



CMS Comprehensive Care for Joint Replacement Model:

Performance Year 1 Evaluation Report – Appendices

Prepared for:

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Prepared by:

The Lewin Group

With our partners:

Abt Associates, GDIT, Telligen, and Optum

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Authors:

Laura Dummit, Kimberly Smathers, OJ Bright, Rebecca Cherry, McCulloch Cline, Amy Cowell, Cindy Gruman, Ashley Johnson, Alex Lampert, Grecia Marrufo, Sebastian Negrusa, Benjamin Niela, Erika Rogan, Karen Schneider, Carol Simon, Julie Somers, Ellen Tan, Katie Verchota, David Zhang, Matt Zhou, Dean Farley, Ian Breunig, Louisa Buatti, Sean McClellan, Matt Kukla, Matt Trombley, Caroline Logan, Rosanna Bertrand, Christine LaRocca, Becky Blystone, Chris Alleman, Colleen Kummet, Chong Wang

Lewin's address:

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

Federal Project Officer:

Jessica McNeely

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

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Note: After initial posting in August 2018, Appendix C was revised to include Exhibit C-10 identifying CJR Treatment and Control Group MSAs and subsequent exhibits were renumbered to account for this addition. The page numbers in Appendix D were corrected and one acronym and term was added to Exhibit A-1 in Appendix A.

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

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Appendix A: List of Acronyms & Glossary Terms

Exhibit A-1: List of Acronyms

Acronym	Meaning
ACH	Acute Care Hospital
ACO	Accountable Care Organization
ACS	American Community Survey
ADLs	Activities of Daily Living
AHA	American Hospital Association
AHRF	Area Health Resource File
AIC	Akaike Information Criterion
APM	Alternative Payment Model
BIC	Bayesian Information Criterion
BMI	Body Mass Index
BPCI	Bundled Payments for Care Improvement
CBSA	Core-Based Statistical Area
CJR	Comprehensive Care for Joint Replacement
CME	Common Medicare Enrollment
CMS	Centers for Medicare & Medicaid Services
DiD	Difference-in-Differences
DME	Durable Medical Equipment
DRG	Diagnosis Related Group
DSH	Disproportionate Share Hospital
ED	Emergency Department
EHR	Electronic Health Record
ESRD	End-Stage Renal Disease
FFS	Fee-for-service
GDIT	General Dynamics Information Technology
GME	Graduate Medical Education
HCAHPS	Hospital Consumer Assessment of Healthcare Providers and Systems
HCC	Hierarchical Condition Category
HH	Home Health
HHA	Home Health Agency
HHI	Herfindahl-Hirschman Index
HIE	Health Information Exchange
IDR	Integrated Data Repository
IME	Indirect Medical Education
IPF	Inpatient Psychiatric Facility
IPPS	Inpatient Prospective Payment System
IRB	Institutional Review Board
IRF	Inpatient Rehabilitation Facility

Acronym	Meaning
IRF-PAI	Inpatient Rehabilitation Facility-Patient Assessment Instrument
JAMA	Journal of the American Medical Association
LEJR	Lower Extremity Joint Replacement
LOS	Length of Stay
LTCH	Long-Term Care Hospital
MA	Medicare Advantage
MBSF	Master Beneficiary Summary File
MCC	Major Complication or Comorbidity
MDM	Master Data Management
MDS	Minimum Data Set
MSA	Metropolitan Statistical Area
MS-DRG	Medicare Severity-Diagnosis Related Group
NP	Nurse Practitioner
NPRA	Net Payment Reconciliation Amount
NQF	National Quality Forum
OASIS	Outcome and Assessment Information Set
OLS	Ordinary Least Squares
PA	Physician Assistant
PAC	Post-Acute Care
PDP	Post-Discharge Period
PECOS	Medicare Provider Enrollment, Chain, and Ownership System
PGP	Physician Group Practice
POS	Provider of Services
PPS	Prospective Payment System
PRO	Patient-Reported Outcomes
PT	Physical Therapist
PTI	Provider Telephone Interview
SNF	Skilled Nursing Facility
THA	Total Hip Arthroplasty
TIN	Tax Identification Number
TKA	Total Knee Arthroplasty

Exhibit A-2: Glossary of Terms

Term	Definition
90-day post-discharge period (PDP)	The 90 days following discharge from the anchor hospitalization.
Acute care hospital (ACH)	A health care facility that provides inpatient medical care and other related services for acute medical conditions or injuries.
Anchor hospitalization	The hospitalization that triggers the start of the episode of care.
Baseline time period	The period of time that precedes the intervention period as a basis for comparison in the difference-in-differences statistical technique. The baseline period includes episodes that were initiated from 2012 to 2014 and that ended between April 1, 2012 and March 31, 2015.
Beneficiary incentive	A programmatic flexibility available to hospitals participating in the CJR model. This allows participating hospitals to offer patients certain incentives not tied to the standard provision of health care, as long as it supports a clinical goal.
Bundle	The services provided during the episode that are linked for payment purposes.
CJR collaborator	Medicare-enrolled providers and suppliers engaged in caring for CJR beneficiaries that enter into sharing agreements with a participant hospital. Collaborators may be a SNF, HHA, LTCH, IRF, physician, non-physician practitioner, provider or supplier of outpatient therapy services, PGP, non-physician provider group practice, ACO, hospital, or critical access hospital.
CJR sharing arrangement	A financial arrangement between a participant hospital and a CJR collaborator for the sole purpose of making gainsharing payments or alignment payments under the CJR model.
Effective discount percentage	The effective discount percentage serves as Medicare's portion of the savings. A 3% effective discount percentage is used to set the prospective quality-adjusted target price. The effective discount percentage used at reconciliation varies based on the hospital's quality performance in the year (for reconciliation in performance year 1, 1.5% for hospitals with excellent quality, 2% for hospitals with good quality and 3% for hospitals with acceptable quality).
Episode benchmark price	The episode benchmark price represents the expected episode payments if treatment patterns and patient mix did not change from historical spending for LEJR episodes. In the first three years of the model, the episode benchmark price is based on a blend of hospital-specific and regional historical LEJR payments. In performance years 4 and 5, the episode benchmark price is based solely on regional amounts. The product of the episode benchmark price and the effective discount percentage equals the quality-adjusted target price.
Episode of care	For the CJR model, an episode of care is triggered by an inpatient hospitalization for an LEJR procedure in which a beneficiary is discharged under MS-DRG 469 (major joint replacement or reattachment of lower extremity with MCC) or 470 (major joint replacement or reattachment of lower extremity without MCC) and ends 90 days after discharge from the anchor hospitalization.
Gainsharing payment	A payment from a participant hospital to a CJR collaborator made pursuant to a CJR sharing arrangement. A gainsharing payment may be composed of reconciliation payments, internal cost savings, or both.
Internal cost savings (ICS)	The measurable, actual, and verifiable cost savings realized by the CJR-participating hospital resulting from care redesign undertaken by the hospital in connection with providing items and services to CJR model beneficiaries. Internal cost savings does not include savings realized by any individual or entity that is not a CJR participant hospital.
Metropolitan Statistical Area (MSA)	Counties associated with a core urban area that has a population of at least 50,000.

Term	Definition
Net Payment Reconciliation Amount (NPRA)	The aggregate quality-adjusted target price minus the total dollar amount of Medicare fee-for-service payments for items and services included in the bundle, adjusted by stop gain or stop loss limits, if applicable.
Post-acute care (PAC)	Rehabilitation and palliative care services received by the beneficiary from SNFs, IRFs, HHAs, or LTCHs following a hospitalization.
Post-episode care	Under the CJR model, care that occurs after the 90-day post-discharge period.
Post-discharge home visit waiver	A waiver available to hospitals participating in the CJR model. Under this waiver, CMS waives the direct supervision requirement for home visits so that CJR beneficiaries may receive a limited number of home visits (up to nine per episode) by licensed clinical staff paid under the Medicare Physician Fee Schedule.
Post-discharge period (PDP)	Period of time starting on the day of the anchor hospitalization discharge. For the CJR model, the post-discharge period covers the 90 days after discharge.
Quality-adjusted target price	The quality-adjusted target price is based on three years of historical data and is a blend of the hospital historical episode payments and the regional average historical payments in the first three years of the CJR model. By performance years 4 and 5, the target price is based completely on the regional historical episode payment. The three years of historical data is rolling across performance years (2012-2014 for years 1 and 2, 2014-2016 for years 3 and 4, 2016-2018 for year 5). The quality adjustment at the beginning of the performance year assumes that the hospital's composite quality score falls in the "acceptable" range. The quality adjustment reflects the hospital's actual composite quality score at reconciliation. There are separate quality-adjusted target prices to account for MS-DRG and hip fracture status.
Reconciliation payment	A retrospective payment that Medicare makes to a CJR participant hospital if total fee-for-service payments for its episodes during a performance year are less than the aggregate quality-adjusted target price. If total fee-for-service payments for a CJR participant hospital's episodes are more than its aggregate quality-adjusted target price, the hospital repays the difference to Medicare in performance years 2 through 5.
Related items and services	Episode-related items and services paid under Medicare Part A or Part B, after exclusions are applied, that are included in the bundle. These include physicians' services; inpatient hospital services (including readmissions with certain exceptions discussed in the Final Rule); inpatient psychiatric facility (IPF) services; LTCH services; IRF services; SNF services; HHA services; hospital outpatient services; outpatient therapy services; clinical laboratory services; DME; Part B drugs; and hospice.
Risk adjustment	A statistical process to adjust claims-based outcomes and ADL measures to take into account differences at the patient, episode, hospital, state, and MSA level that are related to the measures of interest. Without adequate risk adjustment, providers treating a sicker or more service-intensive patient mix would have worse outcomes than otherwise comparable providers serving healthier patients.
Telehealth waiver	A waiver available to hospitals participating in the CJR model. Under this waiver, CMS allows Medicare coverage of telehealth services furnished to eligible beneficiaries regardless of their geographic region. Further, the originating site requirement is waived for eligible beneficiaries receiving telehealth services from their homes or places of residence.
Three-day hospital stay waiver	A waiver available to hospitals participating in the CJR model. Under this waiver, CMS waives the three-day hospital stay requirement for Part A skilled nursing facility coverage.

Appendix B: CJR Programmatic Flexibilities, Including Financial Arrangements, Beneficiary Incentives, and Program Rule Waivers

The CJR model allows hospitals to use several payment policy waivers or waivers from certain fraud and abuse laws to facilitate the implementation of care redesign interventions. Participating hospitals may or may not elect to use these flexibilities. Under the CJR model, hospitals may enter into certain types of financial arrangements with CJR collaborators or provide incentives to CJR beneficiaries. Additionally, CMS waives certain program rules for beneficiaries in CJR episodes, including the direct supervision requirement for post-discharge home visits, certain requirements for furnishing telehealth services, and the three-day hospital stay requirement for coverage of SNF care. These waivers allow CJR beneficiaries to receive certain services under circumstances that would not otherwise be covered by Medicare.

The programmatic flexibilities allowed under the CJR model include:

- **Financial Arrangements** – Under the CJR model, hospitals may enter into sharing arrangements with CJR collaborators. Under such a sharing arrangement, hospitals may pass on a portion of their reconciliation payment, internal cost savings, or both (i.e., a gainsharing payment) to other providers acting as CJR collaborators. Sharing arrangements may also permit payments from a CJR collaborator to a participant hospital (i.e., an alignment payment) when the participating hospital has to repay CMS. Collaborators may be a SNF, HHA, LTCH, IRF, physician, non-physician practitioner, provider or supplier of outpatient therapy services, PGP, non-physician provider group practice, ACO, hospital, or critical access hospital. Under the CJR model gainsharing payments must be made according to a pre-specified methodology.

For example, to receive a gainsharing payment, collaborators must meet quality criteria set forth by the participating hospital. In the event that a hospital is due to make a repayment to CMS under the CJR model, the total amount of alignment payments received by the hospital from all CJR collaborators may not be greater than 50% of the amount the hospital owes CMS. CMS also requires that gainsharing agreements cannot incentivize CJR collaborators to reduce service or provide substandard care to Medicare beneficiaries.

- **Beneficiary Incentives** – Participating hospitals may provide certain in-kind items or services to CJR beneficiaries during an episode of care. The item or service must be reasonably connected to a beneficiary’s medical care and either be preventive or advance a clinical goal. Incentives may include items of technology that allow a beneficiary to receive telehealth visits.
- **Post-Discharge Home Visit Waiver** – The direct supervision requirement for home visits can be waived so that CJR beneficiaries may receive a limited number of home visits (up to nine post-discharge home visits per episode) by licensed clinical staff paid under the Medicare Physician Fee Schedule.
- **Telehealth Waiver** – Under CJR, geographic and originating site requirements that typically apply for Medicare coverage of telehealth services may be waived as long as services are furnished according to other coverage and payment criteria. Medicare

coverage criteria typically require telehealth services be furnished to individuals in certain geographic areas, including rural, medically underserved areas. For the CJR model, CMS waived this provision, allowing Medicare coverage of telehealth services furnished to eligible beneficiaries regardless of their geographic region. Medicare coverage criteria also specify that Medicare may only cover telehealth services that are received in certain clinical settings. For the CJR model, the originating site requirement is waived for eligible beneficiaries receiving telehealth services from their homes or places of residence.

- **Waiver of Hospital 3-Day Rule** – Generally under Medicare rules, beneficiaries are not eligible for Medicare-covered SNF care unless they have a prior inpatient hospital stay of at least three consecutive days within 30 days of SNF admission. Under the three-day hospital stay waiver, the SNF-qualifying hospital admission can be shorter than three days, as deemed appropriate by the treating clinicians. This waiver became available in year 2 of the CJR model, which is when hospitals start bearing repayment responsibility. A provision of this waiver is that CJR beneficiaries may only be discharged to a SNF that is qualified at the time of the beneficiary’s admission. A qualified SNF is one that received three or more stars on CMS’ Five-Star Quality Rating System¹ for at least seven out of the past twelve months. CMS maintains a list of qualified SNFs based on these criteria on its web site, which is updated quarterly.

¹ www.medicare.gov/NursingHomeCompare/

Appendix C: Methodology

I. Data Sources

A. Secondary Data Sources

Secondary data sources were used to:

- 1) Characterize Comprehensive Care for Joint Replacement (CJR) and control group markets (Area Health Resource File, inpatient rehabilitation facility (IRF) Prospective Payment System (PPS) Final Rule, and Census data);
- 2) Identify and characterize CJR hospitals and control group hospitals (Provider of Services file, Acute Inpatient Prospective Payment System (IPPS) data files, and Medicare Provider Enrollment, Chain, and Ownership System);
- 3) Sample CJR hospitals for participation in site visits and provider telephone interviews (CJR programmatic data and American Hospital Association (AHA) Hospital Survey);
- 4) Create lower extremity joint replacement (LEJR) episodes and characterize episodes and beneficiaries (Medicare fee-for-service claims, Medicare fee-for-service beneficiary enrollment data, Master Data Management, and Bundled Payments for Care Improvement (BPCI) Salesforce Database); and
- 5) Generate payment, utilization and quality outcomes (Medicare fee-for-service claims and Medicare standardized payments).

Exhibit C-1 lists the secondary sources, their contents, purpose in this evaluation, and relevant date ranges used for this report.

Exhibit C-1: Secondary Data Sources

Data Source	Date Range	Dataset Contents	Use
Medicare fee-for-service (FFS) claims	Baseline and Intervention	Parts A and B claims data (from TAP files) provide claims for different services received during the anchor hospitalization and post-discharge period (e.g., dates and types of service). A minimum three month claims run out was used for episodes included in this report.	Claims were used to create the CJR episodes, describe service use, and create risk adjustment and outcome variables, such as unplanned readmissions, emergency department visits, and number of days in each care setting (e.g., SNF). Claims data were also used to generate the number of LEJR discharges, LEJR share, and average Medicare beneficiary HCC score for site visit and PTI sampling.
Medicare fee-for-service (FFS) beneficiary enrollment data	Baseline and Intervention	Enrollment data (from CME and MBSF) provide beneficiary Medicare Part A/B eligibility information.	Enrollment data were used to confirm beneficiary eligibility and provide beneficiary characteristics for analyses.

Data Source	Date Range	Dataset Contents	Use
Medicare standardized payments	Baseline and Intervention	Medicare standardized payments for 100% of Part A and B claims received via the Integrated Data Repository (IDR). Produced by a CMS contractor.	Used to create Medicare standardized payment amounts (Part A and B) and allowed standardized payment amounts, including beneficiary out-of-pocket amounts.
Master Data Management (MDM)	Baseline and Intervention	Provider- and beneficiary- level information on participation in CMS Innovation Center payment demonstration programs. Includes beneficiary ID, program ID, and start and end dates of participation.	Used to identify beneficiaries involved in Pioneer, Next Generation, and Medicare Shared Savings ACO programs and control for their participation in our analyses.
CJR programmatic data	Intervention	List of CJR participating hospitals, their performance year 1 target price, reconciliation data, and hospital quality data.	Used to identify CJR participating hospitals and their start dates in CJR, and assess the impact of CJR on hospital episode payment and quality incentives (reconciliation data). Used to generate hospital to regional payment variable for site visit and PTI sampling.
Medicare Provider Enrollment, Chain, and Ownership System (PECOS)	December 2014 (end of baseline period)	Information on Medicare providers (hospitals and PAC providers) including ownership and chain relationships. For this evaluation, a hospital is considered to have “chain ownership” when it bills under the same TIN as another hospital <u>or</u> it has at least one TIN in the PECOS ownership table that is different than the hospital’s TIN.	Used to create an indicator of hospital chain ownership. Used to characterize CJR and control group hospitals.
Provider of Services (POS) file	December 2016	Information on Medicare-approved facilities, including provider identification number, size, and staffing.	Used to identify and characterize acute care hospitals actively engaged in Medicare and located in CJR and control group markets.
Fiscal Year (FY) Acute Inpatient PPS (IPPS) Final Rule data files	FY 2016 (Data is from FY 2012-2014.)	On an annual basis, CMS sets acute care hospital IPPS payment rates. Data files include fiscal year hospital-level information on provider identification number, bed count, medical residents per 1,000 beds, average daily census, DSH patient percentage, UCP per claim, and Medicare days as a percent of total inpatient days.	Used to identify and characterize acute care IPPS hospitals located in CJR and control group markets.
American Hospital Association (AHA) Hospital Survey	2014	Annual survey of acute care hospitals that collects information on hospital organizational structure, system affiliation, facility/service lines, inpatient/outpatient utilization, finances/expenses, physician arrangements, staffing, and corporate/purchasing affiliations.	Used to characterize CJR and control group hospitals. Information on health system membership and PAC ownership was used to inform site visit and PTI sampling.

Data Source	Date Range	Dataset Contents	Use
Area Health Resource File (AHRF)	2015-2016 (Data is from 2012-2014)	County-level data aggregated to the MSA level. Variables include Medicare Advantage penetration, average Medicare beneficiary HCC score, dual eligible percentage, population per square mile, geography, and supply of health care facilities (SNF beds, LTCH beds) and health care professionals (primary care physicians, NPs/PAs, specialists).	Used to characterize CJR and control group markets.
Fiscal Year (FY) IRF PPS Final Rule data files	FY 2016 (Data is from FY 2014)	CMS IRF PPS data are used to set payment rates. Data files identify IRF facilities (by Medicare provider identification number), their geographic location, and annual number of IRF discharges.	Used to identify PPS IRF facilities in CJR and control group markets and produce market level IRF variables (IRF present in MSA; number of IRF discharges per 10,000 population).
US Census Bureau's American Community Survey	2014 5-year estimates	Annual survey from the US Census Bureau that provides sociodemographic (population size, age, sex, race/ ethnicity) and socioeconomic (median household income) population estimates at the MSA level.	Used to characterize CJR and control group markets.
BPCI Salesforce Database	Baseline and intervention	Identifies health care providers (hospitals, PACs, physicians, and physician practice groups) that are participating in BPCI, the time period of participation, and the models and episodes for which they are participating.	Used to identify LEJR episodes that are assigned to BPCI participants instead of CJR participants.

Note: ACO = accountable care organization, BPCI = bundled payments for care improvement, CME = Common Medicare enrollment, CMS = Centers for Medicare & Medicaid Services, DSH = disproportionate share hospital, HCC = hierarchical condition category, IDR = integrated data repository, IPPS = inpatient prospective payment system, IRF = inpatient rehabilitation facility, LEJR = lower extremity joint replacement, LTCH = long-term care hospital, MSA = metropolitan statistical area, MBSF = Medicare beneficiary summary file, NP = nurse practitioner, PA = physician assistant, PAC = post-acute care, PPS = prospective payment system, PTI = provider telephone interview, SNF = skilled nursing facility, TIN = tax identification number, UCP = uncompensated care payment.

B. Primary Data Sources

We collected and analyzed primary data from site visits and telephone interviews to inform questions that are not readily answered by secondary data. In the first year of the evaluation, we completed site visits to nine hospitals and their related providers in four Metropolitan Statistical Areas (MSAs) and conducted two rounds of telephone interviews with 69 providers.¹ The site visits allowed for in-depth discussions with staff from hospitals, orthopedic surgical practices, home health agencies, and skilled nursing facilities about CJR model implementation experiences, characteristics of local markets affecting CJR model response strategies, factors that could explain variation in key outcomes (i.e., payments and quality), and early successes under the model. The provider telephone interviews allowed for efficient collection of targeted information from CJR

¹ Of the four MSAs in our original sample, poor response rates from hospitals in one MSA precluded their inclusion in the site visits, resulting in recruitment of hospitals from a fifth MSA.

hospitals, including hospitals' perspectives on the impact of the CJR model on Medicare beneficiaries, the hospital itself, providers, and local market dynamics and hospitals' relationships with post-acute care (PAC) providers.

1. Site visits

We conducted site visits to providers in four CJR-participating MSAs. In each MSA, we conducted in-person interviews with representatives from one to four hospitals, as well as with orthopedic surgeons and post-acute care providers associated with each hospital through LEJR patient referral relationships. We spent one to two days on site and individual interviews were typically scheduled for one hour. The primary objective was to capture detailed information about how hospitals and their associated providers prepared for and responded to the CJR model. In addition, we used site visits to explore key topics of interest, like characteristics of local markets that affect CJR model response strategies, factors that could explain variation in key outcomes, and early successes under the model. Although hospital and provider experience under the model is still relatively limited, we also discussed perceived and experienced unintended consequences. Site visits were also the primary data source for the case studies, which detail unique hospital activities in response to the model.

a. Topics

The purpose of each site visit was to understand early planning activities and rollout efforts in response to the CJR model. Exhibit C-2 outlines the list of targeted interviewees. We developed a semi-structured interview guide tailored to the expertise of each type of interviewee. Flexibility was encouraged such that if an orthopedic surgeon was also responsible for data analytics, for example, questions intended for the data analyst would be asked of the physician. Given the diversity of hospitals, the number of interviews and interviewees varied by hospital.

To capture the variability in responses to the CJR model, the list of interview topics was broad and diverse, including: relationships/gainsharing with orthopedic surgeons and PAC providers; care redesign and care protocols or pathways for LEJR patients; staffing changes; changes in supply chain management; use of health information technology and electronic information exchange; and use of cost and quality data. In addition, we inquired about anticipated and unanticipated impacts of the CJR model on patients, providers, and the local market. For early adopters that had incorporated changes months or years in advance of the CJR model, we used the interview opportunity to learn more about their experiences. In all discussions, we attempted to ascertain readiness to successfully reduce costs and maintain or improve quality under the model. Full site visit interview protocols are in Appendix D.

