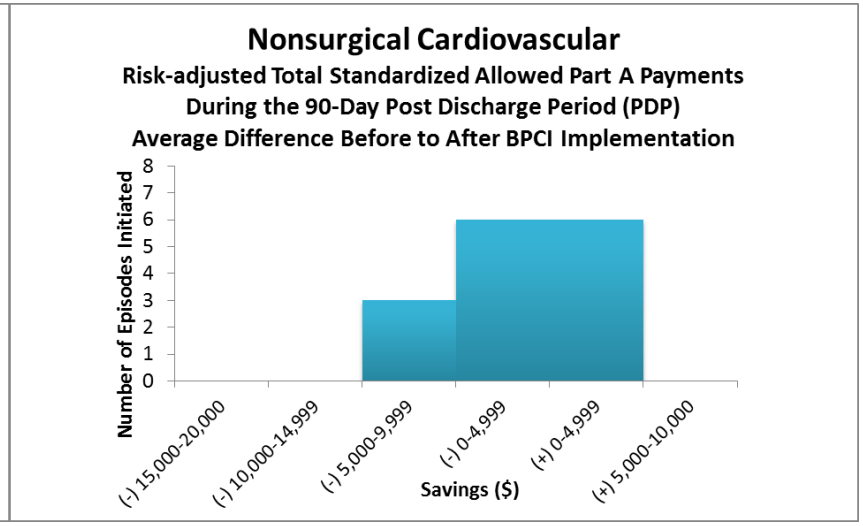

Nonsurgical Cardiovascular
Risk-Adjusted Total Standardized Allowed Part A&B Payments
During Anchor Stay and 90 Days Post Discharge Period (PDP)
Average Difference Before to After BPCI Implementation
Number of Episode Initiators
0
1
2
3
4
5
6
(-) 15,000-20,000
(-) 10,000-14,999
(-) 5,000-9,999
(-) 0-4,999
(+) 0-4,999
(+) 5,000-10,000
Savings ($)

Exhibit S.2: Model 3 Distribution of Savings: Average Difference from Before to After BPCI Implementation for Total Standardized Allowed Part A Payments During the 90-Day Post Discharge Period




Nonsurgical Cardiovascular
Unadjusted Total Standardized Allowed Part A Payments
During the 90-Day Post Discharge Period (PDP)
Average Difference Before to After BPCI Implementation
Number of Episodes Initiated
0
1
2
3
4
5
6
7
8
(-) 15,000-20,000
(-) 10,000-14,999
(-) 5,000-9,999
(-) 0-4,999
(+) 0-4,999
(+) 5,000-10,000
Savings ($)


Nonsurgical Cardiovascular
Risk-adjusted Total Standardized Allowed Part A Payments
During the 90-Day Post Discharge Period (PDP)
Average Difference Before to After BPCI Implementation
Number of Episodes Initiated
0
1
2
3
4
5
6
7
8
(-) 15,000-20,000
(-) 10,000-14,999
(-) 5,000-9,999
(-) 0-4,999
(+) 0-4,999
(+) 5,000-10,000
Savings ($)

C. Results: Cross-tabulation Analysis of Factors Contributing to Differences across BPCI Providers

Among BPCI participants, we were interested in determining what BPCI provider and market characteristics were associated with a decrease in total Medicare standardized payments and readmission rates after joining BPCI. Due to limited sample size of Model 3 post-acute care settings (home health agencies (HHA), inpatient rehabilitation facilities (IRF), and skilled nursing facilities (SNF)) participating in BPCI, we were unable to assess the potential associations in the context of a regression model for three clinical groups: 1) orthopedic surgery, 2) non-surgical cardiovascular, and 3) non-surgical respiratory. Instead, we calculated the risk-adjusted relative cost-savings and change in utilization by the categorical provider, program, and market characteristics of interest. The risk-adjusted relative cost savings represents the difference in average payments from the baseline to the intervention period for providers that were in a given category relative to providers that were not in a given category. These results are based upon cross-tabulations between categorical provider and program characteristics with the change in total standardized allowed payment for Part A and B services during the anchor hospitalization and the 90-day PDP, total standardized allowed payments for Part A institutional services during 90-day PDP, and 30- day unplanned readmission rates from before to after BPCI. These results, while adjusted for patient characteristics, do not adjust for the other provider or market characteristics.

Results for risk-adjusted relative savings are shown in **Exhibits S.3 and S.4**; positive point estimates indicate a decline in cost and utilization. Statistically significant results at a minimum of 5% are described in the narrative below. The text reframes some variable descriptions to consistently describe declines in cost and utilization. Finally, the inability to detect significant associations may be due to limited sample size and power. We will expand these analyses to include a regression analysis as the volume of participants reaches the appropriate sample size.

