CMS Comprehensive Care for Joint Replacement Model: Performance Year 2 Evaluation Report

An In-Depth Look: Hospital Case Studies

HEALTH CARE AND HUMAN SERVICES POLICY, RESEARCH, AND ANALYTICS — WITH REAL-WORLD PERSPECTIVE.

Prepared for: **Centers for Medicare & Medicaid Services**

Submitted by: **The Lewin Group, Inc. with our partners: Abt Associates, GDIT, and Telligen**

June 2019

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An In-Depth Look: Hospital Case Studies

Prepared for:

Jessica McNeely
Research and Rapid-Cycle Evaluation Group (RREG),
Center for Medicare & Medicaid Innovation (CMMI),
Centers for Medicare & Medicaid Services (CMS)

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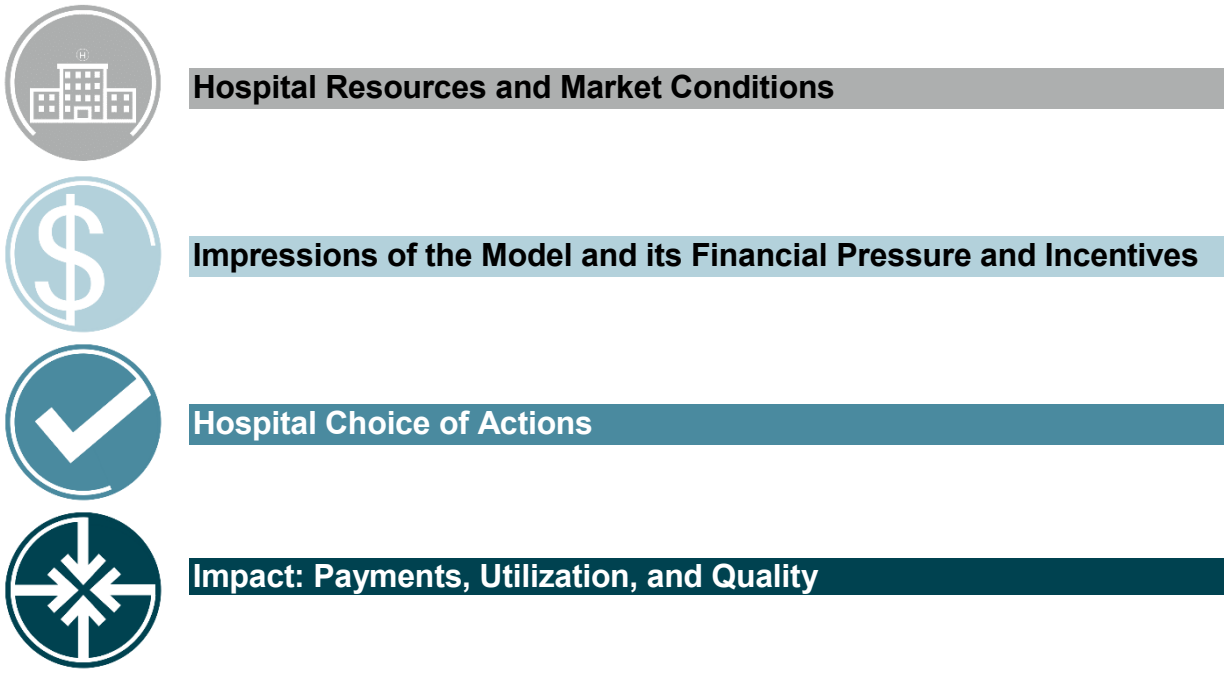
Case Study Supplement: Introduction

This supplement includes 11 case studies, each of which provides a description of one hospital's experience participating in the Comprehensive Joint Replacement (CJR) model. The case studies are based on interview data collected during site visits and supplemented by summary statistics from Medicare claims data. Each case study is organized by the key components of the evaluation conceptual framework (Exhibit 1). The evaluation conceptual framework posits that hospital resources, market conditions, and model incentives influence a hospital's response to the CJR model. These responses, in turn, may affect Medicare episode payments, utilization, or quality.

Exhibit 1: Evaluation conceptual framework components



More information regarding the site visit sampling strategy, characteristics of the hospitals, and interview topics is in Appendix C.

Hospital Resources and Market Conditions

Because of its mandatory, randomized design, the CJR model tests the impact of episode-based bundled payments across a broad spectrum of hospitals with varying levels of infrastructure, care redesign experience, episode utilization patterns, and market positions. We hypothesized that a hospital's response to the CJR model would be influenced by internal resources and market conditions.

- Interviewees at hospitals with prior experience under the Bundled Payment for Care Improvement (Bundled Payments for Care Improvement) initiative or other alterative payment models felt better prepared to enter into the CJR model and reported having a clearer idea of what needed to be done to achieve success.
- Most interviewees from hospitals owned by a health system reported receiving some resources from the health system, such as a data analytics vendor or legal resources to establish gainsharing contracts.
- Alignment between orthopedic surgeons and the hospital administration, whether due to the hospital employing the orthopedic surgeons or a historically collaborative relationship, was key to a hospital's CJR responses.
- Interviewees at hospitals with a history of surgeon engagement in care redesign activities felt more confident in their ability to make changes under the CJR model.
- Interviewees noted that hospitals that own post-acute care (PAC) providers or have a history of collaboration with area PAC providers may have advantages under the model because of their ability to influence the PAC pathway.

Impressions of the Model and Its Financial Pressure and Incentives

The CJR model is intended to motivate hospitals to implement lower extremity joint replacement (LEJR) care redesign activities to reduce episode payments while maintaining or improving quality of care. Because the prospective quality-adjusted target prices are based on a changing blend of hospital-specific historical payments and regional average payments, hospitals will vary in their perceptions of model pressures and each hospital will need to make a business case about whether and what actions to take in response to the model's financial incentives.

- Interviewees discussed the influence of the CJR model on LEJR care redesign in the broader context of their hospital's market, orthopedic service line. The influence of the CJR model on care redesign activities was often not distinguishable from other environmental or situational factors.
- Some described the CJR model as an opportunity to prepare for future bundled payment models and indicated that this perception was their primary motivation to implement changes under the model.

- Some interviewees discussed using an assessment of how much their hospital was likely to gain or lose under the CJR model to motivate changes in response to the model.
- Hospital interviewees indicated that the Medicare claims data they received because of their participation in the CJR model provided new information about their patients' PAC use including insight into length of stay and costs data.

Hospital Choice of Actions

CJR participant hospitals are financially accountable for the quality and cost of an episode and thus incentivized to collaborate with physicians and PAC providers to coordinate care throughout the episode. These efforts were undertaken with a goal of ultimately shifting PAC to less expensive settings and reducing lengths of stay in institutional PAC settings. The model provides flexibilities to hospitals to share internal cost savings with partnering providers, which can be leveraged to increase physician support for care redesign activities.

Interviewees described implementing a number of actions to reduce episode payments:

- Some hospitals established preferred PAC networks to partner with high quality PAC providers willing to collaborate under the CJR model.
- A number of interviewees described changes to the pre-operative care pathway under the CJR model, including a more rigorous assessment of barriers to discharging patients directly home and an increased emphasis on optimizing modifiable risk factors.
- Interviewees reported that sharing CJR performance data was a critical strategy for engaging physicians in their hospital's activities related to the model.
- Less commonly, interviewees described efforts related to internal cost savings and the inpatient care pathway.

The case studies distinguish between the activities interviewees described implementing or enhancing as a result of the CJR model and activities they implemented in response to other factors. Hospitals most commonly identified collection of patient-reported outcome (PRO) data, post-discharge follow-up with patients, and enhanced communication with PAC providers as strategies implanted as a result of the CJR model. Approximately half of hospitals reported pre-surgical actions such as assessment of the home environment, pre-surgical patient optimization, and increased patient and family education. Exhibit 2 summarizes the actions hospitals reported taking in response to the CJR model.

Exhibit 2: Hospital actions in response to the CJR model

	Activity enhanced or implemented in response to the CJR model	A	B	C	D	E	F	G	H	I	J	K	Total
Pre-surgery	Pre-surgical patient optimization	x		x	x			x			x		5
	Patient risk stratification			x	x			x			x		3
	Assessment of the home environment			x	x	x	x	x					6
	Patient and family education		x		x		x	x			x		5
Internal cost savings & care protocols	Standardization of surgical implants or supplies		x	x			x	x			x		3
	Early ambulation				x	x	x	x			x		4
	Inpatient PT or OT changes				x	x					x		3
	Pain management protocols				x		x	x			x		3
	CJR-specific care protocols										x		0
Post-acute	PRO data	x		x	x	x	x	x	x	x	x		9
	Discharge planning	x		x	x	x	x	x			x		7
	Preferred PAC network				x		x	x	x				4
	Patient follow-up post-discharge	x	x	x	x		x	x		x	x	x	9
Resources,	Gainsharing				x			x		x	x	x	5
	New HER or other HIT capabilities	x			x		x	x			x		5
	Use of an external vendor or consultant			x	x		x	x	x			x	6
	Dedicated orthopedic patient navigator	x		x	x		x	x		x	x		7
	Communication with PAC providers	x	x	x	x	x	x	x			x	x	9
	Data sharing with PAC providers		x		x		x	x					4
	Data sharing with orthopedic surgeons	x	x	x	x		x	x			x		7

Source: Lewin analysis of site visit interview data.

Notes: Each letter (A through K) corresponds to the hospital that was the focus of the case study

EHR = electronic health record, HIT = health information technology, OT = occupational therapy, PAC = post-acute care, PRO = patient-reported outcome, PT = physical therapy

Impact: Payments, Utilization, and Quality

The CJR model is designed to influence episode payments, utilization, and quality outcomes. To complement interviewees' descriptions of CJR model impacts, the case studies include hospital-level, claims-based descriptive analyses and reconciliation results. In general, hospitals demonstrated decreases in episode payments and discharging patients to lower intensity PAC settings. The case studies represent a range of hospitals, including those that reduced total episode payments below their quality-adjusted target

price in performance years (PY) 1 and 2 as well as those that did not reduce payments below their target in PY1 but did in PY2 (Exhibit 3).

Exhibit 3: Case study hospital CJR model performance, PY1-2

Reconciliation Results		Hospital										
		A	B	C	D	E	F	G	H	I	J	K
PY1 Reconciliation	Payments below quality-adjusted target price		●		●	●		●	○	○	●	●
	"Acceptable" or higher quality score	○	●	○	●	●	○	●			●	●
PY2 Reconciliation	Payments below quality-adjusted target price	●	●	●	●	●	●	●	○	○	●	●
	"Acceptable" or higher quality score	●	●	●	●	●	●	●			●	●

Source: Lewin analysis of Mathematica Policy Research's CJR reconciliation data for performance year 1 (episodes ending April 2016 through December 2016) and performance year 2 (episodes ending January 2017 through December 2017).

Notes: PY = performance year. Open circles ◦ indicate that the hospital did not receive reconciliation payments.

Hospital A Case Study

The Hospital A case study is based on site visit interviews with health system administrators, hospital administrators, direct care clinical staff, two orthopedic surgeons from the same private group practice, and leadership at one SNF and one home health agency (HHA).

In response to the CJR model, the hospital hired a nurse care navigator to focus on pre-surgical optimization and patient follow-up over the 90-day post-discharge period. In addition, claims data revealed that a high proportion of the hospital's LEJR patients were going to SNFs after discharge, so interviewees indicated they worked to reduce SNF admissions. Exhibit A-1 highlights key takeaways from the case study, summarizing hospital and market characteristics, Hospital A's impression of CJR model incentives, choice of actions, and resulting impacts.

Exhibit A-1: Key findings from Hospital A

Hospital Resources and Market Conditions
(Page 7)

Hospital A is owned by a health system with prior bundled payment experience and data analytics capabilities.

The hospital is located in a competitive LEJR market and several of its orthopedic surgeons have contractual relationships with area SNFs as medical directors.

Impressions of the Model and its Financial Pressure and Incentives
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Hospital A's episode payments were historically above the regional average. Both health system and hospital interviewees reported feeling little financial pressure from the CJR model, as they bear risk for a much larger patient population under their existing Accountable Care Organization.

Hospital Choice of Action
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1.) The hospital hired a new nurse care navigator to work on pre-surgical optimization and patient follow-up over the 90-day post-discharge period.
2.) The hospital also chose to focus on reducing SNF admissions and length of stay.

Impact: Payments, Utilization, and Quality
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Payment: Total episode payments decreased from baseline.
Utilization: The hospital reduced SNF admissions for LEJR patients across all payers.

Hospital A is owned by a health system and has about half as many beds as the average CJR participant hospital. They complete an average of 28 LEJR cases per year. It is located in an MSA with a higher supply of SNF beds than the average CJR-participating hospital and a very competitive market for LEJR procedures (Exhibit A-2).

Exhibit A-2: Hospital A has a relatively low volume of Medicare LEJR patients and is located in a highly competitive market

Location	Characteristic	Hospital A	CJR average
Hospital	Annual Medicare LEJR volume	28	144
	Ownership	Not for profit	60.7% not for profit
	Health system membership	Yes	77.9% membership
	SNF, HHA or IRF ownership	None	44.1% no PAC
	Medicare days percentage	35.1%	34.7%
	DSH percentage	30.5%	32.4%
	Bed count	119	266
	Teaching status	No	58.5% non-teaching
MSA	Population size	2,131,793	1,585,229
	Population aged 65+	12.9%	14.0%
	Herfindahl-Hirschman Index for LEJR[a]	1,000	3,434
	IRF discharges per 10,000 65+ population	17.8	20.6
	Ortho surgeons per 10,000 65+ population	0.9	0.9
	SNF beds per 10,000 65+ population	69.2	53.4

Source: Lewin analysis of 2015-2016 Area Health Resource File, 2014 American Community Survey, 5-Year Estimates, December 2016 POS, December 2014 PECOS, FY 2016 CMS Annual IPPS, and Medicare claims and enrollment data for episodes initiated in 2012 through 2014 that ended between Q2 2012 and Q1 2015.

Notes: LEJR = lower extremity joint replacement, SNF = skilled nursing facility, HHA = home health agency, IRF = inpatient rehab facility, DSH = disproportionate share hospital, MSA = metropolitan statistical area.

[a] A measure of market concentration calculated based on LEJR at acute care hospitals.

Hospital Resources and Market Conditions

Key resources informing CJR model response:

Prior system experience with bundled payments

Lessons learned from participation in shared savings program

Existing relationship with data analytics vendor

Hospital Resources

Hospital A is owned by a health system with several hospitals participating in the CJR model, both in Hospital A's Metropolitan Statistical Area (MSA) and in other areas. Interviewees reported that the response to the CJR model is coordinated at the "market" (MSA) level, so all system-owned hospitals in a given MSA implement similar activities in response to the model and receive similar resources. For example, the health system had an existing relationship with a data vendor that it leveraged to support all of its CJR participant hospitals in Hospital A's market. Due to the system's involvement in CJR model response, interviews captured perspectives from and information about both the hospital and the health system.

Another of the system's hospitals in this MSA (their highest LEJR volume facility) had participated in the Bundled Payment for Care Improvement initiative for LEJR clinical episodes. This hospital decided to withdraw participation in the Bundled Payments for Care Improvement initiative to participate in the CJR model because it would be easier for the health system to have all of its hospitals in the same model. A health system representative explained that the system enrolled the high volume hospital in the Bundled Payments for Care Improvement initiative because of expectations that mandatory bundled payment models were inevitable and participation in a voluntary model was an important opportunity for learning. Interviewees felt that the Bundled Payments for Care Improvement participants' experience informed the system's approach to the CJR model. In addition, prior to both the Bundled Payments for Care Improvement initiative and the CJR model the health system's accountable care organization (ACO) entered into the Medicare Shared Savings Program (MSSP), which interviewees also felt influenced its CJR model response strategy. Specifically, interviewees indicated that their experience under MSSP taught them how to identify patients who would benefit from more intensive care coordination. The Bundled Payments for Care Improvement initiative taught them that they needed to hire care transitions coordinators to track patients over the 90-day post-discharge period.

Only one physician group performs LEJR procedures at Hospital A; the surgeons are under a provider service agreement with the hospital, which includes mutually agreed upon quality benchmarks. The agreement precludes the surgeons from gainsharing with Hospital A or any other hospital; Hospital A is also not gainsharing with any other providers. Some of the surgeons have medical director or orthopedic consultant roles with area SNFs; SNFs pay the surgeons to round on patients in their facilities on a regular basis. These relationships all preceded the CJR model. One surgeon indicated that he has a contractual relationship with eight SNFs and visits each facility once per month. He believes that this arrangement has reduced readmissions. A SNF representative portrayed the arrangement with surgeons very positively and felt the surgeons' presence "elevates their level of care."

Market Conditions

The hospital interviewees described a fiercely competitive market for LEJR procedures, with several large systems located in the same MSA. Additionally, hospital interviewees indicated that there was an over-supply of PAC and outpatient therapy providers in the more densely populated part of their MSA. They said that this was due to the lack of Certificate of Need laws in the state, and that the competition resulting from the large supply of providers helped to increase the quality of care in the area.

Interviewees explained that Hospital A is located outside of the urban center of the MSA and has a relatively large rural catchment area. For patients coming to the hospital from the rural areas, the availability of PAC providers is much more limited.

The evaluation team interviewed representatives of a large HHA closely associated with the hospital. Interviewees described how they proactively approached Hospital A's health system and

other hospitals at the start of the CJR model to educate them about bundled payments and the opportunities for reducing use of institutional PAC. The HHA used Medicare spending per beneficiary and Hospital Readmissions Reduction Program (HRRP) data to create a value report highlighting its ability to safely and effectively care for patients at home after inpatient discharge. The HHA used this report to convince hospitals that the majority of patients can be discharged directly home safely and do not require a SNF stay.

Impressions of the Model and its Financial Pressure and Incentives

> *"CJR is one of the best CMS models in a long time."*
>
> ***-Orthopedic surgeon***

One of the orthopedic surgeons that performed LEJRs at the hospital praised the CJR model and was pleased with the hospital system's improved ability to provide data on LEJR patient outcomes. He felt that CMS should consider expanding the model to include shoulder replacements because his colleagues that perform those procedures do not get quality outcome data.

Health system representatives felt that the CJR model is not a significant source of financial pressure because of the large size of the system's MSSP ACO (more than 70,000 attributed lives) and their assessment that, comparatively, the CJR model "isn't big money for the hospitals." They felt that their effort in preparing for the CJR model would not be recouped through reconciliation payments, but explained that since they feel bundled payments are the future of health care reimbursement it was worthwhile to use the model as an opportunity to build the infrastructure to profit under a value based payment system. The hospital prepared for the CJR model by hiring a new nurse navigator and incorporating the beneficiary notification letter and PRO data collection tool into the electronic health record (EHR).

Hospital Choice of Actions

Hospital A, with the guidance of its health system, implemented a number of efforts under the CJR model that impacted the orthopedic service line. These efforts included changing patients' expectations about their PAC plan and a new post-discharge patient follow up protocol. Exhibit A-3 summarizes care redesign and other activities interviewees discussed implementing and whether the activities were in response to the CJR model.

Preparing to discharge more patients to home health

Interviewees discussed an enhanced focus on preparing the patient to discharge home under the CJR model. The hospital had a pre-surgical class that predated the CJR model with a 60-70% attendance rate. The class was not mandatory because of surgeons' concerns about potential access issues for their more rural patients, so the hospital is exploring options to allow patients who may have difficulty attending in person to join the class virtually. Since the CJR model, surgeons have begun messaging to patients that home is the best place to recover after surgery. This is conveyed during the first office visit prior to surgery. Interviewees reported making progress changing

patients' and families' expectations by dispelling the notion that going to a SNF is automatic. As a result of improved pre-surgical communication, interviewees said patients feel more comfortable and better prepared to be discharged home.

The hospital identified the transition from hospital or institutional PAC to home as the time during the episode when problems were most likely to occur. Therefore, under the CJR model the hospital instructed the HHA that receives the most referrals that the first home health visit must be within 24 to 48 hours of discharge home. Interviewees indicated that this effort has been successful and that now nearly all CJR patients are seen within 24 to 48 hours. In addition, they worked with the HHA to trial a program where the HHA performs a home visit to assess potential risks or issues with a safe discharge home prior to the patient's discharge. These visits are not reimbursed and are only conducted with patients for whom there is a potential concern about ability to safely discharge directly home.

Exhibit A-3: Hospital A took several actions in response to the CJR model

Activity implemented or enhanced	Implemented in response to CJR	Implemented in response to other factors	Not Implemented
Pre-surgical patient optimization	x		
Gainsharing			x
Patient risk stratification		x	
Assessment of the home environment		x	
Patient and family education		x	
Use of an external vendor or consultant		x	
New EHR or other HIT capabilities	x		
Data sharing with PAC			x
Data sharing with orthopedic surgeons	x		
Dedicated orthopedic patient navigator	x		
Standardization of surgical implants or supplies		x	
Early ambulation		x	
Inpatient PT or OT changes		x	
Pain management protocols		x	
CJR-specific care protocols			x
PRO data	x		
Discharge planning	x		
Communication with PAC providers	x		
Preferred PAC network			x
Patient follow-up post-discharge	x		

Source: Lewin analysis of site visit interview data.

Notes: EHR = electronic health record, HIT = health information technology, PAC = post-acute care, PRO = patient-reported outcome, PT = physical therapy, OT = occupational therapy.

The inpatient care pathway

The only inpatient care change implemented due to the CJR model was the creation of a "Meds to Beds" program in which prescriptions are filled at the hospital pharmacy before the patient is discharged. This helped the hospital ensure medication compliance and avoid issues such as the need to change a prescription to ensure insurance coverage. Interviewees explained that changing the inpatient care pathway was not a focus of the hospital's response to the CJR model because it had already made changes to physical therapy and pain management protocols, as well as done work around the surgical supply chain.

Data sharing and analytics capabilities

The health system's data vendor analyzed the claims data provided by CMS under the CJR model, and the hospital shared these data with the surgeons. The data included SNF utilization, SNF LOS, readmissions, and emergency department (ED) use. Interviewees mentioned that these data were very impactful, and that the high prevalence of discharge to SNF was shocking even to the surgeons. Surgeons were motivated to reduce SNF admissions by seeing their performance data compared to their peers.

While the hospital did not submit PRO data during the first year of the CJR model, it collected data for submission in the second year and planned to build data collection into the EHR patient portal. The health system was also the first in the MSA to invest in a new software platform that sends real-time alerts to care navigators when patients change care settings (i.e., from SNF to home). Although interviewees did not attribute this investment to the CJR model, the hospital generates lists of "risk bearing" patients (those under the CJR model or attributed to the ACO) and provides this list to the software vendor for tracking purposes. Lastly, the hospital tested a new emergency department flag in its EHR because of the CJR model. When a CJR patient presents at the ED, the care transitions coordinators are immediately alerted and can intervene to prevent an unnecessary readmission.

Surgeons were motivated to reduce SNF admissions by seeing their performance data compared to their peers.

Pre-surgical optimization and more robust follow up for patients after inpatient discharge

The hospital created an orthopedic nurse navigator position in response to the CJR model to support efforts to formalize its pre-surgical care pathway. The nurse navigator reaches out to patients a month before the scheduled surgery, uses a standardized questionnaire to screen them for potential medical or social issues that need to be addressed before surgery, and encourages them to attend the pre-surgical class. The hospital also increased attention on modifiable risk factors (e.g., BMI, smoking, diabetes, Methicillin-resistant Staphylococcus aureus or MRSA, nutritional status) during the pre-operative patient visit. The patient is urged to address any risk factors to reduce the chances of complications or readmission following surgery. Interviewees reported that this increased focus on patient optimization led to delaying more elective LEJRs. Most of these

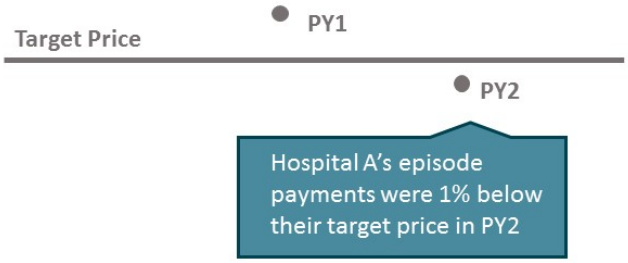
patients did ultimately receive the surgery after addressing their risk factors, although a small percentage changed surgeons.

Hospital A and the other CJR participant hospitals in the health system have staff follow up with LEJR patients after their hospital discharge. If a patient is not a CJR patient, the orthopedic nurse navigator calls them during the week after discharge to check on their recovery and then follow up ends. If a patient is under the CJR model, care transitions coordinators (separate from the dedicated nurse navigator) call within 48 hours of discharge and then every couple of weeks over the 90-day post-discharge period. This follow up protocol was implemented to improve the hospital's ability to catch any signs of adverse events during the full episode of care.

Impact: Payments, Utilization, and Quality

Hospital A performs an average of 28 LEJR procedures annually, which is considerably lower than the CJR-participating hospital average of 144 annual LEJR procedures (Exhibit A-4). Hospital A's historical episode payments were above its quality-adjusted target price for the first performance year of the CJR model. During PY1, Hospital A's episode payments exceeded its quality-adjusted target price by 8%. In PY2, the hospital reduced total episode spending enough to come below the target and earn a reconciliation payment.

Exhibit A-4: Hospital A achieved a reconciliation payment in PY2, but not in PY1



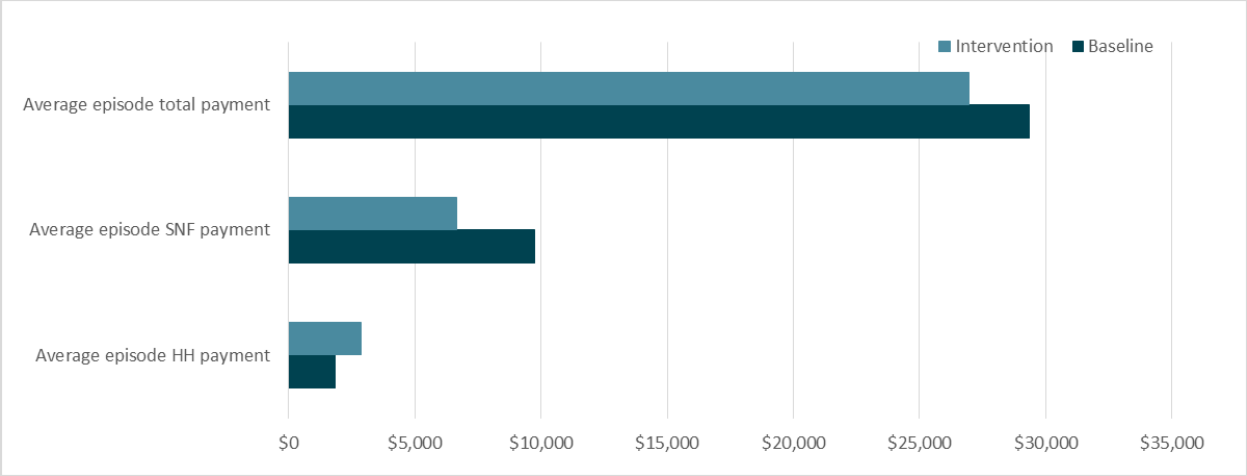
Measure	PY1 Final Reconciliation Results	PY2 Initial Reconciliation Results
Quality category	Acceptable	Acceptable
Spending vs. quality-adjusted target price	Above	Below
Standardized reconciliation amount per episode	$0	$181

Source: Lewin analysis of Mathematica Policy Research's CJR reconciliation data for performance year 1 (episodes ending Q2 2016 through Q4 2016) and performance year 2 (episodes ending Q1 2017 through Q4 2017).

Notes: PY = performance year.

The hospital's average episode payments decreased from baseline to intervention, largely due to a reduction in average SNF payments (Exhibit A-5).

Exhibit A-5: Average total episode payments decreased by $2,200

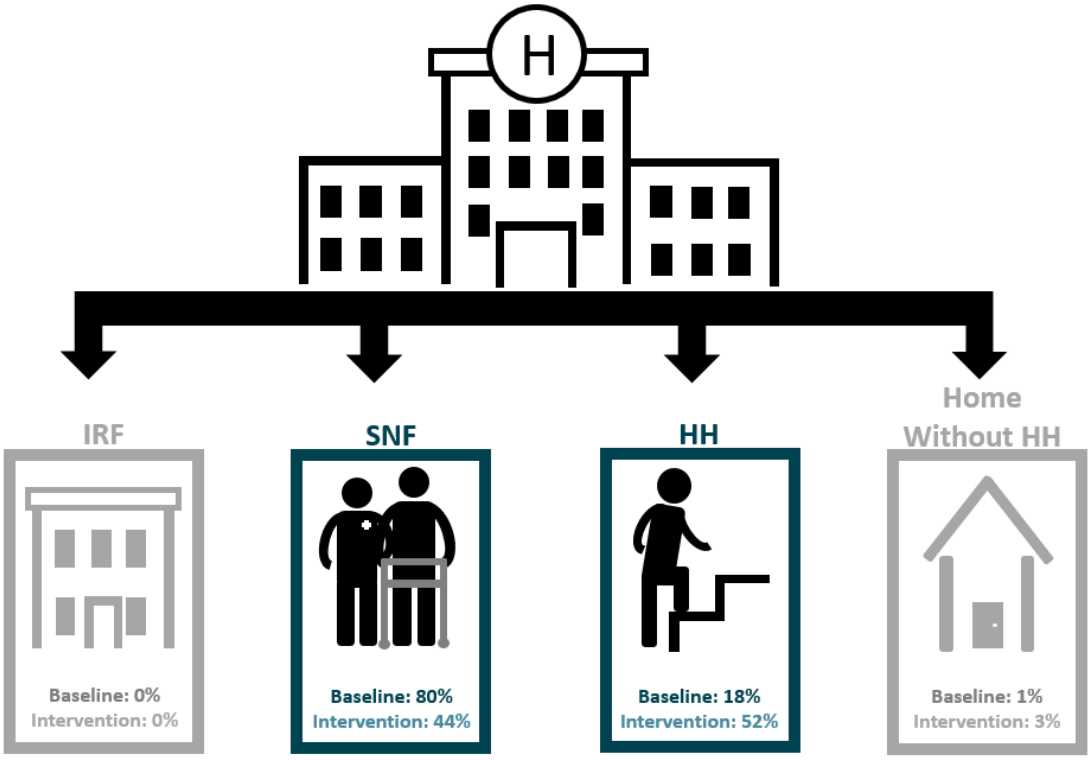


Source: Lewin analysis of Medicare claims and enrollment data for episodes initiated in 2012 through 2014 that ended between Q2 2012 and Q1 2015 (baseline) and episodes initiated during or after Q2 2016 that ended by Q4 2017 (intervention).

Notes: HHA = home health agency, SNF = skilled nursing facility.

The primary impact of the hospital's CJR model response efforts was a decrease in admissions to SNF and increase in admissions to HHA for LEJR patients. The hospital and surgeons' work to change patient expectations for PAC and to promote recovering at home rather than a SNF resulted in shifts in the first PAC discharge setting between baseline and intervention. Hospital representatives reported that, prior to the CJR model, 75% of patients were discharged to SNF and 25% were discharged to HHA as the first PAC setting; they reported that by 2018, those proportions had flipped so that 25% of LEJR patients were discharged to a SNF. Claims-based analysis of the hospital's CJR episodes also showed a large decrease in discharges to SNF (Exhibit A-6). After focusing on reducing SNF admissions for CJR patients, the health system chose SNF admission for all DRG 469 and 470 patients as a corporate key performance indicator for 2017. As a result, the health system reduced discharge to SNF across all payers. The SNF leadership reported that prior to 2016, 50% of their short-term beds were filled with joint replacement patients, whereas that number dropped to below 20% under the CJR model.