Exhibit C-2: Target Interviewees for Site Visits

Organization	Interview Session	Sample Job Titles
Hospital	Executive Leadership	Chief executive officer (CEO), chief operating officer (COO), chief financial officer (CFO)
	Clinical Leadership	Orthopedic surgery or surgical service line leader, head of surgery department, head of operating room
	Direct-Care Physicians	Hospitalist *for orthopedic surgeons, see below
	Care Redesign Leadership	Vice president for quality improvement (QI), nurse in charge of QI or CJR, care redesign experts (Lean Six Sigma, etc.), supply chain management, lead of operating room scheduling/operations
	Direct Care Staff and Case Management	Registered nurse, pharmacist, occupational therapist, care coordinator, discharge planner, physical therapist (PT)
	Data Management	Person collecting cost and quality information, end users
Orthopedic Surgeons and Surgical Groups	Surgeons and Clinical Staff	Senior surgeon, nurse practitioner or physician assistant
	Practice Management	Practice manager
Post-acute Care Providers	Clinical Leadership	Director of nursing, medical director
	Financial Leadership	Finance lead, executive director, CFO
	Front-line Staff	Care coordinator, social services, rehabilitation staff, PT

b. Hospital selection criteria

All CJR hospitals were eligible to participate in data collection activities. We first pulled the most recent list of CJR participating hospitals from the Centers for Medicare & Medicaid Services (CMS) website and then narrowed this list to include only hospitals that performed ten or more LEJR procedures in calendar year 2015 because hospitals with fewer procedures were considered unlikely to take actions to redesign care in response to the CJR model. We next used Medicare fee-for-service (FFS) claims and beneficiary enrollment data, CJR programmatic data, and AHA Hospital Survey data to select a sample of CJR participant hospitals for site visits. The hospital and MSA characteristics used to define the sampling frame and select participants were chosen based on a literature review and past BPCI evaluation experience.

As shown in Exhibit C-3, we delineated tiers of variables to use for sample selection. Our goal was to oversample hospitals that were more likely to take actions to respond to the CJR model while ensuring representation of “average” or “typical” hospitals.

Exhibit C-3: Information used to Select Hospitals for Site Visits in Year 1

TIER 1: Characteristics that motivate/shape hospital responses to CJR	TIER 2: Other variables used to ensure diversity in characteristics that drive variation in performance	Background information and context for conducting interviews and interpreting findings
<p><i>Potential likelihood of taking actions to respond to the CJR model</i></p> <ul style="list-style-type: none"> • Hospital-specific episode payment relative to regional episode payment • Proportion of hospital’s LEJR discharges relative to total Medicare discharges <p><i>Potential success impediments/ facilitators</i></p> <ul style="list-style-type: none"> • Hospital LEJR volume as a proxy for quality performance • Vulnerability of patient population (HCC score) 	<ul style="list-style-type: none"> • Hospital bed count • Hospital ownership/profit status • DSH patient percentage • Hospital teaching status • Hospital affiliation with larger health system (chain ownership) • Hospital ownership of PAC providers • Hospital location (Census region/MSA) 	<ul style="list-style-type: none"> • State Medicaid expansion status • MSA size/population density • MSA Medicare Advantage penetration • MSA Hospital competition (HHI – ACH LEJR) • MSA supply of orthopedic surgeons • MSA supply of PAC providers

Note: ACH = acute care hospital, DSH = disproportionate share hospital, HCC = hierarchical condition category, HHI = Herfindahl-Hirschman index, LEJR = lower extremity joint replacement, MSA = metropolitan statistical area, PAC = post-acute care.

Tier 1 variables included hospital characteristics that we theorized might motivate or shape hospital responses to the CJR model (hospital-specific episode payment relative to regional episode payment; proportion of LEJR discharges relative to hospital’s total Medicare discharges) and barriers and facilitators to successfully responding to the CJR model (vulnerability of the patient population as measured by Hierarchical Condition Categories (HCC) score; LEJR volume as a proxy for quality performance).

We applied Tier 1 variables by selecting hospitals in the top three deciles of the hospital episode payment to regional payment variable (i.e., *above* their regional episode payment amount) and hospitals in the bottom two deciles of the hospital episode payment to regional payment variable (i.e., *below* their regional episode payment amount). We then repeated this process by selecting from the larger eligible CJR participant hospital list hospitals in the top three deciles of proportion of LEJR discharges relative to the hospital’s total Medicare discharges (*high* proportion) and bottom two deciles (*low* proportion). In this way, we attempted to oversample hospitals most likely to take actions to respond to the CJR model.

Using the hospitals selected as described above, we then sorted the list by average hospital beneficiary HCC score as a measure of patient population vulnerability and then by total LEJR volume, selecting hospitals from the top and bottom of the distribution of each variable (i.e., the top 15 and bottom 5 hospitals of the HCC distribution and the top 15 and bottom 5 of the LEJR volume distribution).

Tier 2 variables were applied to ensure inclusion of “typical” CJR hospitals (i.e., those with values close to the median or mode of the total sample of CJR participant hospitals) and variation in hospital-level characteristics that may drive variation in performance (e.g., bed count, chain ownership, ownership/profit status, Disproportionate Share Hospital (DSH) patient percentage,

and teaching status). We evaluated the comparability of our sample to the larger group of CJR participant hospitals and deemed the sample to be comparable. Finally, because site visits were conducted within MSAs, the sample list was further narrowed to only include MSAs with multiple sampled hospitals to allow visits to multiple hospitals during a single trip to an MSA.

Background information variables were primarily MSA-specific and were not used in the sampling strategy to select hospitals. Instead, these variables provided helpful context to support data collection activities.

We compared our final list of hospitals with the CJR Learning and Diffusion contractor’s list of interviewees to ensure there was no overlap in the participant lists between the two contracts, to reduce provider burden and because hospitals sampled for site visits may be less likely to participate if they recently completed an interview with another CJR-related contractor. Our final sample for site visits included 36 hospitals for attempted recruitment. Seventy-five percent of the final sample came from the top three deciles of the Tier 1 variables and 25% came from the bottom two deciles.

c. Hospital recruitment

To recruit sampled hospitals for participation, we emailed information to the CJR point-of-contact for 30 hospitals, inviting them to participate in a brief introductory call with our team. Of the 23 hospitals that responded to our outreach efforts, 15 (65%) participated in an introductory call. On these calls, we described the purpose of the visit and the content that would be covered and provided hospital representative(s) with an opportunity to ask questions. Once a hospital agreed to participate, our team worked with the hospital point-of-contact to schedule interviews with select hospital staff and identify the appropriate orthopedic surgeons and PAC providers to interview.

Of the sampled hospitals contacted for site visits (n=30), seven (23%) did not respond to our contact efforts, thirteen (43%) declined to participate, and nine (30%) agreed to participate in an in-person site visit. One hospital was unable to host our team for an in-person visit, but agreed to an abbreviated “virtual visit” in which our team interviewed its CJR Steering Committee by telephone.

Exhibit C-4 presents characteristics of CJR hospitals that participated in site visits compared to all CJR participant hospitals.

Exhibit C-4: Characteristics of CJR Hospitals that Participated in Site Visits vs. All CJR Hospitals

	Site Visit ^b (n=9)	All CJR ^{c,d} (n=665)
Patient HCC score, mean	2.6	2.4
Chain ownership, % yes	100%	79%
Total Medicare discharges, mean ^a	4,779	3,811
Proportion of Medicare Discharges for LEJR, mean ¹	15%	8%
Number of Beds, mean	356	263
Teaching facility, % yes	33%	42%
Own a PAC provider, % yes	88%	68%

Source: Lewin’s analysis of December 2016 POS, December 2014 PECOS, FY 2016 CMS Annual IPPS, 2014 AHA Hospital Survey, and Medicare claims and enrollment data for LEJR discharges in calendar year 2015.

Notes: HCC = hierarchical condition category, LEJR = lower extremity joint replacement, PAC = post-acute care.

^a Includes hospital discharges from Medicare claims data for calendar year 2015.

^b One hospital has missing data for PAC ownership.

^c One hospital has missing data for number of beds and teaching status, ninety-four hospitals have missing data for PAC ownership.

^d “All CJR” hospitals are defined as all acute care IPPS hospitals located in CJR-participating MSAs as of December 31, 2016 with more than 10 LEJR discharges in CY2015.

Exhibit C-5 summarizes all site visit interviews conducted across the four MSAs.

Exhibit C-5: Site Visits by MSA, Year 1

MSA	Hospitals visited	Hospital interviews	Orthopedic surgeon and surgical practice interviews	Post-acute care provider interviews
Miami-Fort Lauderdale-West Palm Beach, FL	2	12	3	6
Albuquerque, NM	1	7	1	1
Los Angeles-Long Beach-Anaheim, CA	4 (+1 virtual)	26	6	9
New Orleans-Metairie, LA	2	9	2	3

Note: MSA = metropolitan statistical area.

2. Provider telephone interviews

We conducted two rounds of provider telephone interviews to gather targeted information from hospital representatives on specific topics of interest to CMS. We scheduled 30 minute interviews with representatives from hospitals across the 67 CJR MSAs.

a. Topics

In the first round of interviews, we asked about the presence of new or enhanced initiatives that hospitals implemented in response to the CJR model. We also sought hospitals’ perspectives on

the impact of the CJR model on Medicare beneficiaries, the hospital itself, providers, and local market dynamics. Interviewees included CJR program coordinators, data analysts, direct service providers (e.g., orthopedic surgeons, nurse navigators, case managers), administrators, and executive leadership (e.g., Vice President of Orthopedics and Sports Medicine, Director of Population Health, Chief Medical Officer).

During the second round of interviews, we asked questions about the hospitals' relationships with PAC providers and how those relationships changed since the initiation of the CJR model. Interviewees included CJR program coordinators, direct service providers (e.g., orthopedic surgeons, nurse navigators, and care managers), administrators, and data analysts. Protocols for both rounds of interviews are included in Appendix F.

b. Hospital selection criteria

To identify hospitals for both rounds of telephone interviews, we used the same tiered sampling strategy described above for site visit selection, with some minor adjustments. Hospitals in the top and bottom deciles not sampled for site visits were included in the potential sample for telephone interviews. Similar to site visit selection, 75% of the telephone interview sample came from the top three deciles of the Tier 1 hospital characteristics that we theorized might motivate or shape hospital responses to the CJR model (hospital-specific episode payment relative to regional episode payment; proportion of LEJR discharges relative to the hospital's total Medicare discharges) and 25% came from the bottom two deciles. For Round 1, we used LEJR volume and average HCC score to further refine the sample (e.g., hospitals in the top and bottom deciles of hospital-to-regional payment ratio or LEJR proportion *and* either high volume or high average HCC score). For Round 2, we used the same sampling strategy and two of the same variables (hospital-to-regional payment ratio and LEJR proportion of total discharges), but replaced LEJR volume and average HCC with factors that could affect relationships with PAC providers (hospital affiliation with a larger health system and hospital ownership of PAC), consistent with the focus of Round 2 interviews.

Hospitals that were selected for site visits or separately contacted by the CJR Learning and Diffusion contractor for telephone interviews were also excluded from our telephone interview sample to reduce provider burden and because they may be less likely to agree to participate. We also reviewed the location of selected hospitals to ensure the geographic distribution of telephone interviewees matched the overall geographic distribution of the CJR-participating hospitals. For Round 1, we identified 40 hospitals to be interviewed and selected an additional 74 hospitals for replacement in the event of non-participation. For Round 2, we identified 70 hospitals for initial contact and an additional 38 hospitals to use as replacement sample.

c. Hospital recruitment

To recruit interview participants, we worked with the CJR point-of-contact at each hospital to obtain contact information for up to three possible interviewees who could discuss hospital actions and experiences as a result of the CJR model (Round 1) and relationships with PAC providers (Round 2). We first contacted potential interviewees over email and included key

information and related materials (i.e., frequently asked questions document, topics list, and informed consent information).

We encountered several challenges in recruiting participants, including difficulty obtaining current contact information, a low response rate to our initial outreach, and hospital representatives having limited awareness of or time to participate in evaluation activities. When recruitment staff were unable to schedule an interview with a priority hospital, an alternative hospital was selected from the sample.

In the first round of telephone interviews, we successfully interviewed 34 (36%) of the 95 contacted hospitals. Five hospitals (5%) declined to participate and 56 hospitals (59%) did not respond to our request. In the second round of telephone interviews, we successfully interviewed 35 (39%) of the 90 contacted hospitals. Six hospitals (6%) declined to participate and 49 (54%) did not respond to our request.

Exhibit C-6 presents characteristics of CJR hospitals that participated in the first and second round of PTIs compared to all CJR hospitals.

Exhibit C-6: Characteristics of CJR Hospitals that Participated in Provider Telephone Interviews vs. All CJR Hospitals

	R1 PTI ^b (n=34)	R2 PTI (n=35)	All CJR ^{c,d} (n=665)
Patient HCC score, mean	2.4	2.1	2.4
Chain ownership, % yes	88%	91%	79%
Total Medicare discharges, mean ^a	6,364	2,889	3,811
Proportion of Medicare Discharges for LEJR, mean ^a	8%	19%	8%
Number of Beds, mean	389	211	263
Teaching facility, % yes	50%	29%	42%
Own a PAC provider, % yes	53%	63%	68%

Source: Lewin’s analysis of December 2016 POS, December 2014 PECOS, FY 2016 CMS Annual IPPS, 2014 AHA Hospital Survey, and Medicare claims and enrollment data for LEJR discharges in calendar year 2015.

Notes: HCC = hierarchical condition category, LEJR = lower extremity joint replacement, PAC = post-acute care, PTI = provider telephone interview, R1 = round 1, R2 = round 2.

^a Includes hospital discharges from Medicare claims data for calendar year 2015.

^b Four hospitals have missing data for PAC ownership.

^c One hospital has missing data for number of beds and teaching status, ninety-four hospitals have missing data for PAC ownership.

^d “All CJR” hospitals are defined as all acute care IPPS hospitals located in CJR-participating MSAs as of December 31, 2016 with more than 10 LEJR discharges in calendar year 2015.

II. Measures

This section summarizes the claims-based outcome measures in our analysis.

A. Measures of Impact on Payments, Utilization, and Quality

In this section we present the episode-level outcome measures that were constructed to assess the impact of the CJR model on Medicare payments, utilization, and quality during the first CJR performance year. Exhibit C-7 lists the data source for each measure.

Exhibit C-7: Payment, Utilization, and Quality Measures

Measure Category	Measure Name/Description ^e
Medicare Payments ^a	Total Medicare standardized allowed amounts included in the episode, inpatient anchor hospitalization through the 90-day PDP
	Medicare standardized allowed amounts per episode, by service, 90-day PDP ^b
Utilization	First post-acute discharge was to IRF
	First post-acute discharge was to SNF
	First post-acute discharge was to HHA
	Number of IRF days, 90-day PDP ^c
	Number of SNF days, 90-day PDP ^c
	Number of HHA visits, 90-day PDP ^c
	Acute inpatient care length of stay
Quality	Unplanned readmission, 90-day PDP
	Emergency department visit, 90-day PDP
	All-cause mortality, inpatient stay and 90-day PDP ^d
	Incidence of any complications, 90-day PDP

Notes: HHA = home health agency, IRF = inpatient rehabilitation facility, PDP = post-discharge period, SNF = skilled nursing facility.

^a Payments are the standardized Medicare allowed amounts. Standardization removes wage adjustments and other Medicare payment adjustments. Allowed amounts include beneficiary cost sharing.

^b Services include inpatient readmissions, IRF, SNF, HHA, and services covered under Medicare Part B.

^c The eligible sample for PAC days and visits is based on the first PAC setting (IRF, SNF, or HHA) to which a patient was discharged after the anchor hospitalization.

^d Under the CJR model, death during the anchor hospitalization or 90-day PDP cancels the episode. Therefore, to estimate the all-cause mortality rate, this analysis includes CJR and control group episodes as well as beneficiary admissions at CJR and control group hospitals that would have been identified as episodes if the beneficiaries had not died during the anchor hospitalization or 90-day PDP.

^e All measures are constructed from Medicare fee-for-service claims data.

B. Measures of Unintended Consequences

Our evaluation of unintended consequences of the CJR model focused on changes in patient mix. Exhibit C-8 lists the patient characteristics from claims and enrollment data that we monitored. While the impact analysis on payment, utilization, and quality controlled for changes in these

patient characteristics, we also monitored changes in these characteristics separately to directly examine changes in patient mix.

Exhibit C-8: Measures of Unintended Consequences

Type of Unintended Consequence	Measure Name/Description
Changes in Patient Mix	Age
	Sex
	Race/ethnicity
	Medicaid eligibility
	Disability, no ESRD
	Hip fracture
	HCC score
	Prior utilization (in the six months prior to the anchor hospitalization) <ul style="list-style-type: none"> • Inpatient ACH stay • Home health use • IRF stay • SNF stay • No institutional use (inpatient ACH, SNF, IRF, LTCH).

Source: Medicare fee-for-service claims and beneficiary enrollment data.

Notes: ACH = acute care hospital, ESRD = end-stage renal disease, HCC = hierarchical condition category, IRF = inpatient rehabilitation facility, LTCH = long-term care hospital, SNF = skilled nursing facility.

III. Study Population

This section defines the CJR and control group populations, explains the weights used in the analyses where indicated to account for differences in sampling probabilities and the additional eligibility criteria for hospitals and episodes.

A. Defining the CJR and Control Group Populations

CMS selected MSAs for CJR participation based on a stratified random sampling methodology in which MSAs were stratified into eight strata based on historical wage-adjusted episode payments and population size. The eight strata excluded MSAs with BPCI penetration greater than 50% or low LEJR volume. Within each stratum, MSAs were randomly selected to participate in the CJR model. This design allowed for a control group of hospitals in MSAs that were eligible but not selected by CMS to participate in the CJR model (n=104 MSAs). These MSAs represent what would have happened in CJR-type markets if the model was never implemented (i.e., the counterfactual).

Exhibit C-9 shows the count of control group MSAs by stratum and the proportion of MSAs in each stratum that make up the control group. The probability of an MSA being selected to participate in the CJR model varied across the strata. CMS proportionally under-sampled MSAs with lower average episode payments and over-sampled MSAs with higher average episode payments.

Exhibit C-9: CMS’ Random Sample of CJR MSAs

Population	CJR Sampling Stratum	Payment in	# MSAs eligible for CJR	CJR Sample		Control Group Sample	
				# CJR MSAs	Proportion of MSAs selected for CJR	# Control Group MSAs	Proportion of MSAs selected for Control Group
Less than Median Population	1	Lowest quartile	25	8	32.0%	17	68.0%
	2	2 nd lowest quartile	18	6	33.3%	12	66.7%
	3	3 rd lowest quartile	19	8	42.1%	11	57.9%
	4	Highest quartile	22	11	50.0%	11	50.0%
More than Median Population	5	Lowest quartile	15	5	33.3%	10	66.7%
	6	2 nd lowest quartile	28	10	35.7%	18	64.3%
	7	3 rd lowest quartile	22	9	40.9%	13	59.1%
	8	Highest quartile	22	10	45.5%	12	54.5%
		Total	171	67		104	

Sources: Lewin analysis of the Medicare Program Comprehensive Care for Joint Replacement Payment Model for Acute Care Hospitals Furnishing Lower Extremity Joint Replacement Services; A Final Rule by the Centers for Medicare & Medicaid Services, 80 FR 73273 (November 24, 2015) (codified at 42 CFR 510).

Note: MSA = metropolitan statistical area.

Exhibit C-10 shows the names and IDs of the CJR treatment and control group MSAs.

Exhibit C-10: CJR Treatment and Control Group MSAs

Treatment		Control	
CBSA ID	MSA Name, State	CBSA ID	MSA Name, State
10420	Akron, OH	10180	Abilene, TX
10740	Albuquerque, NM	10580	Albany-Schenectady-Troy, NY
11700	Asheville, NC	10900	Allentown-Bethlehem-Easton, PA-NJ
12020	Athens-Clarke County, GA	11100	Amarillo, TX
12420	Austin-Round Rock, TX	11260	Anchorage, AK
13140	Beaumont-Port Arthur, TX	12060	Atlanta-Sandy Springs-Roswell, GA
13900	Bismarck, ND	12700	Barnstable Town, MA
14500	Boulder, CO	13460	Bend-Redmond, OR
15380	Buffalo-Cheektowaga-Niagara Falls, NY	13820	Birmingham-Hoover, AL
16020	Cape Girardeau, MO-IL	14260	Boise City, ID
16180	Carson City, NV	14460	Boston-Cambridge-Newton, MA-NH
16740	Charlotte-Concord-Gastonia, NC-SC	14540	Bowling Green, KY

Treatment		Control	
CBSA ID	MSA Name, State	CBSA ID	MSA Name, State
17140	Cincinnati, OH-KY-IN	15940	Canton-Massillon, OH
17860	Columbia, MO	15980	Cape Coral-Fort Myers, FL
18580	Corpus Christi, TX	16060	Carbondale-Marion, IL
19500	Decatur, IL	16300	Cedar Rapids, IA
19740	Denver-Aurora-Lakewood, CO	16620	Charleston, WV
20020	Dothan, AL	16700	Charleston-North Charleston, SC
20500	Durham-Chapel Hill, NC	16860	Chattanooga, TN-GA
22420	Flint, MI	16980	Chicago-Naperville-Elgin, IL-IN-WI
22500	Florence, SC	17020	Chico, CA
23540	Gainesville, FL	17780	College Station-Bryan, TX
23580	Gainesville, GA	17900	Columbia, SC
24780	Greenville, NC	17980	Columbus, GA-AL
25420	Harrisburg-Carlisle, PA	18140	Columbus, OH
26300	Hot Springs, AR	19100	Dallas-Fort Worth-Arlington, TX
26900	Indianapolis-Carmel-Anderson, IN	19380	Dayton, OH
28140	Kansas City, MO-KS	19660	Deltona-Daytona Beach-Ormond Beach, FL
28660	Killeen-Temple, TX	19820	Detroit-Warren-Dearborn, MI
30700	Lincoln, NE	20260	Duluth, MN-WI
31080	Los Angeles-Long Beach-Anaheim, CA	20740	Eau Claire, WI
31180	Lubbock, TX	22020	Fargo, ND-MN
31540	Madison, WI	22520	Florence-Muscle Shoals, AL
32820	Memphis, TN-MS-AR	22900	Fort Smith, AR-OK
33100	Miami-Fort Lauderdale-West Palm Beach, FL	23060	Fort Wayne, IN
33340	Milwaukee-Waukesha-West Allis, WI	23420	Fresno, CA
33700	Modesto, CA	24340	Grand Rapids-Wyoming, MI
33740	Monroe, LA	24580	Green Bay, WI
33860	Montgomery, AL	24860	Greenville-Anderson-Mauldin, SC
34940	Naples-Immokalee-Marco Island, FL	25060	Gulfport-Biloxi-Pascagoula, MS
34980	Nashville-Davidson--Murfreesboro--Franklin, TN	25540	Hartford-West Hartford-East Hartford, CT
35300	New Haven-Milford, CT	25620	Hattiesburg, MS
35380	New Orleans-Metairie, LA	25940	Hilton Head Island-Bluffton-Beaufort, SC
35620	New York-Newark-Jersey City, NY-NJ-PA	26140	Homosassa Springs, FL
35980	Norwich-New London, CT	26420	Houston-The Woodlands-Sugar Land, TX
36260	Ogden-Clearfield, UT	26580	Huntington-Ashland, WV-KY-OH
36420	Oklahoma City, OK	26620	Huntsville, AL
36740	Orlando-Kissimmee-Sanford, FL	26980	Iowa City, IA
37860	Pensacola-Ferry Pass-Brent, FL	27140	Jackson, MS
38300	Pittsburgh, PA	27860	Jonesboro, AR

Treatment		Control	
CBSA ID	MSA Name, State	CBSA ID	MSA Name, State
38940	Port St. Lucie, FL	27900	Joplin, MO
38900	Portland-Vancouver-Hillsboro, OR-WA	29180	Lafayette, LA
39340	Provo-Orem, UT	29200	Lafayette-West Lafayette, IN
39740	Reading, PA	29340	Lake Charles, LA
40980	Saginaw, MI	29420	Lake Havasu City-Kingman, AZ
41860	San Francisco-Oakland-Hayward, CA	29460	Lakeland-Winter Haven, FL
42660	Seattle-Tacoma-Bellevue, WA	29620	Lansing-East Lansing, MI
42680	Sebastian-Vero Beach, FL	30460	Lexington-Fayette, KY
43780	South Bend-Mishawaka, IN-MI	30620	Lima, OH
41180	St. Louis, MO-IL	30780	Little Rock-North Little Rock-Conway, AR
44420	Staunton-Waynesboro, VA	31140	Louisville/Jefferson County, KY-IN
45300	Tampa-St. Petersburg-Clearwater, FL	31420	Macon, GA
45780	Toledo, OH	31700	Manchester-Nashua, NH
45820	Topeka, KS	33460	Minneapolis-St. Paul-Bloomington, MN-WI
46220	Tuscaloosa, AL	34820	Myrtle Beach-Conway-North Myrtle Beach, SC-NC
46340	Tyler, TX	34900	Napa, CA
48620	Wichita, KS	35840	North Port-Sarasota-Bradenton, FL
		36100	Ocala, FL
		36540	Omaha-Council Bluffs, NE-IA
		37900	Peoria, IL
		37980	Philadelphia-Camden-Wilmington, PA-NJ-DE-MD
		38060	Phoenix-Mesa-Scottsdale, AZ
		38860	Portland-South Portland, ME
		39300	Providence-Warwick, RI-MA
		39460	Punta Gorda, FL
		39580	Raleigh, NC
		40140	Riverside-San Bernardino-Ontario, CA
		40220	Roanoke, VA
		40340	Rochester, MN
		40380	Rochester, NY
		40900	Sacramento--Roseville--Arden-Arcade, CA
		41500	Salinas, CA
		41620	Salt Lake City, UT
		41740	San Diego-Carlsbad, CA
		41940	San Jose-Sunnyvale-Santa Clara, CA
		41980	San Juan-Carolina-Caguas, PR
		42200	Santa Maria-Santa Barbara, CA
		42220	Santa Rosa, CA

Treatment		Control	
CBSA ID	MSA Name, State	CBSA ID	MSA Name, State
		42340	Savannah, GA
		43340	Shreveport-Bossier City, LA
		43620	Sioux Falls, SD
		44060	Spokane-Spokane Valley, WA
		44100	Springfield, IL
		44180	Springfield, MO
		41100	St. George, UT
		46060	Tucson, AZ
		46140	Tulsa, OK
		46520	Urban Honolulu, HI
		47940	Waterloo-Cedar Falls, IA
		48300	Wenatchee, WA
		48900	Wilmington, NC
		49340	Worcester, MA-CT
		49620	York-Hanover, PA
		49660	Youngstown-Warren-Boardman, OH-PA

Sources: <https://innovation.cms.gov/initiatives/cjr>. Control group MSAs information provided by CMS.