Exhibit S.3: Model 3 Risk-Adjusted Relative Savings (in dollars) in Total Standardized Allowed Payments Post-BPCI, by Variables of Interest

Variables	Orthopedic Surgery		Nonsurgical Respiratory		Nonsurgical Cardiovascular	
	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP
Number of Episode Initiators	**7**		**18**		**15**	
% of patients Age ≥80, >Median	-3863	-2172	-1796	578	4734	2752
% of patients Dual Eligible, > Median	3857	2591	-1855	-824	-5796*	-4201*
% patients Disabled, No ESRD, > Median	.	.	2818	981	-5713*	-4229*
% of patients with HCC Case Weight > Median	-617	-675	168	1191	1269	7
% of patients with Household Income > Median	-5729	602	462	-1032	2569	3389
Gainsharing	2781	-293	.	.	.	.
SNF 3-Day Waiver	.	.	.	.	.	.
Beneficiary Incentives	-7371*	-1832	-68	-352	-3260	-2776
Facilitator Convenor	-5293	556	.	.	.	.
EI is under Awardee Convenor or Designated AC	-914	-2943	.	.	.	.
Awardee	914	2943	.	.	.	.
Facilitator Convenor and Awardee	.	.	.	.	.	.
Prior Pay for Performance	.	.	112	-663	-2705	-2286
Prior Shared Savings	.	.	.	.	.	.
Prior Other	2734	-648	.	.	.	.
Beds 0-82	4021	-938	.	.	.	.
Beds 82-142	-201	536	-3369	-107	-2113	325
Beds 143 Plus	-5729	602	3369	107	2113	-325
HHA	347	705	-68	-352	-3260	-2776
IRF	-617	-675	.	.	.	.
LTC	.	.	.	.	.	.
SNF	162	-18	68	352	3260	2776
Ownership Government	.	.	.	.	.	.
Ownership NonProfit	395	-32	.	.	-2608	-2284

Variables	Orthopedic Surgery		Nonsurgical Respiratory		Nonsurgical Cardiovascular	
	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP
Ownership For Profit	-104	443	.	.	2608	2284
% Medicaid Admits >75th %tile	528	-675	.	.	.	.
% Medicare Admits >25th %tile	3857	2591	-551	-2098	2003	1878
Part A Payment during Baseline >75th%tile	-617	-675	4628	3081	2325	1978
% Medicare Days, >25th %tile	5293	-556	-6289	-2346	-3839	-4160
SNF Beds per 10000 >75th %tile	-5729	602	-5060	-1854	2569	3389
SNF Herfindahl Index > Median	201	-536	3218	2020	-6572	-2170
IRF Index > Median	-3349	-2144	-1273	-548	3477	2435
BPCI Market Penetration-Hospital Level > Median	4403	2012	584	-935	778	-1619

*Statistically significant at the 5% level. **Statistically significant at the 1% level. # Statistically significant at the 10% level. Missing values indicate no variation across EIs.

Exhibit S.4: Model 3 Risk-Adjusted Relative Difference in Medicare 30-Day Readmissions (%) Post-BPCI, by Variables of Interest

Variables	Orthopedic Surgery	Nonsurgical Respiratory	Nonsurgical Cardiovascular
Number of Episode Initiators	7	18	15
% of patients Age ≥80, >Median	-0.9	-0.5	1.1
% of patients Dual Eligible, > Median	0.1	-0.1	-1.6#
% patients Disabled, No ESRD, > Median	.	0.1	-0.1
% of patients with HCC Case Weight > Median	-0.6	-2.6**	-0.4
% of patients with Household Income > Median	-3.3#	0.9	0.7
Gainsharing	1.9#	.	.
SNF 3-Day Waiver	.	.	.
Beneficiary Incentives	-1.9	1.8#	-0.6
Facilitator Convenor	-2.9*	.	-0.3
EI is under Awardee Convenor or Designated AC	0.5	.	.
Awardee	-0.5	.	.
Facilitator Convenor and Awardee	.	.	.
Prior Pay for Performance	.	1.8#	-0.4
Prior Shared Savings	.	.	.
Prior Other	0.5	.	.
Beds 0-82	1.1	.	.
Beds 83-142	1.0	0.1	2.6
Beds 143 Plus	-3.3#	-0.1	-2.6
HHA	-0.3	1.8#	-0.6
IRF	-0.6	.	.
LTC	.	.	.
SNF	0.5	-1.8#	0.6
Ownership Government	.	.	.
Ownership NonProfit	-0.6	.	-1.0
Ownership For Profit	1.0	.	1.0
% Medicaid Admits >75th %tile	-0.6	.	.
% Medicare Admits >25th %tile	0.1	1.6	0.4
Part A Payment during Baseline >75th%tile	-0.6	-2.0	1.7
% Medicare Days, >25th %tile	2.9*	0.2	-1.5
SNF Beds per 10000 >75th %tile	-3.3#	1.9	0.7
SNF Herfindahl Index > Median	-1.0	-2.0*	-0.7
IRF in CBSA> Median	-0.5	0.0	0.7
BPCI Market Penetration-Hospital Level > Median	0.5	0.3	-1.1

*Statistically significant at the 5% level. **Statistically significant at the 1% level. #Statistically significant at the 10% level. Missing values indicate no variation across EIs.