Exhibit A-6: Discharges to SNF decreased by nearly half from baseline to intervention



Source: Lewin analysis of Medicare claims and enrollment data for episodes initiated in 2012 through 2014 that ended between Q2 2012 and Q1 2015 (baseline) and episodes initiated during or after Q2 2016 that ended by Q4 2017 (intervention).

Notes: HH = home health, IRF = inpatient rehabilitation facility, SNF = skilled nursing facility.

Hospital leadership noted that while the number of discharges to SNF decreased, the average SNF LOS increased for CJR patients due to more complex patients being discharged to SNF; claims analysis showed a small increase in average SNF LOS (Exhibit A-7).

Exhibit A-7: For patients discharged to SNF, average LOS increased

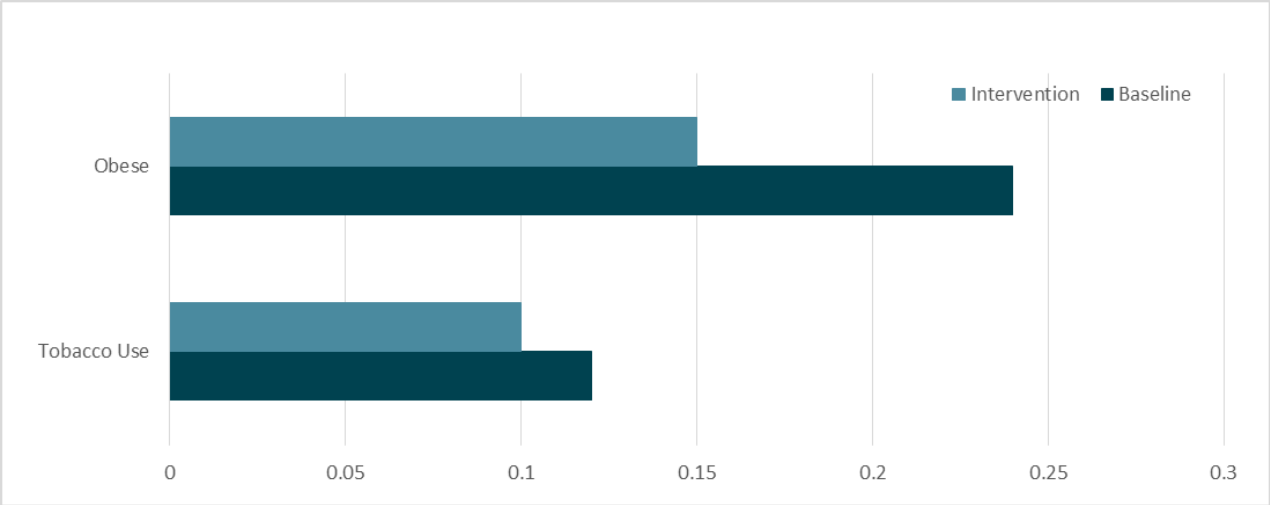
Source: Lewin analysis of Medicare claims and enrollment data for episodes initiated in 2012 through 2014 that ended between Q2 2012 and Q1 2015 (baseline) and episodes initiated during or after Q2 2016 that ended by Q4 2017 (intervention).

Notes: LOS = length of stay, SNF = skilled nursing facility.

As discussed in the previous section, interviewees reported an increased attention to modifiable risk factors during the pre-operative patient visit since the start of the CJR model. They noted this

led to delaying LEJR surgery. Claims analysis showed the proportion of CJR patients with obesity dropped from 24% to 12% from baseline to intervention, with a more modest decrease in tobacco use (Exhibit A-8).

Exhibit A-8: The proportion of Hospital A's CJR patients with obesity decreased



Source: Lewin analysis of Medicare claims and enrollment data for episodes initiated in 2012 through 2014 that ended between Q2 2012 and Q1 2015 (baseline) and episodes initiated during or after Q2 2016 that ended by Q4 2017 (intervention).

Hospital B Case Study

The Hospital B case study is based on site visit interviews with hospital administration, orthopedic nurses, three hospital-employed orthopedic surgeons, and physical therapists that work in both the inpatient setting and in Hospital B's HHA. The evaluation team also interviewed representatives from two independent SNFs that receive LEJR discharges from Hospital B.

In response to the CJR model, the hospital took several actions. Interviewees discussed developing a pre-surgical joint replacement class for all joint replacement patients, reducing the number of surgical implant vendors, developing a care pathway for PAC providers, and implementing a standardized telephonic follow up program for all joint replacement patients. Exhibit B-1 highlights key takeaways from the case study, summarizing hospital and market characteristics, Hospital B's impression of CJR model incentives, choice of actions, and resulting impacts.

Exhibit B-1: Key findings from Hospital B

Hospital Resources and Market Conditions
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Hospital B is a small, independent community hospital that owns a home health agency.
The hospital's primary service area is 5 rural counties and the nearest hospital is about 30 miles away.

Impressions of the Model and its Financial Pressure and Incentives
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Interviewees had a positive view of the CJR model. Seeing Medicare claims data on their LEJR episodes motivated them to implement changes to the service line.
The hospital could have discontinued participation, but chose to stay in.

Hospital Choice of Action
(Page 17)

1.) The hospital implemented a pre-surgical class and a telephonic follow-up program.
2.) Surgeons worked with the hospital to reduce the number of surgical implant vendors.
3.) The hospital developed and shared new guidelines for area PAC providers.

Impact: Payments, Utilization, and Quality
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Payment and Utilization: Average SNF payments decreased due to fewer SNF admissions and shorter SNF LOS.
Quality: The unplanned readmission rate for LEJR patients decreased from baseline.

Hospital B is a government-owned hospital with a higher Medicare days percentage than the average CJR participant hospital. Hospital B's MSA has a higher supply of SNF beds per 10,000 65+ population than the CJR average. The Herfindahl-Hirschman Index indicates that the MSA has a very competitive market for LEJR procedures (Exhibit B-2).

Exhibit B-2: Hospital B is a government-owned hospital located in a highly competitive market

Location	Characteristic	Hospital B	CJR average
Hospital	Annual Medicare LEJR volume	67	144
	Ownership	Government	14.4% government
	Health system membership	No	22.1% no membership
	Ownership of SNF, HHA or IRF	Yes	55.9% own PAC
	Medicare days percentage	48.5%	34.7%
	DSH percentage	22.6%	32.4%
	Bed count	78	266
	Teaching status	No	58.5% non-teaching
MSA	Population size	2,131,793	1,585,229
	Population aged 65+	12.9%	14.0%
	Herfindahl-Hirschman Index for LEJR[a]	1,000	3,434
	IRF discharges per 10,000 65+ population	17.8	20.6
	Ortho surgeons per 10,000 65+ population	0.9	0.9
	SNF beds per 10,000 65+ population	69.2	53.4

Source: Lewin analysis of 2015-2016 Area Health Resource File, 2014 American Community Survey, 5-Year Estimates, December 2016 POS, December 2014 PECOS, FY 2016 CMS Annual IPPS, and Medicare claims and enrollment data for episodes initiated in 2012 through 2014 that ended between Q2 2012 and Q1 2015.

Notes: DSH = disproportionate share hospital, HHA = home health agency, IRF = inpatient rehab facility, LEJR = lower extremity joint replacement, MSA = metropolitan statistical area, SNF = skilled nursing facility.

[a] A measure of market concentration calculated based on LEJR at acute care hospitals.

Hospital Resources and Market Conditions

Key resources informing CJR model response:

History of collaboration between hospital administration and employed orthopedic surgeons

Data analytics services provided by state hospital association

Nurse practitioners round in area SNFs

Hospital Resources

Hospital B is a small, independent community hospital serving a largely rural population. Three orthopedic surgeons perform LEJR procedures at Hospital B and have been employed by the hospital for several years. These surgeons operate exclusively at Hospital B and are not gainsharing under the CJR model. Both surgeon and hospital interviewees described a culture of collaboration between the surgeons and administration. Prior to the CJR model, there was a history of surgeon involvement on committees and in leadership meetings, working to make improvements to the service line.

HOSPITAL B

Hospital B received support from the state hospital association in preparing for the CJR model by providing, for example, analyses of the hospital's Medicare episode payments relative to the regional average.

In a 2017 Final Rule, CMS allowed rural hospitals and those with very low LEJR volume to exit the CJR model starting in 2018.

Hospital B was designated as a rural hospital, but chose to "opt in" and continue participating in the model.

Hospital B owns an HHA, closed its inpatient rehabilitation facility (IRF) in 2010, and owns three outpatient therapy sites; one located on the hospital campus and the other two in the eastern and western parts of the service area. In response to the Hospital Readmissions Reduction Program (HRRP), the hospital recently hired five nurse practitioners (NPs) who see patients in area SNFs and provide education to the SNFs. This collaboration was described positively by the hospital and the SNFs. Interviewees felt their patient population was very independent and had a strong preference to go home after discharge, sometimes against medical advice.

Market Conditions

Hospital B serves patients in 5 counties. There are roughly 12 SNFs across the 5 counties in its primary service area. The hospital is about 30 miles from both the nearest hospital and the urban center of the MSA. Despite a large supply of SNFs in the MSA overall, interviewees reported that due to a wide rural catchment area, there were limited high quality PAC options.

"At the hospital for years, it has always had an approach [of] let's cooperate with the surgeons rather than show [them] this is what you are going to do and this is how it is going to be."

-Orthopedic surgeon

Interviewees explained that the hospital competes with a number of large hospital chains in the MSA, as some patients are willing to travel into the urban center for elective procedures. In addition, there is an ambulatory surgical center right down the street from Hospital B that "takes a lot of their joints," especially patients with commercial insurance.

Impressions of the Model and its Financial Pressure and Incentives

Interviewees repeatedly discussed how influential Medicare claims data (both the analysis of historical claims from the state hospital association, as well as the claims data reports provided by CMS as part of the CJR model) was in their decision-making under the CJR model. Hospital administration explained that they had little idea of their patients' PAC costs. In addition interviewees reported these data made it clearer to hospital administration what their payment for Medicare LEJR procedures was, spurring them to focus on reducing implant costs. In addition, the data highlighted PAC utilization as Hospital B's largest opportunity to reduce total episode payments.

As a rural hospital, Hospital B had a one-time opportunity to discontinue participation in the CJR model at the start of 2018.[1] Hospital administration reported that they chose to continue participating because of a high level of surgeon engagement in the new hospital initiatives under the CJR model. They also indicated their CJR-related efforts "felt like what they were working toward was positive" for both patients and staff. Interviewees indicated that their inpatient LOS had decreased under the CJR model and wanted to maintain that progress.

Hospital Choice of Actions

The hospital implemented a number of changes in response to the CJR model, focusing on patient education and care pathways for PAC providers. Exhibit B-3 summarizes care redesign and other activities interviewees discussed and indicates whether they attributed these efforts to their response to the CJR model.

Implementation of a new pre-surgical education class

One of Hospital B's primary initiatives in response to the CJR model was the development and implementation of a pre-operative education class for joint replacement patients. A representative from the hospital's orthopedic nursing, physical therapy, occupational therapy, and care coordination departments all attend the class to introduce themselves to the patients and describe their role in the patients' care. The class is offered to all patients scheduled for a joint replacement surgery at the hospital, regardless of payer. The surgeons strongly recommend the class to patients and their families, and interviewees reported that about 95% of joint replacement patients attend.

Key aims of the class include educating patients about options for PAC and answering questions in advance of the inpatient stay. The hospital messages that home is the best place to recover if a patient has the proper support in place, and direct care staff continue this messaging during the inpatient stay as a result of the CJR model. One surgeon mentioned patients complaining about a SNF keeping them for a full 20 days although they wanted to go home. He said that now patients are educated that "they are the consumer" and do not need to stay in a SNF longer than they feel they need to.

[1] https://www.federalregister.gov/documents/2017/12/01/2017-25979/medicare-program-cancellation-of-advancing-care-coordination-through-episode-payment-and-cardiac

Exhibit B-3: Hospital B took several actions in response to the CJR model

Activity implemented or enhanced	Implemented in response to CJR	Implemented in response to other factors	Not Implemented
Pre-surgical patient optimization			x
Gainsharing			x
Patient risk stratification			x
Assessment of the home environment		x	
Patient and family education	x		
Use of an external vendor or consultant			x
New EHR or other HIT capabilities			x
Data sharing with PAC	x		
Data sharing with orthopedic surgeons	x		
Dedicated orthopedic patient navigator			x
Standardization of surgical implants or supplies	x		
Early ambulation		x	
Inpatient PT or OT changes		x	
Pain management protocols		x	
CJR-specific care protocols			x
Patient-reported outcome (PRO) data		x	
Discharge planning		x	
Communication with PAC providers	x		
Preferred PAC network			x
Patient follow-up post-discharge	x		

Source: Lewin analysis of site visit interview data.

Notes: EHR = electronic health record, HIT = health information technology, OT = occupational therapy, PAC = post-acute care, PRO = patient-reported outcome, PT = physical therapy.

In addition to providing education about the procedure and PAC plan, the hospital also brought all of the relevant pre-admission clearances (electrocardiography, lab work, social work, etc.) to the patient during the class, so individuals with difficulty walking do not need to go from place to place in the hospital. The social workers use a standard, hospital-developed assessment tool for discharge planning, which asks the patients about the physical environment of their home, about whether they live alone, and their current functional status in terms of activities of daily living.

Standardization of surgical implants and challenges with data collection and analysis

As previously discussed, the state hospital association provided Hospital B with an analysis of Medicare claims data to help it prepare for the CJR model. Administrators described that seeing how much they were paid for joint replacements motivated a new focus on reducing surgical implant prices. Surgeons and administrators met with implant vendors to negotiate prices.

Ultimately, Hospital B's administration convinced one of the surgeons to switch from the more expensive vendor's knee implant he commonly used to the implants used by the other two surgeons, reducing the number of implant vendors at the hospital from three to two. This resulted in significant internal cost savings for the hospital.

The director of quality has a nursing informatics background and was able to create reports out of the claims data provided by CMS. The surgeons noted that seeing their performance against their peers was motivational, and the CJR model encouraged them to review data on cost and quality. Hospital B has experienced challenges collecting PRO data under the CJR model and was unable to submit these data in the first two performance years. Hospital administrators explained that this is a challenge with their fragmented electronic health record system; they started inputting PRO data into patients' electronic records, but were unable to pull these data back out of the system for reporting to CMS.

Enhanced patient follow up and establishing care protocols for PAC providers

Under the CJR model, Hospital B implemented a structured patient follow up program where care transition nurses meet patients for the first time in the pre-surgical education class and then follow them for 90 days after hospital discharge. Nurses call the patients during the first week after discharge and then every other week through the 90-day post-discharge period. Nurses ask patients a standardized set of questions on each call, making sure there are no issues with wound healing, therapy regimen, follow up appointments, or medications. The nurses call patients regardless of whether they go to a SNF, HHA or straight to outpatient therapy and track each patient's PAC path on a spreadsheet. Patients are instructed to call these nurses directly with any concerns and before they make a decision to return to the hospital.

The CJR model also motivated Hospital B to create a new "care pathway" or set of guidelines (including LOS, intensity of therapy, and steps to prevent post-operative complications) for SNFs and HHAs that care for its joint replacement patients post-operatively. The surgeons indicated that the hospital has leverage to get the SNFs to cooperate because it is a major referral source in the rural area and the hospital has not created a preferred PAC network. The hospital started sharing facility-level outcome data, including LOS and readmission rate, on a quarterly basis with SNFs. The target for SNF LOS was set at 14-17 days for the first year of the CJR model. In late 2017, Hospital B informed the SNFs that the new LOS target is 7-9 days. For HHAs, there is now a higher priority placed on seeing the patient within the first 24 hours at home. Prior to the CJR model, if a patient was discharged on a Friday they would not be seen by home health until Monday, but the hospital's HHA now staffs therapists on the weekends. The CJR model has led to more emphasis on trying to get LEJR patients to use the hospital's facilities when they transition to outpatient therapy, where it has control over the quality of care, although patient preference to use other providers is respected.

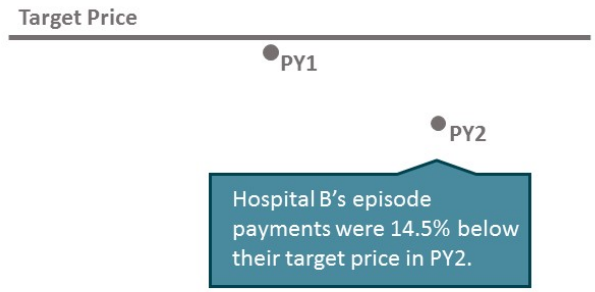
The evaluation team interviewed administrators and rehabilitation directors at two SNFs that receive a share of Hospital B's LEJR referrals. Interviewees from one SNF indicated that they had reduced their average LOS by more than half since the onset of the CJR model. They explained that they were able to achieve this outcome through starting discharge planning earlier in a patient's stay, increasing the amount of therapy patients receive each day, and by changing their goal from maximally rehabilitating a patient to preparing the patient for a lower level of care. The interviewees acknowledged tension between trying to meet LOS goals under the CJR model and treating more complex patients. They also noted that shorter stays reduced incidence of patient depression. While the representatives from one SNF indicated that they implemented Hospital B's care pathways for all joint replacement patients, the other SNF noted that it only provides the increased therapy frequency and shorter LOS to Medicare patients captured under the CJR model.

> *"Before therapy tried to get them to a level [of] independence before letting them discharge home…but now maybe [the goal is] to get them safe enough to where they can go home with some home health or lower level of care."*
>
> ***- SNF administrator***

Impact: Payments, Utilization, and Quality

Hospital B's historical episode payments were 2.3% below its quality-adjusted target price in PY1 and 14.5% below in PY2. It achieved a reconciliation payment in both years (Exhibit B-4).

Exhibit B-4: Hospital B achieved reconciliation payments in the first two performance years



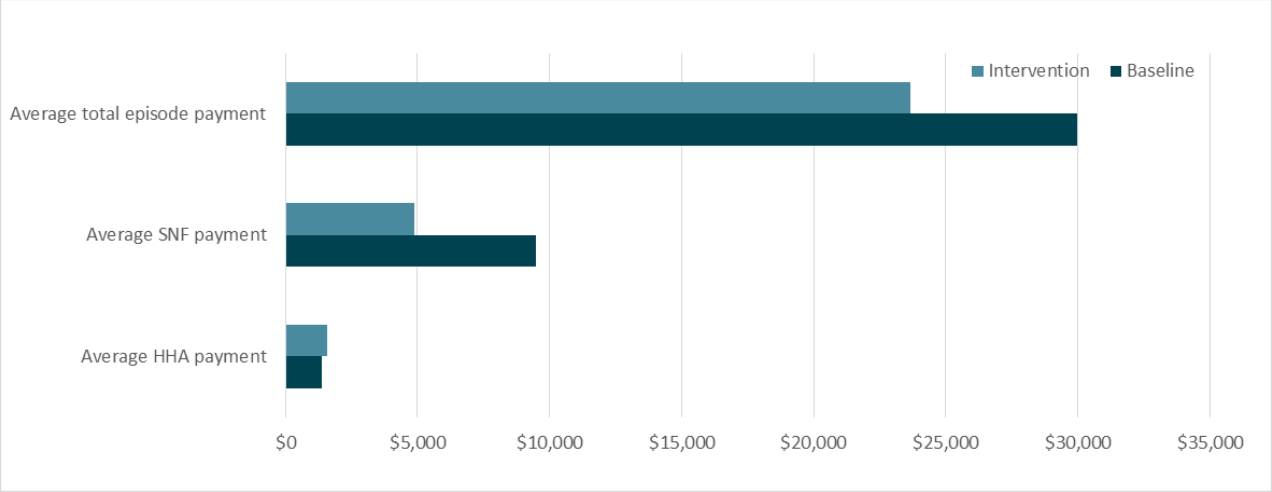
Measure	PY1 Final Reconciliation Results	PY2 Initial Reconciliation Results
Quality category	Acceptable	Good
Spending vs. target price	Below	Below
Standardized reconciliation amount per episode	$540	$1,362

Source: Lewin analysis of Mathematica Policy Research's CJR reconciliation data for performance year 1 (episodes ending Q2 2016 through Q4 2016) and performance year 2 (episodes ending Q1 2017 through Q4 2017).

Notes: PY = performance year.

In the first two performance years of the CJR model, Hospital B's average total episode payment decreased by about $6,300 (Exhibit B-5), largely driven by reductions in SNF payments.

Exhibit B-5: Total episode payments decreased by $6,300 on average from baseline to intervention

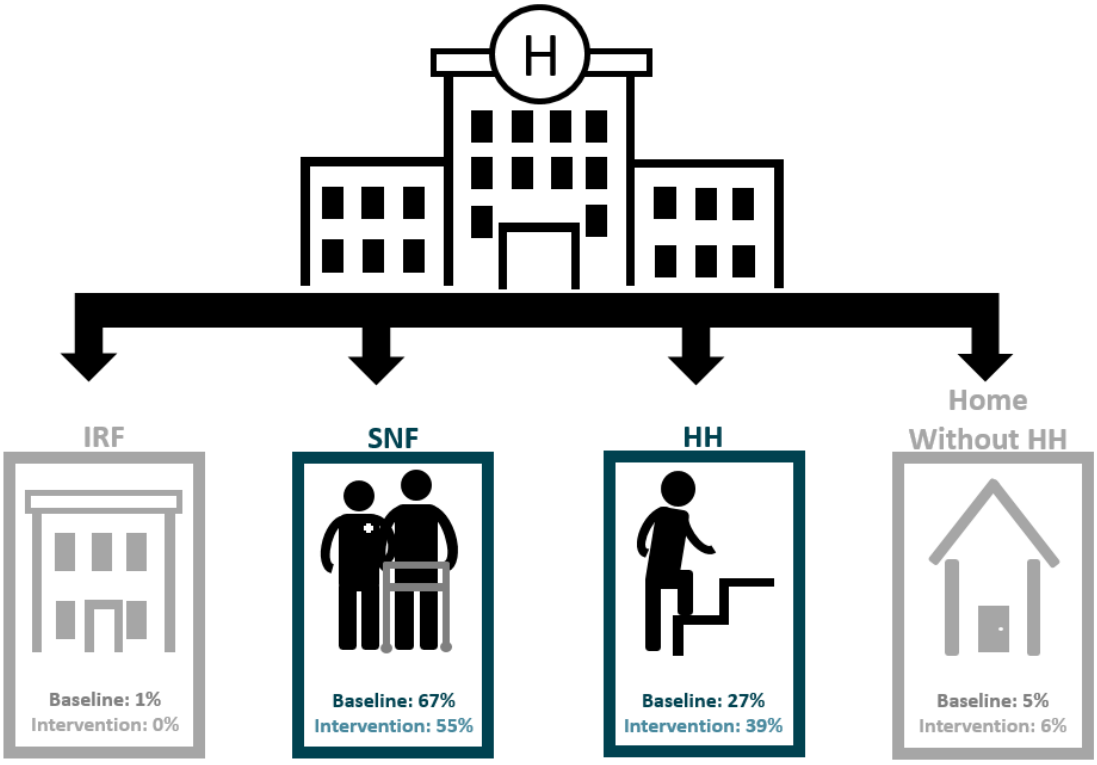


Source: Lewin analysis of Medicare claims and enrollment data for episodes initiated in 2012 through 2014 that ended between Q2 2012 and Q1 2015 (baseline) and episodes initiated during or after Q2 2016 that ended by Q4 2017 (intervention).

Notes: HHA= home health agency, SNF = skilled nursing facility.

Claims analyses showed an average reduction in SNF LOS of over 10 days for Hospital B's LEJR patients (26.7 days in the baseline period vs. 16.2 days in the intervention period); it also showed a decrease in the proportion of patients discharged to a SNF and a corresponding increase in patients discharged to home health (Exhibit B-6).

Exhibit B-6: Fewer patients are discharging from the hospital to a SNF and more patients are going directly home with home health

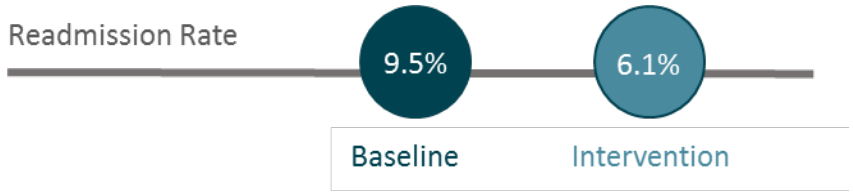


Source: Lewin analysis of Medicare claims and enrollment data for episodes initiated in 2012 through 2014 that ended between Q2 2012 and Q1 2015 (baseline) and episodes initiated during or after Q2 2016 that ended by Q4 2017 (intervention).

Notes: HH = home health, IRF = inpatient rehabilitation facility, SNF = skilled nursing facility.

Interviewees discussed several initiatives intended to reduce readmissions. Hospital B had hired NPs to round in area SNFs, hoping to reduce the number of patients admitted through the emergency room because of the HRRP. Interviewees also indicated that several patients with issues that could have led to sub-optimal surgical outcomes, such as an active infection, were identified in the pre-surgical class. The surgery for these patients was postponed and the patients were referred back to their primary care provider (PCP). In addition, interviewees felt their new patient follow up program had also prevented a number of readmissions by helping catch potential issues early enough to intervene. Claims analysis showed a reduction in Hospital B's LEJR unplanned readmission rate of about a third from baseline to intervention (Exhibit B-7).

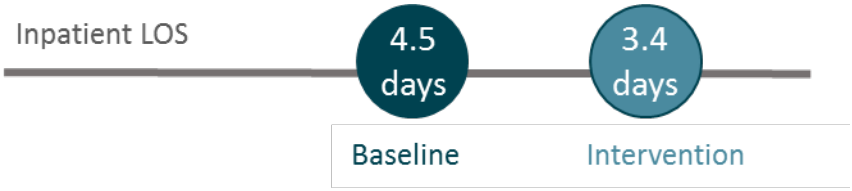
Exhibit B-7: Hospital B's unplanned readmission rate decreased by 3.4 percentage points



Source: Lewin analysis of Medicare claims and enrollment data for episodes initiated in 2012 through 2014 that ended between Q2 2012 and Q1 2015 (baseline) and episodes initiated during or after Q2 2016 that ended by Q4 2017 (intervention).

In discussing their decision to continue participation under the CJR model, Hospital B's administrators indicated that they wanted to maintain their reduced inpatient LOS. The hospital's average LOS decreased by a day on average from baseline (Exhibit B-8).

Exhibit B-8: Average inpatient LOS decreased in the intervention period



Source: Lewin analysis of Medicare claims and enrollment data for episodes initiated in 2012 through 2014 that ended between Q2 2012 and Q1 2015 (baseline) and episodes initiated during or after Q2 2016 that ended by Q4 2017 (intervention).

Note: LOS = length of stay.

Hospital C Case Study

The Hospital C case study is based on site visit interviews with health system orthopedic service line leadership, hospital administration and quality leadership, direct care staff, and individuals serving in care coordination and navigation roles. In addition, the evaluation team interviewed representatives from two local SNF chains, both of which have 3 locations in Hospital C's service area and are preferred providers of the hospital.

In response to the CJR model, the hospital increased data sharing with preferred PAC providers, established care paths for preferred PAC providers, and focused on reducing SNF admissions. It also reduced surgical supply costs and hired a new joint patient coordinator. Exhibit C-1 highlights key takeaways from the case study, summarizing hospital and market characteristics, Hospital C's impression of CJR model incentives, choice of actions, and resulting impacts.

Exhibit C-1: Key findings from Hospital C

Hospital Resources and Market Conditions
(Page 25)
Hospital C is owned by a health system. Although it is the system's only CJR-participating hospital, the system has been heavily involved in its response.
The hospital has a small group of engaged surgeons, an existing preferred PAC provider network, and prior experience with commercial episode-based payments.

Impressions of the Model and its Financial Pressure and Incentives
(Page 26)
Perceived financial pressure from the CJR model spurred the hospital to focus on reducing internal costs in addition to reducing episode payments. The hospital felt the model was a helpful motivator to make improvements and that the incentives were well-aligned with other policy initiatives.

Hospital Choice of Action
(Page 27)
1.) The hospital set care pathways for the preferred PAC network and increased data sharing.
2.) The hospital hired a new full time staff member to serve as a patient coordinator.
3.) The health system launched a new effort to reduce surgical supply chain costs.

Impact: Payments, Utilization, and Quality
(Page 30)
Payment: Average total episode payments decreased from baseline.
Utilization: The proportion of patients admitted to a SNF decreased from baseline.

Hospital C is a member of a larger health system, but is the system's only CJR participant hospital. The hospital is smaller and performs fewer Medicare LEJRs than the average CJR participant hospital. There are over 69 SNF beds per 10,000 65+ population, which is higher than the CJR average of over 50, which is consistent with interviewees views that the area is over-bedded for SNFs (Exhibit C-2).

Exhibit C-2: Hospital C performs a relatively low volume of LEJR surgeries for Medicare patients and is located in a market with a large concentration of SNFs

Location	Characteristic	Hospital C	CJR average
Hospital	Annual Medicare LEJR volume	37	144
	Ownership	Not for profit	60.7% not for profit
	Health system membership	Yes	77.9% membership
	Ownership of SNF, HHA or IRF	Yes	55.9% own PAC
	Medicare days percentage	36.1%	34.7%
	DSH percentage	34.6%	32.4%
	Bed count	140	266
	Teaching status	No	58.5% non-teaching
MSA	Population size	2,131,793	1,585,229
	Population aged 65+	12.9%	14.0%
	Herfindahl-Hirschman Index for LEJR[a]	1,000	3,434
	IRF discharges per 10,000 65+ population	17.8	20.6
	Ortho surgeons per 10,000 65+ population	0.9	0.9
	SNF beds per 10,000 65+ population	69.2	53.4

Source: Lewin analysis of 2015-2016 Area Health Resource File, 2014 American Community Survey, 5-Year Estimates, December 2016 POS, December 2014 PECOS, FY 2016 CMS Annual IPPS, and Medicare claims and enrollment data for episodes initiated in 2012 through 2014 that ended between Q2 2012 and Q1 2015.

Notes: DSH = disproportionate share hospital, HHA = home health agency, IRF = inpatient rehab facility, LEJR = lower extremity joint replacement, MSA = metropolitan statistical area, SNF = skilled nursing facility.

[a] A measure of market concentration calculated based on LEJR at acute care hospitals.

Hospital Resources and Market Conditions

Key resources informing CJR model response:

Previously developed data dashboards for orthopedics, created as a result of commercial bundles

Preferred post-acute care provider network established prior to CJR model

Support and resources provided by larger health system

Hospital Resources

The hospital is owned by a regional health system; all of the system's other hospitals are located outside of the MSA. Although this is the system's only CJR participant hospital, the system provides a lot of support because it plans to use the CJR model to prepare for pursuing commercial bundles. The system provides legal, data analytics, and other resources to help support Hospital C's response to the CJR model. Four orthopedic surgeons perform joint replacements at Hospital C, all of whom are employed by the hospital, but they are not gainsharing partners. Hospital interviewees described a high level of engagement from the surgeons, indicating that once they were educated on the goals of CJR and "doing what's best for the patient," they "hopped on board" to help map out what the expected PAC path would be based on research and to educate the SNFs.