Note: MSA = metropolitan statistical area.

B. Creating Stratum-level Weights

To account for the differential sampling probability across strata and ensure that the sample is representative of the population, we created stratum-level weights – one for the CJR group and one for the control group – based on the inverse of their selection probabilities for their respective group. These weights were used in the descriptive and regression analyses (overall and stratified by hip fracture status).

Steps for calculating stratum-level weights for the CJR group:

- a. Calculated the CJR selection proportion, that is, the share of CJR MSAs by stratum
- b. Calculated the inverse of the CJR selection proportion for each stratum
- c. Summed the inverse of the CJR selection proportions of all the strata
- d. Created the CJR weight for each stratum by dividing the inverse of the CJR selection proportion by the sum of the inverse of the CJR selection proportions of all the strata

Steps for calculating stratum-level weights for the control group:

- e. Calculated the control group selection proportion, that is, the share of control group MSAs by stratum
- f. Calculated the inverse of the control group selection proportion for each stratum

- g. Summed the inverse of the control group selection proportions of all the strata
- h. Created the control group weight for each stratum by dividing the inverse of the control group selection proportion by the sum of the inverse of the control group selection proportions of all the strata

Exhibit C-11 provides the CJR and control group weights by stratum as well as the key values used in steps (a) through (h) detailed above. These weights were assigned at the episode level based on the MSA location of the LEJR surgery, and the regression analyses used these weights so that the sample is representative of the population.

Exhibit C-11: Stratum-level Weights Based on the Inverse of Selection Probabilities

Population	CJR Sampling Stratum	Payment in	CJR			Control Group		
			Proportion of MSAs selected for CJR (a)	Inverse of CJR Proportion (b)	CJR Weight (b/c)	Proportion of MSAs selected for Control Group (d)	Inverse of Control Group Proportion (e)	Control Group Weight (e/f)
Less than Median Population	1	Lowest quartile	32.0%	3.13	14.9%	68.0%	1.47	11.1%
	2	2 nd lowest quartile	33.3%	3.00	14.3%	66.7%	1.50	11.3%
	3	3 rd lowest quartile	42.1%	2.38	11.3%	57.9%	1.73	13.0%
	4	Highest quarter	50.0%	2.00	9.5%	50.0%	2.00	15.1%
More than Median Population	5	Lowest quartile	33.3%	3.00	14.3%	66.7%	1.50	11.3%
	6	2 nd lowest quartile	35.7%	2.80	13.4%	64.3%	1.56	11.7%
	7	3 rd lowest quartile	40.9%	2.44	11.7%	59.1%	1.69	12.7%
	8	Highest quartile	45.5%	2.20	10.5%	54.5%	1.83	13.8%
			Total	20.94^(c)	100%		13.28^(f)	100%

Sources: Lewin analysis of the Medicare Program Comprehensive Care for Joint Replacement Payment Model for Acute Care Hospitals Furnishing Lower Extremity Joint Replacement Services; A Final Rule by the Centers for Medicare & Medicaid Services, 80 FR 73273 (November 24, 2015) (codified at 42 CFR 510).

Note: MSA = metropolitan statistical area.

The weights, described above, account for the differential sampling probability at the MSA sampling stratum level (8 sampling strata total). For regression analyses stratified by historically high payment and low payment MSAs, we modified the weights, aggregating four strata to create the high payment MSA group and aggregating the remaining four strata to create the low payment MSA group. Stratum-level weights for high payment MSAs are shown in Exhibit C-12.

The strata with historically high payment MSAs are used in the high-payment sample (MSA sampling strata 3, 4, 7, and 8).

Exhibit C-12: High payment MSAs - Stratum-level Weights Based on the Inverse of Selection Probabilities

Population	CJR Sampling Stratum	Payment in	CJR			Control Group		
			Proportion of MSAs selected for CJR (a)	Inverse of CJR Proportion (b)	CJR Weight (b/c)	Proportion of MSAs selected for Control Group (d)	Inverse of Control Group Proportion (e)	Control Group Weight (e/f)
Less than Median Population	3	3 rd lowest quartile	42.1%	2.38	26.3%	57.9%	1.73	23.8%
	4	Highest quarter	50.0%	2.00	22.2%	50.0%	2.00	27.6%
More than Median Population	7	3 rd lowest quartile	40.9%	2.44	27.1%	59.1%	1.69	23.3%
	8	Highest quartile	45.5%	2.20	24.4%	54.5%	1.83	25.3%
			Total	9.02^(c)	100%		7.25^(f)	100%

Sources: Lewin analysis of the Medicare Program Comprehensive Care for Joint Replacement Payment Model for Acute Care Hospitals Furnishing Lower Extremity Joint Replacement Services; A Final Rule by the Centers for Medicare & Medicaid Services, 80 FR 73273 (November 24, 2015) (codified at 42 CFR 510).

Note: MSA = metropolitan statistical area.

Stratum-level weights for low payment MSAs are shown in Exhibit C-13. The strata with historically low payment MSAs are used in the low-payment sample (MSA sampling strata 1, 2, 5, and 6). Again, weights were assigned at the episode level based on the MSA location of the LEJR surgery, and the regression analyses used these weights to produce results representative of the population in high versus low payment MSAs.

Exhibit C-13: Low payment MSAs - Stratum-level Weights Based on the Inverse of Selection Probabilities

Population	CJR Sampling Stratum	Payment in	CJR			Control Group		
			Proportion of MSAs selected for CJR (a)	Inverse of CJR Proportion (b)	CJR Weight (b/c)	Proportion of MSAs selected for Control Group (d)	Inverse of Control Group Proportion (e)	Control Group Weight (e/f)
Less than Median Population	1	Lowest quartile	32.0%	3.13	26.2%	68.0%	1.47	24.4%
	2	2 nd lowest quartile	33.3%	3.00	25.2%	66.7%	1.50	24.9%
More than Median Population	5	Lowest quartile	33.3%	3.00	25.2%	66.7%	1.50	24.9%
	6	2 nd lowest quartile	35.7%	2.80	23.5%	64.3%	1.56	25.8%

Population	CJR Sampling Stratum	Payment in	CJR			Control Group		
			Proportion of MSAs selected for CJR (a)	Inverse of CJR Proportion (b)	CJR Weight (b/c)	Proportion of MSAs selected for Control Group (d)	Inverse of Control Group Proportion (e)	Control Group Weight (e/f)
			Total	11.93^(c)	100%		6.03^(f)	100%

Sources: Lewin analysis of the Medicare Program Comprehensive Care for Joint Replacement Payment Model for Acute Care Hospitals Furnishing Lower Extremity Joint Replacement Services; A Final Rule by the Centers for Medicare & Medicaid Services, 80 FR 73273 (November 24, 2015) (codified at 42 CFR 510).

Note: MSA = metropolitan statistical area.

C. Additional Eligibility Criteria for Hospitals and Episodes

1. Hospital criteria

For inclusion in the analysis, hospitals had to be acute care hospitals paid under the IPPS that performed LEJR for Medicare beneficiaries in the baseline or intervention periods. Hospitals were excluded from the control group if they participated in the risk-bearing phase of BPCI for LEJR. This exclusion was made for the control group so that the impact of the CJR model could be measured relative to no prior experience in a bundled payment program for LEJR. In contrast, CJR participating hospitals that previously participated in BPCI were included in the analysis as part of the treatment group in order to study the full set of CJR participating hospitals; we controlled for prior BPCI LEJR participation in our regression models.

2. Episode definition

For both the CJR and control group populations, the beginning of an episode is triggered by an admission to a CJR participating or control group hospital (called an anchor hospital) with a resulting discharge in Medicare Severity-Diagnosis Related Group (MS-DRG) 469 or 470 (LEJR with major complications or comorbidities and LEJR without major complications or comorbidities, respectively). The end of the episode is 90 days after the anchor hospital discharge.

Medicare beneficiaries who met and maintained the following eligibility throughout the period were included in the analysis:

- enrolled in Medicare Parts A and B,
- Medicare was the primary payer (i.e., not enrolled in any managed care plan or covered under other health plans), and
- not eligible for Medicare based on end-stage renal disease (ESRD).

3. Episode criteria

Episodes were cancelled in the CJR model and excluded from the analysis if the patient

- no longer met the eligibility criteria described in the preceding paragraph;

- was readmitted to a participating acute care hospital (ACH) during the episode and discharged under DRG 469 or 470 (in which case the first episode is canceled and a new CJR episode begins); or
- died at any time during the episode period.

However, to estimate the all-cause mortality rate measure, we retained episodes that were canceled due to death of patient.

We also excluded episodes from the study that lacked certain beneficiary information used to risk-adjust outcomes (age, sex, and six months of Medicare FFS enrollment history prior to the LEJR ACH admission). Finally, as specified in the Final Rule, episodes initiated at CJR or control group hospitals but attributed to BPCI were excluded from the evaluation.²

² Episodes initiated at CJR hospitals could be attributed to a physician group practice (PGP) participating in BPCI or to skilled nursing facilities, inpatient rehabilitation facilities, long-term care hospitals or home health agencies participating in BPCI model 3.

IV. Quantitative Analysis of Secondary Data

While the CJR and control group populations are overall quite similar in terms of market, hospital, and patient characteristics, there may be unobserved differences that impact outcomes. To control for both observed and unobserved differences and to isolate the impact of the CJR model on outcomes, we used a difference-in-differences (DiD) regression approach supplemented by risk adjustment.

A. DiD Estimator

The DiD approach quantifies the impact of the CJR model by comparing changes in outcomes between the baseline and intervention periods for the CJR population and the control group population. One of the main advantages of this approach is that it can successfully isolate the effect of unobserved characteristics of treatment and control groups that are time invariant.³

1. Baseline period

The baseline period for our evaluation encompasses episodes that started between January 1, 2012 and December 31, 2014 and ended between April 1, 2012 and March 31, 2015. Episodes that both started and ended in Quarter 1 of 2012 (January 1, 2012 through March 31, 2012) were excluded from the baseline period because the number of episodes was small and these episodes were very different from episodes ending in later quarters because they had short anchor hospitalization lengths of stay.

2. Intervention period

The intervention period for this Annual Report follows the definition of performance year 1 in the Final Rule: episodes starting on or after April 1, 2016 and ending by December 31, 2016.⁴

The DiD model uses an outcome measure, Y , and estimates the differential change in Y for beneficiaries receiving care from CJR providers between the baseline and the intervention periods relative to that same change for beneficiaries receiving care from providers in the control group.

To illustrate the DiD approach, we define:

- $Y_{i,k,t}$ is the outcome for the i^{th} beneficiary with provider k in period t
- $CJR_{i,k}$ is an indicator that takes the value of 1 if an episode was initiated by a CJR provider k and takes the value of 0 otherwise
- $X_{i,k,t}$ is hospital, market, and patient characteristics in period t

³ While the DiD model controls for unobserved heterogeneity that is fixed over time, it does not control for unobserved heterogeneity that varies over time.

⁴ CMS. Medicare Program; Comprehensive Care for Joint Replacement Payment Model for Acute Care Hospitals Furnishing Lower Extremity Joint Replacement Services: final rule (42 CFR Part 510). *Fed Regist.* 2015; 80(226): 73273-73554.

- $E[Y|t, CJR, X]$ is the expected value of outcome measure Y conditional on values of t, CJR, and X

The DiD estimator is:

$$DiD = [E(Y | t=1, CJR = 1, X) - (E(Y | t=0, CJR = 1, X))] - [E(Y | t=1, CJR = 0, X) - (E(Y | t=0, CJR = 0, X))] \tag{1}$$

To illustrate the calculation of the DiD, consider the linear model listed below:

$$Y_{i,k,t} = b_0 + b_1 \cdot t + b_2 \cdot CJR_{i,k} + b_3 \cdot CJR_{i,k} \cdot t + X_{i,k,t}' \cdot B + u_{i,k,t} \tag{2}$$

- The value of coefficient b_1 captures aggregate factors that could cause changes in outcome Y in the intervention period relative to the baseline period that are common across CJR and control group episodes.
- Coefficient b_2 captures the relative differences in outcomes between CJR and control group episodes.
- Coefficient b_3 determines the differential in outcome Y experienced by beneficiaries receiving services from CJR providers during the CJR intervention period relative to control group episodes in the intervention period, and represents the DiD estimator.
- The vector of coefficients B measures the differential effects of risk factors (X) on the outcome variable.

To calculate the DiD estimate for outcome measures that were risk-adjusted with non-linear models, we used the regression model’s coefficient estimates to calculate each of the four conditional expectations that make up the DiD estimator in equation (1). In these cases, the standard errors were computed using the Delta method.⁵ For all DiD models, statistical significance was assessed at the 10% level.

3. Assumptions of DiD estimators

One critical assumption of an unbiased DiD estimate is that the treatment and control group outcomes follow parallel trends in the outcome of interest during the baseline period. Another assumption is that these parallel trends would have remained the same in the period when the policy is actually implemented in the absence of the policy intervention. While the first assumption can be tested if sufficient baseline data on treated and control groups are available, the second assumption is untestable.

We visually inspected trends for all outcomes and statistically tested that the CJR and control group outcomes follow parallel trends during the baseline period. For the statistical test, we

⁵ The delta method expands a function of a random variable about its mean, usually with a Taylor approximation, and then takes the variance. Specifically, if $Y = f(x)$ is any function of a random variable X, we need only calculate the variance of X and the first derivative of the function to approximate the variance of Y. Let μ_x be the mean of X and $f'(x)$ be the first derivative, a Taylor expansion of $Y = f(x)$ about μ_x gives the approximation: $Y = f(x) \approx f(\mu_x) + f'(\mu_x)(x - \mu_x)$. Taking the variance of both sides yields: $Var(Y) = Var(f(X)) \approx [f'(\mu_x)]^2 Var(X)$. For example, suppose $Y = X^2$. Then $f(x) = X^2$ and $f'(x) = 2x$, so that $Var(Y) \approx (2\mu_x)^2 Var(X)$.

assessed parallel trends in each of the four calendar years preceding the CJR model implementation. We estimated regression models in which we included a dummy variable indicating the CJR group; dummy variables for 2012, 2013, 2014, and 2015; and interaction terms between the CJR group dummy and each of the year dummies, along with risk-adjustment factors. A statistically significant coefficient on an interaction term between calendar years and the CJR group dummies is interpreted as evidence that outcomes for the two groups follow different trends in that particular year. All outcomes passed the parallel trends test in each of the four calendar years, overall and for the high and low payment MSA stratification.

B. Risk Adjustment to Control for Differences in Beneficiary Demographics and Clinical Risk Factors

1. Claims-based risk adjustment

In the DiD models that we estimated, we controlled for potential differences in beneficiary demographics, clinical characteristics observed before hospitalization, and provider characteristics (represented by $X_{i,k,t}$ in equation (2) above). Demographic factors included age categories, sex, age and sex interactions, race/ethnicity information, Medicaid eligibility status, and disability status. All outcomes were risk adjusted for the episode's hip fracture status, procedure type (hip or knee), and MS-DRG (469 or 470).⁶ To control for participation in other Medicare initiatives, we used a dummy variable that indicated whether the beneficiary was in the Medicare Shared Savings Program (MSSP), Pioneer ACO Model, or Next Generation ACO Model during the episode. To control for prior health conditions, we used Hierarchical Condition Category (HCC) indicators for the 12 months preceding the anchor hospitalization.⁷ To further control for case-mix differences, we included measures of prior care use in the following settings: acute care IPPS hospital, long-term care hospital (LTCH), skilled nursing facility (SNF), IRF, hospice, other Part A inpatient, custodial nursing facility, and home health agency (HHA).

We also controlled for provider characteristics that might be related to the outcomes of interest, such as hospital bed count, for-profit status, and previous BPCI LEJR experience and previous BPCI experience in a clinical episode other than LEJR. In addition, we included state dummies in all regression models to control for geographic differences in health care spending.

⁶ Models were also estimated separately for fracture episodes and elective episodes in addition to risk adjusting for fracture in models that combined fracture and elective episodes.

⁷ The Hierarchical Condition Category (CMS-HCC) model is a prospective risk-adjustment model used by CMS to adjust Medicare Part C capitation payments for beneficiary health spending risk. The model adjusts for demographic and clinical characteristics. The clinical component of the model uses diagnoses from qualifying services grouped into numerous HCC indicators. Pope, Gregory C.; Kautter, John; Ellis, Randall P.; Ash, Arlene S.; Ayanian, John Z.; Iezzoni, Lisa I.; Ingber, Melvin J.; Levy, Jesse M.; and Robst, John, "Risk adjustment of Medicare capitation payments using the CMS-HCC model" (2004). *Quantitative Health Sciences Publications and Presentations*. Paper 723.

While the same demographic and enrollment status indicators are included for all outcomes, we considered alternative aggregation levels to control for prior care use, prior health conditions, and regional characteristics (Exhibit C-14). To assess different specifications, we split the sample into a model development and a validation sample and estimated each model using data from the model development sample. We then evaluated the models’ goodness of fit (Akaike Information Criterion (AIC) and Bayesian Information criterion (BIC) criteria, R-square, t-tests on differences in conditional expectations by subgroup) in the model development sample and their predictive performance in the validation sample.

Exhibit C-14: Predictive Risk Factors Used to Risk-Adjust Claims-based Outcomes

Domain	Variables
Service Mix	<ul style="list-style-type: none"> • Anchor MS-DRG • Hip fracture status^a • Procedure type (hip or knee)
Patient Demographics and Enrollment	<ul style="list-style-type: none"> • Age (under 65, 65-79, 80+) • Sex • Race/ethnicity • Medicaid status • Disability status • Attribution to Medicare Shared Savings Program, Pioneer ACO Model, or Next Generation ACO Models during CJR episode
Prior health conditions	<ul style="list-style-type: none"> • CMS-HCC version 21 indicators from qualifying services and diagnoses (those meeting a threshold of at least 1%) from claims and data for 12 months preceding the anchor hospitalization
Utilization measures preceding the start of the qualifying anchor hospitalization	<ul style="list-style-type: none"> • Prior use variables used in risk adjustment varied by model^b <ul style="list-style-type: none"> ▪ Binary indicators for any acute care inpatient, SNF, IRF, HHA, hospice, other Part A inpatient, LTCH, and custodial nursing facility service utilization in the six months preceding the start of the episode ▪ Number of days of acute care inpatient, SNF, IRF, HHA, hospice, and other Part A inpatient service use in the one month preceding the start of the episode ▪ Number of days of acute care inpatient, SNF, IRF, HHA, hospice, other Part A inpatient, and LTCH service use in the six months preceding the start of the episode
Geography	<ul style="list-style-type: none"> • State indicators
Hospital Provider Characteristics	<ul style="list-style-type: none"> • Bed count • For-profit status • BPCI LEJR experience^c • BPCI experience in a clinical episode other than LEJR

Notes: ACO = accountable care organization. BPCI = bundled payments for care improvement, HCC = hierarchical condition category, HHA = home health agency, IRF = inpatient rehabilitation facility, LEJR = lower extremity joint replacement, LTCH = long-term care hospital, MS-DRG = Medicare severity-diagnosis related group, SNF = skilled nursing facility.

^a Models were also estimated separately for fracture episodes and elective episodes in addition to risk adjusting for fracture in models that combined fracture and elective episodes.

^b The optimal specification for each prior use variable was chosen using the goodness of fit criteria for each outcome.

^c CJR hospitals that previously participated in the risk-bearing phase of BPCI for LEJR were included in the analysis. However, to be included in the control group, hospitals could not have participated in the risk-bearing phase of BPCI for LEJR.

C. Empirical Specifications

We used a variety of empirical specifications including logistic, Poisson and ordinary least squares (OLS) regressions and two-part models (Exhibit C-15). Models were estimated depending on the type and characteristics of the outcome measure. For example, logistic models were estimated for the discrete quality outcomes (i.e., all claims-based quality of care measures). A Poisson model was used to estimate inpatient length of stay. OLS models were estimated for the continuous total number of days measures (e.g., number of SNF days, number of IRF days, and number of home health (HH) visits) as well as total episode payments and part B payments. Two part models were favored for payment outcomes where more than 5% of individuals had zero payments for the particular outcome. These payment outcomes included the individual Part A payments that exhibited zero-mass and skewness.⁸

Exhibit C-15: Outcomes by Model Type

Model Type	Outcomes
Ordinary least squares (OLS)	<ul style="list-style-type: none"> • Total episode payments • Part B payments • Number of IRF days • Number of SNF days • Number of HHA visits
Poisson	<ul style="list-style-type: none"> • Inpatient length of stay
Logistic	<ul style="list-style-type: none"> • First post-acute discharge was to IRF • First post-acute discharge was to SNF • First post-acute discharge was to HHA • Unplanned readmission • Emergency department visit • Complications, among elective episodes • All-cause mortality
Two part models (Probit/OLS)	<ul style="list-style-type: none"> • Readmission payments • IRF payments • SNF payments • HHA payments

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

Estimates from the multivariate regression models were used to construct model-predicted outcomes under two scenarios (baseline and intervention) for both CJR and control group hospitals. To control for changes in service and case mix over time, as well as differences between CJR and non-CJR beneficiaries, we used the same reference population of beneficiaries to calculate quarterly predicted outcomes for CJR and control group episodes. Given the design of the CJR model (randomly sampling MSAs to participate), we accounted for clustering at the

⁸ LTCH payments were not risk adjusted because of small sample sizes; only 61 CJR episodes had any LTCH payments in the 90 days post-discharge.