1. Orthopedic surgery, Post-acute care

BPCI post-acute care settings (HHAs, IRFs, and SNFs) that did not sign up for the beneficiary incentives waiver had a significantly greater decline in total standardized allowed payment for Part A and B services during the anchor hospitalization and the 90-day PDP ($7,371; **Exhibit S.3**).

No characteristics were associated with a significant decline in total standardized allowed payments for Part A institutional services during 90-day PDP.

In addition, BPCI post-acute care settings (HHAs, IRFs, and SNFs) that were not participating in BPCI under a facility convener had a significantly greater decline in unplanned readmissions within the 30 day post-discharge period (2.9 pp; **Exhibit S.4**). BPCI hospitals with a proportion of Medicare days greater than the 25th percentile had a significantly greater decline in unplanned readmissions within the 30 day post-discharge period (2.9 pp).

2. Non-surgical cardiovascular, Post-acute care

BPCI post-acute care settings (HHAs, IRFs, and SNFs) with lower than the median proportion of dual eligible patients were found to have a significantly greater decline in total standardized allowed payment for Part A and B services during the anchor hospitalization and the 90-day PDP ($5,796) and Part A institutional services during 90-day PDP ($4,201; Table A.19). BPCI post-acute care settings (HHAs, IRFs, and SNFs) that had lower than the median percent of disabled beneficiaries experienced a significantly greater decline in total standardized allowed payment for Part A and B services during the anchor hospitalization and the 90-day PDP ($5,713) and total standardized allowed payments for Part A institutional services during 90-day PDP ($4,229). No characteristics were associated with a significant decline in 30-day unplanned readmission rates (**Exhibit S.4**).

3. Non-surgical respiratory, Post-acute care

No characteristics were associated with a significant decline in total standardized allowed payment for Part A and B services during the anchor hospitalization and the 90-day PDP or with total standardized allowed payments for Part A institutional services during 90-day PDP (**Exhibit S.3**). BPCI post-acute care settings (HHAs, IRFs, and SNFs) with lower than the median patients HCC case weight (2.6pp) and lower than the median SNF Herfindahl index (2.0 pp) had a significantly greater decline in unplanned hospital readmissions during the 30 day post-discharge period (**Exhibit S.4**).

D. Correlation Tables

One of the criterions we used to determine the final model specification was the value of each variable's Pearson coefficient of correlation with the dependent variables. We gave priority to variables for which Pearson's r was 0.15 or greater, and the p-value (of the Pearson's r statistic) was 0.10 or smaller.

Exhibit S.5: Model 3 Pearson's Coefficient of Correlation between Risk-Adjusted Total Standardized Allowed Payment Variables and Variables of Interest

Variables	Orthopedic Surgery		Nonsurgical Respiratory		Nonsurgical Cardiovascular	
	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP
Number of Episode Initiators	**7**	**7**	**18**	**18**	**15**	**15**
% of patients Age 80+, > Median	0.48	0.57	0.22	-0.13	-0.49	-0.39
	(0.28)	(0.18)	(0.38)	(0.59)	(0.06)	(0.15)
% of patients Dual Eligible, > Median	-0.44	-0.62	0.22	0.19	0.61*	0.61*
	(0.33)	(0.14)	(0.39)	(0.46)	(0.01)	(0.02)
% patients Disabled, No ESRD, > Median	.	.	-0.29	-0.20	0.54*	0.54*
	.	.	(0.24)	(0.44)	(0.04)	(0.04)
% patients with HCC Case Weight > Median	0.05	0.12	-0.02	-0.28	-0.14	0.00
	(0.91)	(0.79)	(0.94)	(0.26)	(0.63)	(1)
% patients with Household Income > Median	0.49	-0.11	-0.04	0.18	-0.20	-0.35
	(0.4)	(0.86)	(0.91)	(0.64)	(0.63)	(0.39)
Gainsharing	-0.35	0.08	.	.	.	.
	(0.45)	(0.87)	.	.	.	.
SNF 3-Day Waiver	.	.	.	.	.	.
	.	.	.	.	.	.
Beneficiary Incentives	0.84*	0.44	0.01	0.08	0.35	0.40
	(0.02)	(0.33)	(0.97)	(0.74)	(0.21)	(0.14)
Facilitator Convenor	0.47	-0.10	.	.	.	.
	(0.29)	(0.83)	.	.	.	.
EI is under Awardee Convenor or Designated AC	0.10	0.70	.	.	.	.
	(0.82)	(0.08)	.	.	.	.
Awardee	-0.10	-0.70	.	.	.	.
	(0.82)	(0.08)	.	.	.	.
Facilitator Convenor and Awardee	.	.	.	.	.	.
	.	.	.	.	.	.