Hospital interviewees discussed a number of factors that may have better prepared the hospital to engage with the CJR model. First, a full year before the start of the model, the hospital created a preferred PAC network of SNFs as part of its clinically integrated network. Second, the health system had previously participated in commercial bundled payments for the acute portion of the LEJR episode. As a result, the health system's internal data analytics team had developed orthopedic data dashboards that allowed leadership to regularly review utilization and quality data by surgeon for all patients admitted under DRGs 469 and 470. Sharing these data with the surgeons and providing system- and national-level performance benchmarks, was seen as highly influential in getting the physicians engaged in improvement efforts. Lastly, prior to the CJR model, the hospital had initiated improvements to the orthopedic service line as part of system-wide initiatives. Through the "one best practice," initiative, the orthopedic service line director said the system standardized the inpatient care pathway, including protocols for physical therapy, occupational therapy, and pain management.

Interviewees discussed serving a challenging patient population, noting a large homeless population, high prevalence of opioid abuse, and a large dual-eligible population. Twice as many of the hospital's Medicare LEJR patients were also eligible for Medicaid compared with the typical CJR participant hospital (31.0% vs. 14.4%). Interviewees also noted that less than 20% of their joint replacement patients had commercial insurance, which they described as a "tough payer mix."

Market Conditions

Interviewees described the MSA's orthopedic market as highly competitive, much more so than the market where the other health system hospitals are located. Many interviewees described the SNF market as over-bedded. One SNF representative said there are more than 80 facilities in the county, which is far from the MSA's urban center and not densely populated. Hospital representatives indicated that the nearby SNFs are high quality and most have a 3-star rating. One of the SNF chains gets 70% of their total admissions from Hospital C, so there is a history of collaboration. There are few IRFs in the area, and Hospital C closed its IRF in 2011. Interviewees indicated that there are a limited number of quality home health agencies in their service area.

Impressions of the Model and its Financial Pressure and Incentives

Overall, Hospital C and its health system had a positive view of the CJR model. System-level leadership discussed anticipating bundled payment initiatives for other service lines and have discussed developing bundled payment contracts with employer groups and commercial payers. Therefore, they wanted to use the CJR model as a "pilot" to get more experience and indicated that the entire system has applied to participate in Bundled Payments for Care Improvement-Advanced due to an increased level of comfort and confidence from participating in the CJR model.

> *"Just because it's Medicare and we were already not making ends meet with Medicare patients. And now having the pressure of coordinating over 90 days, that encounter, obviously it put more pressure. Before it was just the hospital visit. Now we're talking about 90 days that we're responsible for that patient."*
>
> ***- Health system administrator***

Interviewees felt the CJR model helped motivate them on initiatives they were already considering, such as efforts to reduce complications and readmissions. Further, they explained that the model's incentives were aligned with other policy initiatives such as the HRRP and public reporting of Medicare spending per beneficiary. By responding to the CJR model, the hospital felt they would improve performance under those other initiatives as well (Hospital C reported it had been penalized for its readmission rate under the HRRP). Hospital and health system administrators indicated that the CJR model spurred a renewed focus on achieving internal cost savings through changes to the surgical supply chain. Interviewees explained that the additional financial pressure they felt participating in the CJR model, coupled with their estimation that 70% of the hospital's LEJR acute care costs were attributed to surgical implants and supplies, led to these internal cost saving efforts.

In terms of specific CJR model incentives and design features, the director of quality at Hospital C felt the 3-day SNF waiver was a positive feature that would be even more beneficial if expanded beyond the model. She explained that since only a fraction of their joint replacements are under the CJR model, and only a portion of those are discharged to SNF, the impact of the waiver is not large.

Hospital Choice of Actions

The CJR model spurred the hospital and health system to take several actions, including implementation of a system-wide effort to reduce surgical implant costs, hiring a new patient coordinator, and leveraging the existing preferred PAC network to reduce SNF LOS. Exhibit C-3 summarizes care redesign and other activities interviewees discussed implementing, indicating whether or not they attributed these efforts to their response to the CJR model.

Exhibit C-3: Hospital C took several actions in response to the CJR model

Activity implemented or enhanced	Implemented in response to CJR	Implemented in response to other factors	Not Implemented
Pre-surgical patient optimization	x		
Gainsharing			x
Patient risk stratification	x		
Assessment of the home environment	x		
Patient and family education		x	
Use of an external vendor or consultant	x		
New EHR or other HIT capabilities			x
Data sharing with PAC		x	
Data sharing with orthopedic surgeons	x		
Dedicated orthopedic patient navigator	x		
Standardization of surgical implants or supplies	x		
Early ambulation		x	
Inpatient PT or OT changes		x	
Pain management protocols		x	
CJR-specific care protocols			x
PRO data	x		
Discharge planning	x		
Communication with PAC providers	x		
Preferred PAC network		x	
Patient follow-up post-discharge	x		

Source: Lewin analysis of site visit interview data.

Notes: EHR = electronic health record, HIT = health information technology, OT = occupational therapy, PAC = post-acute care, PRO = patient-reported outcome, PT = physical therapy.

Successful approach to reducing surgical supply chain costs

As a result of the CJR model, the hospital started working with its system to reduce costs for implants. The system hired a consultant to analyze the costs of different surgical supplies, who built data dashboards of acquisition costs for the components of all implants "down to the screws". These dashboards allowed the system to look at variation in costs and types of supplies used across surgeons. It also used the American Joint Replacement Registry to provide national benchmarks for utilization of different supplies at about one thousand other hospitals. A system-level representative championed this work and has become an expert in the costs of all surgical supply components. She described using a two-pronged approach to reducing costs after reviewing the consultant's dashboards: 1) the health system set price points that vendors needed to meet and 2) the dashboards were presented to surgeons to make them aware of the variation in supplies at the hospital and system compared with the national benchmarks. Surgeons also asked for "cost menus," but the health system could not share between vendor costs without violating their

contracts. Instead, it created a "heat map" of red, yellow, and green-labeled implants so that surgeons could see, roughly, if they are choosing a high or a low cost implant. This was being rolled out at the time of the interview. A health system representative explained that even though they had been focused on reducing surgical supply costs, this CJR model-motivated effort was the most successful.

Interviewees gave examples of large savings from supply changes, such as use of a different cement. One network hospital was using more expensive antibiotic bone cement for 93% of cases and the national benchmark was 47%, so surgeons developed clinical evidence informed criteria for when it is appropriate to use this cement. The system also negotiated with vendors to purchase individual implant components, rather than packs, because components of implant supply packs (e.g. the patella) are often thrown away. Lastly, they described being the first system in the county with a "bundle" price from a certain vendor for all components of one of the highly used implants. The vendor implemented this to win back business after one of the system's surgeons started using a lower cost vendor's implants. As a result, interviewees reported that the health system saves about $3,000 per procedure.

New position added to follow patients throughout the episode of care

Hospital C had an existing pre-operative class, but chose to make it "semi-mandatory" in response to the CJR model, meaning that patients are told the class is required, but if they cannot make it, the surgery is not cancelled. The class is now taught by a full-time care coordinator (the "joint coordinator"), whose position was created in response to the CJR model. There is now more focus on pre-operative planning and the hospital started using the joint class to better understand the patient's home environment and living situation. Hospital C implemented the Risk Assessment and Prediction Tool (RAPT) to use in predicting discharge destination. If a patient planned to go to a SNF but the RAPT suggests they are safe to go home, the hospital can have that conversation with the patient before surgery. The CJR model also motivated the hospital and surgeons to take a closer look at modifiable risk factors such as body mass index (BMI) and hemoglobin A1c (HbA1c). Hospital C did not set "hard stops" for these metrics, but indicated that there were times when the surgery was delayed until the patient was better prepared. A system representative explained that many insurers are also focusing on patient optimization and that one commercial payer will no longer authorize an elective joint replacement unless the patient has not used tobacco for 2 months.

The joint coordinator manually tracks data such as readmissions and PAC use. She follows up with patients telephonically throughout the 90-day post-discharge period, making sure they have the necessary follow-up appointments in place. She hosts weekly multi-disciplinary meetings to discuss all CJR patients still within the 90-day post-discharge period and those on the surgical schedule for the upcoming week. She also collects PRO data. Interviewees indicated that they are trying to get the surgeons access to the PRO data, which are entered into patients' EHRs. She currently only follows CJR patients, but the hospital noted plans to transition her into following all high risk patients, such as individuals with chronic obstructive pulmonary disease (COPD).

New care plan for existing preferred PAC network

Although the preferred PAC provider network was not implemented in response to the CJR model, it was perceived as an important aspect of the hospital's success under the model. The hospital holds quarterly forums with employees at preferred SNFs to discuss best practices and present the SNFs' performance metrics. The system had narrowed referrals from 120 to 60 SNFs, with the goal of focusing referrals at the 25 highest quality facilities. To select preferred providers, the health system relies on quality metrics and other information like staff turnover, leadership, coverage, telehealth capability, and reviews from transition coordinators' site visits. Preferred SNFs are required to acquire software to have read-only access to the hospital's EHR. In addition, health system analysts merged Medicare spend per beneficiary data with quality data to identify the highest performing SNFs. The SNFs submit quality metrics quarterly, including pressure injuries, falls, readmissions, ED use and patient experience to the hospital to remain a preferred provider. The hospital can now supplement these self-reported data with Medicare claims data.

Hospital C's leadership indicated that SNF utilization was the hospital's biggest opportunity to lower payments and improve quality under the CJR model. They educated all of their staff, including nurses working with the patients on the orthopedic floor that the "normal" standard of care is for a patient to return home with home health after surgery. For patients who do need to go to a SNF, the CJR model motivated the hospital to take a more active role in educating patients about the quality of the SNF options because interviewees felt patients most commonly tended to pick whichever facility was more geographically convenient.

> *"And so now that we've been able to have that communication upfront with the patient and family, we have actually gone through and looked at what is each SNFs quality data and here are the ones that far outweigh the others. The patient, the family can still have their choice regardless, but it's a more well-informed decision for them."*
>
> ***- Hospital director of quality***

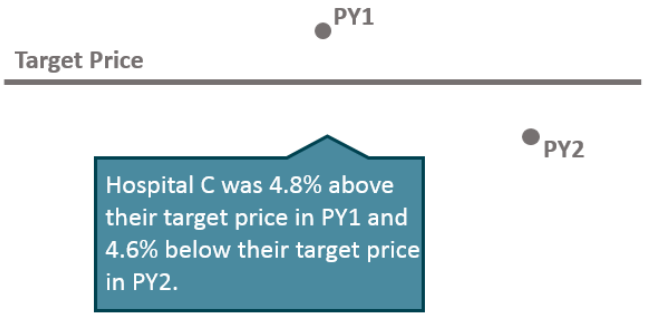
As a result of the CJR model and with the engagement of its orthopedic surgeons, the hospital also developed new care paths for the preferred SNFs. These care paths include best practices for wound care, preferred therapy regimen, and LOS guidelines. One of the orthopedic surgeons met with the representatives from preferred SNFs and educated them on the care path, discussing why the standards are the ones they should follow. The SNFs were also instructed to always call the surgeon directly before sending a patient back to the hospital. SNF representatives were quite positive about this process, noting that it was the first time they actually met the surgeon in person and that they learned a lot. This SNF now applies tenets of Hospital C's care path across all of its joint patients. SNF interviewees also reported that the CJR model prompted better communication across providers. They described that they now emphasize follow up with a patient's PCP with a discharge summary and list of medications. The hospital's director of quality felt that the CJR model shed light on how much the hospital and PAC providers operated in silos and the new

emphasis on partnership across settings for the benefit of the patient is one of the things Hospital C is most proud of.

Impact: Payments, Utilization, and Quality

Hospital C's episode payments were historically above the regional average. During performance year 1, Hospital C's episode payments exceeded its quality-adjusted target price, but in the second performance year, the hospital reduced total episode spending enough to come below the target and earn a reconciliation payment (Exhibit C-4).

Exhibit C-4: After exceeding the target in PY1, Hospital C earned a reconciliation payment in PY2



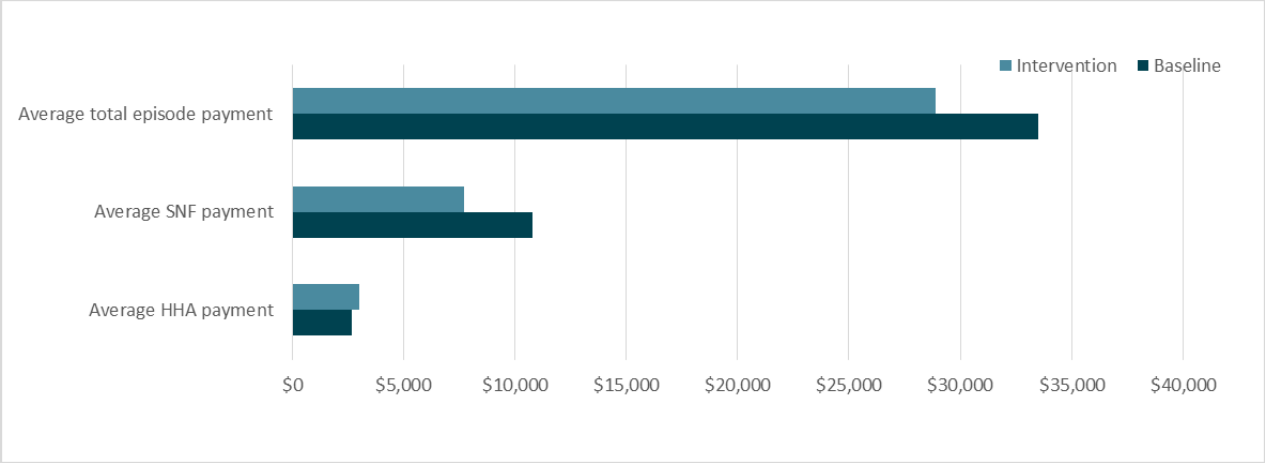
Measure	PY1 Final Reconciliation Results	PY2 Initial Reconciliation Results
Quality category	Good	Acceptable
Spending vs. quality-adjusted target price	Above	Below
Standardized reconciliation amount per episode	$0	$1,387

Source: Lewin analysis of Mathematica Policy Research's CJR reconciliation data for performance year 1 (episodes ending Q2 2016 through Q4 2016) and performance year 2 (episodes ending Q1 2017 through Q4 2017).

Notes: PY = performance year.

Hospital interviewees indicated their focus on discharging more patients to home health instead of SNFs. The hospital reported decreasing the proportion of all of their LEJR patients discharged to a SNF from 58% to 29% during the first year of the CJR model, with a goal of 25%. Claims analysis indicated that the hospital reduced total episode payments for CJR patients by more than $4,500, largely by reducing average SNF payments (Exhibit C-5).

Exhibit C-5: Hospital C decreased average total episode payments by $4,600 from baseline to intervention

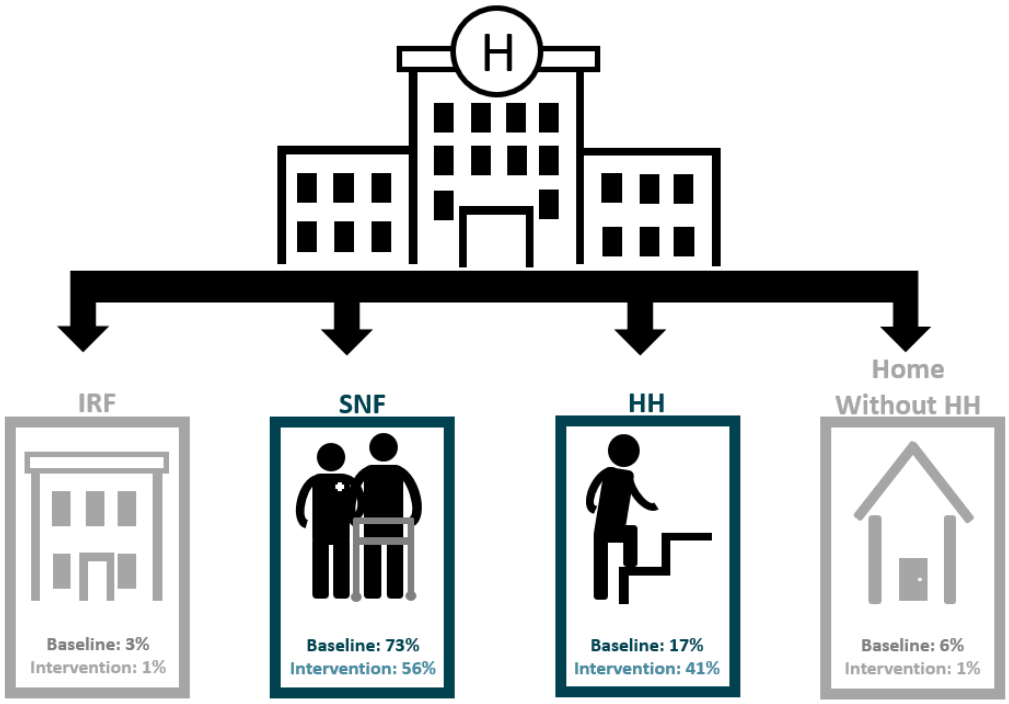


Source: Lewin analysis of Medicare claims and enrollment data for episodes initiated in 2012 through 2014 that ended between Q2 2012 and Q1 2015 (baseline) and episodes initiated during or after Q2 2016 that ended by Q4 2017 (intervention).

Notes: HHA = home health agency, SNF = skilled nursing facility.

Consistent with the trends Hospital C reported for its overall joint replacement population, Medicare claims data indicated a decrease in CJR patients discharged to a SNF and an increase in those discharged to home health (Exhibit C-6).

Exhibit C-6: The proportion of CJR patients discharged home with home health more than doubled from baseline to intervention

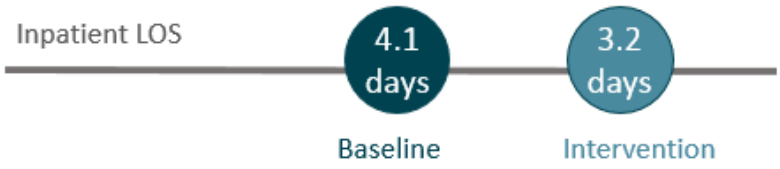


Source: Lewin analysis of Medicare claims and enrollment data for episodes initiated in 2012 through 2014 that ended between Q2 2012 and Q1 2015 (baseline) and episodes initiated during or after Q2 2016 that ended by Q4 2017 (intervention).

Notes: HH = home health, IRF = inpatient rehabilitation facility, SNF = skilled nursing facility.

Interviewees discussed efforts to standardize inpatient care protocols so patients were ambulating more quickly after surgery, although this work was not due to the CJR model. Claims based analysis showed a decrease in the average inpatient LOS for Medicare LEJR patients from baseline (Exhibit C-7).

Exhibit C-7: The average inpatient LOS decreased almost a full day from baseline to intervention



Source: Lewin analysis of Medicare claims and enrollment data for episodes initiated in 2012 through 2014 that ended between Q2 2012 and Q1 2015 (baseline) and episodes initiated during or after Q2 2016 that ended by Q4 2017 (intervention).

Note: LOS = length of stay.

Hospital D Case Study

The Hospital D case study is based on site visit interviews with hospital and health system administrators, the external consultant working on the system's CJR model response, nursing and therapy staff, and an employed orthopedic surgeon. In addition, the evaluation team interviewed one SNF and one HHA that were preferred providers of the hospital.

In response to the CJR model, the hospital's health system hired an external consulting firm to support all of its CJR participant hospitals. The firm developed and oversaw implementation of a system-wide strategic approach to responding to the CJR model. Interviewees described a two-phase effort: first, the hospital focused on changing PAC utilization and quality; second, it focused on implementing best practices to reduce readmissions. Exhibit D-1 highlights key takeaways from the case study, summarizing hospital and market characteristics, Hospital D's impression of CJR model incentives, choice of actions, and resulting impacts.

Exhibit D-1: Key findings from Hospital D

Hospital Resources and Market Conditions
(Page 34)
Hospital D is in a small regional health system that engaged an external consultant to develop a CJR model response strategy to be implemented at all of their hospitals.
There is a large supply of SNFs in the area and the hospital developed a preferred network prior to the CJR model.

Impressions of the Model and its Financial Pressure and Incentives
(Page 34)
The consultant conducted an analysis that suggested the health system was at risk for repayment to CMS under the CJR model if it did not reduce episode payments. The analysis identified PAC spending as the health system's largest opportunity to reduce episode spending.

Hospital Choice of Action
(Page 35)
1.) The health system decreased the number of patients admitting to institutional post-acute care and increase utilization of their preferred PAC providers.
2.) A steering committee developed best practices to reduce patient readmission risk.

Impact: Payments, Utilization, and Quality
(Page 37)
Utilization: Interviewees reported a decrease in institutional PAC admissions, both at Hospital D and system-wide.
Quality: Readmissions and ED use decreased from baseline.

Hospital D performs a high volume of CJR cases annually relative to the average for CJR participant hospitals and it is larger than other participants. The number of SNF beds per 10,000 65+ population is higher for Hospital D's MSA than the CJR average (Exhibit D-2).

Exhibit D-2: Hospital D is large, system-owned hospital in a saturated SNF market

Location	Characteristic	Hospital D	CJR average
Hospital	Annual Medicare LEJR volume	281	144
	Ownership	Not for profit	60.7% not for profit
	Health system membership	No	22.1% no membership
	Ownership of SNF, HHA or IRF	Yes	55.9% own PAC
	Medicare days percentage	29.0%	34.7%
	DSH percentage	19.6%	32.4%
	Bed count	320	266
	Teaching status	No	58.5% non-teaching
MSA	Population size	2,131,793	1,585,229
	Population aged 65+	12.9%	14.0%
	Herfindahl-Hirschman Index for LEJR[a]	1,000	3,434
	IRF discharges per 10,000 65+ population	17.8	20.6
	Ortho surgeons per 10,000 65+ population	0.9	0.9
	SNF beds per 10,000 65+ population	69.2	53.4

Source: Lewin analysis of 2015-2016 Area Health Resource File, 2014 American Community Survey, 5-Year Estimates, December 2016 POS, December 2014 PECOS, FY 2016 CMS Annual IPPS, and Medicare claims and enrollment data for episodes initiated in 2012 through 2014 that ended between Q2 2012 and Q1 2015.

Notes: DSH = disproportionate share hospital, HHA = home health agency, IRF = inpatient rehab facility, LEJR = lower extremity joint replacement, MSA = metropolitan statistical area, SNF = skilled nursing facility.

[a] A measure of market concentration calculated based on LEJR at acute care hospitals.

Hospital Resources and Market Conditions

Key resources informing CJR model response:

Health system engaged a consultant to develop a system-wide response strategy for the CJR model

Reinvigorated effort to establish a preferred post-acute care provider network

Hospital Resources

Hospital D is part of a regional health system with all of its hospitals participating in the CJR model. This hospital is one of the system's higher LEJR volume facilities. Because all of the system's hospitals are in the CJR model, it chose to develop a response at the system level for efficiency. Hospital D's system engaged an external consulting firm to analyze the claims data provided by CMS, develop the system's response strategy, and oversee implementation of CJR-related efforts at each of its hospitals. Due to the system's involvement, interviews captured perspectives and information from the hospital and the health system.

The hospital and system have a mix of employed and private practice surgeons performing joint replacement procedures, but interviewees felt that having a number of employed surgeons helped with buy-in for implementation of care improvement initiatives. Interviewees expressed confidence in the high quality of their orthopedic service line, and indicated that multiple system hospitals

hold Joint Commission Gold Seal certifications for hip and knee replacement. Hospital D holds one for hip fracture care in addition to hip and knee replacement.

Market Conditions

Hospital D's health system was described as one of the three primary systems in the MSA, where the market for LEJR procedures is highly competitive. The hospital does not own any SNFs or HHAs. The system's consultant indicated that this market has a notably high supply of SNFs that stands out among other areas of the country. Interviewees indicated that the PAC providers are very competitive with one another and that SNFs advertise through television commercials. Hospital D originally created a preferred PAC network in 2011, but interviewees indicated that the effort to refer patients to providers within the network was reinvigorated in response to the CJR model.

Impressions of the Model and its Financial Pressure and Incentives

The hospital and system administration had a positive impression of CJR, viewing it as "just one model in a health care system-wide move to focus on population health." Based on analysis of CJR model quality-adjusted target price and historical claims data, the health system's consultant determined that the system was likely to make repayments to CMS unless it lowered episode payments. As a result, the health system focused on shifting PAC utilization.

> *"When we look at the data from 2012 to 2014 by hospital, knowing that the acute is basically the DRG payment…we really saw post-acute as the primary opportunity area to focus on, with a little bit of opportunity around readmissions."*
>
> ***- Health system administrator***

Interviewees expressed specific concern about Medicare's removal of TKA from the inpatient-only list. To project the impact of this policy change on the system's CJR model performance, the consultant analyzed system claims data from February 2018. The analysis indicated a large proportion of the system's healthier Medicare elective knee replacement patients had outpatient surgery. Interviewees expressed concern that if the less complex cases continue to move to the outpatient setting, their CJR TKA volume would be drastically reduced and that a higher proportion of remaining episodes would require SNF stays after discharge. They felt this would negatively impact their ability to reduce total CJR episode spending.

Hospital Choice of Actions

The CJR model spurred the creation of a system-level work group and surgeon steering committee that identified and implemented care redesign initiatives with the help of their consultant. During the first year and a half of the model, the group focused on changing PAC utilization and improving PAC provider quality. Noting that the CJR episode readmission rate was not decreasing, the second phase of the response focused on implementing best practices for inpatient care to

reduce complications. Exhibit D-3 summarizes care redesign and other activities interviewees discussed implementing, indicating whether or not they attributed these efforts to the response to the CJR model.

Exhibit D-3: Hospital D took several actions in response to the CJR model

Activity implemented or enhanced	Implemented in response to CJR	Implemented in response to other factors	Not Implemented
Pre-surgical patient optimization	x		
Gainsharing	x		
Patient risk stratification	x		
Assessment of the home environment	x		
Patient and family education	x		
Use of an external vendor or consultant	x		
New EHR or other HIT capabilities	x		
Data sharing with PAC	x		
Data sharing with orthopedic surgeons	x		
Dedicated orthopedic patient navigator	x		
Standardization of surgical implants or supplies		x	
Early ambulation	x		
Inpatient PT or OT changes	x		
Pain management protocols	x		
CJR-specific care protocols			x
PRO data	x		
Discharge planning	x		
Communication with PAC providers	x		
Preferred PAC network	x		
Patient follow-up post-discharge	x		

Source: Lewin analysis of site visit interview data.

Notes: EHR = electronic health record, HIT = health information technology, OT = occupational therapy, PAC = post-acute care, PRO = patient-reported outcome, PT = physical therapy.

Focus on PAC utilization and quality

The hospital's main focus under the CJR model was reducing institutional PAC use. The "joint book" – information provided to patients prior to surgery – was revised to remove mention of SNF and set expectations that the patient would be discharged home. As a way to further reduce episode costs, the hospital worked to reduce the number of patients receiving home health care by discharging straight to outpatient therapy.

The hospital created a network of preferred PAC providers in 2011, but updated the network in late 2016 due to the CJR model. In addition to meeting hospital-defined quality standards, preferred providers are required to submit patient-level outcome and utilization data through the hospital system's EHR web tool. The tool is free for the facilities to use and was paid for by the health system. The hospital creates reports based on these data that are shared with preferred providers monthly. Interviewees noted that risk adjust the data to account for facilities with more complex patients who need a longer LOS.

> *"Obviously, knowing that patients always have the full right to retain choice, but places that we chose to partner with had shorter lengths of stay, had lower readmission rates, had better quality. And so, there was a real message and reason for trying to get our patients to those facilities if they were amenable to that."*
>
> ***- Consultant***

The CJR model also motivated the hospital to increase patient utilization of the preferred provider network. Through its EHR the hospital tracks the reason a patient chooses a non-preferred PAC provider so that they can address barriers (e.g., lack of coverage for a certain geographic area).

Investment in patient navigators to cover entire episode of care

The health system hired new care transition nurses (equivalent to 2.6 full time equivalent employees) for all of their hospitals in the CJR model. They help begin discharge planning prior to admission. Care transition nurses are notified during the scheduling phase, when the patient first meets with the surgeon to discuss the procedure. The nurses then reach out to the patient and start tracking them. They also review each patient's care needs prior to the procedure to inform discussions about PAC discharge destination.

After the inpatient stay, the care transition nurses follow the patients over the 90-day post-discharge period, using a standardized telephone protocol. If the patient goes to a preferred SNF, the nurses review the patient information in the EHR web tool. If a patient does not use a preferred PAC provider, the nurses call the SNF to collect information until the patient is discharged. Interviewees discussed how these nurses tracking the patients allows them to collect and examine data on patient PAC use and readmission rate; these internal metrics help them track progress on their goals under the CJR model

Quality improvement to reduce readmissions

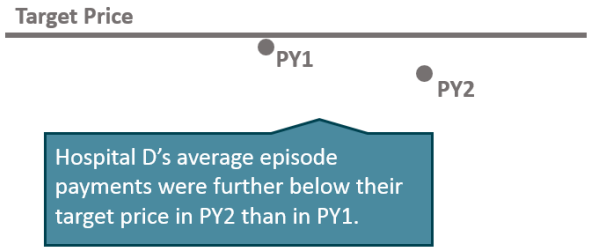
The second phase of the health system's response to the CJR model involved reducing unplanned readmissions through the implementation of clinical best practices. The CJR model steering committee approved and oversaw implementation of initiatives on pre-operative patient optimization, multimodal pain management, and early ambulation after surgery, venous thromboembolism prophylaxis, and post-operative nausea and vomiting. Nursing staff reported that as a result, variation in post-operative orders decreased between individual surgeons. They noted that continuous passive motion machines and patient controlled analgesia pumps had been

completely phased out and more standardization in post-surgical anticoagulants ordered by physicians.

Impact: Payments, Utilization, and Quality

Hospital D's total episode payments were 0.6% below their quality-adjusted target price in performance year 1, and 5.5% below the target in performance year 2. The hospital earned a reconciliation payment in both years (Exhibit D-4).

Exhibit D-4: Hospital D achieved reconciliation payments in both performance years



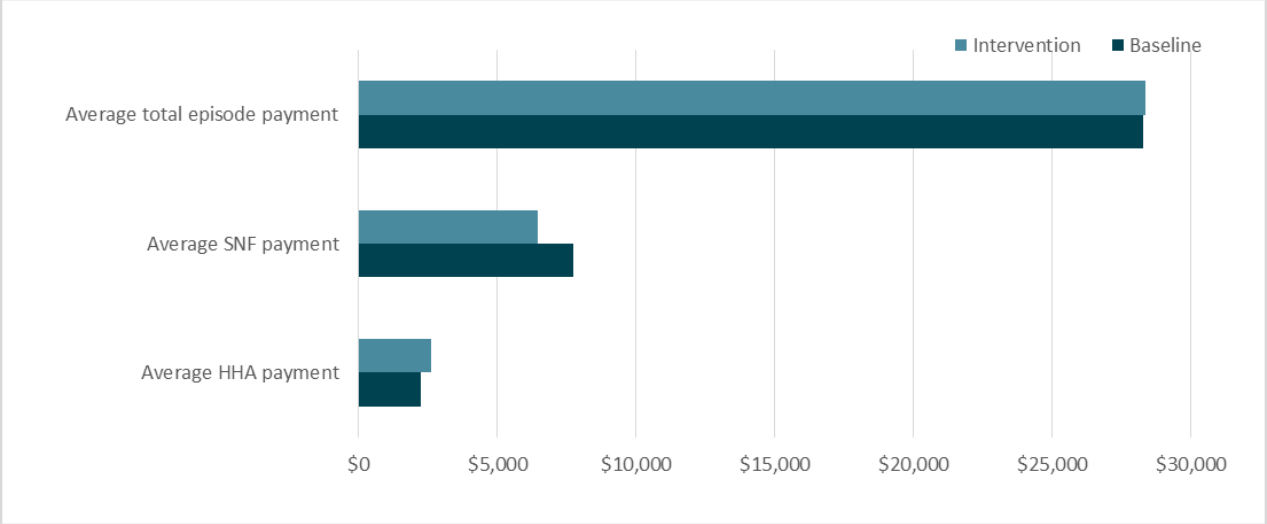
Measure	PY1 Final Reconciliation Results	PY2 Initial Reconciliation Results
Quality category	Excellent	Good
Spending vs. quality-adjusted target price	Below	Below
Standardized reconciliation amount per episode	$201	$1,447

Source: Lewin analysis of Mathematica Policy Research's CJR reconciliation data for performance year 1 (episodes ending Q2 2016 through Q4 2016) and performance year 2 (episodes ending Q1 2017 through Q4 2017).