MSA level in our regression models. The reference population used in this report is all CJR beneficiaries during the baseline and intervention period.

D. Sensitivity Analyses

A number of sensitivity analyses were performed. First, we observed the relative impact of the stratum-level weights by excluding the weights from the DiD estimate and standard errors. Second, we excluded certain hospitals or episodes to identify whether these exclusions would change the DiD estimate, for example, hospitals that ever participated in BPCI and episodes by hospitals that self-selected into the CJR model by dropping out of BPCI on or after April 1, 2016, or episodes generated under MSSP, Pioneer ACO, or Next Generation ACO. We estimated the DiD estimate by excluding these episodes. Fourth, stratum fixed-effects are often implemented in the context of group randomized controlled trials. We tested the sensitivity of the DiD estimate to including stratum fixed-effects. Finally, roughly 5.5% of the LEJR episodes were not included in the risk-adjusted DiD estimation because they did not have information related to prior health care conditions because of the lack of FFS coverage prior to the anchor hospitalization. Unadjusted baseline and intervention mean outcomes including these episodes were comparable to mean outcomes that excluded these episodes. The alternative specifications used in the sensitivity analyses did not materially affect any of the findings in the main analysis and thus provided evidence that the main analysis and the conclusions presented in this report were robust.

V. Qualitative and Mixed Methods Analysis

A. Data Collection

We took notes during site visit and provider telephone interviews and, if the interviewee agreed, also recorded the interview. Recordings were used, if needed, to enhance interviewer notes. Site visit interviews were staffed with at least one interviewer and one note taker. Provider telephone interviews were staffed with one interviewer and one note taker. Notes from both site visits and provider telephone interviews were organized and entered into Atlas.ti software (version 7.5.18; Scientific Software Development GmbH, Berlin, Germany) for coding and analysis.

B. Thematic Analysis

We developed an initial analytic codebook based on the protocols developed for provider telephone interviews and site visits. This codebook contained categories to be used within the Atals.ti software to characterize notes from site visits and telephone interviews and identify key themes across hospitals and markets. As the codebook was used during analysis, it was further refined (i.e., codes were dropped, consolidated, added, or revised) to better capture patterns related to the CJR model as they were identified.

All staff involved in coding notes received systematic training from an experienced analyst. Coders began their training by reviewing and coding one interview. Their codes were then compared to those of the trainer. Discrepancies in coding were discussed, and this review process

was repeated until consistency was established. The coding team also met regularly to discuss the application of codes and potential modifications to the codebook.

To ensure that staff applying codes to notes were doing so in consistent way, we calculated Cohen’s kappa, a measure of inter-coder agreement, on a 5% sample of interview files across provider telephone interviews and site visit summaries. Assessing inter-coder agreement in this way is important for ensuring that themes are reliably captured across coders. Cohen’s kappa results ranged from 0.5 (moderate agreement) to 0.72 (good agreement) between coders.

C. Case Study Approach

We used a case study approach to describe start-up and implementation experiences for hospitals that participated in site visits. After each site visit, we reviewed the data and identified an interesting or illustrative topic to explore in greater detail and prepared a case study to highlight the hospital’s experience with the topic. Most topics involved a strategy that had been initiated by the hospital as a response to the CJR model, such as the development of a preferred PAC provider list. As appropriate, additional research was used to supplement the case studies such as interviews, examination of MSA-level socioeconomic characteristics, and review of relevant literature.

In addition to completing a case study for each hospital, we incorporated the case study findings into the annual report to provide contextual examples when appropriate. The inclusion of case studies in this way allows a more comprehensive understanding of the effects of the CJR model on hospitals and their associated PAC providers and orthopedic surgery groups. Exhibit C-16 lists the topic of each case study and the complete case studies are located in Appendix J.

Exhibit C-16: Case Study Topics

Title	Topics
I	Gainsharing between hospital and orthopedic surgeons
II	Challenges faced during the first year of CJR
III	Developing preferred provider lists and use of patient score cards
IV	Changing discharge patterns through pre-operative education
V	Prior experience with bundled payment models
VI	Lean methodology as a process improvement strategy
VII	Improving trust and collaboration between orthopedic surgeons and hospital administrators
VIII	Discharge planning strategies
IX	Transforming the surgical supply chain

Appendix D: CJR Site Visit and Provider Telephone Interview Protocols

CJR Site Visit Interview Protocols

At the start of each interview, please read:

I. Introduction

Thank you for taking the time to speak with us today. The Lewin Group has a contract with the Centers for Medicare & Medicaid Services, otherwise known as CMS, to conduct an independent evaluation of the Comprehensive Care for Joint Replacement, or CJR model. CMS is implementing the CJR model with the goals of reducing the costs of lower extremity joint replacements (LEJR) while maintaining or improving the quality of care for Medicare beneficiaries. CMS is funding this evaluation of the CJR model.

II. Verbal Informed Consent

Our interview will take no longer than one hour. Your participation will help us provide CMS with valuable information about how hospitals, orthopedic surgery groups and post-acute care providers are responding to the CJR model and its potential impacts. Your participation in today's interview is completely voluntary. At any time, you can skip a question or stop the interview—doing so will not in any way influence your relationship with your employer or CMS.

With your permission, we will audio record this interview to help us as we write up our notes. We will store the recording and notes on a secured server and upon the conclusion of the evaluation we will destroy both the recordings and notes. Our evaluation team will make every effort to ensure your privacy and confidentiality and none of your responses will be shared with your employer. Although CMS will receive a list of the organizations we visit, we will not directly attribute quotes from this conversation to you or your organization in our internal reports to CMS. In addition, we will ensure that all publically-available evaluation reports do not identify individual hospitals, orthopedic surgery groups or post-acute care providers. All interview protocols and materials have been reviewed and approved by the New England Institutional Review Board (IRB).

If you have any questions that I cannot answer, you may contact Jessica McNeely, PhD at the Centers for Medicare and Medicaid Services at (410) 786-9751.

Do I have your permission to proceed and record this interview?

If YES: Great. [Record interview]

If NO: That is fine.

III. Hospitals: Executive Leadership

A. Organization and Market Characteristics

1. To get us started, could you please describe your current role at the hospital?
 - a. How long have you been in this role?
 - b. What are your responsibilities with respect to the CJR model?
2. **IF HOSPITAL IS PART OF A SYSTEM:** We understand that your hospital is part of the [SYSTEM NAME] system. Does being a part of a health system affect your hospital's response to the CJR Model? If so, how?

PROBES:

- i. Are other hospitals within the [SYSTEM NAME] system part of the CJR model?
- ii. What role does the health system play in decisions about whether and how to respond to the CJR Model? Is there a system-wide approach to CJR or are decisions made separately by each participating system hospital?
- iii. What resources or supports does the system provide to help your hospital respond to CJR, if any?
- iv. Does your health system own a health plan that offers a Medicare Advantage product? If so, how does this affect your hospital's response to CJR, if at all?

We would like to get a sense of your patient population and associated providers working with your hospital.

3. Approximately how many LEJR surgeries for Medicare Fee-For-Service beneficiaries does your hospital perform annually?

PROBE: LEJR surgeries include hip, knee and ankle replacements and revisions

 - a. Can you describe the general education or socioeconomic status level, race/ethnicity, and complexity or level of comorbidity of the LEJR patients?
4. From which geographic areas do you draw the majority (or over 75%) of your Medicare LEJR patients? About what proportion comes from each area (i.e., neighborhood, town, or county)?
 - a. With which hospitals or systems do you compete for these patients?
5. How many orthopedic surgeons perform LEJR surgeries at your hospital?
 - a. Briefly describe the orthopedic surgeons or surgery groups that your hospital works with most closely.

6. Does your hospital participate in other programs with alternative payment models, like ACOs or the Bundled Payment for Care Improvement, or BPCI, Initiative?

IF YES:

- a. Please describe your participation (i.e., which program, Medicare and/or commercial payers).
- b. Has your participation in this/these program(s) influenced your ability to participate in the CJR Model? If yes, in what ways?

PROBE: For example, are the relationships or communication channels developed as part of your participation in an ACO useful in responding to CJR?

B. Partnerships

7. Has your hospital/health system established gainsharing agreements with orthopedic surgery groups or surgeons?

IF YES: How did you choose the surgeons or groups?

What are the terms of the gainsharing agreements?

IF NO: Why have you not established gainsharing agreements?

Have there been other changes to your contractual agreements with orthopedic surgery groups or surgeons?

8. Briefly describe the post-acute care providers that you work with most closely, such as skilled nursing facilities, inpatient rehabilitation facilities, long-term care hospitals, and home health care agencies.

9. Has your hospital/health system established gainsharing agreements with any post-acute care providers (skilled nursing facilities, inpatient rehabilitation facilities, long-term care hospitals, and home health care agencies)?

IF YES: How did you choose the providers?

What are the terms of the gainsharing agreements?

IF NO: Why have you not established gainsharing agreements?

Have there been other changes to your contractual agreements post-acute care providers?

C. Knowledge and Awareness of CJR

10. What aspects of participating in the CJR model are you as [JOB TITLE] most excited about, if any?

PROBE: Why is that?

11. What aspects of participating in the CJR model are you as [JOB TITLE] most concerned about, if any?

PROBE: Why is that?

D. Hospital's Response to CJR

We'd like to talk with you about any new or enhanced efforts your hospital has undertaken to respond to the CJR model since it began in April 2016 and what plans you have moving into the next year.

12. Overall, how would you describe your hospital's approach or strategy for responding to CJR?
13. What new or enhanced initiatives has your hospital adopted to **reduce the cost of LEJR care (or maintain low cost relative to regional target)**, if any?
IF ANY: How have those initiatives gone to date? What has worked well and what has worked less well?
IF NONE: Why has your hospital not started any new or enhanced initiatives to reduce LEJR cost?
14. What are your plans for reducing LEJR costs in the next year, if any?
15. What new or enhanced initiatives has your hospital undertaken to **maintain or improve quality of LEJR care**, if any?
IF ANY: How have those initiatives gone to date? What has worked well and what has worked less well?
IF NONE: Why has your hospital not started any new or enhanced initiatives to improve LEJR quality?
16. What are your plans for maintaining or improving the quality of LEJR in the next year, if any?

E. Infrastructure and Resources Needed

17. Have you invested in additional resources to respond to CJR? If so, please describe.
PROBES: Resource types could include: financial, labor, leadership, knowledge, equipment, cost and quality data, as well as IT-related capabilities like health information exchange.
IF ANY NEW INVESTMENTS: What was the cost of this investment?
18. Do you plan to make any additional CJR-related investments over the next year?

F. Early Implementation Experience: Barriers and Facilitators

19. Please describe any early successes in your hospital's response to the CJR Model.
PROBE: For example, with respect to partnerships, care redesign, or care coordination?
 - a. How does your hospital plan to capitalize on these successes?
20. Please describe any early challenges in your hospital's response to the CJR model.
PROBE: For example, with respect to partnerships, care redesign, or care coordination?
 - a. How has your hospital responded to these challenges?
 - b. Do you have any lessons learned you'd like to share with us that may benefit others participating in the CJR Model?

G. CJR Model Impacts

We'd now like to talk with you about any impacts of the CJR Model on your hospital, the local market, and Medicare beneficiaries.

21. What impacts has the CJR Model had on your hospital?

PROBES: Operational and other costs; Patient volume; Care processes for LEJR patients; Relationships with orthopedic surgeons/surgery groups or with PAC providers

22. What impacts has the CJR model had on the local market or adjacent markets?

PROBES: Referral patterns; Consolidation among orthopedic surgery groups and post-acute care providers; other payers' LEJR initiatives

23. What impacts has the CJR Model had on the Medicare LEJR patients over the 90-day episode?

PROBES: Quality of care in the hospital and after discharge; Need/intensity of post-acute care or type of post-acute care; Access to needed services

H. Wrap Up

Thank you for taking the time to speak with me today. Before we finish, is there anything that we did not mention that you believe is important for our team to consider or know about your hospital's response to the CJR model and its potential impacts?

Do you have any questions for me?

Thank you for your time today. Our discussion was highly informative. If you have any additional comments or concerns, please reach out to us at CJReval@lewin.com.

IV. Clinical Leadership

A. Introduction and Background

1. To get us started, could you please describe your current role at the hospital?
 - a. How long have you been in this role?
 - b. What are your responsibilities with respect to the CJR Model?
2. **IF HOSPITAL IS PART OF A SYSTEM:** We understand that your hospital is part of the [SYSTEM NAME] system. Does being a part of a health system affect your hospital's response to the CJR Model? If so, how?

PROBES:

- i. Are other system hospitals participating in the CJR model?
 - ii. What role does the health system play in decisions about whether and how to respond to CJR? Is there a system-wide approach to CJR or are decisions made separately by each system hospital that participates in CJR?
 - iii. What resources or supports does the system provide to help your hospital respond to CJR, if any?
3. Approximately how many LEJR surgeries for Medicare Fee-For-Service beneficiaries does your hospital perform annually?

PROBE: LEJR surgeries include hip, knee and ankle replacements and revisions

 - a. Can you describe the general education or socioeconomic status level, race/ethnicity, and complexity or level of comorbidity of the LEJR patients?
4. From which geographic areas do you draw the majority (or over 75%) of your Medicare LEJR patients? About what proportion comes from each area (i.e., neighborhood, town, or county)?
 - a. With which hospitals or systems do you compete for these patients?
5. How many orthopedic surgeons perform LEJR surgeries at your hospital?
 - a. Are they primarily independent surgeons or surgery groups? If groups, how large are they?
 - b. Which surgeons and/or surgery groups perform the highest volume of Medicare LEJR procedures?
6. Does your hospital use hospitalists to help provide inpatient care? If so, briefly describe whether and how they are involved in LEJR patient care before, during, and after surgery.

B. Knowledge and Awareness of CJR

7. What aspects of participating in the CJR model are you as [JOB TITLE] most excited about, if any?

PROBE: Why is that?

8. What aspects of participating in the CJR model are you as [JOB TITLE] most concerned about, if any?

PROBE: Why is that?

C. Hospital's Responses to CJR

We'd like to talk with you about any new or enhanced efforts your hospital has undertaken to respond to the CJR model since it began in April 2016 and what plans you have moving into the next year.

9. Overall, how would you describe your hospital's approach or strategy for responding to CJR?

10. What new or enhanced initiatives has your hospital made to **reduce the cost of LEJR care (or maintain low cost relative to regional target)**, if any?

IF ANY: How have those initiatives gone to date? What has worked well and what has worked less well?

IF NONE: Why has your hospital not started any new or enhanced initiatives to reduce LEJR cost?

11. What are your plans for reducing LEJR costs in the next year, if any?

12. What new or enhanced initiatives has your hospital undertaken to **maintain or improve quality of LEJR care**, if any?

IF ANY: How have those initiatives gone to date? What has worked well and what has worked less well?

IF NONE: Why has your hospital not started any new or enhanced initiatives to improve LEJR quality?

13. What are your plans for maintaining or improving the quality of LEJR in the next year, if any?

D. Care Coordination

14. What new or enhanced initiatives has your hospital undertaken to improve pre-surgical care for Medicare beneficiaries undergoing LEJR?

PROBE: For example, pre-surgical screenings, immunizations, physical therapy or other services to better prepare higher risk patients for surgery.

15. How have the orthopedic surgeons been involved in these pre-surgical care initiatives, if at all? Please provide a brief example.

- a. What is working well or less well with these initiatives?

- b. What are your plans for the next year with respect to pre-surgical care?

16. What new or enhanced initiatives have you undertaken with respect to in-hospital post-surgical care?

PROBE: For example, pain management or physical therapy.

17. What changes, if any, have you made in discharge planning and post-hospital care coordination? Please provide a brief example.

PROBES:

- i. Have you changed discharge expectations about where patients should be receiving post-surgical therapy?
 - ii. Are you providing different information to patients about the appropriate post-acute care setting, such as about the specific post-acute care provider that you think provides the best care?
18. Are you working with post-acute care providers in new or enhanced care initiatives for LEJR patients? If so, please provide a brief example.

PROBES:

- i. Are you working more closely with PAC providers to specify the rehab program for each patient or the anticipated PAC length of stay?
 - ii. Are you getting more feedback or information about how LEJR patients do after they leave the hospital?
 - iii. Are you monitoring patient progress in the post-acute care facility more closely?
19. What are your plans for the next year with respect to post-surgical care?

E. Care Redesign and Quality Improvement Initiatives

20. Since April 2016, has your hospital undertaken any other new or enhanced LEJR care redesign or quality improvement efforts in response to CJR, in addition to those related to improved care coordination?

PROBE: Patient education, clinical protocols or pathways, risk management, use of processes such as Lean, Six Sigma, and Plan-Do-Study-Act to enhance LEJR care delivery

- a. Could you give an example? Briefly describe the initiative and how it has gone to date.

IF NONE: Why is that?

21. What care redesign or quality improvement efforts do you plan to continue or add in the next year, if any?

F. Staffing

22. What **staffing changes** has your hospital made in response to CJR, if any?

PROBES:

- i. Have you trained more nurses to educate patients pre-surgery, added more discharge planners, or more staff to place follow-up calls to patients?
 - ii. How many and what kinds of staff have you redeployed or cross trained, if any?
 - iii. How many or what kinds of staff have you added, if any?
23. What are your plans for the next year with respect to staffing, if any?

G. Supply Chain Management

24. Since April 2016 when CJR began, what changes has your hospital made to its surgical supply chain management to reduce cost, if any?

IF ANY: How are these initiatives gone? What has worked well and what has worked less well?

IF NONE: Why has your hospital not started any new or enhanced initiatives to modify your surgical supply chain management?

- a. Do you have any plans for the next year with respect to supply chain management? If so, tell us briefly about them.
25. **IF NOT MENTIONED ALREADY:** Some hospitals attempt to get consensus with surgeons on a few types of prostheses so they can negotiate better prices and simplify supply chain management. Does your hospital use this strategy or have you considered it?
- a. Why or why not?

H. Information Systems

26. Please tell us briefly about your Health Information Technology (HIT) capability, particularly as it relates to care for LEJR patients.

PROBES:

- i. Do you have an electronic health record (EHR)?
- ii. Do you collect any additional data on the cost and quality of care for Medicare LEJR patients?
27. How do you communicate with orthopedic surgeons and surgery groups about LEJR patients? Has this changed since the implementation of CJR?
- PROBES:**
- i. How much electronic information exchange is occurring with these practices?
- ii. What electronic information is exchanged? For example, do you receive continuity of care documents (or CCDs)?
- iii. What mode of electronic exchange is used (e.g. view only, direct secure message, exchange via third party Health Information Exchange (HIE) Organization)?
28. How do you communicate with post-acute care providers about your LEJR patients? Has this changed since the implementation of CJR?
- PROBES:**
- i. How much electronic information exchange is occurring with these providers?
- ii. What electronic information is exchanged? For example, do you receive continuity of care documents (or CCDs)?
- iii. What mode of electronic exchange is used (e.g. view only, direct secure message, exchange via third party Health Information Exchange (HIE) Organization)?

I. Data on Quality

29. Please briefly describe the data your hospital is currently collecting on quality of care for Medicare LEJR patients.

PROBE: What data is collected that is specific to the 90-day LEJR episode?

30. Who has access to these data? How are you using the quality data that you have?

J. Early Implementation Experience: Barriers and Facilitators

31. Please describe any early successes in your hospital's response to the CJR Model.

PROBE: For example, with respect to partnerships, care redesign, or care coordination?

- a. How does your hospital plan to capitalize on these successes?

32. Please describe any early challenges in your hospital's response to the CJR model.

PROBE: For example, with respect to partnerships, care redesign, or care coordination?

- a. How has your hospital responded to these challenges?
- b. Do you have any lessons learned you'd like to share with us that may benefit others participating in the CJR Model?

K. CJR Model Impacts

33. What impacts has the CJR Model had on your hospital?

PROBES: Operational and other costs; Patient volume; Care processes for LEJR patients; Relationship with the hospital or with PAC providers

34. What impacts has the CJR Model had on your Medicare LEJR patients over the 90-day episode?

PROBES: Quality of care in the hospital and after discharge; Need/intensity of post-acute care or type of post-acute care; Access to needed services; Speed and completeness of recovery

35. What impact has CJR had on your relationships with orthopedic surgery groups and post-acute care providers?

PROBES: LEJR procedure volume; Referral Patterns; Quality of LEJR care

36. How might the CJR model affect historically vulnerable sub-groups of Medicare beneficiaries for whom your hospital provides care and over the 90 day episode? For example, vulnerable sub-groups include individuals covered by both Medicare and Medicaid, with lower education, and racial and ethnic minorities.

37. The financial incentives of this model could lead to concern that high risk patients may face access barriers for LEJR. Do you have any concerns that this could happen?

- a. What sorts of high risk patients could hospitals try to "avoid"?
- b. Hypothetically, how might a hospital do this?
- c. Have you seen any signs that this is happening at your hospital, or have you heard about this in your community?

L. Wrap Up

Thank you for taking the time to speak with me today. Before we finish, is there anything that we did not mention that you believe is important for our team to consider or know about your hospital's response to the CJR model and its potential impacts?

Do you have any questions for me?

Thank you for your time today. Our discussion was highly informative. If you have any additional comments or concerns, please reach out to us at CJReval@lewin.com.

V. Direct-Care Physicians (Hospitalists only, surgeons in the orthopedic surgery group protocol document)

A. Introduction and Background

1. How long have you been in your current role as a hospitalist for [HOSPITAL NAME]?
2. What is your or your hospitalist group's relationship with the hospital? For example, are you employed by the hospital or working under contract?
3. Have you had any special education or information about CJR from the hospital leadership, or from the orthopedic surgeons? What information was conveyed about CJR?

B. Care Delivery and Responses to CJR

Let's talk briefly about any new or enhanced initiatives your hospital or surgeons who operate at your hospital may have underway to respond to CJR.

4. How are you involved in caring for LEJR patients while they are in the hospital?
 - a. Do you have any interactions with LEJR patients before they are admitted for their surgery, or after they leave the hospital?
5. Tell us about the orthopedic surgeons or surgery groups that perform LEJRs here.

PROBE: Are these large surgical groups? Which has the largest share of LEJR procedures?
6. How do you work with the surgeons who perform orthopedic surgery at [HOSPITAL NAME]?
 - a. Are you involved in discharge planning for LEJR patients?
 - b. Do you work with surgeons or other staff members to establish treatment plans?
7. What new or enhanced initiatives has your hospital undertaken to **reduce cost or improve quality of LEJR care**, if any?

PROBE: such as pre- and post-surgical care coordination, quality improvement efforts, staffing changes,

IF ANY: How have those initiatives gone to date? What has worked well and what has worked less well?

IF NONE: Why has your hospital not started any new or enhanced initiatives to reduce costs or improve LEJR quality?
8. Has your involvement in discharge planning changed since the beginning of the CJR Model in April, 2016?
 - a. What is your role with respect to determining a patient's post-discharge destination?
9. How have orthopedic surgeons changed their care plans for Medicare LEJR patients since CJR?