Variables	Orthopedic Surgery		Nonsurgical Respiratory		Nonsurgical Cardiovascular	
	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP
Prior Pay for Performance	.	.	-0.01	0.15	0.28	0.32
	.	.	(0.96)	(0.54)	(0.31)	(0.24)
Prior Shared Savings	.	.	.	.	.	.
	.	.	.	.	.	.
Prior Other	-0.34	0.17	.	.	.	.
	(0.46)	(0.72)	.	.	.	.
Beds 0-82	-0.42	0.21	.	.	.	.
	(0.48)	(0.74)	.	.	.	.
Beds 83-142	0.02	-0.12	0.32	0.02	0.17	-0.03
	(0.97)	(0.85)	(0.4)	(0.96)	(0.7)	(0.94)
Beds 143 Plus	0.49	-0.11	-0.32	-0.02	-0.17	0.03
	(0.4)	(0.86)	(0.4)	(0.96)	(0.7)	(0.94)
HHA	-0.03	-0.13	0.01	0.08	0.35	0.40
	(0.95)	(0.78)	0.97	0.74	0.21	0.14
IRF	0.05	0.12	.	.	.	.
	(0.91)	(0.79)	.	.	.	.
LTC	.	.	.	.	.	.
	.	.	.	.	.	.
SNF	-0.02	0.00	-0.01	-0.08	-0.35	-0.40
	(0.97)	(0.99)	(0.97)	(0.74)	(0.21)	(0.14)
Ownership Government	.	.	.	.	.	.
	.	.	.	.	.	.
Ownership Non-Profit	-0.05	0.01	.	.	0.14	0.16
	(0.92)	(0.99)	.	.	(0.62)	(0.56)
Ownership For Profit	0.01	-0.11	.	.	-0.14	-0.16
	(0.98)	(0.82)	.	.	(0.62)	(0.56)
% Medicaid Admits >75th %tile	0.05	0.12	.	.	.	.
	(0.91)	(0.79)	.	.	.	.

Variables	Orthopedic Surgery		Nonsurgical Respiratory		Nonsurgical Cardiovascular	
	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP
% Medicare Admits >25th %tile	-0.44	-0.62	0.04	0.32	-0.19	-0.24
	(0.33)	(0.14)	(0.87)	(0.2)	(0.52)	(0.41)
Part A Payment during Baseline >75th%tile	0.05	0.12	-0.26	-0.34	-0.20	-0.23
	(0.91)	(0.79)	(0.29)	(0.17)	(0.48)	(0.41)
% Medicare Days, >25th %tile	-0.47	0.10	0.49*	0.35	0.33	0.48
	(0.29)	(0.83)	(0.04)	(0.15)	(0.23)	(0.07)
SNF Beds per 10000 >75th %tile	0.49	-0.11	0.49	0.33	-0.20	-0.35
	(0.4)	(0.86)	(0.18)	(0.39)	(0.63)	(0.39)
SNF Herfindahl Index > Median	-0.02	0.12	-0.37	-0.43	0.51	0.23
	(0.97)	(0.85)	(0.33)	(0.25)	(0.19)	(0.59)
IRF Index > Median	0.42	0.56	0.15	0.12	-0.35	-0.33
	(0.35)	(0.19)	(0.55)	(0.62)	(0.2)	(0.23)
BPCI Market Penetration-Hospital Level > Median	-0.48	-0.47	-0.07	0.22	-0.08	0.23
	(0.33)	(0.35)	(0.78)	(0.38)	(0.77)	(0.4)

*Statistically significant at the 5% level. **Statistically significant at the 1% level. # Statistically significant at the 10% level. P-value in parenthesis. Missing values indicate no variation across EIs.

Exhibit S.6: Model 3 Pearson's Coefficient of Correlation between Risk-Adjusted 30-Day Readmission Rate and Variables of Interest

	Orthopedic Surgery	Nonsurgical Respiratory	Nonsurgical Cardiovascular
Number of Episode Initiators	**7**	**18**	**15**
% of patients Age 80+, > Median	0.34	0.10	-0.34
	(0.45)	(0.69)	(0.21)
% of patients Dual Eligible, > Median	-0.04	0.02	0.49#
	(0.94)	(0.94)	(0.06)
% patients Disabled, No ESRD, > Median	.	-0.02	0.03
	.	(0.92)	(0.91)
% patients with HCC Case Weight > Median	0.15	0.61**	0.11
	(0.74)	(0.01)	(0.70)
% patients with Household Income > Median	0.86#	-0.27	-0.15
	(0.06)	(0.48)	(0.72)
Gainsharing	-0.70#	.	.
	(0.08)	.	.
SNF 3-Day Waiver	.	.	.
	.	.	.
Beneficiary Incentives	0.65	-0.44#	0.20
	(0.11)	(0.07)	(0.48)
Facilitator Convenor	0.77*	.	.
	(0.04)	.	.
EI is under Awardee Convenor or Designated AC	-0.18	.	.
	(0.70)	.	.
Awardee	0.18	.	.
	(0.70)	.	.
Facilitator Convenor and Awardee	.	.	.
	.	.	.
Prior Pay for Performance	.	-0.43#	0.12
	.	(0.07)	(0.66)
Prior Shared Savings	.	.	.
	.	.	.
Prior Other	-0.22	.	.
	(0.64)	.	.
Beds 0-82	-0.38	.	.
	(0.53)	.	.
Beds 83-142	-0.32	-0.04	-0.57
	(0.60)	(0.93)	(0.14)
Beds 143 Plus	0.86#	0.04	0.57
	(0.06)	(0.93)	(0.14)
HHA	0.08	-0.44#	0.20
	(0.87)	(0.07)	(0.48)