Notes: PY = performance year.

Claims data indicated that average total episode payments for Hospital D did not decreased since baseline, although average SNF payments went down (Exhibit D-5).

Exhibit D-5: Total average episode payments remained stable between baseline and intervention

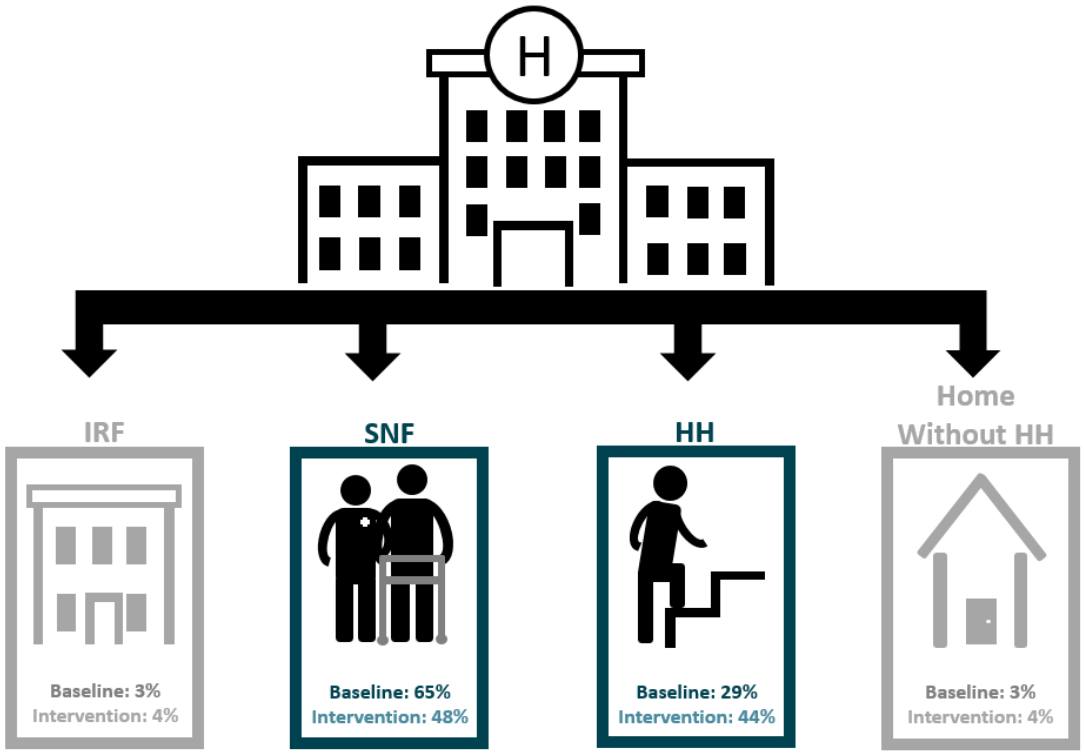


Source: Lewin analysis of Medicare claims and enrollment data for episodes initiated in 2012 through 2014 that ended between Q2 2012 and Q1 2015 (baseline) and episodes initiated during or after Q2 2016 that ended by Q4 2017 (intervention).

Notes: HHA = home health agency, SNF = skilled nursing facility.

The health system's consultant shared results of her claims analysis, which was based on all CJR episodes for the entire system. She reported that in the baseline period, 52.1% of patients were discharged to institutional PAC (IRF and SNF), and that by performance year two that number had dropped to 28.6%. In line with these findings, claims analysis shows that Hospital D is reduced the proportion of patients discharged to SNF from baseline (Exhibit D-6). The system also increased the use of preferred SNFs, reporting that 69% of patients discharged to SNF, compared with 28% when their efforts started.

Exhibit D-6: Hospital D discharged fewer patients to SNF and more patients home with home health under the CJR model

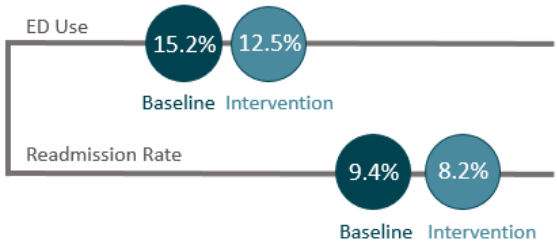


Source: Lewin analysis of Medicare claims and enrollment data for episodes initiated in 2012 through 2014 that ended between Q2 2012 and Q1 2015 (baseline) and episodes initiated during or after Q2 2016 that ended by Q4 2017 (intervention).

Notes: HH = home health, IRF = inpatient rehabilitation facility, SNF = skilled nursing facility.

The system's consultant noted that readmissions decreased slightly from before the CJR model, but they hope to drive down further by implementing new best practices. For Hospital D specifically, claims analysis indicated that ED use and readmissions decreased in the intervention period (Exhibit D-7).

Exhibit D-7: Hospital D's unplanned readmission and ED visit rates decreased



Source: Lewin analysis of Medicare claims and enrollment data for episodes initiated in 2012 through 2014 that ended between Q2 2012 and Q1 2015 (baseline) and episodes initiated during or after Q2 2016 that ended by Q4 2017 (intervention).

Note: ED = emergency department.

Hospital E Case Study

The Hospital E case study is based on site visit interviews with hospital administrators, direct care staff, an employed orthopedic surgeon, and health system representatives. We also interviewed staff from three SNFs. One SNF is part of a long-term and PAC chain that was recently acquired by the Hospital E's health system, and the other two are independent facilities.

In response to the CJR model, the hospital used pre-existing care protocols to develop a standardized care pathway for LEJR patients. Its pre-surgical education class was used to discuss post-discharge care plans with patients and their families. Exhibit E-1 highlights key takeaways from the case study, summarizing hospital and market characteristics, Hospital E's impression of CJR model incentives, choice of actions, and resulting impacts.

Exhibit E-1: Key findings from Hospital E

Hospital Resources and Market Conditions
(Page 42)
Prior to the CJR model, Hospital E implemented a co-management arrangement that provided the infrastructure for engaging surgeons in refining standardization and care redesign in response to CJR. The hospital is owned by one of the two main health systems in the area.

Impressions of the Model and its Financial Pressure and Incentives
(Page 43)
Interviewees discussed challenges collecting patient-reported outcome data.
In addition, they expressed concern about the impact of removal of TKAs from the inpatient only list on their CJR model performance.

Hospital Choice of Action
(Page 43)
1.) The hospital leveraged an existing co-management agreement to engage its orthopedic surgeons in standardizing the care pathway for LEJR patients.
2.) The hospital started discussing discharge planning in pre-surgical education classes.

Impact: Payments, Utilization, and Quality
(Page 46)
Payment: Total average episode payments decreased by $7,000 from baseline.
Utilization: The proportion of patients discharged to SNFs decreased from baseline, while the proportion using home health care increased.

Hospital E is a teaching hospital with 72 beds, making it a relatively small hospital in comparison to the CJR average. Its SNF beds per 10,000 age 65+ population is higher than the CJR MSA average. Hospital E is part of a hospital system that recently acquired a large national long-term care facility chain, which provides skilled nursing, long-term residential care, home health, and other care (Exhibit E-2). The acquisition was not related to the CJR model.

Exhibit E-2: Hospital E is a relatively small teaching hospital, located in a well-bedded SNF market

Location	Characteristic	Hospital E	CJR average
Hospital	Annual Medicare LEJR volume	62	144
	Ownership	Not for profit	60.7% not for profit
	Health system membership	Yes	77.9% membership
	Ownership of SNF, HHA or IRF	Yes	55.9% own PAC
	Medicare days percentage	30.3%	34.7%
	DSH percentage	26.0%	32.4%
	Bed count	72	266
	Teaching status	Yes	41.5% teaching
MSA	Population size	608,847	1,585,229
	Population aged 65+	13.7%	14.0%
	Herfindahl-Hirschman Index for LEJR[a]	2,373	3,434
	IRF discharges per 10,000 65+ population	9.7	20.6
	Ortho surgeons per 10,000 65+ population	1.0	0.9
	SNF beds per 10,000 65+ population	78.7	53.4

Source: Lewin analysis of 2015-2016 Area Health Resource File, 2014 American Community Survey, 5-Year Estimates, December 2016 POS, December 2014 PECOS, FY 2016 CMS Annual IPPS, and Medicare claims and enrollment data for episodes initiated in 2012 through 2014 that ended between Q2 2012 and Q1 2015.

Notes: DSH = disproportionate share hospital, HHA = home health agency, IRF = inpatient rehab facility, LEJR = lower extremity joint replacement, MSA = metropolitan statistical area, SNF = skilled nursing facility.

[a] A measure of market concentration calculated based on LEJR at acute care hospitals.

Hospital Resources and Market Conditions

Key resources informing CJR model response:

Existing co-management arrangement as foundational infrastructure for standardization and engagement of surgeons in care redesign

Hospital Resources

Hospital E is part of a regional health system. Two hospitals in the system are participating in the CJR model. The system's largest and highest LEJR volume hospital was designated rural because of its status as a rural referral center and opted out of the CJR model.[2]

Five orthopedic surgeons operate at Hospital E. The majority of orthopedic surgeons who operate at Hospital E and other system hospitals are part of an orthopedic co-management arrangement through a corporate entity that is separate from the hospital system through which affiliated surgeons buy shares. Under the co-management arrangement, meetings were convened between surgeons and hospital staff to roll out projects to improve the system's orthopedics program. The result has been an ongoing implementation of best practices, defined care pathways,

[2] https://www.law.cornell.edu/cfr/text/42/412.96

and surgical supply vendor consolidation. The co-management arrangement, which existed prior to the CJR model, was the primary vehicle for engaging surgeons in responding to the new model.

Roughly 60% of the hospital's surgical volume is orthopedics. Hospital administration stated, "Orthopedics in general feeds the house" and reported it was one of the only profitable service lines. Additionally, the hospital reported serving an increasingly aging, comorbid, vulnerable population with a high prevalence of complicating conditions such as heart failure, COPD, high blood pressure, high cholesterol, and diabetes.

Market Conditions

Interviewees told us that there are ten hospitals in the MSA and that two systems control the vast majority of the health care market. The hospital system owns 6 SNFs in the market.

The hospital system has an ACO under the MSSP with about 70,000 attributed lives. When asked about the overlap between the ACO and the CJR model, interviewees stated that there were emergent "synergies because of all the work [they] are doing to better manage patients." Interviewees also discussed an increase in the number of patients in Medicare Advantage (MA) plans, which closely monitor SNF LOS. SNF interviewees reported feeling more of an impact on the census from MA than the CJR model. From 2012-2014, the MA penetration of this MSA was 36.9% in comparison to the CJR median of 26.3%, and SNF staff indicated a noticeable increase over the prior two years.

Impressions of the Model and its Financial Pressure and Incentives

Interviewees indicated that the larger volume hospital in the health system opted out of the CJR model when it could due to its rural designation as a rural referral center. This decision to opt out was because Medicare began covering TKAs in the outpatient setting. The hospital was concerned that the patients who received their TKA in the inpatient setting and thus under the CJR model would be the more complex and expensive, and more likely to be discharged to a SNF. They noted that when healthier patients "were taken out of CJR," by becoming outpatients, the average the patient mix and spending per patient would change.

The hospital reported experiencing significant challenges with PRO data collection and reported this activity as its "biggest stumbling block." The data management team indicated that PRO data "does not align with surgery process goals" and therefore feels disconnected from what the hospital is trying to accomplish. One interviewee wished the tool could be used to help inform surgeons about whether a "patient's outcomes are on the curve to set them up for a higher quality of life down the road." The interviewee noted the PRO data are not being shown to the surgeons under the current work flow operational design. Hospital representatives were also concerned that even though they devote significant resources to collecting PRO data, they are not confident that their response rates will meet CMS's requirements. They administer the survey to all of their LEJR patients, to ensure that all CJR patients receive it, because they do not manage by payer. This

resulted in a high volume of reporting so the hospital had to devote a floor nurse to collecting the data to manage the workload. Representatives noted that obtaining the nine-month post-discharge survey is particularly difficult because patients are often unreachable or unwilling to participate and that the mailed paper surveys are difficult for their patients.

Hospital Choice of Actions

The hospital implemented standardized inpatient therapy protocols and used their pre-surgical education classes to encourage patients to discharge home. The hospital's existing co-management agreement was helpful for engaging surgeons in these changes. Exhibit E-3 summarizes care redesign and other activities interviewees discussed implementing, indicating whether or not they attributed these efforts to their response to the CJR model.

Co-management arrangement and development of a "care map"

Hospital E's co-management arrangement facilitated streamlined care coordination and improved the care pathway by engaging physicians in the hospital's efforts. The co-management efforts began prior to the CJR model, however, the orthopedic surgeon noted that the arrangement worked well for the CJR model because it provided an organizational structure to design and implement streamlined care coordination and control of the care pathway. Although the work was already underway, the CJR model was described as an impetus for increased emphasis on standardizing care pathways for LEJR patients. The hospital dedicated a team that was credited with improving efficiency and continuity of care for their LEJR patients. The same nursing team now cares for all LEJR patients, and they use an aligned order set for medications (e.g., they have standardized the anticoagulant that their LEJR patients use) and a standardized protocol for the inpatient hospital stay that emphasizes discharging patients as soon as it is safe to do so.

As a result of the CJR model, the hospital developed a "care map" across the care continuum for all of its LEJR patients. The care map is used for all patients so that the nurses are not tasked with distinguishing CJR from other LEJR patients. Direct care staff noted, "One of the biggest changes we made was we started interviewing the patients at their preadmission testing appointment, so that we could do an assessment [and] find out what their needs were going to be after surgery." Additionally, the hospital started offering home evaluations prior to surgery in which hospital social workers could identify at-risk patients or those who would need SNF care. It also addressed patient concerns about home-based activities. One interviewee described how this meeting helped ease the anxiety of a patient who was nervous about climbing two stairs in her home.

In response to the CJR model, inpatient therapy changed its staffing model by assigning an acute care navigator, increasing staff on high surgery days and adjusting schedules to ensure that patients could receive therapy on day zero. When asked how patients respond to the new accelerated therapy protocol, interviewees stated that patients enjoy going home quickly. Since the CJR model, nurses treat patients according to a new standard order set and adjustments are made on a case-by-

case basis. Hospital E also developed an order set specifically for fracture cases. Interviewees reported that doctors like it because it is comprehensive and familiar. In performance year 1 of the model, the hospital reduced internal costs due to the dedicated care team for LEJR patients and refined care pathway.

Exhibit E-3: Hospital E took several actions in response to the CJR model

Activity implemented or enhanced	Implemented in response to CJR	Implemented in response to other factors	Not Implemented
Pre-surgical patient optimization		x	
Gainsharing			x
Patient risk stratification			x
Assessment of the home environment	x		
Patient and family education		x	
Use of an external vendor or consultant			x
New EHR or other HIT capabilities		x	
Data sharing with PAC			x
Data sharing with orthopedic surgeons		x	
Dedicated orthopedic patient navigator		x	
Standardization of surgical implants or supplies		x	
Early ambulation	x		
Inpatient PT or OT changes	x		
Pain management protocols		x	
CJR-specific care protocols			x
PRO data	x		
Discharge planning	x		
Communication with PAC providers	x		
Preferred PAC network			x
Patient follow-up post-discharge			x

Source: Lewin analysis of site visit interview data.

Notes: EHR = electronic health record, HIT = health information technology, OT = occupational therapy, PAC = post-acute care, PRO = patient-reported outcome, PT = physical therapy.

Pre-surgical education and enhanced discharge communication

Hospital E reported increased attentiveness to pre-surgical education in response to the CJR model. Although pre-surgical education was offered previously, the CJR model encouraged the hospital to make the class "semi-mandatory" and add class attendance to the metrics surgeons are evaluated by under the co-management agreement. After noticing patients' skepticism regarding early ambulation and shortened SNF length of stay, Hospital E "ramped up" conversations about hospital and SNF stays during pre-surgical education class. Pre-surgical classes became an opportunity to begin a discussion with patients on discharge to home with home health rather than

going to a SNF. The hospital reported that the patients who attend the pre-surgical class have better outcomes and higher satisfaction during hospitalization.

CMS data helped motivate changes to the PAC pathway

Interviewees reported that with the onset of the CJR model, they were able to access never-before-seen PAC claims data.

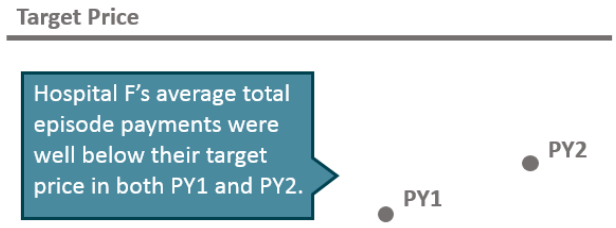
> *"We've always talked about length of stay, readmission, and volume, but CJR data has given us a platform to kind of roll it up into one approach. That, I think, was what this program had us focus on."*
>
> ***- Hospital leadership***

These data helped Hospital E enhance its post-discharge coordination. Now, the orthopedic surgeon makes it clear to patients that they should contact him directly if something is wrong post-discharge. The interviewed surgeon discourages them from going directly to the ED, and he prefers being constantly available to his patients. To prepare for CJR, hospital staff met with the five highest volume SNFs to discuss expectations for CJR patients and discharge destination, length of stay, and readmission rates. Over time, however, SNF discharges decreased so much that the hospital discontinued on-going collaboration meetings with the SNFs. The majority of LEJR patients are now discharged home with home health and "almost none go to SNFs anymore."

Impact: Payments, Utilization, and Quality

Hospital E's episode payments were below their quality-adjusted target price in both performance year 1 and 2 (Exhibit E-4).

Exhibit E-4: Hospital E doubled their reconciliation payment from PY1 to PY2



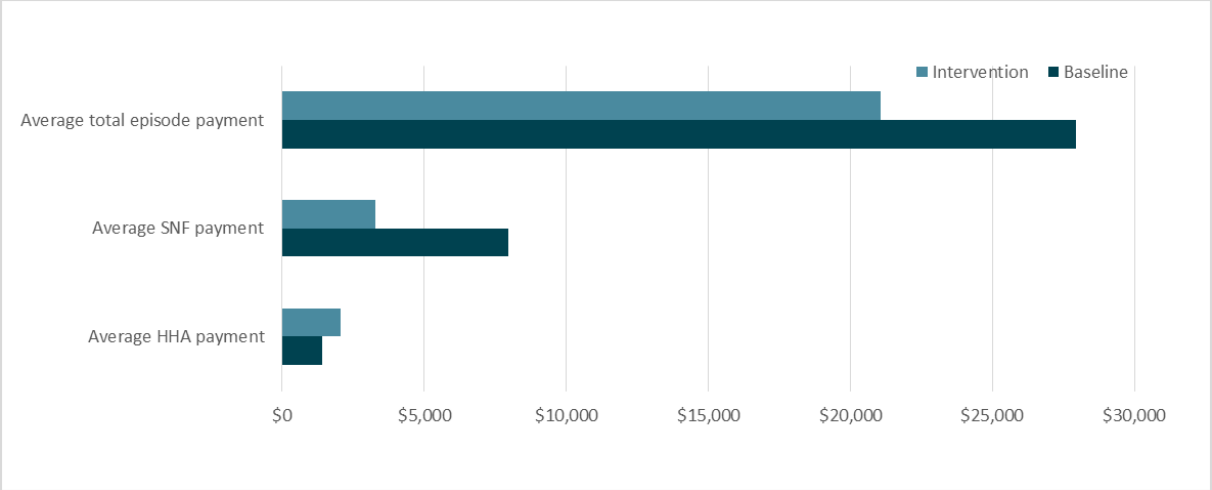
Measure	PY1 Final Reconciliation Results	PY2 Initial Reconciliation Results
Quality category	Good	Good
Spending vs. target price	Below	Below
Standardized reconciliation amount	$1,218	$1,222

Source: Lewin analysis of Mathematica Policy Research's CJR reconciliation data for performance year 1 (episodes ending Q2 2016 through Q4 2016) and performance year 2 (episodes ending Q1 2017 through Q4 2017).

Notes: PY = performance year.

Claims analysis indicated that the average total episode payment decreased by $7,000 from the baseline to intervention period. The average SNF payment decreased from $7,975 to $3,289, nearly a 60% reduction (Exhibit E-5).

Exhibit E-5: Average total episode payments decreased by $7,000 on average from baseline to intervention

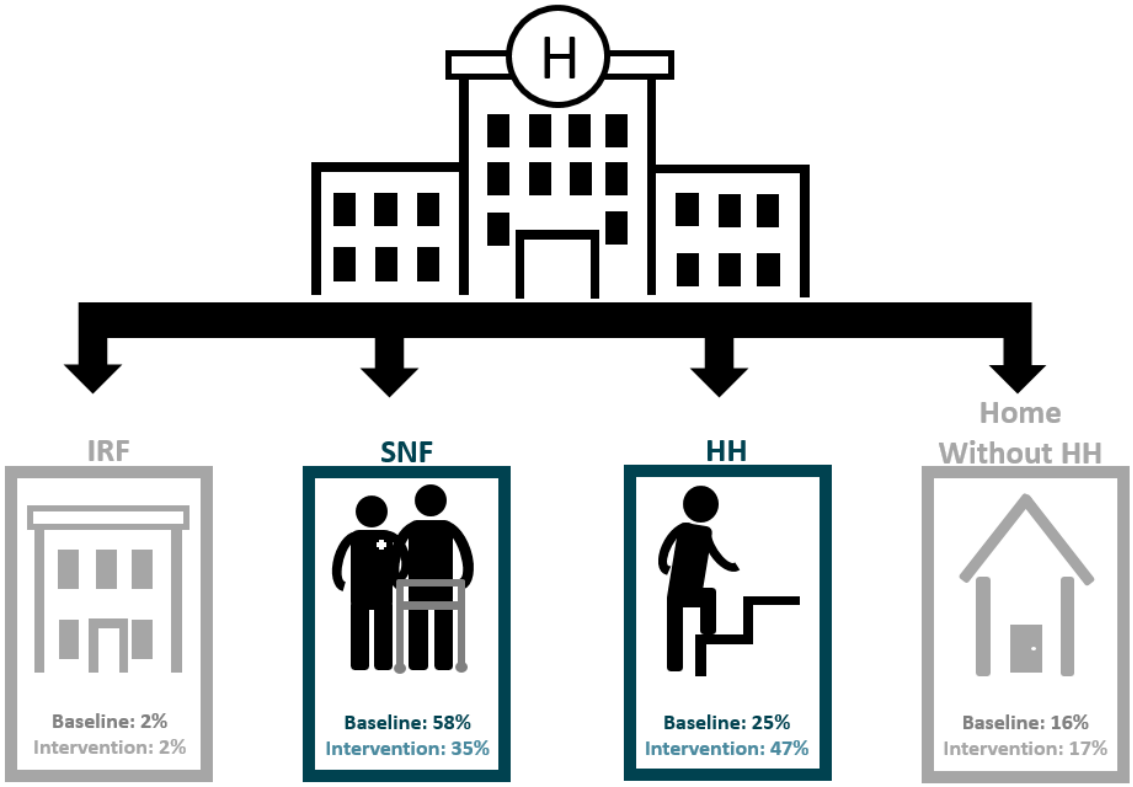


Source: Lewin analysis of Medicare claims and enrollment data for episodes initiated in 2012 through 2014 that ended between Q2 2012 and Q1 2015 (baseline) and episodes initiated during or after Q2 2016 that ended by Q4 2017 (intervention).

Notes: HHA = home health agency, SNF = skilled nursing facility.

Exhibit E-6 illustrates the significant shift in first PAC destination. The percentage of patients discharged from the hospital to home health nearly doubled, while the proportion discharged to SNF decreased. As discussed in the previous section, changing PAC utilization were a priority for the hospital under the CJR model.

Exhibit E-6: Hospital E significantly shifted first PAC destination from SNF to home health



Source: Lewin analysis of Medicare claims and enrollment data for episodes initiated in 2012 through 2014 that ended between Q2 2012 and Q1 2015 (baseline) and episodes initiated during or after Q2 2016 that ended by Q4 2017 (intervention).

Notes: HH = home health, IRF = inpatient rehab facility, SNF = skilled nursing facility.

Interviewees described early ambulation, a standardized care pathway, and an acute care navigator as factors contributing to the LOS reduction under the CJR model. Claims analysis showed a 1.5 day reduction in inpatient LOS for Medicare LEJR patients between baseline and intervention (Exhibit E-7).

Exhibit E-7: Inpatient length of stay reduced by 1.5 days from baseline to intervention

Source: Lewin analysis of Medicare claims and enrollment data for episodes initiated in 2012 through 2014 that ended between Q2 2012 and Q1 2015 (baseline) and episodes initiated during or after Q2 2016 that ended by Q4 2017 (intervention).

Note: LOS = length of stay.

Hospital F Case Study

The Hospital F case study is based on site visit interviews with hospital administrators, direct care staff, and health system representatives. The evaluation team interviewed three orthopedic surgeons, staff from two hospital-preferred SNFs, and staff from one HHA that was in the hospital's preferred provider network.

In response to the CJR model, the hospital reduced SNF payments by creating a preferred PAC collaborative with area SNFs to reduce SNF LOS and encouraging patients to discharge to home health. In addition, the hospital contracted with its affiliate health system to provide care navigation for LEJR patients during the 90-day post-discharge period. Exhibit F-1 highlights key takeaways from the case study, summarizing hospital and market characteristics, Hospital F's impression of CJR model incentives, choice of actions, and resulting impacts.

Exhibit F-1: Key findings from Hospital F

Hospital Resources and Market Conditions
(Page 50)
Hospital F is a large, multi-specialty hospital in a competitive market.
The hospital is affiliated with (but not owned by) a health system that provided data analytics tools and a care navigation program.

Impressions of the Model and its Financial Pressure and Incentives
(Page 51)
Hospital interviewees found the claims data provided by CMS under the CJR model to be useful. They had challenges notifying beneficiaries about the model and with patient-reported outcome data collection.

Hospital Choice of Action
(Page 51)
1.) The hospital established a preferred SNF collaborative and changed messaging around patient discharge destination to encourage recovery at home with home health services.
2.) The hospital contracted with a health system to provide care navigation services.

Impact: Payments, Utilization, and Quality
(Page 54)
Payment: Average total episode payments decreased from the baseline period.
Utilization: Average SNF LOS decreased from the baseline period.
Quality: Unplanned readmission rate decreased from the baseline period.

Hospital F is an affiliate of, but is not owned by, a health system serving the MSA. Hospital F has more than twice as many beds as the average CJR participant hospital. The hospital's disproportionate share percentage is much higher than the CJR average. (Exhibit F-2). The Herfindahl-Hirschman Index (422) indicates that the MSA is a very competitive market for LEJR procedures.

Exhibit F-2: Hospital F is a large hospital with a relatively vulnerable patient population

Location	Characteristic	Hospital F	CJR average
Hospital	Annual Medicare LEJR volume	102	144
	Ownership	Not for profit	60.7% not for profit
	Health system membership	No	22.1% no membership
	Ownership of SNF, HHA or IRF	None	44.1% no PAC
	Medicare days percentage	33.0%	34.7%
	DSH percentage	70.8%	32.4%
	Bed count	571	266
	Teaching status	Yes	41.5% teaching
MSA	Population size	19,865,045	1,585,229
	Population aged 65+	13.6%	14.0%
	Herfindahl-Hirschman Index for LEJR[a]	422	3,434
	IRF discharges per 10,000 65+ population	11.1	20.6
	Ortho surgeons per 10,000 65+ population	1.0	0.9
	SNF beds per 10,000 65+ population	55.6	53.4

Source: Lewin analysis of 2015-2016 Area Health Resource File, 2014 American Community Survey, 5-Year Estimates, December 2016 POS, December 2014 PECOS, FY 2016 CMS Annual IPPS, and Medicare claims and enrollment data for episodes initiated in 2012 through 2014 that ended between Q2 2012 and Q1 2015.

Notes: DSH = disproportionate share hospital, HHA = home health agency, IRF = inpatient rehab facility, LEJR = lower extremity joint replacement, MSA = metropolitan statistical area, SNF = skilled nursing facility.

[a] A measure of market concentration calculated based on LEJR at acute care hospitals.

Hospital Resources and Market Conditions

Key resource informing CJR model response:

Nurse practitioner care navigator program and data analytics services provided by affiliate health svstem

Hospital Resources

The hospital contracts with its affiliated health system to provide data analytics and a care navigation program. The health system participated in the Bundled Payments for Care Improvement initiative and developed a care management platform that tracks patients through the 90-day post-discharge period. The hospital noted that it purchases the health system's services at a rate that is more affordable than those offered by other consultants due to its status as an "affiliate." The hospital's CJR champion serves in an administrative capacity and has the support of the hospital's orthopedic surgeons. The hospital does not own any PAC providers.

Interviewees noted that this urban hospital serves a diverse patient population; over 64 languages are spoken by its patients. They also discussed a challenging payer mix with only 17% of patients covered by commercial insurance, about 3% are self-pay and the rest covered by Medicare or Medicaid. The hospital has a higher than average DSH percentage and considers itself a safety net hospital, though it does not have official designation.

Hospital interviewees said that housing is a common challenge for the hospital's LEJR patients, particularly those with walk-up apartments lacking elevators or combined shower-bathtub units, and those who have to use public transportation.

Market Conditions

The three PAC providers interviewed during the site visit all had previous Bundled Payments for Care Improvement initiative experience and thus interviewees felt they understood what the hospital's goals would be under the CJR model. The PAC provider market was described as competitive and over-bedded, although there are few IRFs. SNF interviewees noted that area SNFs have marketers that will go into hospitals to promote the facilities. Hospital interviewees noted that an internal analysis found that roughly 40% of LEJR patients chose to be discharged to a SNF other than those preferred by the hospital, which limited the hospital's ability to impact SNF LOS.

The patient population was described as educated and well-informed of their Medicare benefits, including familiarity navigating "1-800-MEDICARE" and the SNF discharge appeal process. SNF providers noted that there are community "advocacy groups" that inform patients of their health care options, and patients are willing to call referral agencies. SNF interviewees have received calls from LEJR patients prior to surgery to plan their SNF stay in advance, and the hospital interviewees noted that patients "will have preferences…they have done their homework." Families of patients with certain comorbidities are known to call Medicare to delay hospital discharge. Patients were reported to be hesitant about discharge home without a home health aide or attendant. Hospital interviewees indicated that patients feel entitled to a 21 day SNF stay, and SNF providers have challenges changing patient expectations despite hospital messaging about abbreviated SNF LOS.