PROBE: Physical therapy orders, inpatient length of stay, discharge instructions

C. CJR Model Impacts

10. What impacts has the CJR Model had on your hospital?

PROBES: Operational and other costs; Patient volume; Care processes for LEJR patients; Relationship with the hospital or with PAC providers

11. What impacts has the CJR Model had on your Medicare LEJR patients over the 90-day episode?

PROBES: Quality of care in the hospital and after discharge; Need/intensity of post-acute care or type of post-acute care; Access to needed services; Speed and completeness of recovery

12. The financial incentives of this model could lead to concern that high risk patients may face access barriers for LEJR. Do you have any concerns that this could happen?

- a. What sorts of high risk patients could hospitals try to “avoid”?
- b. Hypothetically, how might a hospital do this?
- c. Have you seen any signs that this is happening at your hospital, or have you heard about this in your community?

D. Wrap Up

Thank you for taking the time to speak with me today. Before we finish, is there anything that we did not mention that you believe is important for our team to consider or know about your hospital’s response to the CJR model and its potential impacts?

Do you have any questions for me?

Thank you for your time today. Our discussion was highly informative. If you have any additional comments or concerns, please reach out to us at CJReval@lewin.com.

VI. Quality Improvement/Care Redesign Leadership

A. Introduction and Background:

1. To get us started, could you please describe your current role and how long you have been in it?
 - a. What are your responsibilities with respect to the CJR Model?
2. In thinking about the CJR model, what aspects of it are you and your colleagues most excited about, if any?

PROBE: Why is that?

3. What aspects of it are you most concerned about?

PROBE: Why is that?

B. Care Pathway for LEJR patient

Now, I'd like to understand what happens to the typical patient who receives a hip or knee replacement at your hospital. Starting from when the patient has his or her first contact with [HOSPITAL NAME] through their complete rehabilitation.

4. Could you just walk me through the process and the clinical and administrative staff who would be in contact with the patient?

PROBES:

- i. **Scheduling:** How does the hospital work with the surgeon's staff?
 - ii. **Any pre-operative testing:** Who provides surgical clearance for the patient? Is it done in the hospital? By the patient's primary care physician?
 - iii. **Any pre-surgical requirements:** Does the hospital or surgeon provide education to the patient? Is there a required educational program?
 - iv. **In the hospital:** When are various departments involved - social work, pharmacy, discharge planning, physical therapy?
 - v. **Discharge Planning and/or Process:** Who is involved in the discharge decision? What determines the post-discharge site of care?
 - vi. **Post-Discharge:** How do you monitor the patient during the 90 days following their discharge from the hospital?
5. How did you change this care delivery process in response to the start of the CJR Model in April of 2016?

PROBES:

- i. **Scheduling:** How does the hospital work with the surgeon's staff?
- ii. **Any pre-operative testing:** Who provides surgical clearance for the patient? Is it done in the hospital? By the patient's primary care physician?
- iii. **Any pre-surgical requirements:** Does the hospital or surgeon provide education to the patient? Is there a required educational program?

- iv. **In the hospital:** When are various departments involved - social work, pharmacy, discharge planning, physical therapy?
 - v. **Discharge Planning and/or Process:** Who is involved in the discharge decision? What determines the post-discharge site of care?
 - vi. **Post-Discharge:** How do you monitor the patient during the 90 days following their discharge from the hospital?
6. Besides what you've just described, what new or enhanced initiatives do you have planned over the next year for your Medicare LEJR patients?
7. **IF NOT IMPLEMENTING ANY NEW OR ENHANCED INITIATIVES:** Why haven't you made changes in response to the CJR Model?
 - a. Would you like to make changes? If yes, what would you like to implement?
8. What process improvement methods or techniques does your hospital use (e.g. Plan-Do-Study-Act or PDSA, Lean, or Six Sigma)?

IF ANY: Have there been any changes in how you use process improvement methods as a result of CJR? If so, please describe.
9. What roles have the orthopedic surgeons played in the care redesign process?
 - a. Has your relationship with the orthopedic surgeons changed as you've responded to CJR? If so, please describe how and the implications for your ability to engage physicians in care redesign initiatives.
10. How have you involved post-acute care providers in improving the care for your LEJR patients?

PROBE: Skilled Nursing Facilities (SNFs), Inpatient Rehabilitation Facilities (IRFs), Home Health Agencies (HHAs)
11. Do you have preferred post-acute care providers?
 - a. **IF YES:** How did you select them and how do you tell your patients about the preferred post-acute care providers?

C. Data: Medicare LEJR Cost and Quality

12. What **cost** information do you review on your Medicare LEJR patients?
 - a. What information do you have about the cost of the full 90-day episode?
 - b. With whom is this cost data shared in your hospital and how is it used?
13. With whom is this cost data shared outside of your hospital (e.g. PAC providers) and how is it used?
14. What **quality** information do you review on your Medicare LEJR patients?
 - a. What information do you have about the quality of the full 90-day episode?
 - b. With whom is this quality data shared in your hospital and how is it used?

15. With whom is this quality data shared outside of your hospital (e.g., PAC providers) and how is it used?

D. CJR Model Impacts

We'd now like to talk to you about any impacts the CJR Model has had on Medicare beneficiaries.

16. What impacts do you think the CJR Model has had on Medicare beneficiaries receiving LEJR procedures at your hospital?

PROBES: Quality of care in the hospital and after discharge, need/intensity of post-acute care or type of post-acute care, access to needed services

17. How might the CJR Model differently affect vulnerable sub-groups of Medicare beneficiaries for whom the hospital provides care?

PROBE: Vulnerable subgroups include those with lower income/dual-eligibles (i.e. individuals who have Medicare and Medicaid coverage), racial and ethnic minorities, and other groups that have historically experienced disparities in outcomes.

E. Wrap Up

Thank you for taking the time to speak with me today. Before we finish, is there anything that we did not mention that you believe is important for our team to consider or know about your hospital's response to the CJR model and its potential impacts?

Do you have any questions for me?

Thank you for your time today. Our discussion was highly informative. If you have any additional comments or concerns, please reach out to us at CJReval@lewin.com.

VII. Direct Care Staff and Case Management

A. Knowledge and Awareness of CJR

1. To get us started, could you please describe your current role at the hospital?
 - a. How long you have been in this role?
 - b. What are your responsibilities with respect to the CJR model?
2. Tell us briefly about when and how you became aware of the CJR model.

PROBE: For example, did you learn of CJR from a professional association, clinical or executive leadership at your hospital, orthopedic surgeons or surgery groups, or some other means?
3. In thinking about the CJR Model, what aspects of it are you most excited about?
4. What aspects of it are you most concerned about?

B. Care Redesign/Care Coordination

Now I'd like to ask you about aspects of care for LEJR patients and how they may have changed in response to the CJR Model.

5. When and how are you involved in the care of a LEJR patient?
 - a. Has your involvement changed since the implementation of the CJR model?
6. What data or information are you receiving about LEJR patients?
 - a. How has this changed since the start of the CJR Model, if at all?
7. What data or information do you report about LEJR patients?
 - a. How has this changed since the start of the CJR Model, if at all?
8. Please describe any new or enhanced initiatives the hospital is making to lower 90-day episode costs while maintaining or improving quality for Medicare LEJR patients as a result of the CJR Model.
9. What is your involvement with [HOSPITAL NAME] efforts to lower LEJR episode cost while maintaining or improving quality, if any?
 - a. What more is [HOSPITAL NAME] planning?
10. What do you think should be implemented to lower costs and improve quality for LEJR patients?

C. Early Implementation Experience: Barriers and Facilitators

11. Please describe any early successes in your hospital's response to the CJR Model.

PROBE: For example, with respect to partnerships, care redesign, or care coordination?

 - a. How does your hospital plan to capitalize on these successes?

12. Please describe any early challenges in your hospital’s response to the CJR model.

PROBE: For example, with respect to partnerships, care redesign, or care coordination?

- a. How has your hospital responded to these challenges?
- b. Do you have any lessons learned you’d like to share with us that may benefit others participating in the CJR Model?

D. CJR Model Impacts

13. What impacts do you think the CJR Model has had on Medicare beneficiaries receiving LEJR procedures at your hospital?

PROBES: Quality of care in the hospital and after discharge, need/intensity of post-acute care or type of post-acute care, access to needed services

E. Wrap Up

Thank you for taking the time to speak with me today. Before we finish, is there anything that we did not mention that you believe is important for our team to consider or know about your hospital’s response to the CJR model and its potential impacts?

Do you have any questions for me?

Thank you for your time today. Our discussion was highly informative. If you have any additional comments or concerns, please reach out to us at CJReval@lewin.com.

VIII. Data Management

A. Information Technology Capability

1. To get us started, could you please describe your role at the hospital?
 - a. How long you have been in this role?
 - b. What are your responsibilities with respect to the CJR Model?
2. What are your hospital's EHR capabilities?
3. Since the CJR Model began in April 2016, have you implemented any new or enhanced EHR initiatives specifically to support the hospital's efforts to reduce cost and improve quality for Medicare LEJR patients? If so, please provide an example.
 - a. In the next year, do you anticipate implementing any new or enhanced EHR initiatives with respect to Medicare LEJR patients? Please describe or provide an example.
4. What are your electronic health information exchange (HIE) capabilities?
5. Since CJR, have you implemented any new or enhanced HIE initiatives to be able to view or share information with orthopedic surgeons? With post-acute care providers? Please provide an example.
 - a. In the next year, do you anticipate implementing any new or enhanced HIE initiatives to support the hospital's efforts to reduce cost and improve quality for Medicare LEJR patients? Please describe or provide an example.
6. Has your hospital invested in telehealth or e-health programs for LEJR patients?
IF INVESTMENT: Can you describe the investments your hospital has made?
IF NO INVESTMENT: What kind of future investments do you plan to make, if any?

B. Cost and Quality data

7. What data do you collect on the cost and quality of care for Medicare LEJR patients?
 - a. In the hospital?
 - b. Over the 90-day episode?
 - c. **IF THE HOSPITAL PARTICIPATES IN GAINSHARING:** What data do you use in calculating and distributing gainsharing under CJR?
8. What are the strengths of this cost and quality data about Medicare LEJR patients?
9. What are the limitations of these data?
PROBE: Completeness, accuracy, timeliness?

10. Since CJR, have you changed your approach or process for collecting cost and quality of care data about Medicare LEJR patients? If so, please describe or provide an example.

PROBES: Internal cost calculations, 90-day episode reporting, quality monitoring, feedback or other reporting activities, costs per provider

11. What plans do you have over the next year for improving the data you have on the cost and quality of care for Medicare LEJR patients?

PROBES: Gainsharing, quality monitoring, internal cost calculations, feedback or other reporting activities, patient and patient care tracking activities, CJR-related administrative activities, other care redesign activities

12. What kinds of patient reported outcomes are collected at your hospital since the beginning of the CJR Model in April 2016?
 - a. How is collection of this patient-reported data going? What has worked well? What's been challenging or working less well?

C. Early Implementation Experience: Successes and Challenges

13. Please describe any early successes in your hospital's response to the CJR Model, with regards to cost and quality data.
 - a. How does your hospital plan to capitalize on these successes?
14. Please describe any early challenges in your hospital's response to the CJR model, with regards to cost and quality data.
 - a. How has your hospital responded to these challenges?
 - b. Do you have any lessons learned you'd like to share with us that may benefit others participating in the CJR Model?

D. Wrap Up

Thank you for taking the time to speak with me today. Before we finish, is there anything that we did not mention that you believe is important for our team to consider or know about your hospital's response to the CJR model and its potential impacts?

Do you have any questions for me?

Thank you for your time today. Our discussion was highly informative. If you have any additional comments or concerns, please reach out to us at CJReval@lewin.com.

IX. Orthopedic Surgeons and Clinical Staff

A. Introduction and Background

1. To get us started, could you please describe your current role and how long you have been in it?
 - a. How have you been involved in hospital activities related to the CJR Model, if at all?

PROBE: Involved in decisions such as gainsharing, participation in meetings with hospital executives, meetings about hospital quality, LEJR cost or quality data review and interpretation, sharing data with peers, care redesign planning
 - b. Do you have responsibilities at the hospital specifically related to the CJR Model at [HOSPITAL NAME where they perform LEJR surgeries]? If so, please briefly describe them.
2. Please tell us briefly about your practice.
 - a. Is this a physician owned practice or does another organization, such as a hospital or health system, own the practice?
 - b. How many orthopedic surgeons are in the practice?
 - c. Do you perform surgeries at any other hospital? If so, which one(s)?
 - d. Approximately how many LEJR surgeries for Medicare beneficiaries would you say your practice performs annually? A ballpark estimate is fine.
3. **IF PRACTICE IS INDEPENDENT:** What is your relationship with [HOSPITAL NAME]?

PROBES:

 - a. Does anyone in your practice have leadership or administrative roles in the hospital?
 - b. Are you involved in the hospital quality committee or other hospital committees?
4. Is there a gain-sharing arrangement between the hospital and your practice for Medicare LEJR patients?

IF YES: Please describe the general structure and nature of the agreement.

IF NO: Why not?
5. Does your group participate in other programs with alternative payment models, like ACOs or the Bundled Payment for Care Improvement, or BPCI, Initiative, with this hospital or independently?

IF YES:

 - a. Please describe your participation (i.e., which program, Medicare and/or commercial payers, with this hospital and/or independently).
 - b. Has your participation in this/these program(s) influenced your ability to participate in the CJR Model? If yes, in what ways?

PROBE: For example, are the relationships or communication channels developed as part of your participation in an ACO useful in responding to CJR?

6. **IF PRACTICE IS PART OF A HEALTH SYSTEM:** We understand that your practice is owned by [HOSPITAL NAME/ HEALTH SYSTEM NAME]. How does this ownership affect your practice's response to the CJR Model, if at all? If possible, provide an example of how this hospital or system works with your group versus practices that it does not own.
7. Tell us about your Medicare beneficiary patient population. For example, can you describe their general education level, race/ethnicity, socioeconomic status?
 - a. What share of your Medicare LEJR patients have elective joint replacements vs. fracture?
8. Are hospitalists involved in the care of your LEJR patients at [HOSPITAL NAME]?

IF YES - PROBES:

- a. What is their role in patient care? Do they see all of your LEJR patients?
 - b. How do you share information with the hospitalists?
 - c. What role do they play in discharge planning, if any?
9. Does your surgical team include surgical residents, physician assistants, nurse practitioners, and/or other healthcare professionals? If so, what is the role of each of these professionals as it relates to the CJR model?
 10. In thinking about the CJR model, what aspects of it do you think could improve patient care?

PROBE: Why is that?
 11. What aspects of it do you think could impair/detract from patient care?

PROBE: Why is that?

B. Hospital and Practices' Response to CJR

Let's talk briefly about any new or enhanced initiatives [HOSPITAL NAME] hospital may have underway or planned in response to CJR.

12. Please describe any new or enhanced initiatives focusing on changing care or improving quality over 90-day LEJR episodes that [HOSPITAL NAME] hospital has implemented since CJR began.

PROBE – We will provide a list of potential initiatives the hospital may be engaged in – please let us know if they are doing anything related to:

 - a. Changes in pre- and post-surgical care coordination (e.g. pre-hab, care protocols, pain management protocols)
 - b. Risk stratification: Implementing a tool to assess risk of readmission
 - c. Quality improvement efforts (e.g. multidisciplinary rounding project)
 - d. Staffing changes (e.g. adding a patient navigator)
 - e. Supply chain management, such as prostheses/implants
 - f. EHR/HIE enhancements
 - g. Enhanced patient and family engagement and education
 - h. Changes in discharge planning (e.g., providing education and/or care protocols to SNFs & HHAs)

- i. Efforts to assess PAC provider quality and develop relationships with PAC providers
 - j. Changes in patient follow-up (e.g., phone calls to patients throughout the 90 day episode, etc.)
 - k. Others?
13. To date, how have these new or enhanced initiatives performed? What stage of development are they in? Which have worked especially well?
- IF NONE:** Are any currently planned? Are there barriers or challenges to implementing care redesign?
14. What new or enhanced initiatives has **your practice** undertaken to maintain or improve quality in response to the CJR model?
- PROBES:** We will provide a list of potential initiatives you may be engaged in – please let us know if you are doing anything related to:
- a. Staffing changes (e.g., adding a patient navigator)
 - b. EHR/HIE enhancements
 - c. Enhanced patient and family engagement and education
 - d. Enhanced pre-surgical screening for pre-operative risks, family/caregiver support, home environment, access to transportation
 - e. Efforts to optimize patients' health and functional status prior to surgery (e.g., weight reduction, diabetes control)
 - f. Adding pre-operative rehabilitation
 - g. Adding or improving pre-operative joint education classes
15. For your Medicare LEJR patients, have you changed your rehabilitation orders or expectations for SNFs, HHAs, and/or outpatient physical therapists?
- PROBES:** Starting home physical therapy visits earlier, faster transition to outpatient physical therapy, more physical therapy visits per week, fewer total weeks of physical therapy
- IF ANY OF THESE ARE MENTIONED:** were any of these changes difficult to accomplish – any push-back from your patients, SNFs, HHAs, or physical therapists?
16. How often do you, the physician, or a member of your team (e.g., RN, NP, or PA) communicate with SNF/HHA/Outpatient therapy staff about your LEJR patient's progress? In what situations?
17. We've talked about a lot of possible changes in care delivery. Of the ones you've implemented, which were implemented as a result of the start of the CJR Model? Which were implemented as a result of other programs (e.g., ACOs)?

C. Early Implementation Experience

18. Has your practice or the hospital had any successes to date with respect to partnerships, care redesign and care coordination, or outcomes for LEJR patients over the 90-day episode? If so, please describe them.
- a. What has worked well? What resources or skills have made these successes possible?

19. Has your practice or the hospital had any challenges to date with respect to partnerships, care redesign and care coordination, or outcomes for LEJR patients over the 90-day episode? If so, please describe them.
 - a. How has the hospital or your practice responded to these challenges?

D. CJR Model Impacts

20. What impact has CJR had on [HOSPITAL NAME]?
PROBES: Staffing, LEJR procedure volume, relationships with orthopedic surgery groups and post-acute care providers
21. What impact has CJR had on your practice?
PROBES: Overall revenue and profit; Patient volume; Care processes for LEJR patients; Relationship with the hospital or with post-acute care providers
22. What impact has CJR had on your Medicare beneficiary LEJR patients?
PROBES: Quality of care within the practice, in the hospital, and in inpatient and outpatient PAC after discharge; Need/intensity of post-acute care or type of post-acute care; Access to needed services; Speed and completeness of recovery
23. The financial incentives of this model could lead to concern that high risk patients may face access barriers for LEJR. Do you have any concerns that this could happen?
 - a. What sorts of high risk patients could hospitals try to “avoid”?
 - b. Hypothetically, how might a hospital do this?
 - c. Have you seen any signs that this is happening at your [HOSPITAL NAME], or have you heard about this in your community?

E. Wrap Up

Thank you for taking the time to speak with me today. Before we finish, is there anything that we did not mention that you believe is important for our team to consider or know about your hospital’s response to the CJR model and its potential impacts?

Do you have any questions for me?

Thank you for your time today. Our discussion was highly informative. If you have any additional thoughts or concerns you would like to share, please contact us at CJReval@lewin.com.

X. Orthopedic Surgery Group Practice Management

A. Organizational Characteristics and LEJR Market

To get us started, we want to talk to with you about your responsibilities as practice manager, your orthopedic surgery practice, and the market for LEJR procedures.

1. To get us started, could you please describe your current role and how long you have been in it?
 - a. How have you been involved in hospital activities related to the CJR Model, if at all?

PROBE: Involved in decisions such as gainsharing, participation in meetings with hospital executives, meetings about hospital quality, LEJR cost or quality data review and interpretation, sharing data with peers, care redesign planning
 - b. Do you have responsibilities at the hospital specifically related to the CJR Model at **[HOSPITAL NAME where they perform LEJR surgeries]**? If so, please briefly describe them.
2. Please tell us briefly about your practice.
 - a. Is it a physician owned practice or does another organization, such as a hospital or health system, own the practice?
 - b. How many orthopedic surgeons are in the practice?
 - c. Where do your physicians perform orthopedic surgery?
 - d. Approximately, how many LEJR surgeries for Medicare beneficiaries would you say your practice performs annually? A ballpark estimate is fine.
 - e. What proportion of your practice revenues is attributed to LEJR surgeries for Medicare beneficiaries?
3. **IF PRACTICE IS INDEPENDENT:** Could you describe your relationship with **[HOSPITAL NAME]**?

PROBES:

 - a. Does your practice have formal relationships such as leadership or administrative positions, joint ventures, or management service arrangements? If so, please briefly describe them.
 - b. Do any surgeons in your practice have involvement on a quality or other hospital committee?
4. Is there a gain-sharing arrangement between the hospital and your practice, for Medicare LEJR patients?

IF YES:

 - a. Why did your practice enter into this agreement with the hospital?
 - b. Please describe the general structure and nature of the arrangement.
 - c. Is there a certain dollar amount you expect to receive through this arrangement?

IF NO: Why not?

5. Does your group participate in other programs with alternative payment models, like ACOs or the Bundled Payment for Care Improvement, or BPCI, Initiative, with this hospital or independently?

IF YES:

- a. Please describe your participation (i.e., which program, Medicare and/or commercial payers, with this hospital and/or independently).
- b. Has your participation in this/these program(s) influenced your ability to participate in the CJR Model? If yes, in what ways?

PROBE: For example, are the relationships or communication channels developed as part of your participation in an ACO useful in responding to CJR?

6. **IF PRACTICE IS PART OF A HEALTH SYSTEM:** We understand that your practice is owned by [HOSPITAL NAME/ HEALTH SYSTEM NAME]. How does this ownership affect your practice's response to the CJR Model, if at all? If possible, provide an example of how this hospital or system works with your group versus practices that it does not own.
7. Tell us about the Medicare beneficiaries for whom you provide care. For example, can you describe their general education level, race/ethnicity, socioeconomic status and complexity?
 - a. What share of your Medicare LEJR patients have elective joint replacements vs. fracture?
8. From which geographic areas does your practice draw the majority (or over 75%) of your Medicare LEJR patients?

PROBE: Which, towns, cities, or counties?
9. How would you describe your local market for LEJR surgery?
 - a. How competitive is it?
 - b. Which orthopedic surgery groups are dominant in terms of market share?
 - c. Which hospitals or systems are dominant in terms of market share?
 - d. What are the dominant PAC providers in this market?

B. Knowledge and Awareness of CJR

10. Tell us about when and how you became aware of the CJR model.

PROBE: For example, did you hear about it from local hospitals with whom you work, a professional association, or some other means?

11. In thinking about the CJR model, what aspects of it are you most excited about as [RESPONDENT(S) TITLE(S)] of this practice, if any?

PROBE: Why is that?

12. What aspects of it are you most concerned about as [RESPONDENT(S) TITLE(S)] of this practice, if any?

PROBE: Why is that?

C. Partnerships / Networks

We'd now like to talk more with you about your practice's relationship to [HOSPITAL NAME] hospital and/or system and any changes that have occurred in response to the CJR Model.

13. **IF AN INDEPENDENT/NON-HOSPITAL OWNED PRACTICE:** Has [HOSPITAL NAME] approached your practice about CJR and changes it would like to make in care processes?
 - a. What changes have they proposed?
 - b. What have they implemented?
 - c. Did the hospital work with your practice in developing and implementing new approaches to improve care and lower costs?
 - d. How was your practice involved?
14. **IF THE PRACTICE HAS A GAINSHARING AGREEMENT WITH THE HOSPITAL:** How important is the gainsharing agreement with [HOSPITAL NAME] to enlisting your practice to work with them in responding to CJR?
15. **IF NO GAINSHARING AGREEMENT:** Would a gainsharing agreement with [HOSPITAL NAME] encourage greater cooperation in making changes to respond to CJR?
 - a. How do you think it would change your relationship with [HOSPITAL NAME]?