	Orthopedic Surgery	Nonsurgical Respiratory	Nonsurgical Cardiovascular
IRF	0.15	.	.
	(0.74)	.	.
LTC	.	.	.
	.	.	.
SNF	-0.18	0.44#	-0.20
	(0.70)	(0.07)	(0.48)
Ownership Government	.	.	.
	.	.	.
Ownership Non-Profit	0.22	.	(0.16)
	(0.64)	.	0.58
Ownership For Profit	-0.36	.	-0.16
	(0.43)	.	(0.58)
% Medicaid Admits >75th %tile	0.15	.	.
	(0.74)	.	.
% Medicare Admits >25th %tile	-0.04	-0.23	-0.10
	(0.94)	(0.35)	(0.75)
Part A Payment during Baseline >75th%tile	0.15	0.23	-0.44
	(0.74)	(0.36)	(0.10)
% Medicare Days, >25th %tile	-0.77*	-0.03	0.36
	(0.04)	0.23	(0.44)
SNF Beds per 10000 >75th %tile	0.86#	-0.54	-0.15
	(0.06)	(0.13)	(0.72)
SNF Herfindahl Index > Median	0.32	0.68*	0.14
	(0.60)	(0.04)	(0.73)
IRF in CBSA > Median	0.19	0.01	-0.22
	(0.68)	(0.97)	(0.44)
BPCI Market Penetration-Hospital Level > Median	-0.16	-0.09	0.34
	(0.76)	(0.72)	(0.22)

*Statistically significant at the 5% level. **Statistically significant at the 1% level. #Statistically significant at the 10% level. P-value in parenthesis. Missing values indicate no variation across EIs.

Appendix T: Model 4, Factors Contributing to Differences across BPCI Providers

I. Preliminary and Supplemental Analysis Findings

A. Model 4

This analysis sought to determine what beneficiary, program, provider, and environmental factors contributed to the various results of the BPCI initiative. A multilevel regression model was used to evaluate clinical episode groups meeting the minimum sample criteria of a minimum of 20 EIs with a minimum of 25 episodes in the baseline and intervention periods. To support the multilevel regression analysis, a cross-tabulation analysis of factors contributing to BPCI results, and correlation analysis between beneficiary, program, provider, and environmental factors and the differences in outcomes from before to after BPCI implementation. The results of these analyses were used to inform the decision of variable selection for inclusion into the multilevel model as detailed in the Methods Section of the full report. While only multilevel model results from the Model 2 orthopedic surgery clinical episode group were found to be statistically significant, the results from the supporting analyses for each clinical episode group are all included here in the appendix.

B. Results: Cross-tabulation Analysis of Factors Contributing to Differences across BPCI Providers

Among BPCI participants, we were interested in determining what BPCI provider and market characteristics were associated with a decrease in total Medicare standardized payments and readmission rates after joining BPCI. Due to limited sample size of Model 4 hospitals participating in BPCI, we were unable to assess the potential associations in the context of a regression model for two clinical episode groups: 1) orthopedic surgery and 2) cardiovascular surgery. Instead, we calculated the risk-adjusted relative cost-savings and change in utilization by the categorical provider, program, and market characteristics of interest. The risk-adjusted relative cost savings represents the difference in average payments from the baseline to the intervention period for providers that were in a given category relative to providers that were not in a given category. These results are based upon cross-tabulations between categorical provider and program characteristics with the change in total standardized allowed payment for Part A and B services during the anchor hospitalization and the 90-day PDP, total standardized allowed payments for Part A institutional services during 90-day PDP, and 30-day unplanned readmission rates from before to after BPCI. These results, while adjusted for patient characteristics, do not adjust for the other provider or market characteristics.

Results for risk-adjusted relative savings are shown in **Exhibits T.1 and T.2**; positive point estimates indicate a decline in cost and utilization. Statistically significant results at a minimum of 5% level are described in the narrative below. The text reframes some variable descriptions to consistently describe declines in cost and utilization. Finally, the inability to detect significant associations may be due to limited sample size and power. We will expand these analyses to include a regression analysis as the volume of participants reaches the appropriate sample size.