Impressions of the Model and its Financial Pressure and Incentives

Interviewees noted that the CJR model reinforces best practices and CMS-provided claims data has provided a better understanding of payments across the episode of care. Hospital F receives data analytic services from its affiliate health system. When the interviewees reviewed the hospital's data, they noted that it could improve its discharge home rate. System interviewees noted that CMS has done a better job packaging data for the CJR model (e.g., providing target price data) than the Bundled Payments for Care Improvement initiative, however the changing data format requires staff time to "remap the data" before it can be integrated into data analytics tools. System interviewees indicated the CJR model was

> *"I think there are some things that are so high-yield and so fantastic about these bundles. They are pushing clinical excellence in ways that are so needed, and then there are these little tethers to it…and then if they [the patients] don't answer every question, it doesn't count. We could have been helping people with this time that we [spent collecting and uploading PRO data]...And there would have been better ways, I think, to get to that information than tethering it to this program."*
>
> ***- Affiliate health system representative***

"trickier administratively" than the Bundled Payments for Care Improvement initiative, particularly the beneficiary notification component of the model. System interviewees noted that "it'll be easier to make investment decisions" for patient care management tools related to the CJR model after they have a "firmer footing" and get hospital reconciliation amounts. Interviewees indicated that collecting PRO data under the CJR model has been a challenge.

Hospital interviewees noted that older surgeons are resistant to discharging patients directly home and it has been challenging to change this culture. A surgeon interviewee said there should be pre-surgical social evaluations of patients to understand their home environment prior to discharging them directly home. Surgeons also expressed concern that the CJR model will drive business towards larger, centralized hospitals.

SNF interviewees noted that due to the implementation of the CJR model they focused on reducing LOS, and better communicating with their patients when they no longer need institutional skilled nursing care. SNF interviewees noted that the CJR model focuses on the quality of care for rehabilitation and helps "meet the needs of the patient to facilitate a quicker discharge back to the community."

Hospital Choice of Actions

The hospital leveraged its affiliate relationship with a health system to receive data analytics and care navigation support under the CJR model. Exhibit F-3 summarizes care redesign and other activities interviewees discussed implementing, indicating whether or not they attributed these efforts to their response to the CJR model.

Exhibit F-3: Hospital F took several actions in response to the CJR model

Activity implemented or enhanced	Implemented in response to CJR	Implemented in response to other factors	Not Implemented
Pre-surgical patient optimization			x
Gainsharing			x
Patient risk stratification			x
Assessment of the home environment	x		
Patient and family education	x		
Use of an external vendor or consultant	x		
New EHR or other HIT capabilities	x		
Data sharing with PAC	x		
Data sharing with orthopedic surgeons	x		
Dedicated orthopedic patient navigator	x		
Standardization of surgical implants or supplies		x	
Early ambulation	x		
Inpatient PT or OT changes	x		
Pain management protocols	x		
CJR-specific care protocols	x		
PRO data	x		
Discharge planning	x		
Communication with PAC providers	x		
Preferred PAC network	x		
Patient follow-up post-discharge	x		

Source: Lewin analysis of site visit interview data.

Notes: EHR = electronic health record, HIT = health information technology, OT = occupational therapy, PAC = post-acute care, PRO = patient-reported outcome, PT = physical therapy.

Establishing a SNF collaborative

The hospital's initial response to the CJR model was the creation of a SNF preferred network, termed a "collaborative," which was led by the hospital administrator. The hospital identified four to five SNFs with which it had existing referral relationships and met with SNF administrators to discuss the CJR model and care redesign. The collaborative aimed to reduce readmissions, improve quality of care, and reduce average LOS to7 days for TKA and 10 days for total hip arthroplasty (regardless of fracture status). The hospital worked with surgeons to establish criteria that the SNFs use for reporting why a patient needed a LOS greater than 7 days. SNF interviewees noted an increase in communication with the hospital administrators since the start of the CJR model. Interviewees from one SNF noted they also established relationships with orthopedic surgeons as a result of the CJR model and the surgeons worked with the SNF to prevent rehospitalization.

SNFs' representatives reported implementing several changes in response to participation in the collaborative. The interviewees noted medication reconciliation and pain management efforts. Specifically, they were engaging in pain management early and only discharging patients with necessary pain medication. One SNF developed templates for assessing patient comorbidities and works closely with hospitals regarding medication reconciliation to avoid falls and other issues. A SNF interviewee noted that they pay orthopedists a consulting fee to visit patients in the facility, and SNF physicians communicate with patients' primary care providers. SNF interviewees believe this helped prevent ED visits or readmissions and improved both patient satisfaction and the relationship with the hospital.

Implementation of a new pre-surgical education class and changes to inpatient care protocols

> *"But this [the class], making them see the bed, the floor, going over spirometry, going over pain management, going over therapy, I think it eases [patients' minds]… it really reinforces that you're going to be okay, we're here for you… I think a lot of it helps [ease patient apprehension]."*
>
> ***- Nurse Manager***

Partially motivated by the CJR model, the hospital started a voluntary joint class in 2017. The joint class occurs on the same day as pre-admission testing and a multidisciplinary team orients patients to post-operative expectations based on their procedure type, demonstrates the use of assistive devices, discusses discharge planning and the home environment (e.g. number of stairs in the home), and familiarizes patients with the orthopedic unit. Nursing staff noted that the class helps ease patients' fears and apprehension. HHA interviewees noted that patient preparation during pre-surgical classes helps set patient expectations regarding the LEJR experience.

The hospital also implemented a three-day inpatient protocol and criteria for elective total joints in response to the CJR model; most surgeries occur on Tuesday and the hospital aims for discharge on Friday. Hospital nursing staff noted that patients are much more aware of their post-surgical care pathway, which was attributed to the pre-surgical joint class. In addition, the hospital made changes to its pain management protocols and inpatient care pathway – such as early ambulation – as a result of the CJR model. Other changes included the use of IV Tylenol on post-operative day zero for breakthrough pain, beginning physical therapy on post-op day zero (unless for patients who are medically unstable or waiting for pain medication), and dedicated physical therapy (PT) and occupational therapy (OT) staff on the orthopedic unit.

Data analytics and data sharing

The health system analyzes the hospital's claims data and creates a dashboard with several clinical overviews, including number of cases, cases by physician, discharge disposition, LOS, readmissions, and financial data. The hospital adds real time data collected by the care navigator during the 90-day post-discharge period. The historical baseline and recent data are reviewed monthly by health system and hospital representatives, including the care navigator, who pay

particular attention to any outlier information. Data can be filtered by surgeon to view LOS, readmission rates, discharge rates and trends. The dashboard also includes SNF, IRF, and HHA outcomes and ED visits.

The hospital collects PRO data manually through staff calls to patients. The hospital is exploring a software product to collect PRO data. The hospital is also using software to alert surgeons when their patients present at the ED when still in a CJR episode.

Discharge planning and care navigation

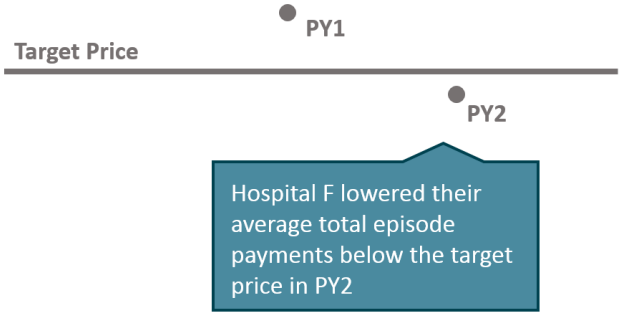
In response to surgeon concerns about increasing discharges home under the CJR model, the hospital contracted with the affiliate health system for access to its care navigation program, which includes a nurse practitioner who is supported by a nurse and a resource coordinator. Patients receive the care navigator's phone number that they (or their caregiver) can call with any questions or concerns "24/7." In addition, the care navigator contacts patients within 72 hours of discharge and follows patients through the 90-day post-discharge period. In the PAC setting, the care navigator can help engage in medication reconciliation.

The care navigator may also remove staples, refill medications, and diagnose or treat any additional issues and will follow up with surgeons. The care navigator also alerts the hospital if they learn of a readmission to a different hospital.

Impact: Payments, Utilization, and Quality

Hospital F's efforts under the CJR model resulted in earning a reconciliation payment in performance year two (Exhibit F-4). The hospital's average total episode payment decreased by nearly $4,000 between baseline and intervention, driven primarily by a reduction in SNF payments (Exhibit F-5).

Exhibit F-4: Average total episode payments were 4.8% above the quality-adjusted target price in PY1 and the average total episode payments decreased to 2.5% below the quality-adjusted target price in PY2

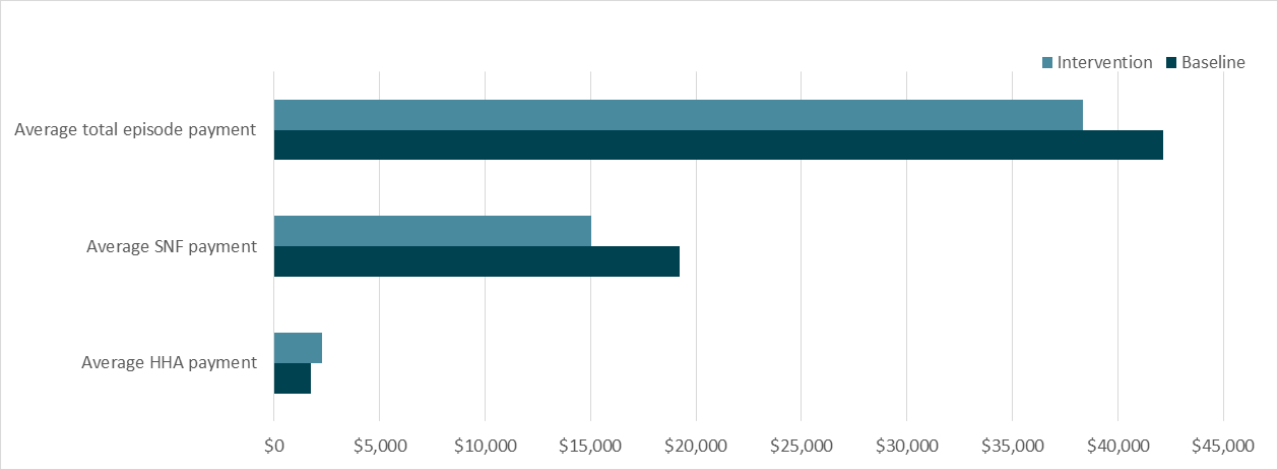


Measure	PY1 Final Reconciliation Results	PY2 Initial Reconciliation Results
Quality category	Good	Good
Spending vs. quality-adjusted target price	Above	Below
Standardized reconciliation amount per episode	$0	$917

Source: Lewin analysis of Mathematica Policy Research's CJR reconciliation data for performance year 1 (episodes ending Q2 2016 through Q4 2016) and performance year 2 (episodes ending Q1 2017 through Q4 2017).

Notes: PY = performance year.

Exhibit F-5: Total episode payment decreased by $3,800 on average from baseline to intervention

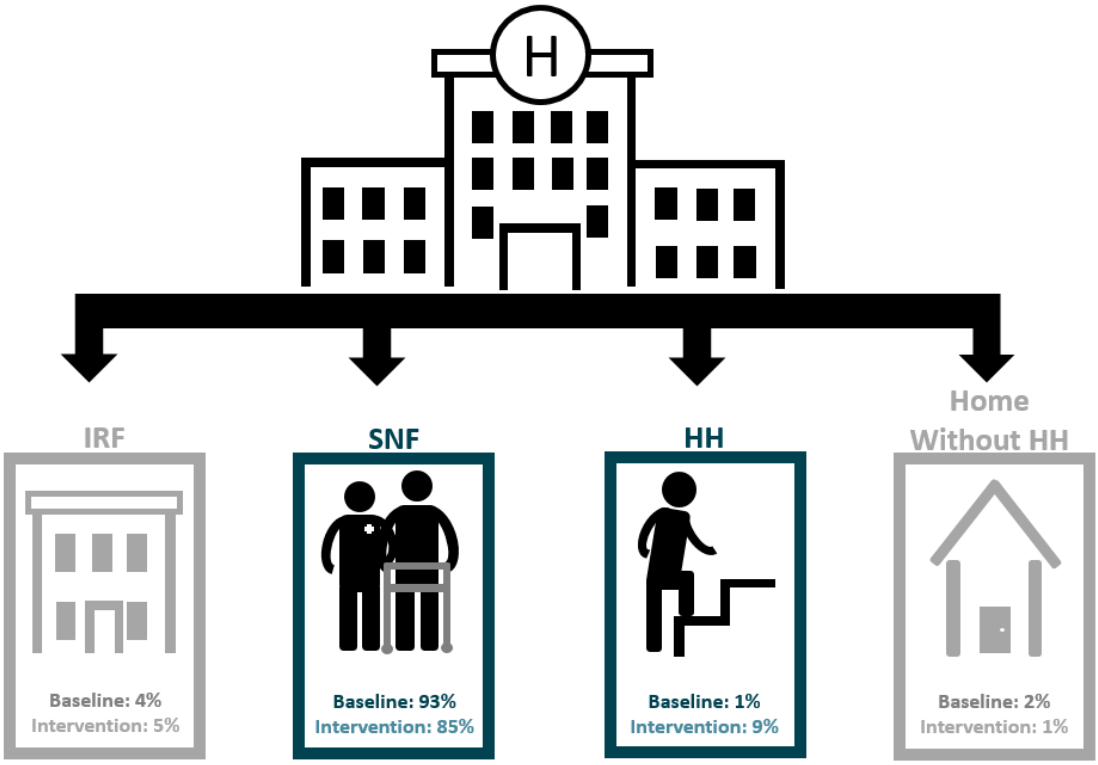


Source: Lewin analysis of Medicare claims and enrollment data for episodes initiated in 2012 through 2014 that ended between Q2 2012 and Q1 2015 (baseline) and episodes initiated during or after Q2 2016 that ended by Q4 2017 (intervention).

Notes: HHA = home health agency, SNF = skilled nursing facility.

The hospital focused on reducing SNF LOS and admissions after reviewing the CMS-provided claims data and discharging patients home. The hospital reported setting SNF LOS targets for hip and knee episodes and increased communication between the hospital and the SNFs regarding episodes with an expected LOS greater than the targets. Claims-based analyses showed a decrease in discharges to SNF (Exhibit F-6) and SNF LOS (Exhibit F-7) from baseline to intervention.

Exhibit F-6: The proportion of patients discharged to SNF decreased from baseline to intervention, while those discharge to home health increased



Source: Lewin analysis of Medicare claims and enrollment data for episodes initiated in 2012 through 2014 that ended between Q2 2012 and Q1 2015 (baseline) and episodes initiated during or after Q2 2016 that ended by Q4 2017 (intervention).

Notes: HH = home health, IRF = inpatient rehab facility, SNF = skilled nursing facility.

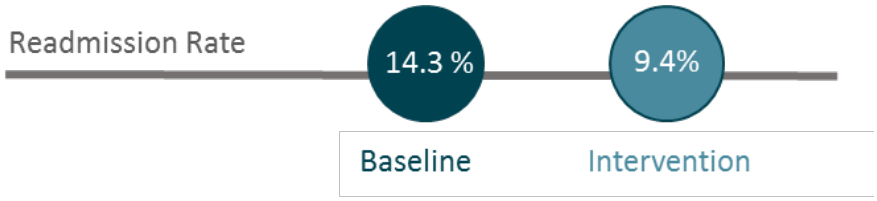
Exhibit F-7: Average SNF LOS decreased by nine days between the baseline and intervention periods

Source: Lewin analysis of Medicare claims and enrollment data for episodes initiated in 2012 through 2014 that ended between Q2 2012 and Q1 2015 (baseline) and episodes initiated during or after Q2 2016 that ended by Q4 2017 (intervention).

Notes: LOS = length of stay, SNF = skilled nursing facility.

The hospital also aimed to reduce readmissions through the care navigation program. Claims analysis showed a roughly one-third decrease in the unplanned readmission rate from baseline to intervention (Exhibit F-8).

Exhibit F-8: The readmission rate period decreased from an average of 14.3% in the baseline period to 9.4% in the intervention period



Source: Lewin analysis of Medicare claims and enrollment data for episodes initiated in 2012 through 2014 that ended between Q2 2012 and Q1 2015 (baseline) and episodes initiated during or after Q2 2016 that ended by Q4 2017 (intervention).

Hospital G Case Study

The Hospital G case study is based on site visit interviews with hospital administration staff, one orthopedic surgeon, and direct care staff, including staff from the hospital's skilled nursing facility unit, which it refers to as a transitional care unit. The evaluation team also interviewed staff at one of the hospital's preferred skilled nursing facilities and two preferred home health agencies.

In response to the CJR model, the hospital implemented gainsharing agreements with its orthopedic surgeons and used CMS claims data to investigate historical episode spending and LOS at area PAC providers. In addition, the hospital implemented improvements to its pre-surgical testing and education protocols. Exhibit G-1 highlights key takeaways from the case study, summarizing hospital and market characteristics, Hospital G's impression of CJR model incentives, choice of actions, and resulting impacts.

Exhibit G-1: Key findings from Hospital G

Hospital Resources and Market Conditions
(Page 59)
Hospital G has an in-house SNF where surgeons continue to round on patients. Hospital G utilized its SNF unit and CMS data to set length of stay expectations for post-acute care partners.

Impressions of the Model and its Financial Pressure and Incentives
(Page 60)
Interviewees considered the CJR model to be "training wheels" for them to prepare for other episode-based payment models and characterized the model as a "race" for hospitals to reduce episode payments against other facilities.

Hospital Choice of Action
(Page 61)
1.) The hospital implemented gainsharing agreements with orthopedic surgeons.
2.) The hospital adjusted pre-surgical testing timeframes to optimize patients and utilized its mandatory pre-surgical joint class to message discharge home.

Impact: Payments, Utilization, and Quality
(Page 65)
Payment: Average total episode payments decreased from baseline.
Utilization: The proportion of patients discharged home with home health increased and the proportion of patients discharged to the TCU or SNFs decreased.

Hospital G has a lower disproportionate share percentage and a higher percentage of Medicare days compared to the average CJR participant hospital. The Herfindahl-Hirschman Index (422) indicates that the MSA is a very competitive market for LEJR procedures. The MSA also has a relatively high number of SNF beds per 10,000 age 65+ population (Exhibit G-2).

Exhibit G-2: Hospital G serves a relatively affluent population in a highly competitive market

Location	Characteristic	Hospital G	CJR average
Hospital	Annual Medicare LEJR volume	73	144
	Ownership	Not for profit	60.7% not for profit
	Health system membership	No	22.1% no membership
	Ownership of SNF, HHA or IRF	None	44.1% no PAC
	Medicare days percentage	59.4%	34.7%
	DSH percentage	10.9%	32.4%
	Bed count	195	266
	Teaching status	No	58.5% non-teaching
MSA	Population size	19,865,045	1,585,229
	Population aged 65+	13.6%	14.0%
	Herfindahl-Hirschman Index for LEJR[a]	422	3,434
	IRF discharges per 10,000 65+ population	11.1	20.6
	Ortho surgeons per 10,000 65+ population	1.0	0.9
	SNF beds per 10,000 65+ population	55.6	53.4

Source: Lewin analysis of 2015-2016 Area Health Resource File, 2014 American Community Survey, 5-Year Estimates, December 2016 POS, December 2014 PECOS, FY 2016 CMS Annual IPPS, and Medicare claims and enrollment data for episodes initiated in 2012 through 2014 that ended between Q2 2012 and Q1 2015.

Notes: DSH = disproportionate share hospital, HHA = home health agency, IRF = inpatient rehab facility, LEJR = lower extremity joint replacement, MSA = metropolitan statistical area, SNF = skilled nursing facility.

[a] A measure of market concentration calculated based on LEJR at acute care hospitals.

Hospital Resources and Market Conditions

Key resources informing CJR model response:

Transitional care unit, which acts as an in-house SNF unit

CJR model surgeon champion

Pre-existing pre-surgical joint replacement class

Hospital Resources

Hospital G recently joined an area health system, though it retains local governance. At the time of the site visit, the hospital had not yet determined what health system resources could be leveraged to respond to the CJR model, though the hospital's SNF unit was a key component of its response. The hospital noted it received Magnet recognition from the American Nurses Credentialing Center and has national accreditation for its nurse residence program.

The hospital's multidisciplinary CJR team hosts joint replacement seminars, which were developed prior to CJR to educate patients about LEJR and showcase the quality of the service line. In addition to these seminars, the hospital had a robust pre-surgical patient education class that pre-dates the CJR model. The hospital has a CJR surgeon champion and an orthopedist specially trained in foot and ankle procedures. Hospital interviewees indicated that orthopedic surgery does not contribute a high volume of admissions, but it is a financially important service line.

Previously, the hospital did not provide LEJR procedures, based on a collaborative agreement with another community hospital. Part of the understanding or agreement was built on the proximity of the two facilities – interviewees noted that "it didn't make sense to duplicate services." This other hospital employs surgeons and specializes in rehabilitation. Hospital G does not employ orthopedists, but medical staff are privileged at both Hospital G and the other community hospital. About twelve years ago, Hospital G changed the terms of the agreement so that it could "get into the total joint business." As a result, the LEJR procedure volume at Hospital G has grown 10-15% each year.

Market Conditions

Interviewees indicated that about one third of area LEJR patients travel outside of the community for LEJR given its proximity to the urban center of the MSA.

The hospital's preferred PAC providers had prior Bundled Payments for Care Improvement initiative experience, and PAC provider staff felt this helped prepare them for the CJR model. Hospital interviewees commented that the PAC market was not "over-bedded." The hospital has a 26% stake in an ambulatory surgery center that is owned by the hospital's orthopedic surgeons. The hospital expects to lose some lower intensity TKA cases to the surgery center because of the removal of TKA from the Medicare inpatient-only list.

Impressions of the Model and its Financial Pressure and Incentives

Hospital interviewees characterized the CJR model and the regional pricing scheme as a "race"; the hospital that can decrease their episode costs lower and faster "wins in the region." The interviewees indicated that the fracture quality-adjusted target price was "easier for us to beat" and the first year of the model was "pretty easy" as hospitals just had to decrease spending below their own historical average episode payments.

> *"But when it is mandatory you don't have a choice…its getting the providers off the fee-for-service drug…because you're putting them at risk for 90 days. That's the first step."*
>
> ***-Hospital interviewee***

The hospital was below its PY1 quality-adjusted target price but does not expect to receive NPRA in later model years as the quality-adjusted target price methodology shifts toward regional pricing. Interviewees expected all hospitals in their region to decrease payments and for the quality-adjusted target price to be recalibrated based on early model years. Interviewees indicated that "unless certain hospitals just don't perform" and decrease payments, there won't be an opportunity for the hospital to achieve positive reconciliation amounts.

Hospital interviewees noted that "the future looked like bundles were going to be rolling out all over the place" and felt that the CJR model was the "training wheels" to prepare for other episode-based payments. The hospital did not participate in the Bundled Payments for Care Improvement initiative, but reported pursuing Bundled Payments for Care Improvement-Advanced for other

clinical episodes. The hospital attributed its pursuit of Bundled Payments for Care Improvement-Advanced to its successful experience under the CJR model. HHA interviewees viewed the CJR model positively, saying, "there needs to be some type of cost containment… being able to deliver quality care and drive great outcomes… this was the model that [CMMI] has chosen to utilize in order to do this."

Hospital Choice of Actions

The hospital established a multidisciplinary committee as a result of the CJR model, led by the CJR surgeon champion to develop process improvements across the care continuum. In its monthly meetings the committee has focused on, for example, the perioperative stay, discharge disposition, physical therapy, and operating room costs. The hospital's preoperative and post-operative protocols have been enhanced and patients are not differentiated by payer. Exhibit G-3 summarizes care redesign and other activities interviewees discussed implementing, indicating whether or not they attributed these efforts to their response to the CJR model.

Exhibit G-3: Hospital G took several actions in response to the CJR model

Activity implemented or enhanced	Implemented in response to CJR	Implemented in response to other factors	Not Implemented
Pre-surgical patient optimization	x		
Gainsharing	x		
Patient risk stratification	x		
Assessment of the home environment	x		
Patient and family education	x		
Use of an external vendor or consultant	x		
New EHR or other HIT capabilities	x		
Data sharing with PAC	x		
Data sharing with orthopedic surgeons	x		
Dedicated orthopedic patient navigator	x		
Standardization of surgical implants or supplies	x		
Early ambulation	x		
Inpatient PT or OT changes			x
Pain management protocols	x		
CJR-specific care protocols			x
PRO data	x		
Discharge planning	x		
Communication with PAC providers	x		
Preferred PAC network	x		
Patient follow-up post-discharge	x		

Source: Lewin analysis of site visit interview data.

Notes: EHR = electronic health record, HIT = health information technology, OT = occupational therapy, PAC = post-acute care, PRO = patient-reported outcome, PT = physical therapy.

Development of gainsharing agreements

Surgeons in private practice approached the hospital about gainsharing under the CJR model. The hospital reviewed its CMS data produced by a data vendor, and hired another consulting group to develop the gainsharing agreement, which hospital interviewees described as "economic alignment." The hospital engaged consultants that previously developed Bundled Payments for Care Improvement initiative gainsharing agreements to draft the CJR model gainsharing agreements with five orthopedic surgeons. The agreements went into effect in 2017, so the hospital's PY1 reconciliation payment was not available for gainsharing. The hospital anticipates that its hospital system will standardize gainsharing agreements across all CJR participant hospitals.

The CJR model and gainsharing motivated surgeons to negotiate a capped price with implant vendors that contributed to the hospital's internal cost savings. Two pricing schemes were developed for implants - high demand and low demand – and the hospital does not restrict surgeons' implant selection. As a result, the hospital costs for implants decreased by over $100,000 in the second performance year of the model.

Pre-surgical testing and inpatient process improvements

> *"I think the CJR push improved quality for all surgical patients…"*
>
> ***-Hospital interviewee***

As a result of the CJR model, the hospital began engaging patients in pre-surgical testing 21-24 days prior to surgery and nurse practitioners review test results. Prior to CJR, this testing occurred roughly seven days before surgery, which was viewed as too little time to optimize patients. Interviewees indicated that changing the timing of the testing has been very successful. In the first 6 months of implementation, the hospital identified 19 out of 67 patients who were newly diagnosed with or had out-of-control diabetes. Patient optimization efforts, including referrals to endocrinology and day of surgery blood glucose tests, resulted in 12 of those patients continuing to surgery. The interviewees indicated that the CJR model educates physicians to optimize patients to be in the best condition possible before a procedure.

Also in response to the CJR model, the hospital implemented a Cleveland Clinic tool – Predicting Patient Discharge Disposition – for elective surgeries. Interviewees noted the importance of optimizing patients with elective procedures, stating "that's the culture change that has happened." The hospital also standardized its perioperative procedures. Surgical incisions are closed with surgical glue instead of staples, and the hospital uses tranexamic acid - a medication used to slow bleeding - which reduced transfusion rates. The hospital deleted unnecessary equipment from its post-surgical protocol and altered its anesthesia and pain management protocols. The hospital's anesthesia department requested that complicated cases are scheduled earlier in the day so support staff are readily available. The hospital also integrates aromatherapy to help alleviate patients' pain, and identified a new compression and cooling device that patients could use while ambulating. Lastly, interviewees indicated day of surgery ambulation is one of the key changes

resulting from CJR model implementation. In 2017, all patients were ambulating the day of surgery.

Enhanced patient education and new orthopedic coordinator position

The hospital has a pre-surgical joint class that predates the CJR model; the hospital made the pre-surgical joint class mandatory for patients and caregivers after implementation of the CJR model. Interviewees noted the class allows the hospital to better understand a patient's home environment. The mandatory joint class ensures that patients and their caregivers receive consistent messaging that the goal is to discharge home. The hospital conducts a discharge class with the patient and caregiver to continue patient optimization where patients receive a self-management plan.

As a result of the CJR model, the hospital created an orthopedic coordinator position. The orthopedic coordinator conducts patient outreach and PAC phone calls, organizes the joint class, and is a resource for the patient and family after hospital discharge. The orthopedic coordinator also helps manage fracture cases, which are more likely to be financially risky for the hospital in the post-acute phase of the episode. The navigator follows up with patients the first day post-operatively, and follows up after 10 days, 30 days and at times 90 days after discharge.

Seeing claims data spurred work to change PAC utilization

Interviewees noted that the CMS data was "pretty eye-opening" and indicated that a large portion of the hospital's patients received inpatient rehabilitation at the nearby community hospital. These patients did not have any medical indication for an inpatient rehabilitation stay, so the hospital stopped sending patients. CMS data also motivated the hospital to look at physician behaviors, patients' perceptions and expectations for care, and best practices for patient pre-surgical optimization.

The hospital developed an internal tracking system with surgery date, inpatient LOS, MS-DRG, surgeon, and patient data from the SNF, HHA, or outpatient setting, ED visits and any readmissions. The hospital tracks each LEJR patient in this manner.

The hospital's internal SNF unit has been important in developing their response to the CJR model because it allowed the hospital to control LOS in a PAC setting. Hospital interviewees indicated that the SNF unit allowed the hospital to better control patients' LOS, which is 6-7 days for LEJR patients. The SNF unit is on the same electronic health record as the hospital, surgeons continue to round on patients in that setting, and CJR episodes have admission priority. Patients in the hospital's SNF unit receive two PT sessions and one OT session daily, and unit staff walk with patients in the evening. The orthopedic navigator also follows patients in the hospital's SNF unit.

The hospital's SNF unit and three or four SNFs are considered the hospital's preferred providers. In response to the CJR model, the hospital sent a questionnaire to all SNFs that received LEJR referrals and asked for information about, for example, staffing levels, available specialists, and readmission rates to identify potential SNF partners. Key hospital staff then met with about ten

> *"We were able to use the TCU [hospital SNF unit] as the model…as kind of the gold star."*
>
> ***-Hospital interviewee***

SNFs to explain the CJR model, review their data, and compare average LOS to the hospital's SNF unit average LOS. SNF partners were told that an increased proportion of discharges home would decrease the SNF's discharge proportions, and the social work director provided their cell phone number and indicated, "I want a call no matter what if the patient is being sent back [to the hospital]." SNF and HHA representatives are invited to weekly readmission and transition of care meetings at the hospital.

SNF interviewees indicated that their admissions directors regularly communicate with the hospital about CJR LEJR discharge destinations, LOS, and any complications. Transfers from the hospital to the SNF have started to occur earlier in the day so therapy can begin promptly. A SNF interviewee noted that most LEJR cases that require SNF care have more comorbidities than those discharged home.

The hospital identified three preferred HHAs in response to the CJR model, and asked SNFs to discharge to the preferred agencies. One HHA noted it "definitely" had an advantage responding to the CJR model given prior experience with bundled payments. One HHA had a well-established joint replacement program that included weekend evaluations, frontloading home visits, and medication reconciliation. HHA interviewees noted that the CJR model improved communication between the hospital and orthopedists, which improved the discharge process for PAC providers because "everybody was on the same page."