D. Care Redesign / Care Coordination

Now, please think about your practice and [HOSPITAL NAME] since CJR began in April, 2016.

16. Has the [HOSPITAL NAME] hospital started any new or enhanced hospital initiatives to reduce cost and improve quality for Medicare LEJR patients? If so, please briefly describe them.
17. What has been your practice's role in developing and implementing the hospital's CJR initiatives?
 - a. How have these initiatives gone to date?
 - b. What's worked well? What's worked less well?
 - c. What impact have these initiatives had on your practice's patients?
18. Has **your orthopedic surgery group** started any new or enhanced initiatives to reduce cost and improve quality for Medicare LEJR patients in response to CJR? If so, please briefly describe them
PROBES: Staffing changes; more interactions with post-acute care providers; Patient education and engagement changes; other?

E. Data: Cost and Quality

19. How has the cost and quality of care for your Medicare LEJR patients changed since [HOSPITAL NAME] came under the CJR model?
 - a. Has the hospital shared any cost and quality data with your practice?
 - b. What is indicated by your practice's cost and quality data?

20. How has the cost of care over the entire LEJR episode (the hospitalization plus 90 days post discharge) changed since CJR? What has caused these changes?
21. How has the quality of care for LEJR patients changed since CJR? What has caused these changes?

F. CJR Model Impacts

22. What impacts has CJR had on your practice?

PROBES: Operational and other costs; Growth in revenue; Patient volume; Care processes for LEJR patients; Relationship with the hospital or with post-acute care providers

23. What impacts has the CJR Model had on the local market?

PROBES: Referral patterns; Relationships between hospitals/systems, orthopedic surgery groups, PACs; Consolidation among LEJR providers; other payers' LEJR initiatives

24. Overall, what issues or areas related to the CJR model and its impacts do you think it would be most important for our evaluation team to focus on in the next year?

G. Wrap Up

Thank you for taking the time to speak with me today. Before we finish, is there anything that we did not mention that you believe is important for our team to consider or know about your hospital's response to the CJR model and its potential impacts?

Do you have any questions for me?

Thank you for your time today. Our discussion was highly informative. If you have any additional comments or concerns, please reach out to us at CJReval@lewin.com.

XI. Post-Acute Care Providers: Executive and/or Financial Leadership

A. Organizational Characteristics

1. To get us started, could each of you please describe your current role, and how long you have been in it?
2. Tell us a bit about **[PAC organization]**.
 - a. **IF SNF:** Are you independent or owned by another organization? If owned, are you owned by a hospital, hospital system or a larger PAC chain? Which one?
 - b. **IF SNF:** How many units/beds are in this building (how many Medicare certified beds)?
 - c. **IF SNF:** What is your average occupancy rate?
 - d. **IF SNF:** Rehab department – how many employees and are they on staff or contracted?
 - e. **IF SNF:** Social services department- how many employees in this department? Contract or on staff?
 - f. **IF HHA:** How many employees do you have?
 - g. **IF HHA:** How many full-time/part-time registered nurses, licensed practical nurses, nurse aides?
 - h. **IF OWNED:** What role does the larger organization play in decision making about your facility/agency's response to CJR?
 - i. From which areas do you draw Medicare beneficiaries now?
 - ii. Approximately how many Medicare LEJR patients do you care for in a year?
 - iii. Approximately what percent of your organization's overall patient population is that?
3. Briefly describe the PAC market in this area.
 - a. How competitive is the PAC market? Is there adequate SNF/HHA supply?
4. Besides CJR, are there any other federal or state policies that are having a major impact on the way your facility/agency provides care to Medicare LEJR beneficiaries?

B. Knowledge and Awareness of CJR

5. Tell us about when and how you became aware of the CJR model.

PROMPT: For example, did you hear about it from your corporate owner, local hospitals with whom you work, a professional association, or some other source?
6. In thinking about the CJR model, what aspects of it are you most excited about as **[RESPONDENT(S) TITLE(S)]** of this facility/agency, if any?

PROBE: Why is that?
7. What aspects of it are you most concerned about as **[RESPONDENT(S) TITLE(S)]** of this facility/agency, if any?

PROBE: Why is that?

C. Partnerships / Networks

8. How have you been involved/engaged in the CJR Model, particularly with [HOSPITAL NAME] hospital with whom you work?
 - a. Are you working with other CJR-participating hospitals? If so, which ones?
9. Have you been involved in developing new hospital or system partnerships as a result of CJR? Do you anticipate developing new partnerships? If so, please tell me about them.
10. Do you have a CJR gainsharing agreement with [HOSPITAL NAME]?

PROBES:

IF THEY HAVE THEM: Please describe the general nature of the agreement.

IF NOT: Why do you think they have not been offered and/or ultimately put in place?

11. Has there been any change in the proportion of elective vs. fracture hip replacement patients you receive from [HOSPITAL NAME]?
 - a. How about any change in the proportion of hip vs. knee replacement patients?

D. Early Implementation Experience: Barriers and Facilitators

12. Please tell us about any successes to date with respect to hospital partnerships, or care redesign and care coordination, in response to the CJR model. These care redesign and coordination successes could be those that the hospital has implemented or ones that your own facility/agency has implemented.
 - a. What has worked well? What resources or skills have made these successes possible?
13. Please tell us about any challenges to date with respect to partnerships, or care redesign and care coordination, in response to the CJR model. The care redesign and coordination challenges could be those that the hospital is trying to implement or ones that your own facility/agency is trying to implement.
 - a. How has the hospital or your organization responded to these challenges?

E. CJR Model Impacts

14. What financial impacts has CJR had on your facility/agency?

PROBES: Operational and other costs; Overall margin; Overall revenue
15. What changes to your local post-acute care market as a result of CJR have you noticed, if any? Do you anticipate changes in the future?

PROBES: Referral patterns; Consolidation among PACs; Impacts on hospitals and orthopedic surgery groups; Other Payers' LEJR initiatives, such as Medicaid

F. Wrap Up

Thank you for taking the time to speak with me today. Before we finish, is there anything that we did not mention that you believe is important for our team to consider or know about your organization's response to the CJR model and its potential impacts?

Do you have any questions for me?

Thank you for your time today. Our discussion was highly informative. If you have any additional comments or concerns, please reach out to us at CJReval@lewin.com.

XII. Post-Acute Care Providers: Clinical Leadership

A. Organizational Characteristics

1. To get us started, could each of you please describe your current role, and how long you have been in it?
2. Tell us a bit about **[PAC organization]**.

IF SNF:

- i. How many units/beds in this building (how many Medicare certified beds)?
 - ii. What is your average occupancy rate?
- a. How many employees do you have?
 - i. How many full-time/part-time registered nurses, licensed practical nurses, nurse aides?
 - ii. Rehab department – how many and are they on staff or contracted?
 - iii. Social services department- how many in this department? Contract or on staff?
 - b. Are you independent or owned by another organization?

IF OWNED:

- i. Are you owned by a hospital, hospital system or a larger PAC chain? Which one?
 - ii. What role does the larger organization play in decision making about your facility/agency's response to CJR?
- c. Tell us briefly about your case mix.

FOR SNFs: Acute vs. long term.

FOR HHAs: Post-hospital, post-SNF, community-referral.

- d. Approximately how many Medicare LEJR patients do you care for in a year?
 - i. Approximately what percent of your organization's overall patient population is that?
- e. From which geographic areas do you draw Medicare beneficiaries now?

3. Please describe the supply of PACs in your local market, including Inpatient Rehabilitation Facilities (IRFs), Skilled Nursing Facilities (SNFs), Long-Term Care Hospitals (LTCHs) and Home Health Agencies (HHAs).

PROBE: What types of PACs predominate your market? Are PACs in the market owned or closely aligned with specific hospitals or free-standing and working with several hospitals or systems?

4. Besides CJR, are there any other federal or state policies that are having a major impact on the way your facility/agency provides care to Medicare LEJR beneficiaries? If so, please describe them briefly.

B. Knowledge and Awareness of CJR

5. Tell us about when and how you became aware of the CJR model.

PROMPT: For example, did you hear about it from local hospitals, a professional association, or some other source?

6. In thinking about the CJR model, what aspects of it are you most excited about as [RESPONDENT(S) TITLE(S)] of this facility/agency?

PROBE: Why is that?

7. What aspects of it are you most concerned about as [RESPONDENT(S) TITLE(S)] of this facility/agency?

PROBE: Why is that?

C. Partnerships / Networks

8. How have you been involved/engaged in the CJR Model, particularly with [HOSPITAL NAME] hospital?

a. Are you working with other CJR-participating hospitals? If so, which ones?

9. From which hospitals do you receive the majority of your LEJR patients?

a. Has this changed for Medicare LEJR patients since CJR began in April 2016?

b. Have the number of LEJR patients changed since before the CJR program was implemented? If so, please describe.

c. How has the acuity of Medicare LEJR patients you care for changed since the CJR model was implemented in April, 2016, if at all?

i. Could you speak specifically about patients with co-morbidities?

ii. Those with fractures vs. elective surgeries?

D. Care Redesign/Care Coordination

10. How has [HOSPITAL NAME] hospital changed the coordination of care for its Medicare LEJR patients?

a. Please describe any new or enhanced efforts the hospital is making around LEJR patient and family engagement and education.

b. Please describe any new or enhanced efforts the hospital is making to improve the discharge process for LEJR patients and any impacts this is having on your facility/agency.

c. Please describe any new or enhanced efforts the hospital or surgeons are making around PAC referral orders.

i. Any new or additional treatment or intervention orders? For example, frequency of physical therapy, weekend physical therapy, goals of treatment?

ii. Any new recommendations coming from the hospital or surgeons concerning LOS/number of visits?

11. Please describe any efforts your facility/agency is making to lower LEJR episode cost while maintaining or improving quality.
 - a. Please describe any new or enhanced efforts your facility/agency is making to improve the hospital transfer/discharge process for LEJR patients.
 - b. Please describe any new or enhanced efforts your facility/agency is making around patient admission, or patient and family engagement for LEJR patients.
 - c. **IF SNF:**
 - i. How is care redesign affecting your facility's LOS?
 - ii. How is care redesign affecting your facility's hospital readmission rate for CJR patients?
 - iii. Has care redesign for LEJR patients changed your facility staffing plan? Your employment or contracting for physical therapists?
 - d. What additional CJR-related changes does your facility/agency have planned going forward?
12. Is [HOSPITAL NAME] urging or requiring you to make changes in how you care for its LEJR patients?
 - a. What types of changes? How do you think these changes will affect patient outcomes?
 - b. Has this influenced your choice of care redesign interventions?

E. Data Management/IT

13. What data do you collect on the cost and quality of care for Medicare LEJR patients?
14. How do you exchange information with [HOSPITAL NAME]?
 - a. Can you electronically view and share information or do you rely on the phone and fax? What kinds of information do you share?
 - b. Can you access the hospital's EHR to see the records for LEJR patients referred to you? For example, is it view or read only access, direct secure messaging or email, or an exchange via third-party Health Information Exchange (HIE) Organization?
 - c. If the patient goes from the hospital to another PAC provider before coming to you, do you still have access to the hospital EHR?
 - d. What kinds of documents are you capable of electronically sending to or receiving from the hospital? For example, continuity of care documents (CCDs) or electronic discharge summaries.
15. Can you send information back to the hospital that is sent to you (i.e., is communication bi-directional)?
 - a. What impact has the ability to electronically exchange health information, or lack thereof, had on care coordination and efforts to respond to CJR?

F. Early Implementation Experience: Barriers and Facilitators

16. Please tell us about any successes to date with respect to hospital partnerships, or care redesign and care coordination, in response to the CJR model. These care redesign and coordination successes could be those that the hospital has implemented or ones that your own facility/agency has implemented.
 - a. What has worked well? What resources or skills has made these successes possible?
17. Please tell us about any challenges to date with respect to partnerships, or care redesign and care coordination, in response to the CJR model. The care redesign and coordination challenges could be those that the hospital is trying to implement or ones that your own facility/agency is trying to implement.
 - a. How has the hospital or your organization responded to these challenges?

G. CJR Model Impacts

18. What impacts has CJR had on Medicare LEJR patients?
 - a. In what ways might CJR improve care?

PROBES: Access and quality, including care experience and satisfaction, faster and better mobility and function, long term recovery and functional status
 - b. In what ways might CJR impact LEJR patients' informal caregivers?
 - c. What would you be concerned about, in terms of possible negative impacts?
 - d. What evidence have you seen of any of these impacts so far?
19. How might the CJR model affect historically vulnerable sub-groups of Medicare beneficiaries? For example, vulnerable subgroups include those with lower income/individuals who also have coverage through Medicaid, racial and ethnic minorities, and other groups that have historically experienced disparities in outcomes.
20. What impacts has CJR had on your facility/agency?

PROBES: Operational, staffing, contracting, or other costs; Patient volume, LOS, and turnover; Patient mix (**for SNFs:** acute vs. long term; **for HHAs:** post-hospital, post-SNF, community-referral).

H. Wrap Up

Thank you for taking the time to speak with me today. Before we finish, is there anything that we did not mention that you believe is important for our team to consider or know about your organization's response to the CJR model and its potential impacts?

Do you have any questions for me?

Thank you for your time today. Our discussion was highly informative. If you have any additional comments or concerns, please reach out to us at CJReval@lewin.com.

XIII. Post-Acute Care Providers: Front-line Staff

A. Knowledge and Awareness of CJR

1. To get us started, could you please describe your current role and how long you have been in it?
2. Tell us briefly about when and how you became aware of the CJR model.

PROMPT: For example, did you hear about it from local hospitals, a professional association, your employer, or some other means?

3. In thinking about the CJR model, what aspects of it are you most excited about as [RESPONDENT(S) TITLE(S)] of this facility/agency?

PROBE: Why is that?

4. What aspects of it are you most concerned about as [RESPONDENT(S) TITLE(S)] of this facility/agency?

PROBE: Why is that?

B. Care Redesign/Care Coordination

5. How has [HOSPITAL NAME]'s approach to rehabilitation and physical therapy for LEJR patients changed since CJR? That is, are they doing more or less physical therapy in the hospital before the patient comes to you?
 - a. Has patient mobility or rehabilitation improved since CJR?
 - b. What kind of changes have there been in the use of pain medication and medical equipment, since the beginning of CJR in April, 2016?
6. Do you get different instructions from the hospital or surgeons regarding rehab/physical therapy for LEJR patients than you did before CJR?

PROBES: More frequent physical therapy, weekend physical therapy, functional goals of care, pain medication?

7. Does the hospital contact you about their patients after transfer, or ask you for any updates/reports about their patients' progress? Has this changed at all since the start of the CJR Model?

8. What kinds of changes, if any, have occurred with respect to patient and family education for Medicare LEJR patients?

PROBE: Setting patient expectations for length of PAC care, additional patient and family education

9. Please describe any new or enhanced efforts the hospital is making around PAC referral orders.
 - a. Any new or additional treatment or intervention orders?
 - b. Any recommendations for LOS (visits for HHAs)?

10. Please describe the efforts your facility/agency is making to lower LEJR episode costs while maintaining or improving quality, if any.
 - a. Please describe any new or enhanced efforts your facility/agency is making to improve the admission process for LEJR patients.
 - b. Please describe any new or enhanced efforts your facility/agency is making around patient and family engagement for LEJR patients.
 - c. **IF SNF:**
 - i. How has care redesign affected your facility's LOS?
 - ii. How has care redesign affected your facility's hospital readmissions rate for LEJR patients?
 - iii. Has care redesign affected your facility staffing plan?
 - d. What additional changes does your facility/agency have planned going forward?
11. Has your facility/agency changed the frequency, timing, or duration of physical therapy sessions for LEJR patients? What about the goals of care?
12. **IF SNF:** Have CJR hospitals asked you to change your discharge timing or process?
 - a. Have there been any changes in the goals of physical therapy since CJR? For example, are you now working toward optimal functional recovery before discharge, or functional recovery adequate for discharge to HHA? Are you discharging more of your patients to HHA care rather than home with no HHA?
 - b. Is an expected discharge date set for each patient when they are admitted to your facility, which all therapists are aware of?
 - c. Are you changing the process for discharging LEJR patients to home?

PROBE: For example, interacting more with HHAs? Ensuring durable medical equipment is ordered in time for discharge to home? Doing more education with patients and families prior to discharge?
13. **IF HHA:** has there been a change in the home health and rehab services that LEJR patients need since before CJR?
 - a. Have the services needed by LEJR patients changed since CJR? Such as with respect to pain management, physical therapy, or wound care?
 - b. Have you changed the education you provide to family and other informal caregivers since CJR? If so, how?

C. Early Implementation Experience: Barriers and Facilitators

14. Please tell us about any successes to date with respect to partnerships, or care redesign and care coordination, in response to the CJR model. These care redesign and coordination successes could be on initiatives that the hospital has implemented or ones that your own facility/agency has implemented.
 - a. What has worked well? What resources or skills have made these successes possible?

15. Please tell us about any challenges to date with respect to partnerships, or care redesign and care coordination, in response to the CJR model. The care redesign and coordination challenges could be on initiatives that the hospital is trying to implement or ones that your own facility/agency is trying to implement.
 - a. How has the hospital or your organization responded to these challenges?

D. CJR Model Impacts

16. What impacts has CJR had on Medicare LEJR patients?
 - a. In what ways might CJR improve care?

PROBES: More intensive physical therapy; Varied physical therapy; Access and quality, including care experience and satisfaction; Faster and better mobility and function; Long term recovery and functional status
 - b. In what ways might CJR impact LEJR patients' informal caregivers?
 - c. What would you be concerned about, in terms of possible negative impacts?
 - d. What evidence have you seen of any of these impacts so far?

E. Wrap Up

Thank you for taking the time to speak with me today. Before we finish, is there anything that we did not mention that you believe is important for our team to consider or know about your organization's response to the CJR model and its potential impacts?

Do you have any questions for me?

Thank you for your time today. Our discussion was highly informative. If you have any additional comments or concerns, please reach out to us at CJReval@lewin.com.

Provider Telephone Interview Protocol, Round 1 Script

I. Introduction

My name is (LEAD_INTERVIEWER), from the Lewin Group, along with my colleague (NOTE_TAKER). We want to thank you for joining us today for this 30 minute interview on your hospital's response to the CJR model. Lewin has a contract with the Centers for Medicare & Medicaid Services, or CMS, to conduct an independent evaluation of the Comprehensive Care for Joint Replacement, or CJR, model. The CJR model was announced in July 2015, and began on April 1, 2016. Both the CJR model and our evaluation are funded by CMS with the goals of reducing the costs of lower extremity joint replacements (LEJR), while maintaining or improving the quality of care for Medicare *beneficiaries*.

Were you able to read the verbal informed consent agreement prior to our call today?

If YES:

Do you have any questions about the consent agreement?

Do I have your permission to proceed with the interview?

- **IF YES:** Thank you [PROCEED WITH THE INTERVIEW]
- **IF NO:** We understand. Thank you for your time. [END THE INTERVIEW]

Do I have your consent to record the interview?

- **IF YES:** Thank you [BEGIN RECORDING THE INTERVIEW]
- **IF NO:** We understand [DO NOT RECORD]

If you have any questions that I cannot answer, you may contact Jessica McNeely, PhD at CMS at (410) 786-9751.

If NO:

Verbal Informed Consent

That's fine, we are going to take a minute to read it now:

Our interview is expected to take thirty minutes. Your participation will help us provide CMS with valuable information about how hospitals are responding to the CJR model and its potential impacts. Your participation in today's interview is completely voluntary. At any time, you can skip a question or stop the interview—doing so will not in any way influence your relationship with your employer or CMS.

We would like to audio record this interview to help us as we write up our notes. Both the recording and notes are confidential and will not be shared with your employer, the government, or anyone else outside of our evaluation team. Quotes from this conversation may be used in our reports to CMS, but they will not be directly attributed to you. The recording and notes will be stored on a secured server and upon the conclusion of the evaluation both the recordings and notes will be destroyed.

Do I have your permission to proceed with the interview?

- **IF YES:** Thank you [PROCEED WITH THE INTERVIEW]
- **IF NO:** We understand. Thank you for your time. [END THE INTERVIEW]

Do I have your consent to record the interview?

- **IF YES:** Thank you [BEGIN RECORDING THE INTERVIEW]
- **IF NO:** We understand [DO NOT RECORD]

If you have any questions that I cannot answer, you may contact Jessica McNeely, PhD at CMS at (410) 786-9751.

II. Introduction and Background

1. Please briefly describe your responsibilities in the hospital generally and with CJR more specifically.

- a. How long have you been a **[POSITION TITLE]** at or for this hospital?

2. Approximately how many LEJR surgeries for Medicare beneficiaries does your hospital perform annually?

PROMPT: LEJR surgeries include hip, knee, and ankle replacements

3. From which geographic areas do you draw the majority (or over 75%) of your Medicare LEJR patients?

PROBES: What neighborhoods, towns, or counties? About how far do your patients travel?

4. How would you describe the local market for LEJR surgeries?

- a. Is it consolidated, with one or more dominant hospitals, or is there significant competition?

5. **IF HOSPITAL IS PART OF A SYSTEM:** We understand that your hospital is part of the **[SYSTEM NAME]** system. How does being a part of a system affect your hospital's response to the CJR model, if at all?

PROBES:

- iv. What role does the system play in decisions about whether and how to respond to CJR? Is there a system-wide approach to CJR or are decisions made separately by each system hospital?

- v. Does your system own any PACs or a health plan with a Medicare Advantage product? If so, briefly describe how this ownership affects your response to CJR?

- vi. What resources or supports does the system provide to help your hospital respond to CJR, if any?

6. What other Medicare, Medicaid, or private payer initiatives are you currently involved in that aim to decrease costs while maintaining or improving quality, if any?

- a. Do you think your involvement in any of those initiatives will have an impact on your response to CJR? Why or why not?

PROBES:

- i. Accountable Care Organizations (ACOs)

- ii. Other alternative or value-based payment models

A. Relationships with Orthopedic Surgeons and Post-Acute Care Providers

7. Approximately how many orthopedic surgeons perform LEJR surgeries in your hospital?
 - a. Briefly describe the orthopedic surgeons and/or surgery groups with whom your hospital currently works most closely.
 - b. Does your hospital own any orthopedic surgery groups? If so, which orthopedic surgery groups does your hospital own?
 - c. Does your hospital have contracts with any orthopedic surgery groups? If so, which ones? Are these contracts exclusive – do the surgeons do all their LEJR surgeries in your hospital?
8. How have your relationships with orthopedic surgery groups or surgeons evolved since CJR began, if at all?
 - a. Has your organization developed any gainsharing agreements with orthopedic surgery groups or surgeons?

IF YES: With which orthopedic surgery groups or surgeons? Briefly describe the general features of your gainsharing agreements with them.

IF NO: Why have you not created gainsharing agreements with orthopedic surgery groups or surgeons?
 - b. Do you anticipate any changes in your relationships with orthopedic surgery groups or surgeons next year? If so, please tell me a bit more about what changes you anticipate.
9. Briefly describe the post-acute care providers, or PACs, that your hospital prefers for LEJR patients, such as skilled nursing facilities, inpatient rehabilitation facilities, long-term care hospitals, and home health care agencies.
 - a. Does your hospital own any PACs? If so, which PACs does your hospital own?
10. How have your relationships with PAC providers changed since CJR began, if at all? We're interested in your relationships with skilled nursing facilities, inpatient rehabilitation facilities, long-term care hospitals, and home health care agencies.
 - a. Has your organization developed any gainsharing agreements with PAC providers?

IF YES: Which providers? Briefly describe the general features of your gainsharing agreements with them.

IF NO: Why have you not created gainsharing agreements with PAC providers?
 - b. Do you anticipate any changes in your relationships with PAC providers? If so, please tell me more about what changes you anticipate.