1. Orthopedic surgery

No characteristics were associated with a significant decline in total standardized allowed payment for Part A and B services during the anchor hospitalization and the 90-day PDP or total standardized allowed payments for Part A institutional services during 90-day PDP (**Exhibit T.1**). BPCI hospitals that were not under an Awardee Convener (AC) or designated AC (1.2 pp) and BPCI hospitals that were Awardees (in addition to being an EI) (1.2 pp) had a significantly greater decline in unplanned readmissions within the 30 day post-discharge period (**Exhibit T.2**).

2. Cardiovascular surgery

BPCI hospitals that had previously participated in shared savings programs ($4,411) had a significantly greater decline in total standardized allowed payments for Part A institutional services during 90-day PDP. BPCI hospitals that had prior experience with shared savings programs ($4,411) had a significantly greater decline in total standardized allowed payments for Part A institutional services during 90-day PDP. BPCI hospitals with less than the median percent of Medicare days ($4,411) had a significantly greater decline in total standardized allowed payments for Part A institutional services during 90-day PDP. No characteristics were associated with a significant decline in total standardized allowed payment for Part A and B services during the anchor hospitalization and the 90-day PDP (**Exhibit T.1**) or 30-day unplanned readmission rates (**Exhibit T.2**).

Exhibit T.1: Model 4 Risk-Adjusted Relative Savings (in dollars) in Total Standardized Allowed Payments Post-BPCI, by Variables of Interest

Variables	Orthopedic Surgery		Cardiovascular Surgery	
	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP
Number of Episode Initiators	**9**		**4**	
% of patients between Age 65-79, > Median	-81	-10	8261	2364
% of patients Dual Eligible, > Median	1161	311	-3810	-2495
% patients Disabled, No ESRD, > Median	-1351	-1645	772	-1259
% of patients with HCC Case Weight > Median	-315	-1143	-3810	-2495
Gainsharing	1124	1169	.	.
SNF 3-Day Waiver	-600	-418	.	.
Beneficiary Incentives	.	.	.	.
Facilitator Convenor	.	.	.	.
EI is under Awardee Convenor or Designated AC	-1438	-22	.	.
Awardee	1438	22	.	.
Facilitator Convenor and Awardee	.	.	.	.
Prior Bundle	301	925	.	.
Prior Pay for Performance	-81	-310	.	.
Prior Shared Savings	537	748	10243#	4411*
Prior Other	-2135	-341	10243#	4411*
HER	.	.	.	.
HIE	.	.	.	.

Variables	Orthopedic Surgery		Cardiovascular Surgery	
	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP
Beds 0-99	.	.	.	.
Beds 100-249	1511	1786	.	.
Beds 250 Plus	-1511	-1786	.	.
Ownership Government	.	.	.	.
Ownership NonProfit	1369	1245	601	-506
Ownership For Profit	-1369	-1245	.	.
% Medicaid Admits >Median	-612	-766	772	-1259
% Medicare Admits >Median	-767	-112	-3293	-1758
Part A Payment during Baseline >Median	-986	-1053	-5852	-2067
Volume of Episodes during Baseline >50th%tile	-489	-1354	5852	2067
% Medicare Days, >Median	1079	925	-10243#	-4411*
Resident to Bed Ratio >Median	-425	-1200	3810	2495
SNF Beds per 10,000 > Median	1040	182	-5163	-1085
Herfindahl Index >Median	353	-287	-5163	-1085
Hospital Market Share, >Median	-2338	-2180	-3293	-1758
Median Income > Median	230	756	-772	1259
Medicare Advantage Penetration >Median	230	756	-8261	-2364
First PAC home >Median	452	1255	-3293	-1758
First PAC IRF > Median	1768	68	-772	1259
First PAC SNF > Median	-301	1	.	.
Readmission Rate during Baseline >Median	1163	-646	8261	2364
Disproportionate Share >Median	630	-444	-5852	-2067
BPCI Market Penetration-Hospital Level>Median	2163	1222	-8261	-2364

*Statistically significant at the 5% level. **Statistically significant at the 1% level. # Statistically significant at the 10% level. Missing values indicate no variation across EIs.