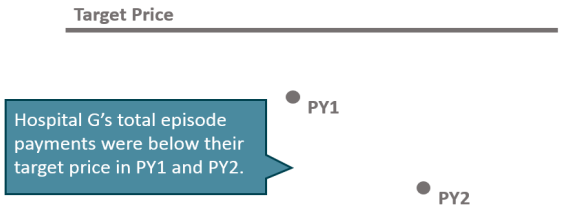
Enhanced discharge planning for fracture patients

Hospital interviewees noted that they start discharge planning for fracture cases the day the patient arrives, and aims to apply the same treatment protocols as elective cases. Fracture cases are in the operating room within 24 hours of presenting in the emergency department. Hospital interviewees indicated that caregivers are key when responding to fracture cases, as they can help identify comorbidities. The hospital attempts to ambulate fracture patients on the same day as surgery.

Impact: Payments, Utilization, and Quality

This hospital received a total reconciliation payment of nearly $100,000 in PY1. The hospital estimated about $77,000 a year in data vendor and consulting costs for its CJR model response (Exhibit G-4).

Exhibit G-4: Average total episode payments were below the quality-adjusted target price in both performance years



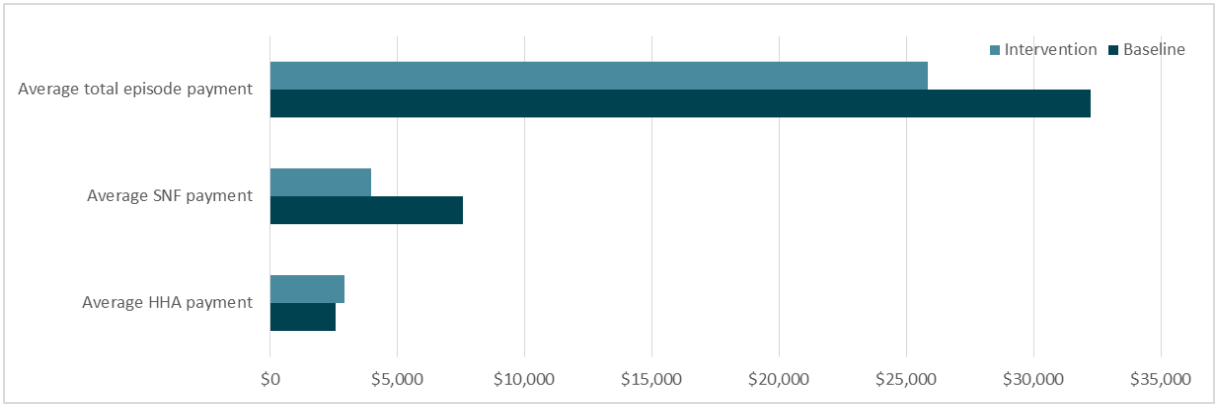
Measure	PY1 Final Reconciliation Results	PY2 Initial Reconciliation Results
Quality category	Excellent	Good
Spending vs. quality-adjusted target price	Below	Below
Standardized reconciliation amount per episode	$1,411	$1,408

Source: Lewin analysis of Mathematica Policy Research's CJR reconciliation data for performance year 1 (episodes ending Q2 2016 through Q4 2016) and performance year 2 (episodes ending Q1 2017 through Q4 2017).

Notes: PY = performance year.

Claims analysis showed average episode payments decreased in the intervention period (Exhibit G-5). The hospital representatives indicated that episode spending was below the quality-adjusted target price because the hospital eliminated discharges to IRFs, decreased length of stay at SNFs, and increased the number of patients discharged home. They noted that the number of patients discharged to the hospital's SNF unit decreased, but it still received a larger proportion than other facilities.

Exhibit G-5: Average total episode payments decreased by $6,400 from baseline to intervention



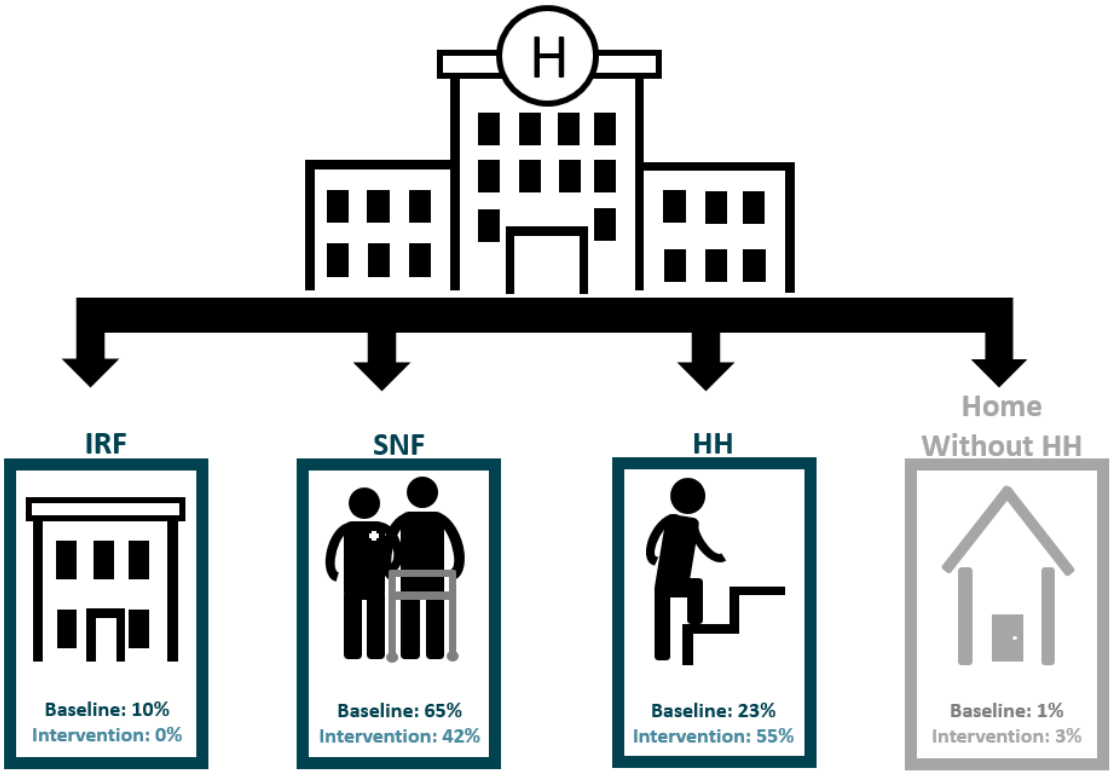
Source: Lewin analysis of Medicare claims and enrollment data for episodes initiated in 2012 through 2014 that ended between Q2 2012 and Q1 2015 (baseline) and episodes initiated during or after Q2 2016 that ended by Q4 2017 (intervention).

Notes: HHA = home health agency, IRF = inpatient rehab facility, SNF = skilled nursing facility.

Prior to the CJR model, interviewees estimated that hospital discharges were about 50% to home, 30% to the hospital's SNF unit, and 20% to SNF or IRF. As of 2018, they reported the hospital

discharged about 78% of its LEJR patients home, 15 to 20% to the hospital's SNF unit, and a small number of patients to other SNFs. Hospital interviewees noted that one surgeon previously focused on discharge home, however others "wanted somebody else to take care of that patient post-op" and for those surgeons "it was a true culture change." Claims-based analyses presented in Exhibit G-6 confirms a shift in discharges from institutional PAC to home health between the baseline and intervention periods.

Exhibit G-6: The proportion of LEJR episodes discharged to home health increased, the proportion of LEJR episodes discharged to IRF and SNF decreased



Source: Lewin analysis of Medicare claims and enrollment data for episodes initiated in 2012 through 2014 that ended between Q2 2012 and Q1 2015 (baseline) and episodes initiated during or after Q2 2016 that ended by Q4 2017 (intervention).

Notes: HH = home health, IRF = inpatient rehab facility, SNF = skilled nursing facility.

The CJR model spurred an increased focus on early ambulation and in 2017 all patients were ambulating the day of surgery. The hospital aims to discharge patients home as soon as possible. This messaging is consistent across the care experience and interviewees indicated that most patients favor discharge home. Claims analysis showed a decrease in inpatient LOS from baseline to intervention (Exhibit G-7).

Exhibit G-7: Average inpatient LOS decreased by one day between the baseline and intervention periods

Source: Lewin analysis of Medicare claims and enrollment data for episodes initiated in 2012 through 2014 that ended between Q2 2012 and Q1 2015 (baseline) and episodes initiated during or after Q2 2016 that ended by Q4 2017 (intervention).

Note: LOS = length of stay.

Hospital H Case Study

The Hospital H case study is based on site visit interviews with hospital administrators, direct care clinical staff, an orthopedic surgeon from a private physician group practice (PGP), and leadership at an HHA that is part of the hospital's PAC provider collaborative.

In response to the CJR model, the hospital invested in an external data vendor to analyze the claims data from CMS and began to meet monthly with PAC providers to share data on the 90-day post-discharge period and discuss improvements in care transitions for LEJR patients. Exhibit H-1 highlights key takeaways from the case study, summarizing hospital and market characteristics, Hospital H's impression of CJR model incentives, choice of actions, and resulting impacts.

Exhibit H-1: Key findings from Hospital H

Hospital Resources and Market Conditions
(Page 69)
A health system serves as an "active parent" for Hospital H, providing resources but not dictating activities under the CJR model. One orthopedic physician group practice performs LEJR at the hospital. The hospital is located in a highly competitive market for LEJR.

Impressions of the Model and its Financial Pressure and Incentives.
(Page 70)
Historically, LEJR episode payments for the hospital were below the regional average. Interviewees reported feeling little financial pressure under the CJR model because they already were an efficient provider.

Hospital Choice of Action
(Page 71)
1.) The hospital hired an external data vendor to analyze claims data received as part of its participation in the CJR model.
2.) The hospital meets now monthly with PAC providers to discuss care transitions for its LEJR patients and share data on utilization and payments.

Impact: Payments, Utilization, and Quality
(Page 74)
Payment: Average episode payments decreased from baseline.
Utilization: Average SNF LOS decreased from baseline.

Hospital H entered into a strategic partnership with a large health system in mid-2018. Hospital H has a slightly lower number of beds than the average CJR participant hospital. The hospital has a higher Medicare days percentage than the CJR average. The Herfindahl-Hirschman Index (422) indicates that the MSA is a very competitive market for LEJR procedures, with many providers performing the procedure (Exhibit H-2).

Exhibit H-2: Medicare is a top payer for Hospital H and performs over 100 LEJR annually in a highly competitive market

Location	Characteristic	Hospital H	CJR average
Hospital	Annual Medicare LEJR volume	132	144
	Ownership	Not for profit	60.7% not for profit
	Health system membership	No	22.1% no membership
	SNF, HHA or IRF ownership	None	44.1% no PAC
	Medicare days percentage	46.5%	34.7%
	DSH percentage	31.2%	32.4%
	Bed count	188	266
	Teaching status	Yes	41.5% teaching
MSA	Population size	19,865,045	1,585,229
	Population aged 65+	13.6%	14.0%
	Herfindahl-Hirschman Index for LEJR[a]	422	3,434
	IRF discharges per 10,000 65+ population	11.1	20.6
	Ortho surgeons per 10,000 65+ population	1.0	0.9
	SNF beds per 10,000 65+ population	55.6	53.4

Source: Lewin analysis of 2015-2016 Area Health Resource File, 2014 American Community Survey, 5-Year Estimates, December 2016 POS, December 2014 PECOS, FY 2016 CMS Annual IPPS, and Medicare claims and enrollment data for episodes initiated in 2012 through 2014 that ended between Q2 2012 and Q1 2015.

Notes: DSH = disproportionate share hospital, HHA = home health agency, IRF = inpatient rehab facility, LEJR = lower extremity joint replacement, MSA = metropolitan statistical area, SNF = skilled nursing facility.

[a] A measure of market concentration calculated based on LEJR at acute care hospitals.

Hospital Resources and Market Conditions

Key resources informing CJR model response:

Investment in external data vendor to analyze CJR model claims data

Clear surgeon champion involved in care redesign efforts prior the start of the CJR model

Hospital Resources

Hospital H is a not-for-profit, teaching hospital. It is also a safety net hospital with a high proportion of Medicare patients (49%) and Medicaid patients (20-25%). The hospital ends "in the red" every year, "with a $14 million loss year over year," which interviewees attributed to the hospital's difficult payer mix. There is one independent orthopedic PGP that operates at the hospital with five surgeons doing LEJRs. One of the surgeons is considered a surgeon champion and has collaborated with the hospital to implement care redesign efforts prior to the CJR model.

Hospital H's joint center opened in 2006. The hospital has experienced a large increase in LEJR volume, particularly knee replacements, over the last few years, from 250 total elective cases in 2015 to 476 in 2017. Hospital representatives attribute the increased LEJR volume to their marketing efforts in the community. Orthopedics is an important service line to the hospital and the profitability of these procedures has helped the hospital improve its financial performance.

Hospital H does not own PAC providers, but works collaboratively with several PAC providers in the region. Before the CJR model was introduced, Hospital H was already focused on sending LEJR patients home instead of institutional PAC. Hospital H established a pre-surgical joint class more than 10 years ago, and the hospital expanded the class due to its recent increase in LEJR volume. The orthopedic surgeons strongly support the drive to send patients directly home after discharge and initially made the push to shift LEJR patients out of institutional PAC settings. LEJR patients are given the message from the first office visit prior to surgery that home is the best place to recover, and this message is consistent across all staff. Prior to the CJR model, Hospital H reported that 80% of its elective LEJR patients are discharged home with home health or outpatient PT.

Given its financial struggles, the hospital recently entered into a strategic partnership with a large health system in the region. The health system became an "active parent" in June 2018, and is now responsible for the financial health of the hospital. In addition, the hospital receives financial assistance from the state to maintain operations and vital services while working toward longer-term sustainability, which includes moving toward value-based payment models.

Market Conditions

Hospital H representatives described their market as highly competitive for LEJR procedures. There are four other competitor hospitals performing LEJR and participating in the CJR model within a 20 mile radius of Hospital H. Further, there are multiple hospitals performing LEJR in a large nearby metropolitan center, including a large specialty orthopedic hospital that has received Magnet designation from the American Nurses Credentialing Center.

Additionally, there are 100 SNFs and two IRFs in the hospital's catchment area and four HHAs in its county. Given this supply, patients tend to select PAC providers based on proximity, over quality ratings. Hospital representatives also described the region as having a high supply of outpatient physical therapy clinics.

Impressions of the Model and its Financial Pressure and Incentives

Hospital H is located in the highest LEJR episode payment region in the CJR model. Historically, the hospital's average episode payments were below the regional average, however, Hospital H received a "below acceptable" composite quality score so it has not received reconciliation payments.

Interviewees reported initially being surprised by the hospital's low CJR model quality composite score and described a need for more transparency from CMS on the individual measure scores. Representatives stated that CMS provides Medicare claims data to hospitals on an ongoing basis to look at episode costs, but CMS shares the quality measure data used to adjust target prices only on an annual basis. Further, representatives voiced frustration with the lag in data availability. CMS uses older data to calculate the quality measure scores (based on a pre-CJR model time period for

the first two performance years) so Hospital H's actions today to improve quality under the CJR model will not impact its quality scores for next year's reconciliation. It is hard for the hospital to remain motivated to improve without a more immediate impact on its NPRA payments.

Hospital H's surgeon champion stated that the CJR model is a "requirement with uncompensated effort." As an example, he described that Hospital H made investments in its infrastructure, such as a data vendor to analyze the claims data, to support the CJR model but then did not receive a reconciliation payment.

> *"Having been two years into it, it's a good thing we didn't [gainshare] because there wouldn't be any money to share."*
>
> -***Hospital administrator***

Hospital H has not entered into any gainsharing agreements with surgeons or PAC providers. The surgeon champion expressed feeling uncomfortable accepting gainsharing payments from a CJR participant hospital because he believed it created a financial conflict of interest for physicians: "I can choose a much inferior implant and line my pocket, but I couldn't sleep at night. So it's an instant conflict." Further, a hospital representative expressed some discomfort initiating gainsharing agreements when the hospital is not eligible to receive reconciliation payments due to their low quality performance.

Hospital Choice of Actions

In response to the CJR model, the hospital hired a data vendor to analyze the Medicare claims data provided by CMS, implemented the collection and reporting of PRO data, and worked more closely with the PAC providers that receive its LEJR patients. Exhibit H-3 summarizes care redesign and other activities interviewees discussed implementing, indicating whether or not they attributed these efforts to their response to the CJR model.

Exhibit H-3: Hospital H has a number of initiatives to improve efficiency of the orthopedic service line, but not in response to the CJR model

Activity implemented or enhanced	Implemented in response to CJR	Implemented in response to other factors	Not Implemented
Pre-surgical patient optimization		x	
Gainsharing			x
Patient risk stratification		x	
Assessment of the home environment			x
Patient and family education		x	
Use of an external vendor or consultant	x		
New EHR or other HIT capabilities		x	
Data sharing with PAC		x	
Data sharing with orthopedic surgeons		x	
Dedicated orthopedic patient navigator		x	
Standardization of surgical implants or supplies		x	
Early ambulation		x	
Inpatient PT or OT changes		x	
Pain management protocols		x	
CJR-specific care protocols			x
PRO data	x		
Discharge planning		x	
Communication with PAC providers		x	
Preferred PAC network	x		
Patient follow-up post-discharge		x	

Source: Lewin analysis of site visit interview data.

Notes: EHR = electronic health record, HIT = health information technology, OT = occupational therapy, PAC = post-acute care, PRO = patient-reported outcome, PT = physical therapy.

Post-surgical discharge planning and patient follow up

Under the CJR model, the hospital had limited ability to further reduce discharge to SNF, so it focused on reducing the use of home health and began sending a greater proportion of patients' home with outpatient PT or home with a limited number of home health visits.

To support this goal, Hospital H leveraged its two care transition nurses to facilitate the patients' transition home. At the pre-surgical joint class, the care transition nurses assess patients' home environment and caregiver availability to help determine the post-discharge disposition. In January 2018, a nurse was hired as an orthopedic patient navigator. The hospital noted that this position was not created in response to the CJR model, but was due to the recent increase in LEJR volume. She supports all joint replacement and spine surgery patients and reaches out to patients one week before their scheduled surgery, meets with them after surgery, and then follows up with them

monthly through the 90-day post-discharge period. She follows up more frequently with the more complex patients.

While the hospital considers home to be the ideal post-discharge setting, patient needs and complexity are considered by hospital staff in their discharge planning. Hospital representatives reported that they consider keeping a patient an extra day in the hospital if it means the patient can be discharged home instead of to a SNF. Hospital H representatives reported discharging the more complex elective patients to SNFs and approximately 85% of the fracture patients.

Collaboration and communication with PAC providers to improve care transitions

> *"There's an exchange of information and each agency is involved"*
>
> ***-HHA representative***

With the advent of the CJR model and the goal of improving communication about care transitions, Hospital H started a collaborative with over 30 patient care organizations in its catchment area. The collaborative meets on a monthly basis and includes hospital staff and representatives from SNFs, HHAs, hospice, and independent living. The collaborative focuses on education about care transitions and standardization of care. For example, in response to a request from SNFs, the hospital is providing more detailed patient information at discharge on weight-bearing status, showering abilities, and use of anticoagulants by completing a form that is included in the patient discharge packet to the SNF.

An HHA representative discussed their collaboration with Hospital H and approach to improving care transitions to home health. The HHA has a home care intake coordinator working in the hospital with the case management department. Case management gives the home health intake coordinator a "heads up" when an LEJR patient is going to be discharged home so the HHA can ensure staff are available to support the patient. The intake coordinator obtains copies of discharge information from the hospital and enters the information into the HHA case management system so the therapists can review the documentation before they see the patient for the first time. Per the hospital's request, the HHA's goal is to see the patient at home within 24 hours of discharge and to provide at least one nursing visit and five physical therapy visits in the first seven days after discharge (before the patient's first post-surgical visit with the surgeon).

> *"There were a lot of surprised looks in the room when we started having those conversations…But we were able to show them [CMS data] first-hand and it was kind of like an 'a-ha' moment."*
>
> ***-Hospital administrator***

With access to the Medicare claims data through the CJR model, hospital staff were able to develop and provide PAC providers with data snapshots of the LEJR patients discharged to their facilities/agencies. These data snapshots include measures of length of stay in the PAC setting and associated charges, etc. and interviewees reported that the data have been "eye opening" for the PAC providers, leading to changes in protocol. For example, SNF representatives thought the average length of stay for LEJR patients at their SNFs was 20 days. The hospital then shared the average length of stay data with the

SNF representatives, which showed it was actually 33 days. As an approach to decrease SNF LOS, Hospital H reported calling and following up with SNF staff on day seven after inpatient discharge to check in and discuss expected length of stays for LEJR patients.

In response to the CJR model, Hospital H representatives said they were developing a preferred provider network to achieve better quality outcomes at SNFs and increase their leverage over the SNFs with the "preferred provider" status. Interviewees reported that LEJR patients choose SNFs based on proximity to their home, not quality. Hospital H reported that there are some SNFs that are conveniently located to patients, but have poor quality ratings and surgeons explicitly request that their LEJR patients not be sent to these facilities.

Focus on improving CJR quality measures

As a result of its "below acceptable" score under the CJR model, the hospital is focusing on specific efforts to improve its quality score. Once CMS published the measures used for quality adjustment, Hospital H began looking at the specific complications included in the total hip and knee replacement complications measure. The orthopedic department meets monthly and reviews data on LEJR inpatient length of stay, discharge disposition, and complications. Hospital H conducted analysis to better understand why its complications rate was high and attributed it to a "blip" in pneumonias in 2014. As a result, it increased testing patient lung function and getting patients out of bed.

For the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS), Hospital H pulls the data every week and provides physicians with individual scores. The hospital, based on analysis, attributes its low HCAHPS scores to the poor performance of its hospitalist group and it has not renewed the group's contract. Representatives indicated that the hospital will include a HCAHPS metric in the future hospitalist group's contract, which will require the physicians to maintain a minimum score. Hospital representatives were frustrated that the CJR model HCAHPS measure is hospital-wide, because its HCAHPS scores for LEJR patients are higher.

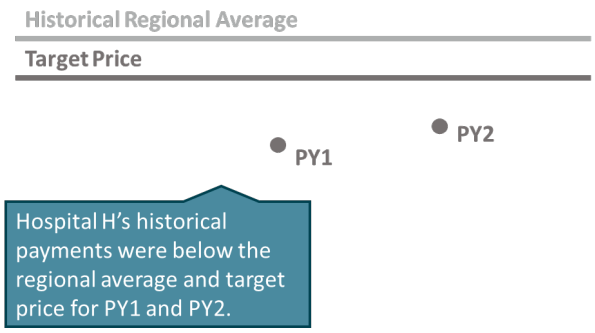
> Hospital H had composite quality scores of 0 in the first two performance years. This means their hospital did not meet the thresholds for HCAHPS score, complication rate for elective LEJR procedures, and submission of PRO data.

Hospital H submitted PRO data in the first two performance years, but received no credit because in PY1, it did not meet the minimum sample size by one patient. As a result, all LEJR patients are now surveyed so CJR-eligible patients are not missed. Hospital representatives also reported that they only collect the PRO data to increase their quality composite score, they do not analyze the PRO data and it does not affect the hospital's clinical processes.

Impact: Payments, Utilization, and Quality

Hospital H's episode payments were historically below the regional average. In the first two performance years, Hospital H had LEJR episode payments below its quality-adjusted target prices (Exhibit H-4; 4% and 3% below the quality-adjusted target price, respectively). The hospital would have received a total reconciliation payment of approximately $120,000 in performance year 1 if it had achieved the minimum composite quality score.

Exhibit H-4: Hospital H came under the quality-adjusted target price in both performance years



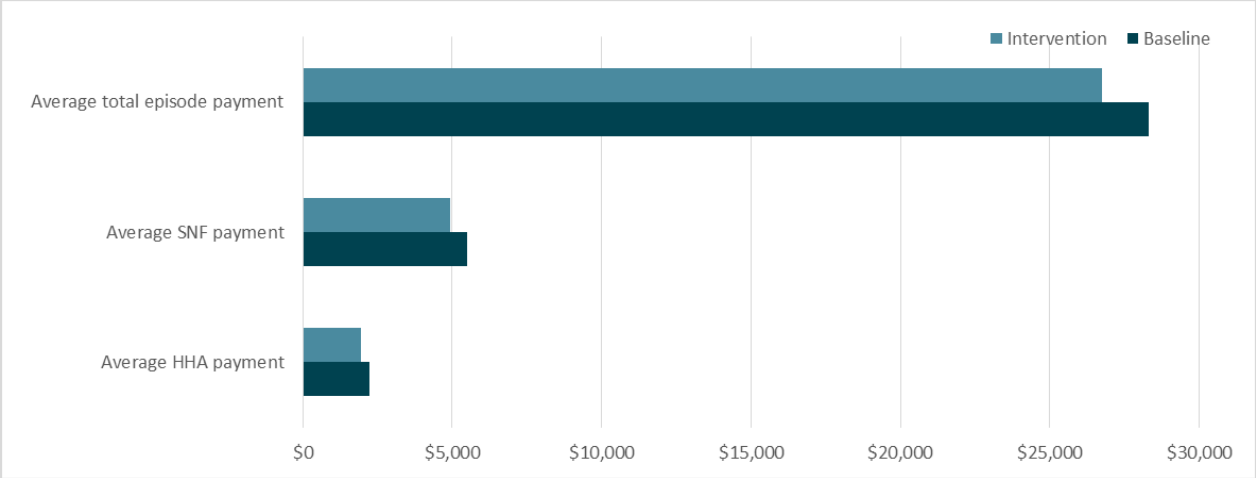
Measure	PY1 Final Reconciliation Results	PY2 Initial Reconciliation Results
Quality category	Below Acceptable	Below Acceptable
Spending vs. quality-adjusted target price	Below	Below
Standardized reconciliation amount per episode	$0	$0

Source: Lewin analysis of Mathematica Policy Research's CJR reconciliation data for performance year 1 (episodes ending Q2 2016 through Q4 2016) and performance year 2 (episodes ending Q1 2017 through Q4 2017).

Notes: PY = performance year.

Hospital H continued to reduce LEJR payments under the CJR model. Claims analysis indicates that average total episode payments for Hospital H decreased by $1,548 between the baseline and intervention period (Exhibit H-5).

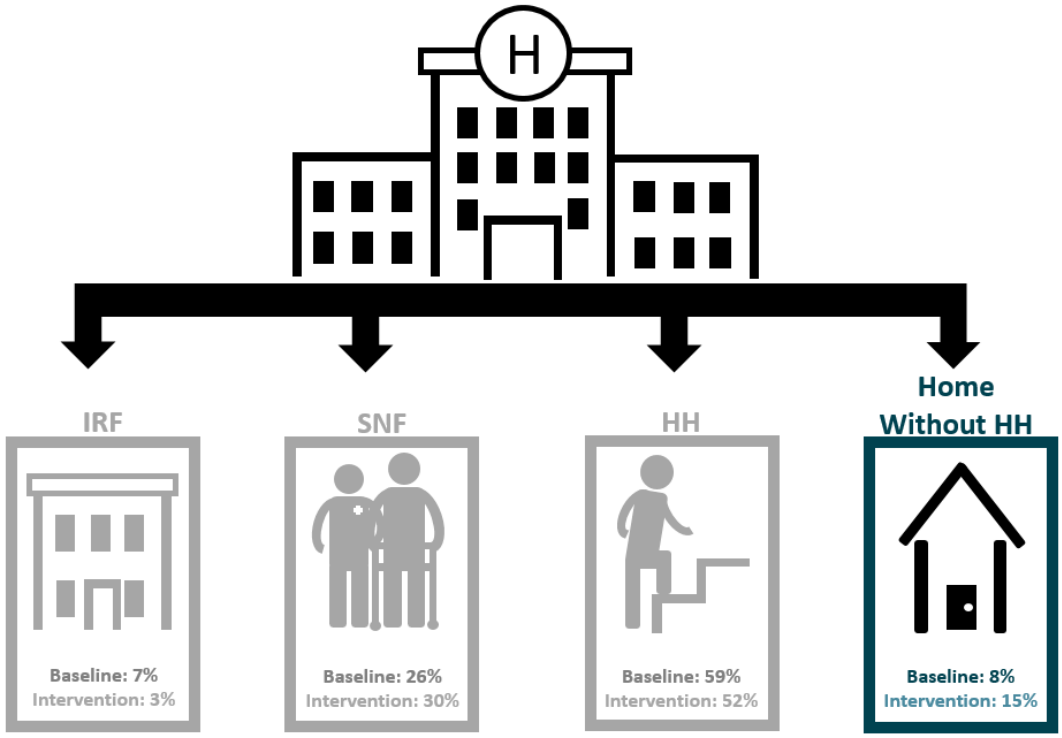
Exhibit H-5: Average total episode payments decreased by $1,500 and average SNF payments decreased by $600



Source: Lewin analysis of Medicare claims and enrollment data for episodes initiated in 2012 through 2014 that ended between Q2 2012 and Q1 2015 (baseline) and episodes initiated during or after Q2 2016 that ended by Q4 2017 (intervention).

Notes: HHA = home health agency, SNF = skilled nursing facility.

Exhibit H-6: Discharges to home without home health increased from 8% to 15%



Source: Lewin analysis of Medicare claims and enrollment data for episodes initiated in 2012 through 2014 that ended between Q2 2012 and Q1 2015 (baseline) and episodes initiated during or after Q2 2016 that ended by Q4 2017 (intervention).

Notes: HH = home health, IRF = inpatient rehab facility, SNF = skilled nursing facility.

Hospital leadership noted that they only discharge complex elective episodes or fracture episodes to SNFs. They have been working with SNFs through their collaborative to decrease average length of stay. Even with the improved communication, education and data sharing activities of the collaborative, SNFs are not decreasing length of stay to the extent the hospital wants. Interviewees reported having little influence over SNFs, given that only a small percent of the hospital's LEJR patients go to SNFs. The percentage of patients discharged to SNF has not decreased under CJR (Exhibit H-6), but the average length of a SNF stay decreased from 40 to 26 days (Exhibit H-7) and average SNF payments decreased by $561 (Exhibit H-5).

Exhibit H-7: For patients discharged to SNF, average LOS decreased

Source: Lewin analysis of Medicare claims and enrollment data for episodes initiated in 2012 through 2014 that ended between Q2 2012 and Q1 2015 (baseline) and episodes initiated during or after Q2 2016 that ended by Q4 2017 (intervention).

Note: LOS = length of stay.

Hospital I Case Study

The Hospital I case study is based on site visit interviews with hospital and health system administrators, front-line staff, an orthopedic surgeon in private group practice (the hospital's "surgeon champion"), and representatives of the SNF that receives the majority of Hospital I's LEJR patients that are not discharged directly home.

In response to the CJR model, the hospital executed gainsharing contracts with surgeons in private practice and hired a patient and program coordinator to call patients after discharge and collect PRO data. Exhibit I-1 highlights key takeaways from the case study, summarizing hospital and market characteristics, Hospital I's impression of CJR model incentives, choice of actions, and resulting impacts.

Exhibit I-1: Key findings from Hospital I

Hospital Resources and Market Conditions
(Page 78)
The hospital had a clear surgeon champion and implemented many improvement initiatives for its orthopedic service line prior to the CJR model. Hospital I also had an existing relationship with a SNF that had experience participating in the BPCI initiative.

Impressions of the Model and its Financial Pressure and Incentives
(Page 79)
Interviewees shared perceived limitations of the methodology used to assign a quality score to hospitals under the CJR model. In addition, they expressed concern with the inclusion of fractures in the CJR model, as they felt this population was entirely different than elective LEJR patients.