III. Hospital's Responses to CJR

Instructions: Only ask questions 11 and 12 if we do not receive a topics table prior to the interview. If we receive a topics table prior to the interview, skip to questions 13-20, as applicable.

Let's talk about any new or enhanced initiatives your hospital may have underway or planned to respond to CJR.

11. Since April of 2016 when CJR began, what new or enhanced initiatives has your hospital undertaken to reduce the cost of LEJR care for Medicare beneficiaries in the hospital and over the 90-day episode, if any?

IF ANY: How have those initiatives gone to date? What has worked well and what has worked less well?

IF NONE: Why has your hospital not started any new or enhanced initiatives to reduce LEJR cost?

- What are your plans for reducing LEJR costs in the next year, if any?

12. Since April of 2016 when CJR began, what new or enhanced initiatives has your hospital undertaken to maintain or improve quality for Medicare beneficiaries undergoing LEJR care in the hospital and over the 90-day episode, if any?

IF ANY: How have those initiatives gone to date? What has worked well and what has worked less well?

IF NONE: Why has your hospital not started any new or enhanced initiatives to improve LEJR quality?

- What are your plans for maintaining or improving the quality of LEJR in the next year, if any?

Instructions: Prioritize the topics below based on the topics table received prior to the interview (e.g., first ask about any topics the hospital indicates are in progress, followed by those that the hospital indicates are planned, followed by those that the hospital indicates are considered. Ask about topics that the hospital indicates they have not considered last). Discuss as many topics as time allows, deemphasizing Q15 (Care Redesign and Quality Improvement Initiatives).

If the hospital reports that it does not yet have new or enhanced initiatives underway, ask about whether they are planning to implement any new or enhanced activities in these areas over the next year.

A. Care Coordination

13. In response to CJR, what new or enhanced initiatives has your hospital undertaken to improve pre-surgical or post-surgical care for Medicare beneficiaries undergoing LEJR, if any?

PROBE: For example, pre-surgical screenings and interventions to better prepare higher risk patients for surgery, changes in pain management, timing of in-hospital rehabilitation, patient education

14. In response to CJR, what new or enhanced initiatives has your hospital undertaken to improve discharge planning?

PROBE: For example, improved or expanded discharge instructions; Discharge location; Preferred Provider lists; Quality and/or outcomes information on PAC providers; Care coordinators; Medication reconciliation; Family/patient support system engagement

B. Care Redesign and Quality Improvement Initiatives

15. In response to CJR, has your hospital undertaken any new or enhanced LEJR care redesign efforts, in addition to those related to improved care coordination?

PROBES: Processes such as: Lean, Six Sigma, plan-do-study-act cycle (PDSA)? If so, please provide an example of how you're using them to improve LEJR care.

C. Staffing

16. What staffing changes has your hospital made in response to CJR, if any?

PROBE: For example, have you trained more nurses to act as patient educators, added more discharge planners, or added staff to make follow-up calls to patients?

D. Supply Chain Management

17. Since CJR began, what changes has your hospital made to its surgical supply chain management or array of joint prostheses, to reduce cost, if any?

E. Health Information Exchange with PACs

18. What information does the hospital get from PAC providers about its Medicare LEJR patients, if any; conversely, to what extent are the PAC providers able to access the hospital's EHR?

PROBE: For example, does the hospital monitor beneficiaries' length of stay in skilled nursing facilities or work with the post-acute care provider to move patients home as quickly as possible? What about any information from home health agencies (HHAs)?

PROBE: For example, can they view information in the hospital's EHR such as discharge summaries? Are there any similarities or differences among different types of PACs, namely SNFs, IRFs, or HHAs?

F. Data: Cost and Quality

19. Currently, how do you use the LEJR episode data that you receive from CMS? What internal data do you generate to track LEJR episode costs, if any?

a. Based on data that you've seen, how is your hospital doing with respect to Medicare LEJR episode spending?

20. Is your hospital collecting the Patient Reported Outcomes data under CJR?

a. Are you collecting or examining any other data on quality of care for Medicare LEJR patients?

IV. Potential Outcomes and Impacts

We'd like to get your thoughts on the what excites your about the CJR model, and what concerns you about it, in addition to potential impacts of CJR on Medicare beneficiaries, hospitals and associated providers, and local markets.

A. Knowledge and Awareness of CJR

21. In thinking about the CJR model, what aspects of it is your hospital most excited about, if any?

PROBE: Why is that?

22. What aspects of the CJR model is your hospital most concerned about, if any?

PROBE: Why is that?

B. Medicare Beneficiaries, Providers, and the Local Market

23. What impacts might CJR have on the Medicare LEJR patients that your hospital serves, your hospital and associated providers (such as orthopedic surgeons/surgery groups and PAC providers), and your local market (including nearby markets)?

PROBE: access to services; utilization, total costs, quality, vulnerable sub-groups

[NOTE: By a vulnerable sub-group we mean Medicare beneficiaries with relatively low incomes or dually eligible for Medicare and Medicaid, those that do not speak English as their first language; minority patients who have been shown to have poorer outcomes for LEJR.]

IF BOTH POSITIVE AND NEGATIVE IMPACTS ARE NOT MENTIONED ASK ABOUT TYPE OF IMPACT NOT DISCUSSED. FOR EXAMPLE, IF ONLY POSITIVE IMPACTS MENTIONED, ASK ABOUT AREAS OF CONCERN.

C. Wrap-Up

Thank you for taking the time to speak with me today. Before we finish, is there anything that we did not mention that you believe is important for our team to consider or know about your hospital's response to the CJR model and its potential impacts?

Do you have any questions for me?

Thank you again for your time today. Our discussion has been very informative. If you have any additional comments or concerns, please reach out to us at CJReval@lewin.com.

Provider Telephone Interview Protocol, Round 2 Script

I. Introduction

My name is (LEAD_INTERVIEWER), from Abt Associates. Joining me on this call is my colleague (NOTE_TAKER) also from Abt. Abt is working with The Lewin Group, which has a contract with the Centers for Medicare & Medicaid Services, or CMS, to conduct an independent evaluation of the Comprehensive Care for Joint Replacement, or CJR, model.

Were you able to read the informed consent agreement prior to our call today?

If YES:

That's great; did you have any questions about the consent agreement?

Do I have your permission to proceed with the interview?

- **IF YES:** Thank you [Proceed with the interview]
- **IF NO:** We understand. Thank you for your time. [END THE INTERVIEW]

Do I have your consent to record the interview?

- **IF YES:** Thank you [Begin recording the interview]
- **IF NO:** We understand [DO NOT RECORD]

If you have any questions that I cannot answer, you may contact the Project Director, Laura Dummit, at (703) 269-5698 or laura.dummit@lewin.com, or our Evaluation Project Officer at CMS, Jessica McNeely, PhD at (410) 786-9751 or Jessica.McNeely@cms.hhs.gov.

If NO:

Verbal Informed Consent

That's fine we are going to take a minute to read it now:

The Comprehensive Care for Joint Replacement (CJR) model incentivizes hospitals to improve care coordination across an entire 90-day episode of care for lower extremity joint replacement (LEJR). The Centers for Medicare & Medicaid services hired The Lewin Group and Abt Associates to evaluate whether the CJR model is meeting the goals of reducing costs for LEJR episodes of care while maintaining or improving quality. In addition to cost and quality outcomes for Medicare beneficiaries, the evaluation will assess the impacts (both positive and negative) that the CJR model has on participating hospitals and other providers, over the 90-day episode (i.e., orthopedic surgeons and surgery groups, post-acute care providers, physical therapists), including any unintended consequences.

Our interview is expected to take thirty minutes. Your insights will help CMS understand how hospitals are responding to the CJR model, and its potential impacts. Your participation in today's interview is completely voluntary. At any time, you can skip a question or stop the interview—doing so will not in any way influence your relationship with CMS.

Quotes from this conversation may be used in our public reports, but they will not be directly attributed to you.

We would like to audio record this interview to help us write up our notes. The recording and notes may be shared with other members of the evaluation team and with the CMS project officer at CMS.

Do you have any questions about the consent agreement?

Do I have your permission to proceed with the interview?

- **IF YES:** Thank you [Proceed with the interview]
- **IF NO:** We understand. Thank you for your time. [END THE INTERVIEW]

Do I have your consent to record the interview?

- **IF YES:** Thank you [Begin recording the interview]
- **IF NO:** We understand [DO NOT RECORD]

If you have any questions that I cannot answer, you may contact the Project Director, Laura Dummit, at (703) 269-5698 or laura.dummit@lewin.com, or our Evaluation Project Officer at CMS, Jessica McNeely, PhD at (410) 786-9751 or Jessica.McNeely@cms.hhs.gov.

II. Introduction and Background

[Note to interviewer: This information should be collected from the hospital ahead of time in the topics table, which we have asked respondents to complete and return to us prior to the interview. If the information received is complete, please skip this table. If it has not been received, it is incomplete or unclear please use the beginning of the interview to clarify and confirm responses.]

First, we'd like to confirm some information about your hospital:

Is [hospital name] part of a health system	Yes	No		
If yes, how many hospitals in your health system are included in the CJR model?				
Do any hospitals in your system participate in BPCI?	Yes	No		
Are you working on bundles – episode payments - for LEJR patients with private payers?	Yes	No		
Are you involved in other Medicare, Medicaid or private payer initiatives that aim to reduce cost and improve quality (e.g. ACOs, private-payer bundled programs)?	Yes	No		
Does [hospital] or [health system] own any post-acute care facilities?	Yes	No		
If yes, how many?				
What types? (e.g., skilled nursing facilities, inpatient rehabilitation facilities, home health agencies)?				
Has your hospital entered into gainsharing agreements with post-acute care providers?	Yes	No	In Progress	Planned

1. Please briefly describe your responsibilities in the hospital, particularly with respect to the CJR model and developing and maintaining relationships with post-acute care (PAC) providers.

III. Post-Acute Care Partnerships

2. Can you briefly describe the PAC providers (e.g. skilled nursing facilities, inpatient rehabilitation facilities, and home health agencies) with which you work most closely in caring for LEJR patients?
 - a. **IF HOSPITAL OR SYSTEM OWNS PAC PROVIDERS:** About what portion of your Medicare LEJR patients are cared for by hospital or system owned PAC providers?
3. Has your hospital changed the PAC providers to which you refer patients as a result of CJR? If so, how and why did you make the change?
 - a. Do you have a preferred PAC provider list or network for Medicare LEJR patients?
 - b. **IF YES:** How did your hospital decide to work closely with these PAC providers? For example, PAC providers that your hospital or system owns, geographic proximity, performance on cost and quality measures, care coordination, mutual relationships with physicians, other factors?

IV. Gainsharing with PAC Providers

IF HOSPITAL HAS GAINSHARING AGREEMENTS WITH PAC PROVIDERS OR IS CONSIDERING GAINSHARING ARRANGEMENTS WITH PAC PROVIDERS. [IF HOSPITAL DOES NOT HAVE GAINSHARING AGREEMENTS IN PLACE OR IS NOT CONSIDERING THEM SKIP TO Q9.]

4. With which types of PAC providers does your hospital have gainsharing agreements?
For example, SNF, HHA, IRF, or outpatient therapy providers.
PROBE: How did you select these providers for gainsharing?
5. Can you briefly describe the general features of your gainsharing agreements with these PAC providers?
PROBE: Quality measures; cost
6. In general, how well are these gainsharing arrangements working?
 - a. Were/are there any challenges to establishing gainsharing arrangements with PAC providers? If yes, how did you/could you overcome the challenges?
 - b. Do you anticipate making changes to gainsharing arrangements in the future?

IF HOSPITAL DOES NOT HAVE GAINSHARING AGREEMENTS WITH PAC PROVIDERS IN PLACE

7. Why have you not created gainsharing agreements with PAC providers at this time?
 - a. Are there barriers to establishing gainsharing arrangements? If yes, please explain.
 - b. Are you considering developing gainsharing agreements in the future?

Now I'd like to discuss with you care coordination with post-acute care providers.

V. Coordination with Post-Acute Providers

8. What is your current process for coordinating care with post-acute care providers for LEJR patients (e.g. pre-surgical coordination, discharge planning, and post-surgical coordination)?
 - a. Is the process the same for all post-acute care providers? If not, please describe briefly the main differences. PROBE: SNF, IRF, HHA, Outpatient Physical Therapy.
 - b. What is working well?
 - c. Where have you experienced challenges?
9. Are there any aspects of coordinating care with PAC providers that were developed or enhanced because of CJR?
 - a. **IF YES:** Is it just for Medicare LEJR patients in the CJR model, or is this the same for all LEJR patients (regardless of payer)?
 - b. Do you anticipate making any changes to the care coordination process for LEJR patients in the future? If so, please briefly describe them.

Now I'd like to ask you some questions about the type of patient-level and episode data you are collecting, and the information you have access to when other providers also care for your LEJR patients. I'm also interested in hearing how this information is shared.

VI. Data Use and Exchange

10. Since CJR began in April of 2016, have you made any investments or changes in how you share information about Medicare LEJR patients with PAC providers? For example, do you primarily rely on phone and fax or other electronic means (e.g., view-only portals, direct secure messaging, full access to EHR, or special software)?
11. What types of health information/data is most helpful for coordinating care for your Medicare LEJR patients?
 - a. Have you made any changes in the types of information/data that you share about Medicare LEJR patients with PAC providers or the format? If so, how?
12. What, if any, information gaps exist related to coordinating care with PAC providers? For example, do you have the information you need from PAC providers about the cost and quality of care for Medicare LEJR patients over the 90 day episode?
 - a. How do you plan to address these needs in the future, if at all?
13. How do you currently use the LEJR episode data you receive from CMS?
 - a. Do you share the LEJR episode data shared with PAC provider partners? If so, in what format? For example are you sharing summary results, or patient-specific results?

VII. Potential Outcomes and Impacts

We have discussed whether and how relationships with PAC providers have changed since the CJR model began and any new or enhanced efforts you've undertaken to improve care coordination or the use and sharing of cost and quality information with PAC provider partners.

14. How have these activities with PAC providers affected Medicare beneficiaries undergoing LEJR surgical procedures? Please explain.

PROBES: Access to these procedures, quality of care, including their care experience and functioning.

15. How have these activities with PAC providers affected your hospital's financial performance under CJR?
16. To date, to what do you attribute your hospital's success/challenges with the CJR model?

VIII. Wrap-Up

Thank you for taking the time to speak with me today. Before we finish, is there anything that we did not mention that you believe is important for our team to consider or know about how CJR is changing your relationships and how you work with post-acute care providers for Medicare LEJR patients?

Do you have any questions for me?

Thank you again for your time today. Our discussion has been very informative. If you have any additional comments or concerns, please get in touch. You can reach me at the same email address used to schedule this discussion. If you do not have that information handy, I can give it to you now.

Appendix E: Outcome Definitions

Exhibit E-1: Claims-based Outcome Definitions

Measure Category	Outcome Name	Definition	Measurement Period(s)	Eligible Sample ^a
Medicare Payments	Total Medicare standardized allowed amounts per episode ^b	The sum of Medicare payment and beneficiary out-of-pocket amounts for related items and services covered by Medicare Part A & Part B ^c performed during the acute inpatient hospitalization (anchor stay) through the 90-day post-discharge period that are included in the episode.	Inpatient anchor stay through 90-day post-discharge period	Beneficiaries who: 1) have a complete FFS enrollment history six months prior to the anchor stay; 2) have consistent, reliable sex and age data (age <115); 3) maintain Parts A and B enrollment throughout the measurement period; 4) have a measurement period that ends on or before December 31, 2016; 5) have non-zero anchor hospitalization payments and Part B payments included in the episode.
	Medicare Part A standardized allowed amounts per episode, by service	The sum of Medicare payment and beneficiary out-of-pocket amounts for readmissions, SNF, IRF, and LTCH services covered under Medicare Part A.	90-day post-discharge period	Beneficiaries who: 1) have a complete FFS enrollment history six months prior to the anchor stay; 2) have consistent, reliable sex and age data (age <115); 3) maintain Parts A and B enrollment throughout the measurement period; 4) have a measurement period that ends on or before December 31, 2016; 5) have non-zero anchor hospitalization payments and total Part A and Part B payments.
	Medicare standardized allowed amounts for HHA services per episode	The sum of Medicare payment and beneficiary out-of-pocket amounts for HHA services covered under Medicare Part A or Part B HHA.	90-day post-discharge period	Beneficiaries who: 1) have a complete FFS enrollment history six months prior to the anchor stay; 2) have consistent, reliable sex and age data (age <115); 3) maintain Parts A and B enrollment throughout the measurement period; 4) have a measurement period that ends on or before December 31, 2016; 5) have non-zero anchor hospitalization payments and total Part A and Part B payments.
Medicare Payments	Medicare Part B standardized allowed amounts per episode	The sum of Medicare payment and beneficiary out-of-pocket amounts for related items and services covered under Medicare Part B (except HHA services) including physician evaluation and management services, outpatient therapy services (speech, occupation, and physical therapy), imaging and lab services, procedures, DME, all other non-institutional services, and other institutional services.	90-day post-discharge period	Beneficiaries who: 1) have a complete FFS enrollment history six months prior to the anchor stay; 2) have consistent, reliable sex and age data (age <115); 3) maintain Parts A and B enrollment throughout the measurement period; 4) have a measurement period that ends on or before December 31, 2016; 5) have non-zero anchor hospitalization payments and total Part A and Part B payments.

Measure Category	Outcome Name	Definition	Measurement Period(s)	Eligible Sample ^a
Utilization	First discharge to IRF	The percent of all episodes with beneficiaries initially discharged to an IRF. The first PAC setting is an IRF (a freestanding facility or a distinct unit within an acute hospital) if admission to the IRF occurred within the first five days of hospital discharge and no other PAC use occurred prior to IRF admission. If the beneficiary is directly transferred to another ACH after the anchor stay, then the first PAC setting was defined within five days of the transfer discharge.	1 st to 5 th day after discharge from the anchor/transfer hospitalization	Beneficiaries who: 1) have a complete FFS enrollment history six months prior to the anchor stay; 2) have consistent, reliable sex and age data (age <115); 3) maintain Parts A and B enrollment throughout the measurement period; 4) have a measurement period that ends on or before December 31, 2016.
	First discharge to SNF	The percent of all episodes with beneficiaries initially discharged to a SNF. The first PAC setting is a SNF if admission to the SNF occurred within the first five days of hospital discharge and no other PAC use occurred prior to SNF admission. If the beneficiary is directly transferred to another ACH after the anchor stay, then the first PAC setting was defined within five days of the transfer discharge.	1 st to 5 th day after discharge from the anchor/transfer hospitalization	Beneficiaries who: 1) have a complete FFS enrollment history six months prior to the anchor stay; 2) have consistent, reliable sex and age data (age <115); 3) maintain Parts A and B enrollment throughout the measurement period; 4) have a measurement period that ends on or before December 31, 2016.
	First discharge to HHA	The percent of all episodes with beneficiaries initially discharged to a HHA. The first PAC setting is a HHA if admission to the HHA occurred within 14 days of hospital discharge and no other PAC use occurred prior to HHA admission. If the beneficiary is directly transferred to another ACH after the anchor stay, then the first PAC setting was defined within 14 days of the transfer discharge.	1 st to 14 th day after discharge from the anchor/transfer hospitalization	Beneficiaries who: 1) have a complete FFS enrollment history six months prior to the anchor stay; 2) have consistent, reliable sex and age data (age <115); 3) maintain Parts A and B enrollment throughout the measurement period; 4) have a measurement period that ends on or before December 31, 2016.
	Number of IRF days	The average number of IRF days of care during the 90-days post-discharge period. The outcome is limited to patients who had at least one IRF day during this period.	90-day post-discharge period	Beneficiaries who: 1) have a complete FFS enrollment history six months prior to the anchor stay; 2) have consistent, reliable sex and age data (age <115); 3) maintain Parts A and B enrollment throughout the measurement period; 4) have a measurement period that ends on or before December 31, 2016.
	Number of SNF days	The average number of SNF days of care during the 90-day post-discharge period. The outcome is limited to patients who had at least one SNF day during this period.	90-day post-discharge period	Beneficiaries who: 1) have a complete FFS enrollment history six months prior to the anchor stay; 2) have consistent, reliable sex and age data (age <115); 3) maintain Parts A and B enrollment throughout the measurement period; 4) have a measurement period that ends on or before December 31, 2016.

Measure Category	Outcome Name	Definition	Measurement Period(s)	Eligible Sample ^a
Utilization	Number of HHA visits	The average number of HHA visits during the 90-day post-discharge period. The outcome is limited to patients who had at least one HHA visit during this period.	90-day post-discharge period	Beneficiaries who: 1) have a complete FFS enrollment history six months prior to the anchor stay; 2) have consistent, reliable sex and age data (age <115); 3) maintain Parts A and B enrollment throughout the measurement period; 4) have a measurement period that ends on or before December 31, 2016.
	Anchor length of stay (LOS)	The number of days between the admission date and the discharge date for the LEJR anchor stay. Anchor LOS is winsorized by MS-DRG and quarter at the 1 st and 99 th percentiles.	Acute anchor stay	Beneficiaries who: 1) have a complete FFS enrollment history six months prior to the anchor stay; 2) have consistent, reliable sex and age data (age <115); 3) maintain Parts A and B enrollment throughout the measurement period; 4) have a measurement period that ends on or before October 2, 2016.
Quality	Unplanned readmission rate	The proportion of episodes with one or more unplanned readmissions for any eligible condition. This measure was based on specifications for the NQF-endorsed all-cause unplanned readmission measure (NQF measure 1789). Following these specifications, we excluded planned admissions, based on AHRQ Clinical Classification System Procedure and Diagnoses codes.	90-day post-discharge period	Beneficiaries who: 1) have a complete FFS enrollment history six months prior to the anchor stay; 2) have consistent, reliable sex and age data (age <115); 3) maintain Parts A and B enrollment throughout the measurement period; 4) have a measurement period that ends on or before December 31, 2016; 5) are discharged from the anchor hospital stay in accordance with medical advice.
	Emergency department visit rate	The proportion of episodes with one or more ED visits during the 90-day post-discharge period for which the beneficiary required medical treatment but was not admitted to the hospital. Eligible ED visits are outpatient claims with a code indicating the beneficiary used the emergency department but was not admitted to the hospital.	90-day post-discharge period	Beneficiaries who: 1) have a complete FFS enrollment history six months prior to the anchor stay; 2) have consistent, reliable sex and age data (age <115); 3) maintain Parts A and B enrollment throughout the measurement period; 4) have a measurement period that ends on or before December 31, 2016; 5) are discharged from the anchor hospital stay in accordance with medical advice.
	All-cause mortality rate	Death from any cause during the anchor hospitalization or 90-day post-discharge period. For beneficiaries with multiple LEJR hospitalizations during the baseline and intervention periods, one hospitalization was randomly selected across the baseline and intervention periods for inclusion in this measure.	Anchor stay and 90-day post-discharge period	Under CJR, death during the anchor stay or 90-day PDP cancels the episode. Therefore, this analysis includes CJR and comparison group episodes as well as beneficiaries at CJR and comparison group hospitals that would have been identified as episodes if the beneficiaries had not died during the episode of care. Beneficiaries who: 1) have a complete FFS enrollment history six months prior to the anchor stay; 2) have consistent, reliable sex and age data (age <115); 3) maintain Parts A and B enrollment throughout the measurement period; 4) have not received hospice care in the six months prior to admission; 5) have a measurement period that ends on or before December 31, 2016; 6) are discharged from the anchor hospital stay in accordance with medical advice.