Exhibit T.2: Model 4 Risk Adjusted Relative Difference in Medicare 30-Day Readmissions (%) Post-BPCI, by Variables of Interest

Variables	Orthopedic Surgery	Cardiovascular Surgery
Number of Episode Initiators	**9**	**4**
% of patients between Age 65-79, > Median	-0.2	-1.0
% of patients Dual Eligible, > Median	-0.2	1.1
% patients Disabled, No ESRD, > Median	0.1	0.2
% of patients with HCC Case Weight > Median	0.6	1.1
Gainsharing	-0.4	.
SNF 3-Day Waiver	.	.
Beneficiary Incentives	.	.
Facilitator Convenor	.	.
EI is under Awardee Convenor or Designated AC	-1.2*	.
Awardee	1.2*	.
Facilitator Convenor and Awardee	.	.
Prior Bundle	-0.6	.
Prior Pay for Performance	0.7	.
Prior Shared Savings	0.9	-1.4
Prior Other	-0.9	-1.4
Electronic Health Record	.	.
Health Information Exchange	.	.
Beds 0-99	.	.
Beds 100-249	0.3	.
Beds 250 Plus	-0.3	.
Ownership Government	.	.
Ownership NonProfit	1.6#	.
Ownership For Profit	-1.6#	.
% Medicaid Admits >Median	0.1	0.2
% Medicare Admits >Median	-0.2	0.1
Part A Payment during Baseline >Median	0.2	0.1
Volume of Episodes during Baseline >50th%tile	0.6	-1.4
% Medicare Days, >Median	-0.1	1.4
Resident to Bed Ratio >Median	0.8	-1.1
SNF Beds per 10,000 > Median	0.7	-0.1
Herfindahl Index >Median	0.6	-0.1
Hospital Market Share, >Median	0.1	0.1
Median Income > Median	0.1	-0.2
Medicare Advantage Penetration >Median	0.1	1.0
First PAC home >Median	0.1	0.1
First PAC IRF > Median	0.4	-0.2
First PAC SNF > Median	0.4	0.6
Readmission Rate during Baseline >Median	0.3	-1.0
Disproportionate Share >Median	0.1	1.4
BPCI Market Penetration-Hospital Level>Median	0.0	1.0

*Statistically significant at the 5% level. **Statistically significant at the 1% level. # Statistically significant at the 10% level. Missing values indicate no variation across EIs.

C. Correlation Tables

One of the criterions we used to determine the final model specification was the value of each variable's Pearson coefficient of correlation with the dependent variables. We gave priority to variables for which Pearson's r was 0.15 or greater, and the p-value (of the Pearson's r statistic) was 0.10 or smaller.

Exhibit T.3: Model 4 Pearson's Coefficient of Correlation between Risk-Adjusted Payment Variables and Variables of Interest

Variables	Orthopedic Surgery		Cardiovascular Surgery	
	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP
Number of Episode Initiators	**9**		**4**	
% of patients between Age 65-79, > Median	0.02	0.00	-0.85	-0.61
	(0.96)	(0.99)	(0.15)	(0.39)
% of patients Dual Eligible, > Median	-0.30	-0.11	0.39	0.65
	(0.44)	(0.77)	(0.61)	(0.35)
% patients Disabled, No ESRD, > Median	0.33	0.56	-0.07	0.28
	(0.39)	(0.12)	(0.93)	(0.72)
% patients with Household Income > Median	0.08	0.41	0.39	0.65
	(0.84)	(0.27)	(0.61)	(0.35)
Gainsharing	-0.18	-0.28	.	.
	(0.67)	(0.50)	.	.
SNF 3-Day Waiver	.	.	.	.
	.	.	.	.
Beneficiary Incentives	.	.	.	.
	.	.	.	.
Facilitator Convenor	.	.	.	.
	.	.	.	.
EI is under Awardee Convenor or Designated AC	0.37	0.01	.	.
	(0.33)	(0.98)	.	.
Awardee	-0.37	-0.01	.	.
	(0.33)	(0.98)	.	.
Facilitator Convenor and Awardee	.	.	.	.
	.	.	.	.
Prior Bundle	-0.05	-0.21	.	.
	(0.90)	(0.59)	.	.
Prior Pay for Performance	0.02	0.09	.	.
	(0.96)	(0.81)	.	.
Prior Shared Savings	-0.13	-0.25	-0.92#	-0.99*
	(0.74)	(0.51)	(0.08)	(0.01)
Prior Other	0.45	0.10	-0.92#	-0.99*
	(0.22)	(0.80)	(0.08)	(0.01)