Hospital Choice of Action
(Page 79)
1.) The hospital executed gainsharing contracts with orthopedic surgeons performing a high volume of LEJRs.
2.) The hospital hired a new coordinator, tasked with collecting PRO data.

Impact: Payments, Utilization, and Quality
(Page 82)
Payment: Average total episode spending decreased from baseline.

Hospital I is a not-for-profit facility that is part of a small health system and owns a SNF and an HHA. The hospital has a higher bed count than the average CJR participant hospital. It is located in an MSA with a relatively high number of SNF beds per 10,000 age 65+ population (Exhibit I-2).

Exhibit I-2: Hospital I is part of a small health system that owns a SNF and an HHA.

Location	Characteristic	Hospital I	CJR average
Hospital	Annual Medicare LEJR volume	124	144
	Ownership	Not for profit	60.7% not for profit
	Health system membership	Yes	77.9% membership
	Ownership of SNF, HHA or IRF	Yes	55.9% own PAC
	Medicare days percentage	44.2%	34.7%
	DSH percentage	21.8%	32.4%
	Bed count	365	266
	Teaching status	No	58.5% non-teaching
MSA	Population size	19,865,045	1,585,229
	Population aged 65+	13.6%	14.0%
	Herfindahl-Hirschman Index for LEJR[a]	422	3,434
	IRF discharges per 10,000 65+ population	11.1	20.6
	Ortho surgeons per 10,000 65+ population	1.0	0.9
	SNF beds per 10,000 65+ population	55.6	53.4

Source: Lewin analysis of 2015-2016 Area Health Resource File, 2014 American Community Survey, 5-Year Estimates, December 2016 POS, December 2014 PECOS, FY 2016 CMS Annual IPPS, and Medicare claims and enrollment data for episodes initiated in 2012 through 2014 that ended between Q2 2012 and Q1 2015.

Notes: DSH = disproportionate share hospital, HHA = home health agency, IRF = inpatient rehab facility, LEJR = lower extremity joint replacement, MSA = metropolitan statistical area SNF = skilled nursing facility.

[a] A measure of market concentration calculated based on LEJR at acute care hospitals.

Hospital Resources and Market Conditions

Key resources informing CJR model response:

Proactive SNF making its own CJR model care protocols due to prior experience with the Bundled Payments for Care Improvement initiative

Surgeon champion led many service line improvement initiatives prior to the onset of the CJR model

Hospital Resources

Hospital I is part of a small regional health system. All of the system's hospitals but one are participating in the CJR model. Most of the LEJR surgeries are performed by 3 surgeons in private group practice. Interviewees explained that each of the system's CJR participant hospitals serves a different patient population and works with different orthopedic groups. Each hospital's orthopedic service line makes its own decisions about the CJR model, although interviewees reported coordination across the system hospitals for particular CJR-reported initiatives.

Prior to the CJR model, Hospital I began implementing quality improvement and cost reduction initiatives, partially due to the work of a surgeon champion who significantly influenced care redesign; initiatives included standardization of pain management protocols and surgical implants, improvements in discharge planning, and increased discharge home without home health. Interviewees repeatedly contrasted the positive experience of implementing care

redesign at Hospital I and their level of surgeon leadership with the experience at another system-owned CJR participant hospital. At the other hospital, the primary surgical group decreased the system's offer to gain share under the CJR model and is "not engaged" in CJR model response.

Hospital I is a Level 2 trauma center, and as a result, approximately 50% of its overall hip replacement procedures are fracture-related. For fracture patients, the hospital works closely with a nearby, high-quality SNF, which was participating in model 3 of the Bundled Payments for Care Improvement initiative. When the CJR model was announced, the hospital invited the SNF to present and share its bundled payment knowledge.

Market Conditions

Hospital I estimated that it had a significant proportion of the local market for LEJR procedures. While the hospital owns a SNF and an HHA, very few LEJR patients go to the hospital-owned SNF because of its inconvenient location. Prior to the CJR model, the hospital sent the vast majority of its elective LEJR patients home after surgery. Interviewees said that most patients go straight to outpatient therapy, with approximately 10% receiving care from an HHA. There are only three HHAs in the hospital's service area, and interviewees reported that they frequently have challenges with finding coverage for patients after discharge.

Impressions of the Model and its Financial Pressure and Incentives

> *"[Our surgeon] really is a champion for quality. It's just unfortunate that we can't reward him. It's frustrating, especially because it's the older data and it's not relevant to what has been happening."*
>
> - ***Hospital leadership***

Interviewees expressed frustration with receiving a "below average" composite quality score in the first two performance years of the CJR model, which prevents the hospital from receiving reconciliation payments. They explained that because the complications measure is based on historical data, it does not capture any of the improvements made to the service line during the performance period. They also felt that using global HCAHPS in the quality score was not ideal, as none of the initiatives they implement for their orthopedic population will influence HCAHPS for the entire hospital; they suggested that CMS pull just the scores from patients with an orthopedic attending physician.

Hospital leadership also felt that it was challenging that elective LEJR surgeries and those performed as a result of a hip fracture were both included in the model, as the patient populations and procedures are very different. Further, they expressed concern that the hospital's fracture patient volume and acuity had largely increased between the quality-adjusted target price historical period and the start of the CJR model when the hospital became a trauma center. Due to this unique situation, leadership felt that the quality-adjusted target price may not adequately reflect the higher acuity of the current mix of patients.

However, hospital leadership reported that participation in the CJR model helped make them feel more comfortable with bundled payment models and the hospital has applied to participate in Bundled Payments for Care Improvement-Advanced.

Hospital Choice of Actions

The hospital interviewees reported implementing gainsharing contracts with orthopedic surgeons and hiring a new patient and program coordinator. Exhibit I-3 summarizes care redesign and other activities interviewees discussed implementing, indicating whether or not they attributed these efforts to their response to the CJR model.

Surgeons engaged in orthopedic service line improvements

> *"All of these changes have been in evolution… as a result of striving toward standardization."*
>
> -***Hospital leadership***

Although Hospital I's leadership reported historically strong surgeon engagement in improving the service line, they chose to execute gainsharing contracts with all surgeons performing LEJR procedures under the CJR model. Hospital I implemented several joint replacement care pathway protocols prior to and during the CJR model, which were attributed to the work of the surgeon champion at the hospital, and not as a response to the model. These included a medication evaluation, which resulted in all four joint replacement surgeons using standardized pain management and anesthesia protocols. Since becoming a level two trauma center, the hospital has focused on fracture operating process improvement by medically optimizing fracture patients quickly so they can get into the operating room as promptly as possible. As of September 2017, hospitalists co-manage 87% of fracture patients and focus on medically optimizing them for the operating room the same day.

Creation of a new patient and program coordinator position and collection of PRO data

The main investment the hospital made in response to the CJR model was hiring a new patient and program coordinator who is responsible for teaching the pre-surgical patient education class, calling the patients after discharge, and PRO data collection. Prior to surgery, the coordinator reviews the patient's charts, determines who is a CJR patient, and then communicates with the case manager. The case manager distributes the PRO survey during case management assessment, collects it during the pre-surgical class, and documents it in the CMS spreadsheet. The patient coordinator calls the patient 9 to 12 months post-discharge to collect PRO data.

Hospital representatives believe that collecting the PRO data is a big investment with little return and does not capture a large portion of "what is being done" in the hospital's service line. They indicated that the call after 9 to12 months to collect the data provided little value-add and noted difficulties in getting patients to complete the PRO survey. Furthermore, the hospital's volume had shifted to fractures and revisions, which do not count towards PRO data submission.

Exhibit I-3: Hospital I took several actions in response to the CJR model

Activity Implemented or Enhanced	Implemented in response to CJR	Implemented in response to other factors	Not Implemented
Pre-surgical patient optimization		x	
Gainsharing	x		
Patient risk stratification		x	
Assessment of the home environment			x
Patient and family education		x	
Use of an external vendor or consultant			x
New EHR or other HIT capabilities		x	
Data sharing with PAC		x	
Data sharing with orthopedic surgeons		x	
Dedicated orthopedic patient navigator	x		
Standardization of surgical implants or supplies		x	
Early ambulation		x	
Inpatient PT or OT changes		x	
Pain management protocols		x	
CJR-specific care protocols			x
PRO data	x		
Discharge planning		x	
Communication with PAC providers		x	
Preferred PAC network			x
Patient follow-up post-discharge	x		

Source: Lewin analysis of site visit interview data.

Notes: EHR = electronic health record, HIT = health information technology, OT = occupational therapy, PAC = post-acute care, PRO = patient-reported outcome, PT = physical therapy.

Focus on patient optimization

Under the CJR model, interviewees indicated a heightened focus on pre-surgical patient optimization. Surgeons now suggest a BMI of 40; patients with a higher-than-suggested BMI are referred to the bariatric program. The hospital has also implemented a hemoglobin A1C cutoff of 8% for elective LEJR surgeries. A specialized patient assessment tool that was developed in-house is administered on the same day as pre-surgical education class that measures barriers to discharge such as stairs, family support, equipment, or previous home agency connections.

No new efforts to create a formal preferred PAC network

The hospital has not engaged in any new efforts to work with SNFs since the CJR model. Interviewees explained that with such a small number of elective cases going to SNFs and fracture patients requiring much more individualized care, it did not make sense to provide standardized therapy instructions to the SNFs. Interviewees noted that the hospital does not try to steer patients

to a list of preferred PAC providers, but will notify beneficiaries and their families if they select a facility that has fewer than 3 stars on Nursing Home Compare.

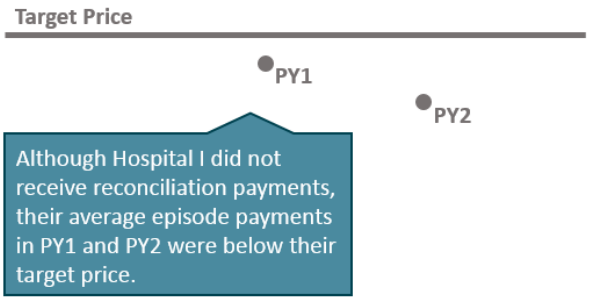
The SNF interviewee, however, indicated the SNF played a significant role in assisting Hospital I with the transition into the CJR model. As previously noted, the SNF was enrolled in model 3 of the Bundled Payments for Care Improvement initiative, and therefore had an existing framework for bundled payment models. When the CJR model launched, the SNF presented to the hospital about care pathways and its use of a Clinical Integration Specialist (CIS) to follow up with patients after discharge. The CIS who works for the SNF makes follow-up phone calls over the 90-day post-discharge period – a practice that has been in place since enrollment in the Bundled Payments for Care Improvement initiative in 2015. Leadership at the SNF explained that they prepared for the CJR model on their own, rather than at the direction of Hospital I.

> The evaluation team interviewed a SNF that had its own CJR-specific protocol based on its previous experience with bundled payment in the Bundled Payments for Care Improvement initiative. The SNF developed its own trainings and care model pathways. It has a LOS goal of eight days for LEJR patients (including fracture patients). It is also taking responsibility for readmissions after SNF discharge. It stresses that HHAs should call the SNF if a patient experiences post-SNF-discharge complications.

Impact: Payments, Utilization, and Quality

Hospital I's total episode payments were 4.1% and 8.8% below its quality-adjusted target price in performance years 1 and 2, respectively. However, it did not receive reconciliation payments because of its "below average" composite quality score (Exhibit I-4).

Exhibit I-4: Hospital I is below quality-adjusted target price, but did not receive reconciliation payments



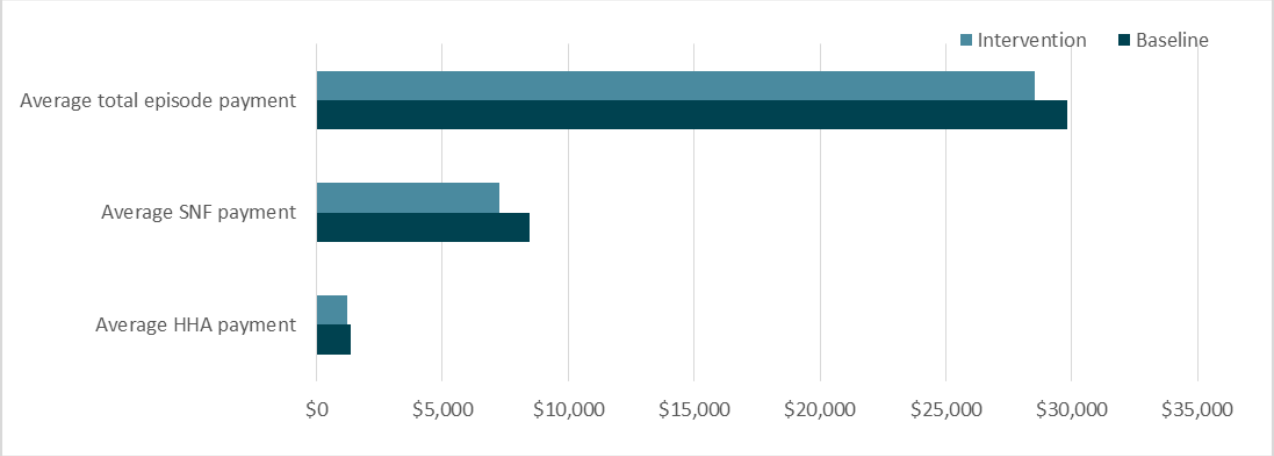
Measure	PY1 Final Reconciliation Results	PY2 Initial Reconciliation Results
Quality category	Below Acceptable	Below Acceptable
Spending vs. quality-adjusted target price	Below	Below
Standardized reconciliation amount per episode	$0	$0

Source: Lewin analysis of Mathematica Policy Research's CJR reconciliation data for performance year 1 (episodes ending Q2 2016 through Q4 2016) and performance year 2 (episodes ending Q1 2017 through Q4 2017).

Notes: PY = performance year.

Total episode payments decreased due to a decrease in SNF payments. From baseline to intervention, total episode payments decreased by $1,300 on average; SNF payments decreased by $1,200 on average (Exhibit I-5).

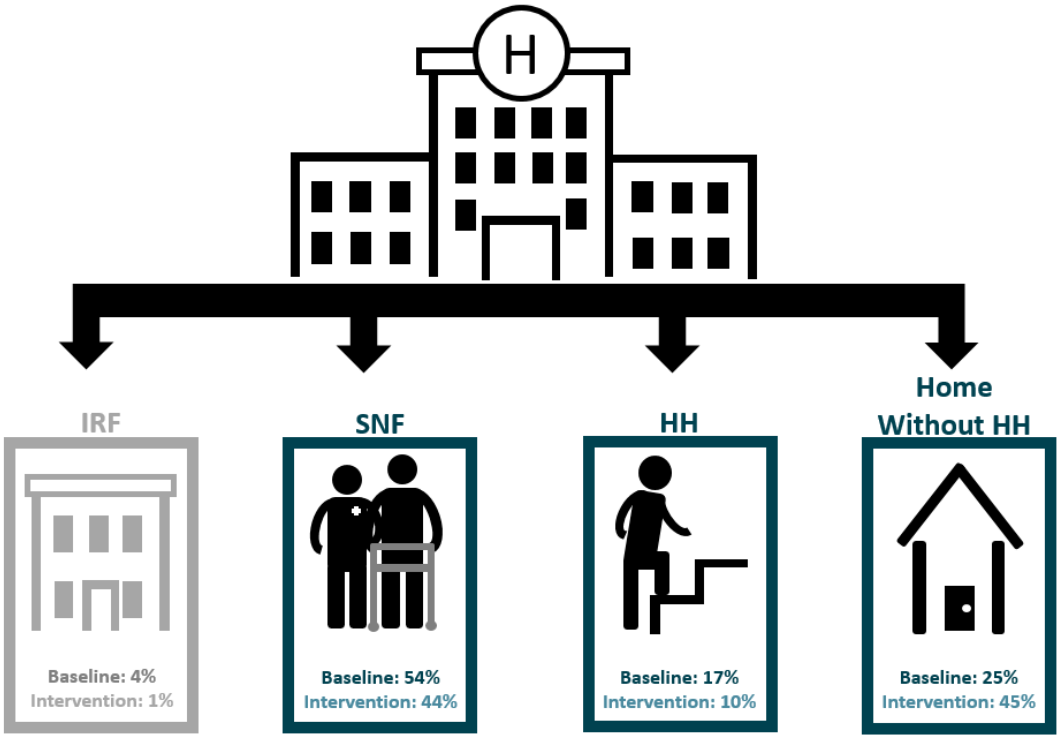
Exhibit I-5: Total episode payments decreased on average $1,300 from baseline to intervention



Source: Lewin analysis of Medicare claims and enrollment data for episodes initiated in 2012 through 2014 that ended between Q2 2012 and Q1 2015 (baseline) and episodes initiated during or after Q2 2016 that ended by Q4 2017 (intervention).

Notes: SNF = skilled nursing facility, HHA = home health agency.

Exhibit I-6: Discharge to home without home health increased from 25% to 45%



Source: Lewin analysis of Medicare claims and enrollment data for episodes initiated in 2012 through 2014 that ended between Q2 2012 and Q1 2015 (baseline) and episodes initiated during or after Q2 2016 that ended by Q4 2017 (intervention).

Notes: HH = home health, IRF = inpatient rehab facility, SNF = skilled nursing facility.

Interviewees discussed working to reduce institutional PAC use prior to the CJR model due to orthopedic surgeons' preferences. Therefore, under the CJR model the hospital chose to focus on reducing utilization of home health to continue to decrease episode payments. Claims analysis show a decrease in discharge to SNF and home health as well as a large increase in discharge to home without home health (Exhibit I-6).

The hospital reported a reduction in its elective LEJR complications rate, which indicated improved quality, during the CJR model performance period. Claims data showed a complication rate of 2.2% in the baseline, which decreased to less than 1% in the intervention period (Exhibit I-7).

Exhibit I-7: Hospital I's complication rate decreased in the intervention period

Source: Lewin analysis of Medicare claims and enrollment data for episodes initiated in 2012 through 2014 that ended between Q2 2012 and Q1 2015 (baseline) and episodes initiated during or after Q2 2016 that ended by Q4 2017 (intervention).

Hospital J Case Study

The Hospital J case study is based on site visit interviews with health system population health leadership, hospital administrators, and direct care staff. In addition, the evaluation team interviewed two employed orthopedic surgeons responsible for a high volume of the hospital's LEJR procedures. Lastly, the evaluation team interviewed administrators from one SNF and one HHA, both of which are owned by Hospital J's health system.

In response to the CJR model, the health system expanded an existing comprehensive care navigation program from its Bundled Payments for Care Improvement participants to Hospital J and its other CJR participant hospitals. In addition, the health system worked with the orthopedic surgeons and HHA to increase the proportion of LEJR patients discharged home with home health. Exhibit J-1 highlights key takeaways from the case study, summarizing hospital and market characteristics, Hospital J's impression of CJR model incentives, choice of actions, and resulting impacts.

Exhibit J-1: Key findings from Hospital J

Hospital Resources and Market Conditions
(Page 86)
Hospital J is a large hospital owned by a regional health system. The health system previously participated in the Bundled Payments for Care Improvement initiative at other hospitals and leveraged that experience to respond to the CJR model. The health system owns SNFs, HHA, and outpatient therapy practices.

Impressions of the Model and its Financial Pressure and Incentives
(Page 87)
The health system conducted a "do nothing" analysis that predicted it would need to repay Medicare over the life of the CJR model. This analysis helped obtain system leadership buy-in to invest resources in responding to the CJR model.

Hospital Choice of Action
(Page 88)
1.) The hospital implemented a comprehensive care navigation program.
2.) The health system worked with surgeons and its HHA to increase discharges home.

Impact: Payments, Utilization, and Quality
(Page 91)
Payment: Average total episode payments decreased from baseline.
Utilization: The proportion of patients discharging to institutional PAC decreased, with a large increase in patients discharging to HHA.

Hospital J is larger and performs more Medicare LEJR procedures than the average CJR participant hospital. Like 77% of CJR participant hospitals, Hospital J is owned by a health system. A low Herfindahl-Hirschman Index for Hospital J's MSA indicates a highly competitive market for LEJR procedures (Exhibit J-2).

Exhibit J-2: Hospital J is a large academic medical center owned by a regional health system

Location	Characteristic	Hospital J	CJR average
Hospital	Annual Medicare LEJR volume	378	144
	Ownership	Not for profit	60.7% not for profit
	Health system membership	Yes	77.9% membership
	Ownership of SNF, HHA or IRF	Yes	55.9% own PAC
	Medicare days percentage	34.7%	34.7%
	DSH percentage	21.4%	32.4%
	Bed count	740	266
	Teaching status	Yes	41.5% teaching
MSA	Population size	19,865,045	1,585,229
	Population aged 65+	13.6%	14.0%
	Herfindahl-Hirschman Index for LEJR[a]	422	3,434
	IRF discharges per 10,000 65+ population	11.1	20.6
	Ortho surgeons per 10,000 65+ population	1.0	0.9
	SNF beds per 10,000 65+ population	55.6	53.4

Source: Lewin analysis of 2015-2016 Area Health Resource File, 2014 American Community Survey, 5-Year Estimates, December 2016 POS, December 2014 PECOS, FY 2016 CMS Annual IPPS, and Medicare claims and enrollment data for episodes initiated in 2012 through 2014 that ended between Q2 2012 and Q1 2015.

Notes: DSH = disproportionate share hospital, HHA = home health agency, IRF = inpatient rehab facility, LEJR = lower extremity joint replacement, MSA = metropolitan statistical area, SNF = skilled nursing facility.

[a] A measure of market concentration calculated based on LEJR at acute care hospitals.

Hospital Resources and Market Conditions

Key resources informing CJR model response:

Health system population health department provides strategic direction

System-owned HHA and SNF

Care navigation program developed under other system hospitals' participation in the Bundled Payments for Care Improvement initiative

Hospital Resources

Hospital J is a large teaching hospital owned by the largest health system in the region. Orthopedic service line oversight comes from the health system, so there is a lot of standardization across system hospitals. Several system hospitals are participating in the CJR model, so efforts are coordinated at the health system level. Specifically, the director of the system's population health department leads model response efforts. Interviewees felt that it was most efficient to have a central team responsible for understanding CJR model requirements and developing strategic response, which allows the hospital service lines to just focus on clinical care.

Two other system hospitals previously participated in the Bundled Payments for Care Improvement initiative for LEJR episodes. Interviewees felt that experience helped the system feel better prepared for the CJR model. Many of the initiatives

implemented under the Bundled Payments for Care Improvement initiative were expanded to the hospitals participating in the CJR model, most notably the care navigation program.

Hospital J's elective LEJR volume is mainly driven by 3 orthopedic surgeons in the same group practice, which is owned by the health system. These surgeons do not operate on hip fracture patients because the hospital has separate orthopedic traumatologists that handle those cases. Interviewees reported that the health system also owns SNFs, HHAs, and outpatient therapy practices. The HHA that receives the largest proportion of the hospital's LEJR patients to is owned by the health system. One of the system's SNFs is located just "up the hill" from Hospital J and is well regarded in the community; many of the hospital's patients want, and expect, to go there. Changing patients' expectations about discharge to that SNF was seen as a challenge under the CJR model. Interviewees felt owning PAC providers was an advantage under the model because they understood the full spectrum of PAC and have leverage over the care protocols used at those providers.

> *"…some of our hospitals are already in BPCI [Bundled Payments for Care Improvement]. So from an organizational standpoint, we had a baseline understanding of what it took to be successful."*
>
> ***- System administrator***

Interviewees explained that Hospital J shares a CMS Certification Number (CCN) with another nearby hospital. Because they share a CCN, the two hospitals are treated as one entity for the purposes of CMS payment. Under the CJR model, the LEJR episodes are combined under a shared quality-adjusted target price. Interviewees felt this was a challenge because the hospitals worked with different orthopedic surgeons and served different patient populations.

Market Conditions

Interviewees described the market for LEJR procedures as highly competitive. Hospital J competes directly with the large academic medical centers in the MSA's urban center. Many people in its catchment area work in the MSA's urban center and have easy access to those hospitals. The Medicare patient population was described as "aging in place," as opposed to moving into an assisted living facility and some interviewees felt that more needed to be done to provide resources to this population in the community.

Impressions of the Model and its Financial Pressure and Incentives

When the CJR model was announced, the population health department conducted a "do nothing analysis." The findings suggested that if the system did not make any changes, Hospital J was projected to lose $500,000 in repayment to CMS over the life of the model. These findings helped obtain leadership buy in for CJR-related investments. Interviewees noted that they did not attempt to predict reconciliation amounts to determine how much to invest in responding to the CJR model. They felt that focusing on improving clinical outcomes would be more important than worrying about upfront investment costs.

> *"Organizationally we have thought about the CJR program as a platform to create a super high quality product that then allows us to show the commercial people 'Look at [Hospital J]; look at what they have done. Look at how incredible this program is. You can believe these numbers because they are coming from CMS. We are not doctoring this.'"*
>
> ***- System administrator***

The health system leaders decided not to invest in external vendors in responding to the CJR model and instead rely on internal resources. Interviewees indicated that the preference was for any reconciliation amounts to go "right back into the service line" rather than to consultants. Using the claims data provided by CMS, they looked at past performance and any variance across their participating hospitals. The director of population health then met with the leadership at each hospital to talk through areas of opportunity to improve under the CJR model.

Interviewees explained that strategic planning for the orthopedic service line focuses more on commercial payers than Medicare, due to the larger profit margin. The system is actively working on commercial bundles; responding to the CJR model convinced the health system that it had a top quality product and provided it with the data it needed to pursue arrangements with other payers. Additionally, as a result of experience in the CJR model, the health system leadership felt confident that they had the infrastructure to participate in Bundled Payments for Care Improvement-Advanced for other clinical episode groups.

Hospital Choice of Actions

Using lessons learned from the Bundled Payments for Care Improvement initiative, interviewees said that the health system took several actions in response to the CJR model, including establishing gainsharing agreements with surgeons, expanding the care navigation program, and working with surgeons to increase discharges to HHA. Exhibit J-3 summarizes care redesign and other activities interviewees discussed implementing, indicating whether or not they attributed these efforts to the CJR model.

Gainsharing with employed orthopedic surgeons

Under the CJR model, the health system implemented gainsharing agreements with all surgeons performing LEJRs on Medicare beneficiaries. Service line administrators explained that there was originally some pushback from health system leadership, who felt that these employed surgeons' salaries already accounted for their participation and engagement in hospital initiatives. However, the labor market is highly competitive and these surgeons are highly respected, so the service line's leadership felt gainsharing was necessary to keep the surgeons happy and practicing at Hospital J. Interviewees reported that all of the other CJR participant hospitals in their area were gainsharing with their orthopedic surgeons, which also was a motivating factor. It took two years to get the gainsharing contracts fully in place because it took time to get everyone to agree to the specific terms and then for the legal department to set everything up.

We interviewed two of Hospital J's surgeons. One indicated that he had not received any money through the gainsharing contracts yet, as they were so new. He felt that so far the agreements were a bit of a hassle, since he was required to notify his patients of the agreement. The other surgeon felt that gainsharing in general is a good idea, explaining that increasingly fewer physicians are privately practicing and these agreements give physicians a little extra incentive to engage in hospital efforts. In response to the model, the surgeons did describe setting hard stops for BMI and HbA1c above which patients are referred to other services before they will operate. There have been no formal efforts to reduce the cost of surgical supplies, but the hospital has started sharing cost information with the surgeons. The surgeons reported that with this information they are trying to avoid using more expensive supplies that do not provide additional benefit.

Exhibit J-3: Hospital J took several actions in response to the CJR model

Activity implemented or enhanced	Implemented in response to CJR	Implemented in response to other factors	Not Implemented
Pre-surgical patient optimization	x		
Gainsharing	x		
Patient risk stratification		x	
Assessment of the home environment	x		
Patient and family education	x		
Use of an external vendor or consultant			x
New EHR or other HIT capabilities	x		
Data sharing with PAC			x
Data sharing with orthopedic surgeons	x		
Dedicated orthopedic patient navigator	x		
Standardization of surgical implants or supplies			x
Early ambulation		x	
Inpatient PT or OT changes		x	
Pain management protocols		x	
CJR-specific care protocols			x
PRO data	x		
Discharge planning	x		
Communication with PAC providers	x		
Preferred PAC network			x
Patient follow-up post-discharge	x		

Source: Lewin analysis of site visit interview data.

Notes: EHR = electronic health record, HIT = health information technology, OT = occupational therapy, PAC = post-acute care, PRO = patient-reported outcome, PT = physical therapy.

Expansion of existing care navigation program

Under the Bundled Payments for Care Improvement initiative, the health system's population health department developed a comprehensive care navigation program. Under the CJR model, the health system invested in expanding the program to all of its CJR participant hospitals. Teams of care navigators led by nurse practitioners follow patients from the moment their surgery is scheduled. They round on the patients during the inpatient stay, call them within 24 hours of discharge, conduct a home visit within 72 hours of discharge if the patient is deemed high risk, and then continue telephonic follow up over the 90-day post-discharge period. Patients are given the navigator's contact information and are encouraged to contact them whenever they have questions. During business hours, incoming calls go directly to the patient's assigned navigator. After hours and weekends, incoming calls go to the health system's clinical call center, which is staffed by registered nurses (RNs). The RNs ask the patient standardized questions as part of a triage algorithm to determine whether the patient needs to come to the ED. The care navigation program is not for all LEJR patients - instead, navigators follow CJR patients as well as a few other patients populations at high risk for readmission. Interviewees reported that the care navigation program is expensive to maintain, but that the savings ultimately realized through CJR model reconciliation were greater than the cost of the care navigators.

> *"…there was tremendous concern on the part of some physician practices that their offices were going to be inundated with calls from patients who now weren't at rehab but were at home…That was another part of using NP's was that they were going to be able to kind of handle some of that potential additional work that the practices felt like would be disruptive."*
>
> ***- Population health leadership***

The care navigator program is supported by software developed internally by the health system. The software "Care Tool" tracks all CJR patients through the 90-day post-discharge period and care navigators enter data from telephonic follow up activities. The Care Tool indicates where each patient is in their episode of care, their clinical complexity level, and it is linked to other data sources, including the patient's medication list, care plan, and the health system's health information exchange (HIE). Being linked to the HIE means that Care Tool can track if a CJR patient is readmitted at another system-owned hospital. Interviewees explained that the software has allowed them to make improvements to the care navigation program because everything the navigators enter into the system can be pulled into Tableau dashboards and analyzed. The population health department can see what percent of patients actually received a call within 24 hours of discharge, or what percentage of patients with a readmission placed an inbound call to their navigator in the 12 hours before they presented to the ED. Interviewees explained that they rely on their internal data from Care Tool in real time, but that the claims data later provided by CMS does fill a gap. For example, the CMS claims show when patients are readmitted outside of the health system. The CMS claims data is used by the population health department to evaluate the impact of the care navigation program on key outcomes, such as readmission rate and episode payments.

The health system trialed a new "black phone" ED alert system in all of its CJR participant hospitals. If a CJR patient presents to the ED, a small black phone icon appears in the patient's chart. Clicking on the icon results in a pop-up with the number of the relevant care navigator and a note to call them before admitting the patient. While the Care Tool eventually generates an email alert to a navigator when the patient is readmitted, this new system will allow the care navigator to intervene while the patient is still in the ED and potentially avoid a readmission.