Variables	Orthopedic Surgery		Cardiovascular Surgery	
	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP
Electronic Health Record	.	.	.	.
	.	.	.	.
Health Information Exchange	.	.	.	.
	.	.	.	.
Beds 0-99	.	.	.	.
	.	.	.	.
Beds 100-249	-0.24	-0.41	.	.
	(0.53)	(0.28)	.	.
Beds 250 Plus	0.24	0.41	.	.
	(0.53)	(0.28)	.	.
Ownership Government	.	.	.	.
	.	.	.	.
Ownership NonProfit	-0.22	-0.28	.	.
	(0.57)	(0.46)	.	.
Ownership For Profit	0.22	0.28	.	.
	(0.57)	(0.46)	.	.
% Medicaid Admits >Median	0.16	0.27	-0.07	0.28
	(0.69)	(0.47)	(0.93)	(0.72)
% Medicare Admits >Median	0.20	0.04	0.34	0.46
	(0.62)	(0.92)	(0.66)	(0.54)
Part A Payment during Baseline >Median	0.2505	0.38	0.52	0.46
	(0.52)	(0.32)	(0.48)	(0.54)
Volume of Episodes during Baseline >50th%tile	0.12	0.49	-0.52	-0.46
	(0.75)	(0.19)	(0.48)	(0.54)
% Medicare Days, >Median	-0.27	-0.33	0.9168#	0.9896*
	(0.48)	(0.38)	(0.08)	(0.01)
Resident to Bed Ratio >Median	0.11	0.43	-0.39	-0.65
	(0.78)	(0.25)	(0.61)	(0.35)
SNF Beds per 10,000 > Median	-0.22	-0.05	0.46	0.24
	(0.57)	(0.89)	(0.54)	(0.76)
Herfindahl Index >Median	-0.09	0.10	0.46	0.24
	(0.83)	(0.80)	(0.54)	(0.76)
Hospital Market Share, >Median	0.56	0.74	0.34	0.46
	(0.11)	(0.02)	(0.66)	(0.54)
Median Income > Median	-0.06	-0.27	0.07	-0.28
	(0.88)	(0.48)	(0.93)	(0.72)
Medicare Advantage Penetration >Median	-0.06	-0.27	0.85	0.61
	(0.88)	(0.48)	(0.15)	(0.39)
First PAC home >Median	-0.11	-0.45	0.34	0.46

Variables	Orthopedic Surgery		Cardiovascular Surgery	
	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP	Part A & B Services during Anchor, and 90-day PDP	Part A Institutional Services during 90-day PDP
	(0.77)	(0.22)	(0.66)	(0.54)
First PAC IRF > Median	-0.45	-0.02	0.07	-0.28
	(0.23)	(0.95)	(0.93)	(0.72)
First PAC SNF > Median	0.08	0.00	.	.
	(0.85)	(0.99)	.	.
Readmission Rate during Baseline >Median	-0.30	0.23	-0.85	-0.61
	(0.44)	(0.55)	(0.15)	(0.39)
Disproportionate Share >Median	-0.16	0.16	0.52	0.46
	(0.68)	(0.68)	(0.48)	(0.54)
BPCI Market Penetration-Hospital Level>Median	-0.55	-0.44	0.85	0.61
	(0.13)	(0.23)	(0.15)	(0.39)

*Statistically significant at the 5% level. **Statistically significant at the 1% level. # Statistically significant at the 10% level. Missing values indicate no variation across EIs.

Exhibit T.4: Model 4 Pearson's Coefficient of Correlation between Risk-Adjusted 30-Day Unplanned Readmission Rate and Variables of Interest

	Orthopedic Surgery	Cardiovascular Surgery
Number of Episode Initiators	**9**	**4**
% of patients between Age 65-79, > Median	-0.2	-1.0
% of patients Dual Eligible, > Median	-0.2	1.1
% patients Disabled, No ESRD, > Median	0.1	0.2
% of patients with HCC Case Weight > Median	0.6	1.1
Gainsharing	-0.4	.
SNF 3-Day Waiver	.	.
Beneficiary Incentives	.	.
Facilitator Convenor	.	.
EI is under Awardee Convenor or Designated AC	-1.2*	.
Awardee	1.2*	.
Facilitator Convenor and Awardee	.	.
Prior Bundle	-0.6	.
Prior Pay for Performance	0.7	.
Prior Shared Savings	0.9	-1.4
Prior Other	-0.9	-1.4
Electronic Health Record	.	.
Health Information Exchange	.	.
Beds 0-99	.	.
Beds 100-249	0.3	.
Beds 250 Plus	-0.3	.
Ownership Government	.	.
Ownership NonProfit	1.6#	.
Ownership For Profit	-1.6#	.
% Medicaid Admits >Median	0.1	0.2
% Medicare Admits >Median	-0.2	0.1
Part A Payment during Baseline >Median	0.2	0.1
Volume of Episodes during Baseline >50th%tile	0.6	-1.4
% Medicare Days, >Median	-0.1	1.4
Resident to Bed Ratio >Median	0.8	-1.1
SNF Beds per 10,000 > Median	0.7	-0.1
Herfindahl Index >Median	0.6	-0.1
Hospital Market Share, >Median	0.1	0.1
Median Income > Median	0.1	-0.2
Medicare Advantage Penetration >Median	0.1	1.0
First PAC home >Median	0.1	0.1
First PAC IRF > Median	0.4	-0.2
First PAC SNF > Median	0.4	0.6
Readmission Rate during Baseline >Median	0.3	-1.0
Disproportionate Share >Median	0.1	1.4
BPCI Market Penetration-Hospital Level>Median	0.0	1.0

*Statistically significant at the 5% level. **Statistically significant at the 1% level. # Statistically significant at the 10% level. Missing values indicate no variation across EIs.