Focus on increasing the proportion of patients discharged to HHA

Health system interviewees discussed working with surgeons and PAC providers to increase utilization of home health and decrease utilization of SNF for their LEJR patients under the CJR model. First, they worked to understand the physician rationale for sending their patients to SNF. Second, they talked to physicians to understand what it would take to make them feel more comfortable with sending patients home. Third, they worked with the system-owned HHA to make improvements to the care pathway. In addition to these efforts, interviewees discussed adding a physical therapist to the pre-surgical joint class and changing the messaging during the class and inpatient stay to indicate that HHA was the default discharge destination.

The HHA created a standardized LEJR care pathway to ensure hospital and surgeon expectations were met. The care pathway includes an initial visit to the patient within one day of their inpatient discharge, 3 to 4 nursing visits focusing on pain management and comorbidities, and 8 to 9 therapy visits focusing on functionality. The HHA committed to increasing therapy resources so that as LEJR referrals increased it would continue to have the capacity to see patients every day. Hospital J staff explained to patients who they could guarantee the level of care at the system-owned HHA, which increased discharges to that HHA.

> *"There's quite a bit of dysmorphia, data dysmorphia, around physicians looking at their numbers. And everybody thinks they have low numbers…it could be even lower. Here are 400 patients that are just like yours where it's even lower."*
>
> ***- Population health leadership***

In addition to working with the HHA, the population health leadership used data from the Bundled Payments for Care Improvement initiative to show surgeons that it is safe for patients to discharge directly home. Specifically, they showed the high discharge home rate for surgeons at their Bundled Payments for Care Improvement participants and those surgeons' low readmission rate. They made the point that despite having a similar case mix, the physicians discharging more patients home had lower readmission rates. One Hospital J surgeon described experiencing a complete "mindset shift" as a result of being presented with these data. He said that there was a time that he assumed all his patients would go to SNF and he did not care about their length of stay there, but now he works to discharge as many patients safely home as possible. He tells his patients that they are not sick, they are having an elective procedure, and it is healthier for them to recover in their own home. The health system also included proportion of patients discharged to HHA as a metric in its gainsharing agreements with

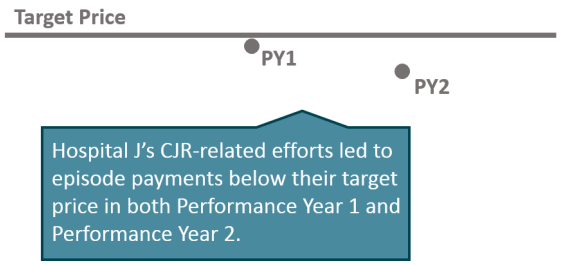
the surgeons. The HHA described a positive impact of the CJR model on the relationship with the surgeons; staff at the HHA now contact the surgeons directly with questions and they are very responsive.

Although the focus was on sending patients straight home after discharge, interviewees did ask the system-owned SNF and some other area SNFs that receive their LEJR referrals to shorten their LOS. The system-owned SNF described implementing changes to its care pathway, such as including a PT evaluation the day the patient arrives and increasing the frequency of therapy sessions during the patient's stay. It has reduced the LOS by half since the start of the CJR model.

Impact: Payments, Utilization, and Quality

The hospital and system were highly successful in reducing episode payments through the efforts described above. In contrast to the prediction of the "do nothing analysis," Hospital J received nearly $500,000 in reconciliation payments for PY 1 (Exhibit J-4). Hospital J has reduced total episode payments from baseline to intervention, largely by reducing SNF payments (Exhibit J-5).

Exhibit J-4: Hospital J achieved a reconciliation payment both performance years

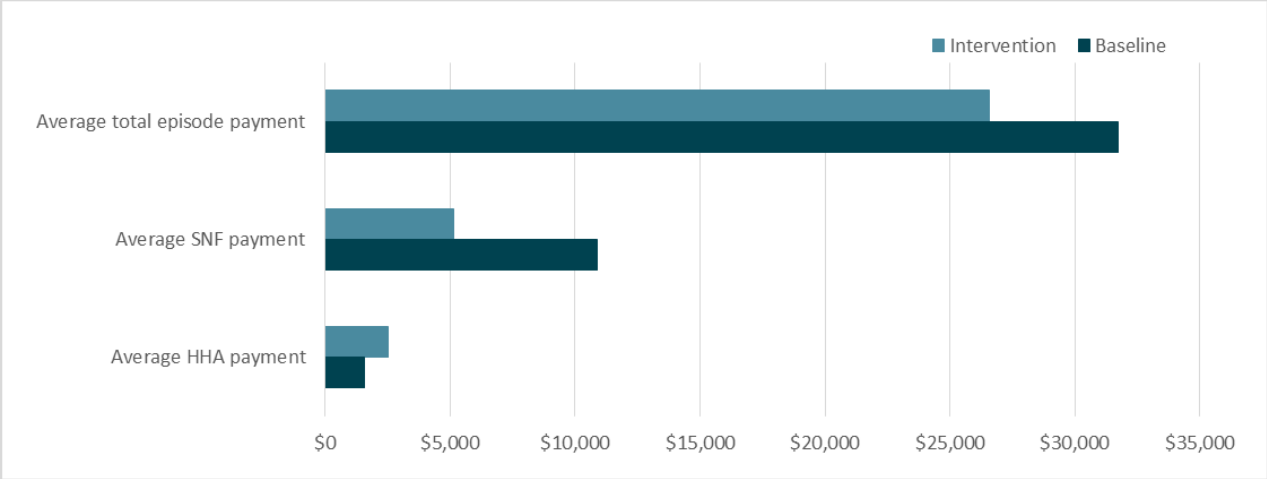


Measure	PY1 Final Reconciliation Results	PY2 Initial Reconciliation Results
Quality category	Good	Good
Spending vs. quality-adjusted target price	Below	Below
Standardized reconciliation amount per episode	$1,371	$1,454

Source: Lewin analysis of Mathematica Policy Research's CJR reconciliation data for performance year 1 (episodes ending Q2 2016 through Q4 2016) and performance year 2 (episodes ending Q1 2017 through Q4 2017).

Notes: PY = performance year.

Exhibit J-5: Hospital J's total episode payments decreased in the intervention period

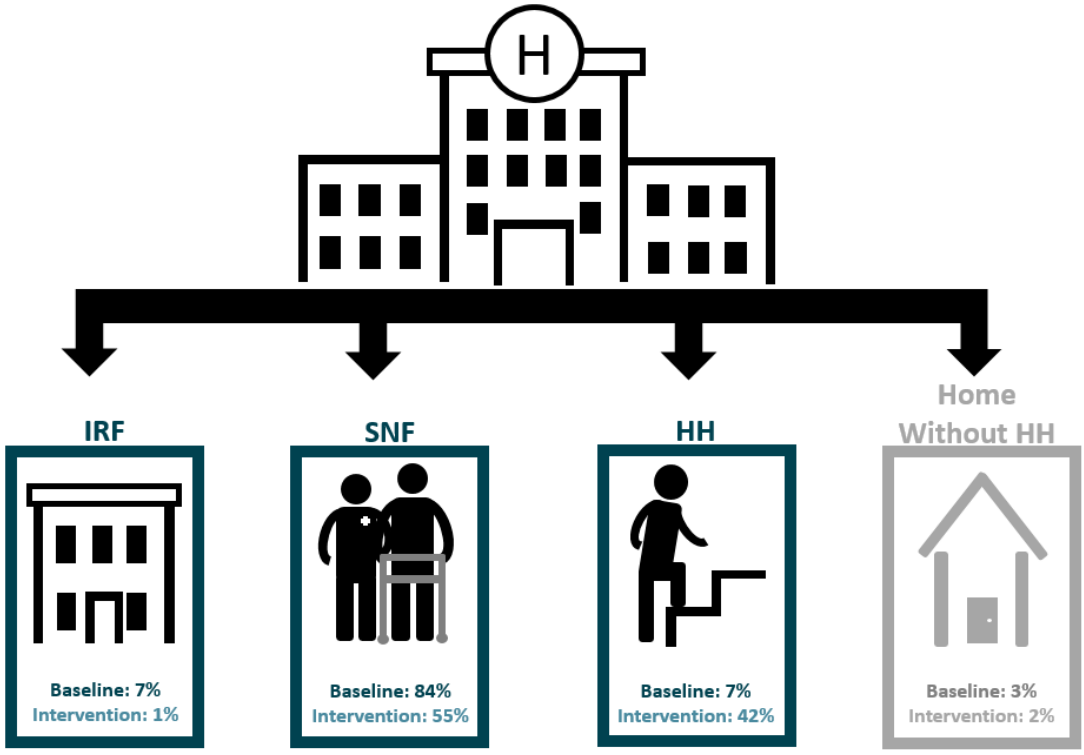


Source: Lewin analysis of Medicare claims and enrollment data for episodes initiated in 2012 through 2014 that ended between Q2 2012 and Q1 2015 (baseline) and episodes initiated during or after Q2 2016 that ended by Q4 2017 (intervention).

Notes: HHA = home health agency, SNF = skilled nursing facility.

Hospital J and its health system focused on increasing HHA utilization under the CJR model by listening to physician concerns and working with its system-owned HHA to improve the care pathway. Interviewees reported a resulting increase in discharge to HHA and decrease in discharge to SNF, corroborated by claims-based analysis (Exhibit J-6).

Exhibit J-6: Hospital J largely increased the proportion of patients discharging to HHA between the baseline and intervention periods

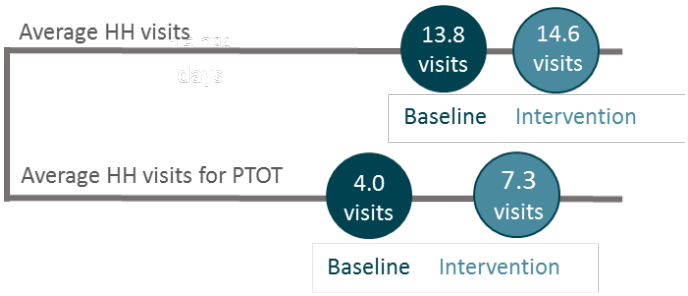


Source: Lewin analysis of Medicare claims and enrollment data for episodes initiated in 2012 through 2014 that ended between Q2 2012 and Q1 2015 (baseline) and episodes initiated during or after Q2 2016 that ended by Q4 2017 (intervention).

Notes: HH = home health, IRF = inpatient rehabilitation facility, SNF = skilled nursing facility.

The HHA described standardizing its care pathway for LEJR patients in response to the health system's request, including standardizing the number of home health visits for nursing and therapy. The HHA also increased staff availability because surgeons wanted to know that physical therapists were available for their patients every day of the week. Exhibit J-7 shows that, on average, the number of home health visits for physical or occupational therapy increased under the CJR model.

Exhibit J-7: The number of home health visits for physical or occupational therapy increased under the CJR model



Source: Lewin analysis of Medicare claims and enrollment data for episodes initiated in 2012 through 2014 that ended between Q2 2012 and Q1 2015 (baseline) and episodes initiated during or after Q2 2016 that ended by Q4 2017 (intervention).

Notes: HHA = home health, PTOT = physical therapy / occupational therapy, SNF = skilled nursing facility.

Hospital K Case Study

The Hospital K case study is based on site visit interviews with hospital administrators, direct care clinical staff, and two orthopedic surgeons employed by the hospital. In addition, the evaluation team interviewed leadership teams at a hospital-preferred SNF and HHA.

In response to the CJR model, the hospital continued existing efforts to standardize clinical pathways from pre-admission through the 90-day post-discharge period and strengthen relationships and care protocols with PAC providers. Hospital K previously participated in the Bundled Payments for Care Improvement initiative. Exhibit K-1 highlights key takeaways from the case study, summarizing hospital and market characteristics, hospital representatives' impressions of CJR model incentives, choice of actions, and resulting impacts.

Exhibit K-1: Key findings from Hospital K

Hospital Resources and Market Conditions
(Page 96)
Hospital K is an academic medical center with many independent orthopedic surgeons performing LEJRs at the facility.
The hospital is located in a highly competitive market for LEJR and serves patients from a wide catchment area.

Impressions of the Model and its Financial Pressure and Incentives.
(Page 97)
Interviewees reported little financial pressure under the CJR model because the hospital has excellent quality and has always had LEJR episode payments below the regional average.

Hospital Choice of Action
(Page 97)
1.) The hospital continued efforts to standardize clinical pathways, from pre-admission through 90 days after discharge.
2.) The hospital strengthened its relationships with SNFs and set care expectations.

Impact: Payments, Utilization, and Quality
(Page 101)
Payment: Total episode payments decreased from baseline to intervention.
Utilization: Discharges to institutional post-acute care and the LOS for patients initially sent to SNFs after discharge decreased from baseline.

Hospital K is an academic medical center. Its MSA is a very competitive market for LEJR procedures, as measured by a Herfindahl-Hirschman Index, and has a slightly higher supply of SNF beds than the CJR average (Exhibit K-2).

Exhibit K-2: Hospital K is a large orthopedic hospital in a highly competitive market

Location	Characteristic	Hospital K	CJR average
Hospital	Ownership	Not for profit	60.7% not for profit
	Health system membership	No	22.1% no membership
	SNF, HHA or IRF ownership	None	44.1% no PAC
	Medicare days percentage	43.8%	34.7%
	DSH percentage	4.7%	32.4%
	Bed count	202	266
	Teaching status	Yes	41.5% teaching
MSA	Population size	19,865,045	1,585,229
	Population aged 65+	13.6%	14.0%
	Herfindahl-Hirschman Index for LEJR[a]	422	3,434
	IRF discharges per 10,000 65+ population	11.1	20.6
	Ortho surgeons per 10,000 65+ population	1.0	0.9
	SNF beds per 10,000 65+ population	55.6	53.4

Source: Lewin analysis of 2015-2016 Area Health Resource File, 2014 American Community Survey, 5-Year Estimates, December 2016 POS, December 2014 PECOS, FY 2016 CMS Annual IPPS, and Medicare claims and enrollment data for episodes initiated in 2012 through 2014 that ended between Q2 2012 and Q1 2015.

Notes: DSH = disproportionate share hospital, HHA = home health agency, IRF = inpatient rehab facility, LEJR = lower extremity joint replacement, MSA = metropolitan statistical area, SNF = skilled nursing facility.

[a] A measure of market concentration calculated based on LEJR at acute care hospitals.

Hospital Resources and Market Conditions

Key resources informing CJR model response:

- Prior experience in bundled payment initiative
- Orthopedic surgeon commitment to Hospital K
- Existing partnerships with PAC providers
- Strong data collection and analytic capabilities in-house

Hospital Resources

Hospital K is an academic medical center. Approximately 8% of the hospital's annual surgeries are LEJRs with only a fraction consisting of fracture cases. The hospital draws patients from a wide catchment area. Hospital K reported little control over the 90-day post-discharge period for its patients because of its large catchment area, with over two-thirds of patients coming from outside its local county.

Hospital K does not own any PAC providers, but the hospital works closely with a preferred provider network of SNFs in the region and one large, "progressive" HHA. The HHA staff are located onsite at the hospital and have access to the hospital's EHR to identify patients being discharged to home health; this collaboration preceded the CJR model. With access to this information before discharge, they are able to see patients during the inpatient stay, verify the patient's insurance, and set everything up so agency staff are in the patient's home within 24 hours of discharge.

Hospital K previously participated in the Bundled Payments for Care Improvement initiative. Interviewees indicated that under the CJR model the hospital continued efforts that were spurred by their Bundled Payments for Care Improvement initiative participation.

The majority of Hospital K's orthopedic surgeons are independent, but only perform LEJR at Hospital K. They are described as being highly engaged and dedicated to Hospital K and their patients. Hospital K also has strong in-house data collection and analytic capabilities. Hospital representatives reported regularly using data from the hospital's EHR to monitor quality and outcome measures.

Market Conditions

Hospital K representatives describe the market as highly competitive for LEJR procedures.

The SNF interviewees reported a highly competitive PAC market and hospital representatives also described the region as having a high supply of outpatient physical therapy clinics. However, because its patients come from across the United States, the hospital has to manage relationships with PAC providers from outside its region.

Impressions of the Model and its Financial Pressure and Incentives

In response to the CJR model, the hospital hired an actuarial firm to evaluate the cost-benefit to participation in the Bundled Payments for Care Improvement initiative compared to the CJR model. The results predicted it would be more profitable for Hospital K to participate in the CJR model because it is a highly efficient, high quality hospital in an otherwise high-payment region. Historically, the hospital's average episode payments were below the regional average, and thus it was relatively well-positioned to financially benefit from participating in the CJR model, where the quality-adjusted target price will eventually be based completely on the regional average. Further, interviewees reported the routine data provided by CMS as a benefit to participation in the CJR model.

Interviewees reported the CJR model is having a negative impact on the bottom line of SNFs within the market because more patients are going home after joint replacement, an overall shift to "more appropriate care."

Hospital Choice of Actions

In addition to continuing efforts launched under the Bundled Payments for Care Improvement initiative, the hospital discussed collaboration with PAC providers and enhanced efforts to follow up with patients after discharge. Exhibit K-3 summarizes care redesign and other activities interviewees discussed implementing, indicating whether or not they attributed these efforts to their response to the CJR model.

Exhibit K-3: Hospital K has implemented a number of effects to improve efficiency of the orthopedic service line, but not in response to the CJR model

Activity implemented or enhanced	Implemented in response to CJR	Implemented in response to other factors	Not Implemented
Pre-surgical patient optimization		x	
Gainsharing	x		
Patient risk stratification		x	
Assessment of the home environment		x	
Patient and family education		x	
Use of an external vendor or consultant	x		
New EHR or other HIT capabilities		x	
Data sharing with PAC		x	
Data sharing with orthopedic surgeons		x	
Dedicated orthopedic patient navigator		x	
Standardization of surgical implants or supplies			x
Early ambulation		x	
Inpatient PT or OT changes		x	
Pain management protocols		x	
CJR-specific care protocols			x
PRO data		x	
Discharge planning		x	
Communication with PAC providers		x	
Preferred PAC network		x	
Patient follow-up post-discharge		x	

Source: Lewin analysis of site visit interview data.

Notes: EHR = electronic health record, HIT = health information technology, OT = occupational therapy, PAC = post-acute care, PRO = patient-reported outcome, PT = physical therapy.

Standardizing clinical pathways from pre-admission to 90 days after discharge

Given that the majority of Hospital K's episodes are elective, planned LEJR, interviewees reported that hospital staff start planning for the episode of care before the patient is admitted. These activities have been strengthened and further expanded under the CJR model with the hiring of additional staff, development of different educational tools, and analysis of Medicare claims data through the 90-day post-discharge period. The goals of these pre-surgical activities are to optimize patients for surgery and set patient expectations that they will be discharged home.

Members of the hospital's pre-admission case management team call patients two to four weeks before surgery and perform a psychosocial assessment to gather information about, for example, potential risk factors (obesity, HbA1c, smoking), patients' living situation and support at home. With this information, hospital staff optimize patients before surgery by identifying high-risk

patients, controlling health issues, and making necessary referrals. The result of the assessment is a preliminary discharge plan.

Hospital K's post-operative program is run by NPs. After discharge, patients are called within 48 hours, which has improved patient satisfaction. Patients are told to call their surgeons' offices if they experience any problems or have any questions, and the surgeon transfers them to the post-operative NPs. The NPs triage patients' questions and concerns, with the goal of reducing readmissions and ED use.

Finally, Hospital K has CJR care coordinators that follow patients discharged to SNFs. Since CJR was implemented, Hospital K also hired a complex care clinical navigator to serve the subset of patients with multiple comorbidities to help transition these patients across the continuum of care. Hospital K is developing work flows for this complex care clinical navigator including post-discharge phone calls at the 90-day mark.

Collaboration and communication with PAC providers to improve care transitions

Hospital K's collaboration and improved communication with PAC providers began under the Bundled Payments for Care Improvement initiative and was expanded under the CJR model. Hospital representatives reported that the claims data regularly provided by CMS has informed and supported the work with PAC providers.

Prior to the CJR model, hospital staff reviewed utilization and noted that patients were being sent to a large number of different nursing homes with varying lengths of stay. In response, Hospital K developed a preferred provider list of SNFs that must meet the hospital's quality requirements, maintain a 4 or 5 Medicare star rating, provide rehabilitation seven days a week, and agree to routinely share patient information with the hospital. Hospital representatives stressed the importance of visiting the facilities and meeting with staff and leadership face-to-face when initially building these relationships with SNFs. At the start of the partnership, Hospital K representatives shared protocols with the SNFs and ask that they abide by them as adjusted for patient needs.

SNF interviewees reported that Hospital K representatives communicate with their teams on a daily basis. They alert the SNF about any patients who will be discharged to the SNF and share relevant patient care plan information through a secure server. Under the CJR model, the SNF is working to decrease the length of stay for LEJR patients and reported it is working towards an average length of stay of 5.5 to 6 days with PT/OT started within 24 hours of admission per Hospital K's protocol. The SNF interviewees also reported changes in patient mix due to CJR. Only

> *"I think developing relationships with the PAC providers that was extremely beneficial to us because their behavior completely changed the minute that they realized that we are paying attention."*
>
> - ***Hospital administrator***

LEJR patients with increased acuity or who are otherwise unable to go home alone are admitted to the SNF.

The collaborative relationship between the hospital and the large HHA in the area is key to supporting the hospital's goal of increasing the proportion of patients discharging to home health, according to hospital interviewees. The onsite HHA has always worked closely with the hospital to develop programs that meet the needs of the patients. In the past, a program was put in place where the HHA would provide more intense PT/OT services with the goal of matching the level of therapy provided in an institutional setting for certain eligible patients. Per Hospital K's home health protocol under this program, the agency starts therapy within 24 hours of patient discharge home. The hospital is now working with HHA to further tailor the intensive rehabilitation program based on results from the Medicare claims provided by CMS under the CJR model.

Collecting, monitoring and sharing data on patient experience during the LEJR episode

Prior to the CJR model, Hospital K did not have access to data on their patients during the post-discharge period. Under the CJR model, Hospital K representatives reported that the data provided by CMS on CJR episodes of care has been very helpful. Now, the hospital follows the utilization of patients during the 90-day post-discharge period, including any readmissions and ED visits to other hospitals.

> *"It has forced the medical community to look at the entire episode, which I think is a good thing. To look at not only the cost, but actually what really happens to patients…what was really eye opening for me was getting information on my 90-day readmission rate."*
>
> ***- Orthopedic surgeon***

Hospital EHR data, including type of surgery, discharge disposition, length of stay, and any readmissions is used to supplement the claims data. The hospital also collects PRO data on patient satisfaction and functional status pre-surgery and then at scheduled post-operative times monitors change in functional status. These data are used to monitor improvements in functional status across LEJR cases. The CJR care coordinators collect data on CJR patients discharged to SNFs during their regular phone calls with the SNFs. They collect information on bed days and readmissions. This information is only collected on CJR patients, but they are considering expanding it to all patients. From its partner HHAs, the hospital routinely obtains quality measure data to ensure that patients are getting the appropriate level of service and quality of care.

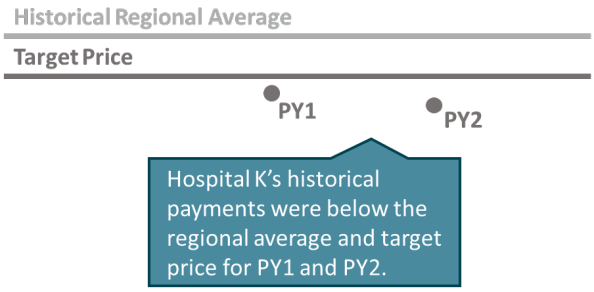
These data are all shared with hospital leadership, service line chiefs, members of the CJR workgroup meetings, and PAC partners. The CMS data are included in one of the hospital's dashboards and are shared quarterly with the CJR workgroup and orthopedic surgeons. Individual-level clinician data are shared with orthopedic surgeons and have helped engage surgeons and demonstrate that patients can go home safely after discharge.

Hospital K also shares aggregated data on a quarterly basis with its PAC partners, including length of stay, readmissions, and discharge disposition from the PAC (e.g., SNF to HH). The hospital looks at data for their preferred network of SNFs to ensure that length of stay is decreasing without increases in complications and readmissions. Hospital interviewees reported that these data help engage PAC providers and increase awareness about utilization patterns.

Impact: Payments, Utilization, and Quality

In the first two performance years of the CJR model, Hospital K reduced its LEJR payments, while achieving "excellent" quality. The hospital interviewees reported that the actuarial analysis accurately predicted Hospital K's performance under the CJR model. In the first two performance years, Hospital K earned average reconciliation payments of over $1,200 per episode, hitting the stop gain limit in both years (Exhibit K-4).

Exhibit K-4: Hospital K came under the quality-adjusted target price in both performance years



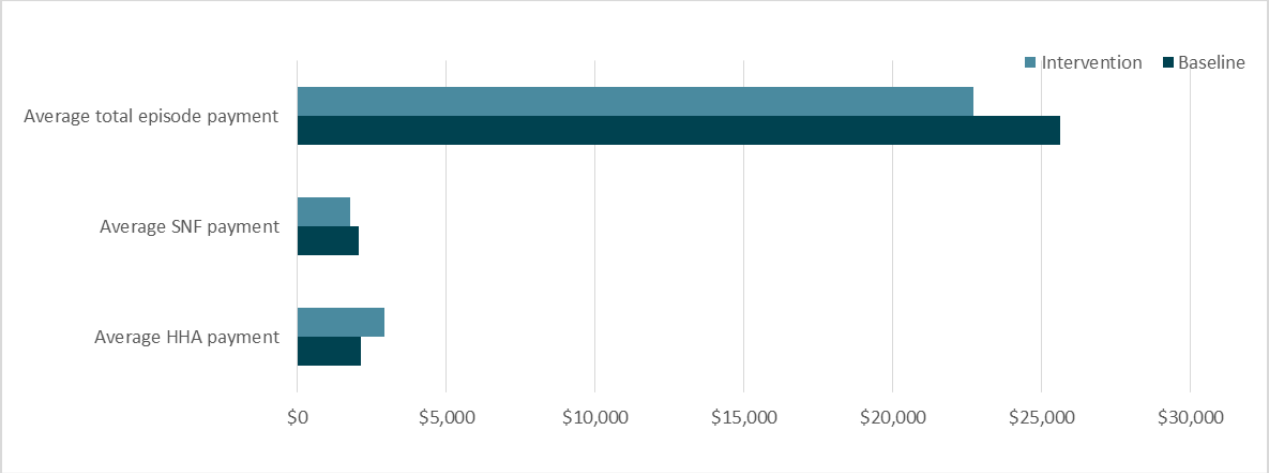
Measure	PY1 Final Reconciliation Results	PY2 Initial Reconciliation Results
Quality category	Excellent	Excellent
Spending vs. quality-adjusted target price	Below	Below
Standardized reconciliation amount per episode	$1,213	$1,225

Source: Lewin analysis of Mathematica Policy Research's CJR reconciliation data for performance year 1 (episodes ending Q2 2016 through Q4 2016) and performance year 2 (episodes ending Q1 2017 through Q4 2017).

Notes: PY = performance year.

Prior to the CJR model, Hospital K was a high quality, efficient hospital and the hospital continued to reduce LEJR payments under the CJR model by nearly $3,000 per episode from baseline to the end of performance year 2. This was achieved through decreases in institutional PAC payments, with average IRF payments going down by $1,881 and SNF payments by $276. On average, home health payments increased by $771 per episode from baseline (Exhibit K-5).

Exhibit K-5: Average total episode payments decreased by $2,900

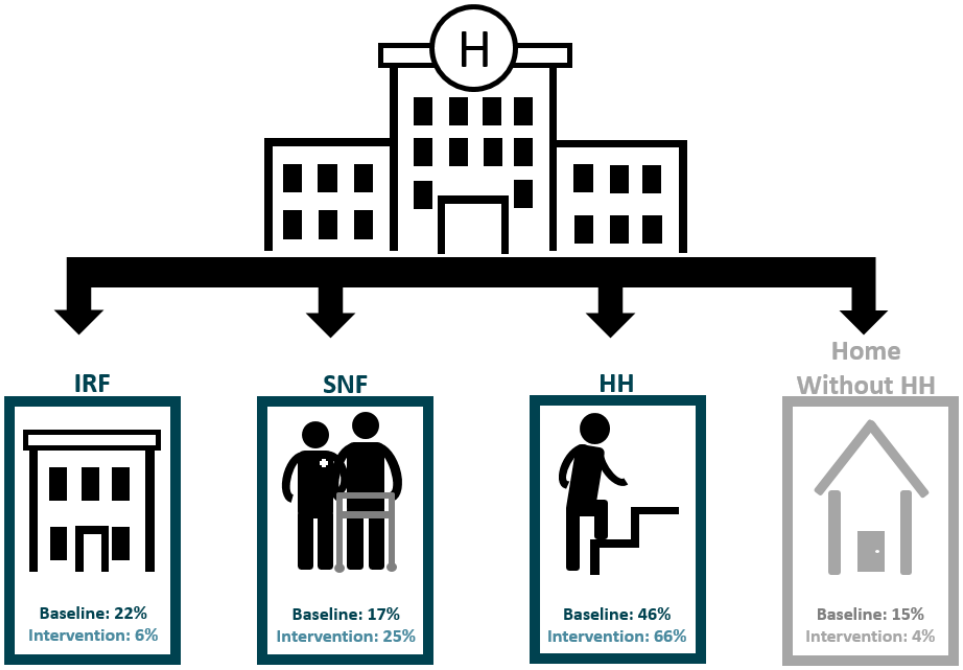


Source: Lewin analysis of Medicare claims and enrollment data for episodes initiated in 2012 through 2014 that ended between Q2 2012 and Q1 2015 (baseline) and episodes initiated during or after Q2 2016 that ended by Q4 2017 (intervention).

Notes: HHA = home health agency, IRF = inpatient rehab facility, SNF = skilled nursing facility.

To achieve greater efficiency and cost savings, hospital interviewees noted working to shift away from institutional PAC settings, such as IRFs and SNFs. Hospital K reported that 20% of its LEJR patients are now discharged to a SNF and many of these patients go to SNFs on the preferred provider list. Hospital K's close relationship with the onsite HHA provider has supported this shift from post-discharge care in IRF and SNF settings to home with HH. For example, from baseline to intervention, Hospital K decreased the percent of patients first discharged to an IRF from 22% at baseline to 6% at intervention (Exhibit K-6).

Exhibit K-6: Hospital K reduced the percent of episodes initially discharged to expensive IRF settings



Source: Lewin analysis of Medicare claims and enrollment data for episodes initiated in 2012 through 2014 that ended between Q2 2012 and Q1 2015 (baseline) and episodes initiated during or after Q2 2016 that ended by Q4 2017 (intervention).

Notes: HH = home health, IRF = inpatient rehabilitation facility, SNF = skilled nursing facility.

Patients who previously would have been sent to a SNF or IRF are now being sent home with appropriate rehab services. At baseline, 46% of patients were discharged home with HH, which increased to 66% by the intervention period (Exhibit 6).The hospital's complications rate and unplanned readmission rate remained less than 5% in the intervention period, according to claims data.

Further, LOS for SNFs has decreased. Prior to the CJR model, the average SNF LOS was 20 days. It fell to 12 days by the end of performance year 2, contributing to the decrease in average SNF payments (Exhibit K-7).

Exhibit K-7: Since the CJR model was introduced, Hospital K's patients are spending 8 fewer days in the SNF

Source: Lewin analysis of Medicare claims and enrollment data for episodes initiated in 2012 through 2014 that ended between Q2 2012 and Q1 2015 (baseline) and episodes initiated during or after Q2 2016 that ended by Q4 2017 (intervention).

Notes: LOS = length of stay, SNF = skilled nursing facility.