Measure Category	Outcome Name	Definition	Measurement Period(s)	Eligible Sample ^a
Quality	Incidence of any complications	<p>The proportion of elective episodes with incidence (during the anchor stay or a readmission) of: acute myocardial infarction (AMI), pneumonia, or sepsis/septicemia within the 7-day PDP; or surgical site bleeding or pulmonary embolism within the 30-day PDP; or mechanical complications, periprosthetic joint infection, or wound infection within the 90-day PDP.</p> <p>This measure was based on specifications for the NQF-endorsed THA/TKA complications measure (NQF measure 1550). Death in the 30 days after discharge is part of the technical definition, but is not included in our analysis because beneficiaries who died during the anchor stay or in the 90-day PDP are excluded from CJR.</p>	90-day post-discharge period	Beneficiaries who: 1) have an elective procedure (non-fracture); 2) have a complete FFS enrollment history six months prior to the anchor stay; 3) have consistent, reliable sex and age data (age <115); 4) maintain Parts A and B enrollment throughout the measurement period; 5) have a measurement period that ends on or before December 31, 2016; 6) are discharged from the anchor hospital stay in accordance with medical advice.

^a The eligible sample column notes the inclusion criteria for episodes as defined by the Final Rule and additional measure-specific inclusion criteria required for the evaluation.

^b Standardized payments remove wage adjustments and other Medicare payment adjustments (e.g., GME, IME, and DSH). Allowed amounts include beneficiary cost sharing.

^c Episode-related items and services paid under Medicare Part A or Part B, after exclusions are applied, include: physician services; inpatient hospital services (including readmissions with certain exceptions discussed in the Final Rule); inpatient psychiatric facility (IPF) services; LTCH services; IRF services; SNF services; HHA services; hospital outpatient services; outpatient therapy services; clinical laboratory services; DME; Part B drugs; and hospice.

Exhibit E-2: Assessment-based Quality Outcome Definitions

First PAC Setting	Outcome Name	Definition	Measurement Period(s)	Eligible Sample ^a
HHA	Improved ambulation/locomotion	Percent of patients who improve status in ambulation/locomotion over the measurement period (i.e., change in performance score that was negative).	From start or resumption of HHA care to HHA discharge, if HHA discharge is within 90 days of hospital discharge. Else, from start or resumption of HHA care to the 60-day recertification assessment.	Beneficiaries whose first PAC setting is HHA who: 1) have a complete FFS enrollment history six months prior to the anchor stay; 2) have consistent, reliable sex and age data (age<115); 3) maintain Parts A and B enrollment throughout the measurement period; 4) had a valid start or resumption of care assessment and at least one follow-up OASIS assessment within 90 days of hospital discharge; 5) were not transferred from HHA care to an inpatient facility during the HHA episode or at discharge; 6) could not perform the ADL independently (had pain) at start or resumption of care; 7) had no missing data used to calculate the performance score.
	Improved bed transferring	Percent of patients who improve status in bed transferring over the measurement period (i.e., change in performance score that was negative).		
	Improved lower body dressing	Percent of patients who improve status in lower body dressing over the measurement period (i.e., change in performance score that was negative).		
	Reduced pain	Percent of patients whose frequency of pain when moving around reduced.		
SNF	Improved transfer, locomotion on unit, and walking in corridor	Percent of patients whose cumulative status in transfer, locomotion on unit, and walk in corridor improved over the measurement period (i.e., change in performance score that was negative).	SNF admission to SNF discharge, if SNF discharge is within 90 days of hospital discharge. Else, from SNF admission to the most recent MDS PPS assessment within 90 days of hospital discharge.	Beneficiaries whose first PAC setting is a SNF who: 1) have a complete FFS enrollment history six months prior to the anchor stay; 2) have consistent, reliable sex and age data (age<115); 3) maintain Parts A and B enrollment throughout the measurement period; 4) had a valid 5-day MDS assessment and at least one follow-up MDS assessment within 90 days of hospital discharge; 5) were not indicated as comatose, whose life expectancy was greater than six months, and were not in hospice as of the 5-day MDS assessment; 6) were not independent in all three ADLs (for the first measure) and dressing (for the second measure) at the 5-day MDS assessment; 7) had no missing data used to calculate the performance score.
	Improved dressing	Percent of patients with improved status in dressing over the measurement period (i.e., change in performance score that was negative).		
	Self-reported pain	Percent of patients who self-report moderate to severe pain in the first five days of their SNF stay. Unlike the other ADL outcomes, a negative DiD estimate indicates quality improvement over time, relative to control group patients.	Measured once within five days of SNF admission.	

First PAC Setting	Outcome Name	Definition	Measurement Period(s)	Eligible Sample ^a
IRF	Average change in mobility score	Average change in a composite mobility score over the measurement period. The composite score ranges from 4 (worst) to 28 (best).	From IRF admission to IRF discharge	Beneficiaries whose first PAC setting is an IRF who: 1) have a complete FFS enrollment history six months prior to the anchor stay; 2) have consistent, reliable sex and age data (age<115); 3) maintain Parts A and B enrollment throughout the measurement period; 4) had a valid IRF-PAI assessment with discharge at or before 90 days after hospital discharge; 5) were not diagnosed with the following conditions on the IRF-PAI assessment: coma, persistent vegetative state, complete tetraplegia, locked-in syndrome, severe anoxic brain damage, cerebral edema, or compression of brain; 6) were not independent in mobility (for the first measure) and lower body dressing (for the second measure) at the time of admission; 7) had a length of stay longer than three days; 8) were not discharged from the IRF against medical advice; 9) had no missing data used to calculate the performance score.
	Average change in lower body dressing	Average change in lower body dressing status over the measurement period. The values range from 1 (total assistance) to 7 (complete independence).		

^a The eligible sample column notes the inclusion criteria for episodes as defined by the Final Rule and additional measure-specific inclusion criteria required for the evaluation.

Appendix F: Additional Variable Definitions

Exhibit F-1: Market Characteristic Variable Definitions

Variable	Definition	Source
% Age 65 years and older	% of total population age 65 years and older in a given MSA	2014 American Community Survey (ACS) 5-Year Estimates
Herfindahl-Hirschman Index	Sum of the squared LEJR market shares of all ACH providers (CJR and control group), multiplied by 10,000. The HHI values can range from 0 (large number of firms in the market) to 10,000 (a single firm controls the market). Values between 1,500 and 2,500 indicate moderately concentrated markets and values greater than 2,500 are considered highly concentrated.	2012-2014 Medicare Claims
IRF discharges per 10,000 residents	Number of inpatient rehabilitation facility discharges per 10,000 residents in a given MSA	FY 2014 CMS IRF PPS Final Rule data for IRF discharges and 2014 ACS 5-Year Estimates for population
Median household income	Median household income in a given MSA	2014 ACS 5-Year Estimates
Medicare Advantage penetration	% of Medicare beneficiaries enrolled in Medicare Advantage in a given MSA	2012-2014 MA penetration (3-year average) from 2015-2016 AHRF county-level data (aggregated to MSA level)
Population	Census population estimates for a given MSA	2014 American Community Survey (5-Year Estimates)
SNF beds per 10,000 residents	Number of skilled nursing facility beds per 10,000 residents in a given MSA	2012-2014 SNF beds (3-year average) from 2015-2016 AHRF county-level data (aggregated to MSA level) and 2014 ACS 5-Year Estimates for population
Specialists per 10,000 residents	Number of specialists per 10,000 residents in a given MSA	2014 Specialist counts from 2015-2016 AHRF county-level data (aggregated to MSA level) and 2014 ACS 5-Year Estimates for population

Exhibit F-2: Hospital Characteristic Variable Definitions

Variable	Definition	Source
Bed count	Number of beds	FY 2016 CMS Annual IPPS Final Rule data (based on FY2012-2013 cost report data)
Chain	Whether the hospital is part of a chain of providers	December 2014 CMS PECOS
Disproportionate share (DSH) patient percentage	The sum of the percentage of Medicare inpatient days attributable to patients eligible for both Medicare Part A and Supplemental Security Income (SSI), and the percentage of total inpatient days attributable to patients eligible for Medicaid but not Medicare Part A.	FY 2016 CMS Annual IPPS Final Rule data (based on FY2012-2013 cost report and Social Security Administration data)
Hospital LEJR discharges as a percent of total discharges	Percent of the hospital’s total discharges that were LEJR discharges	January 2012 - December 2014 Medicare Claims
Hospital LEJR share in the market	Percent of LEJR in a given MSA that were performed at the hospital	January 2012 - December 2014 Medicare Claims
Medical residents per 1,000 beds	Number of medical residents assigned per 1,000 beds	FY 2016 CMS Annual IPPS Final Rule data (based on FY2012-2013 cost report)
Medicare share of days	Medicare days as a percent of total inpatient days	FY 2016 CMS Annual IPPS Final Rule data (based on FY2012-2013 cost report)
Occupancy rate	Average daily census divided by the total bed count	FY 2016 CMS Annual IPPS Final Rule data (based on FY2012-2013 cost report)
Ownership	Ownership type of a provider (i.e., for-profit, not-for-profit, government)	December 2016 CMS POS file
Region (Census division)	Location of hospital among nine Census Divisions	December 2016 CMS POS file
Teaching hospital	Hospital has any affiliation with a medical school	December 2016 CMS POS file
Total hospital LEJR episodes	Total number of LEJR episodes initiated at the hospital meeting CJR eligibility criteria	January 2012 - December 2014 Medicare Claims

Exhibit F-3: Patient Characteristic Variable Definitions

Variable	Definition	Source
Age	Percent of patients by age category; 20 to 64, 65 to 79, 80 and above	January 2012 - December 2014 Medicare Enrollment Database
Disability, not due to ESRD	Percent disabled, based on Medicare eligibility status (not including ESRD)	January 2012 - December 2014 Medicare Enrollment Database
MS-DRG 469	Percent of patients discharged under MS-DRG 469 (major joint replacement or reattachment of lower extremity with major complication or comorbidity)	January 2012 - December 2014 Medicare Claims
Eligible for Medicaid	Percent eligible for Medicaid based on Medicare enrollment file	January 2012 - December 2014 Medicare Enrollment Database
Fracture status	Percent of patients with fractures	January 2012 - December 2014 Medicare Claims
Sex	Percent of female patients	January 2012 - December 2014 Medicare Enrollment Database
HCC score	Average CMS-HCC score that corresponds to the HCCs present during the one year prior to the anchor hospitalization	January 2011 - December 2014 Medicare Claims
Prior utilization- HH use	Percent of patients with one or more instances of home health use during the six months prior to anchor hospitalization	July 2011 – December 2014 Medicare Claims
Prior utilization- inpatient acute care hospitalization	Percent of patients with one or more inpatient acute care hospitalization during the six months prior to anchor hospitalization	July 2011 – December 2014 Medicare Claims
Prior utilization- IRF stay	Percent of patients with one or more inpatient rehabilitation facility stay during the six months prior to anchor hospitalization	July 2011 – December 2014 Medicare Claims
Prior utilization- no institutional stay	Percent of patients with no institutional use (inpatient, skilled nursing facility, inpatient rehabilitation or long-term care hospital) during the six months prior to anchor hospitalization	July 2011 – December 2014 Medicare Claims
Prior utilization- SNF stay	Percent of patients with one or more skilled nursing facility stay during the six months prior to anchor hospitalization	July 2011 – December 2014 Medicare Claims
Race/ethnicity	Percent of patients by race/ethnicity: White, Black, Hispanic, Other Race, Unknown	January 2012 - December 2014 Medicare Enrollment Database

Appendix G: Hospital Case Studies

This section includes nine case studies that describe, in detail, start-up and implementation experiences for hospitals that participated in site visits. Exhibit G-1 provides a guide to this section and details the case study number, topic and hospital characteristics.

After each site visit, the evaluation team reviewed the qualitative data that was collected and identified an interesting or illustrative topic to explore in greater detail and prepared a case study to highlight the hospital's experience with the topic. Most topics involved a strategy that had been initiated by the hospital as a response to CJR, such as the development of a preferred PAC provider list. As appropriate, additional research, such as interviews, examination of MSA-level socioeconomic characteristics, and review of relevant literature, was used to supplement the site visit data for the case studies.

Exhibit G-1: Case Study Number, Topic and Hospital Characteristics

Case Study	Topic	Hospital Characteristics		
		Bed Count ^a CJR Average: 263	# of LEJR ^b Discharges CJR Average: 190	LEJR discharges as a % of total Medicare discharges ^b CJR Average: 7.4%
I	Gainsharing	310	338	10.1%
II	Challenges with Administrative Turnover	367	378	4.0%
III	Preferred Provider Lists	651	688	8.5%
IV	Patient Education	475	113	2.5%
V	Prior experience with Bundles	75	1,291	66.9%
VI	Lean Methodology	335	228	6.2%
VII	Increasing Collaboration - Surgeon engagement in care redesign	310	41	1.7%
VIII	Discharge Planning	37	89	31.4%
IX	Surgical Supply Chain management	649	363	3.9%

Sources: ^a FY 2016 CMS Annual IPPS Final Rule data (based on FY2012-2013 cost report data)

^b Lewin's analysis of Medicare claims and enrollment data for episodes initiated in 2012 through 2014 that ended between Q2 2012 and Q1 2015 (baseline).

I. Hospital A Case Study – Gainsharing

A. Background

Hospital A is a government-owned safety-net hospital that is part of a small health system. Hospital A has more than 300 beds, compared to the CJR average of 263. In 2015, Hospital A had a higher number of LEJR discharges for Medicare beneficiaries and a higher percentage of lower extremity joint replacement (LEJR) discharges out of total discharges for Medicare beneficiaries compared to the average for all CJR hospitals (338 vs. 190 discharges, 10.1% vs. 7.4%).

Exhibit G-2: Hospital A Characteristics Compared to Average for all CJR Hospitals

	Bed Count	# of LEJR Discharges	LEJR discharges as a % of total Medicare discharges
Hospital A	310	338	10.1%
CJR Hospital Average	263	190	7.4%

Hospital A has a highly regarded orthopedic surgery program and over the past ten years, redesigned their surgical service lines, including their orthopedic service line, to earn and maintain a Joint Commission certification. These efforts involved the cooperation of the hospital's administrators, staff, surgeons and other physicians who work there. Interviewees noted these efforts led to an organizational culture that promoted constant improvement and incorporation of the latest evidence-based practices into their joint replacement program. As a result, hospital and joint replacement program administrators did not feel the need to make significant changes to their pre- and peri-operative practices when CJR was implemented.

B. Topic

This case study examines Hospital A's experience with gainsharing under the CJR model. This topic was chosen because it was one of the key activities interviewees discussed in response to CJR and the efficacy of gainsharing and any unforeseen consequences stemming from it are important components of the CJR model evaluation. Information for this case study was collected through a site visit during the second year of the CJR model.

C. Implementation

Under the CJR model, hospitals and their partners, including orthopedic surgeons, can participate in a gainsharing agreement to share any savings (upside risk) accrued resulting from a hospital reducing total episode spending below its target price on LEJR procedures covered by DRGs 469 and 470¹. Gainsharing agreements can also include downside risk - any money that the hospital must repay to CMS as a result of total episode payments above its target price. Stop-gain and stop-loss amounts included in the model design place limits on the amount of money hospitals (and any providers they are gainsharing with) can earn or be required to repay. Post-acute care

¹ DRG 469 is major joint replacement or reattachment of lower extremity with major complication; DRG 470 is major joint replacement or reattachment of lower extremity without major complication.

providers and non-surgical physicians are also eligible to participate in gainsharing; however, Hospital A has not expressed any interest in engaging in such agreements with any group other than surgeons.

Orthopedic surgeons practicing at Hospital A approached administrators with a request to establish gainsharing agreements. The hospital's parent system worked with surgeons to establish four quality metrics that would be used to determine a physician's eligibility to receive gainsharing payments: blood utilization or transfusions, bleeding incidence, volume of patients with deep vein thrombosis, and volume of patients with surgical site infections. If participating physicians meet set thresholds for these quality metrics, they will share in any gains the hospital may receive from reconciliation payments. Interviewees explained that these four quality metrics were chosen because they were areas in which the hospital had room for improvement. Hospital A hired a third-party consulting firm to review the hospital's clinical quality data and gauge whether the hospital's orthopedic surgeons qualified for payments.

All of Hospital A's associated orthopedic surgeons are eligible to participate in gainsharing. At the time of our site visit, three surgeons had just fully executed contracts to participate in gainsharing, with five more expected to participate in the coming year. The hospital had not yet executed contracts with the three surgeons from the group practice that performs the highest volume of the LEJR surgeries at the hospital. Hospital administrators noted that surgeons participating in gainsharing also have gainsharing contracts with other area CJR hospitals, raising two concerns, that:

- 1) Administrators will be pressured to continue revising agreements to be more favorable to surgeons, and,
- 2) Surgeons will be encouraged to direct their healthiest patients to the hospital or hospital system with the most favorable gainsharing contract.

As a result, hospital administrators felt that they could not incentivize surgeons to share in downside risk under the model, and instead had to create a gainsharing agreement that only included upside risk for surgeons. Despite these concerns, both administrators and orthopedic surgeons are hoping that gainsharing agreements will improve collaboration and care quality while further decreasing costs at Hospital A.

D. Challenges

While Hospital A earned a reconciliation payment and met the stop-gain threshold during the first year of the CJR model, both administrators and surgeons expressed skepticism that Hospital A would continue qualifying for a reconciliation payment as the model continued due to having an already streamlined joint replacement program with little opportunity for additional efficiencies. Due to Hospital A's cost-cutting and quality improvement initiatives implemented to earn and maintain a Joint Commission certification over the past ten years, they now have the lowest average LEJR episode payment relative to other hospitals in the area. Hospital A's administrators are concerned that gainsharing could result in reduced profit as the hospital has

little room for further improvement, and the anticipated gains in cost reduction and quality improvement would not offset the share of profits that would be lost to surgeons through gainsharing agreements. One administrator explained the concern by stating, “I don’t like the idea of losing some of my profits for uncertain improvements in quality when we already have high quality.” There was also concern that gainsharing would incentivize surgeons and administrators to select lower-quality implants or to inappropriately discharge patients to home who otherwise would have been discharged to a SNF.

Hospital A’s administrators felt pressure to gainshare with their associated orthopedic surgeons. They noted that their associated orthopedic surgeons had gainsharing agreements with other area hospitals, creating a difficult situation for Hospital A’s administration. Administrators indicated that physicians with multiple established gainsharing agreements have an incentive to engage in patient steering, directing healthier patients to hospitals with more generous gainsharing agreements and leaving sicker patients to hospitals that have less favorable or no agreements. In addition, administrators feel incapable of establishing any downside risk component. Surgeons also expressed concern that financial incentives could lead to adverse patient selection practices or rejecting less healthy patients for surgery.

E. Results

During the first year of the CJR model, both administrators and orthopedic surgeons reported no change in their collaborations; however, both groups hope for a long-term improvement as a result of the model.

Hospital A earned a reconciliation payment during the first year of the CJR model and a portion of the payment will be distributed to associated orthopedic surgeons with whom Hospital A has a gainsharing agreement. During the first year of the model, Hospital A made no additional modifications or changes to its orthopedic service line to earn this payment, but noted that opportunities were identified to reduce the length of stay in skilled nursing facilities (SNF) and to examine patient discharge locations in the future.

F. Summary

Approximately one-third of the hospital interviewed during year one site visits reported gainsharing with orthopedic surgeons. Several of these hospitals said the decision to gain share was due to surgeon interest or the hospital’s interest in modifying provider behaviors, such as increasing engagement in care redesign strategies, or encouraging visiting patients in SNFs. Hospitals who were not gainsharing identified low patient volume, direct employment of surgeons and administrative burden as the main reasons for not entering gainsharing agreements. In contrast to other hospitals visited, Hospital A’s administration was reluctant to enter into a gainsharing agreement due to the limited value they felt it offered to the hospital, who had successfully developed a collaborative relationship with its surgeons prior to onset of the CJR model. Hospitals who, like Hospital A already have collaborative relationships with surgeons prior to CJR, may not find value in a gainsharing agreement.

II. Hospital B Case Study – Challenges with Administrative Turnover

A. Background

Hospital B is a not-for-profit hospital and is not a member of a health system. The hospital operates independently, although it is part of an alliance of hospitals in the southeast United States that functions as a group purchasing organization. The hospital's patient population was described as predominantly white, with some Hispanic representation. Medicare is the primary payer for roughly 70 percent of the hospital's patient population. Hospital B has more than 350 beds, compared to the CJR average of 263. In 2015, Hospital B had a much higher number of lower extremity joint replacement (LEJR) discharges for Medicare beneficiaries, but a lower percentage of LEJR discharges out of total discharges for Medicare beneficiaries compared to the average for all CJR hospitals (378 vs. 190 discharges, 4.0% vs. 7.4%).

Exhibit G-3: Hospital B Characteristics Compared to Average for all CJR Hospitals

	Bed Count	# of LEJR Discharges	LEJR discharges as a % of total Medicare discharges
Hospital B	367	378	4.0%
CJR Hospital Average	263	190	7.4%

B. Topic

This case study examines the impact of leadership turnover and fragmented data management practices that affected Hospital B during the first year of the CJR model, as well as the steps enacted to overcome them. This topic was chosen to understand how internal factors can affect an institution's ability to respond to the model and redesign care. Information from this case study was collected through a site visit during the second year of the CJR model.

C. Implementation

When the model was announced, Hospital B's Chief Medical Officer (CMO) led the hospital's response, assisted by the Executive Director of Care Coordination. They worked closely together, analyzing post-acute care (PAC) utilization. The CMO also led the effort to create the preferred provider list for PAC organizations, which involved six skilled nursing facilities (SNFs) and five home health agencies (HHAs). Hospital B's CMO considered patient discharge location, physician preference, and Medicare star ratings when creating the preferred provider list. The hospital also hired a CJR Coordinator from a HHA in the community to coordinate pre-operative education and follow-up with patients after discharge during the 90-day episode.

Hospital B experienced several challenges due to leadership turnover at the onset of the CJR model. Both the CMO and the Executive Director responsible for spearheading the response to the CJR model left the hospital shortly after the model was implemented. According to interviewees, the CJR Coordinator, hired when the model began, stayed with the hospital for only three months, leaving a leadership and knowledge vacuum within the hospital. The hospital

directed two quality managers to take the reins on coordinating the hospital's response to the model. They were then responsible for collecting patient reported outcomes (PRO) data, requesting and verifying access to the CMS portal, submitting timely reports to CMS, and tracking patient discharge location. Unfortunately, the transition was not seamless because the hospital had difficulty replacing the CJR Coordinator position and the quality managers had to add these new responsibilities to their existing workload.

Interviewees noted problems collecting and organizing PRO data contained in the hospital's electronic medical record (EMR), hindering the hospital's ability to easily identify and respond to concerns in the hospital. Interviewees explained that the hospital's EMR is fragmented between different departments in the hospital, creating significant challenges for interdepartmental data sharing. As a result, the hospital is unable to measure utilization across the entire hospital with their current system. The quality managers also described challenges with obtaining CMS data. They rely on a third-party consulting firm to interpret CMS provided data, and there is a significant lag between data submission and the receipt of results. Although respondents described an attempt to track patient discharge location and progress through a spreadsheet, they noted that the information was often inaccurate because it is difficult to constantly update manually.

Many interviewees, including orthopedic surgeons working with the hospital, expressed frustration at the current CJR response by Hospital B. One physician interviewee saw himself as a champion and cheerleader for the CJR program, but was disheartened over the perceived lack of response to the CJR model. The most commonly cited issue, by both hospital administrators and surgeons, was that the hospital did not have sufficient infrastructure to collect and analyze the data they needed to fully participate in the model. Specifically, hospital administrators felt that without the ability to track surgeon and post-acute care cost, quality and utilization, they could not identify areas for improvement and hold providers accountable. In addition, the surgeons practicing at the hospital were very interested in seeing these data on their individual performance and were disappointed that the hospital did not currently have the capacity to provide them.

D. Challenges

Hospital B felt that their struggles with administrative turnover and data management significantly hindered their ability to effectively respond to many aspects of the model. They felt particularly challenged as a stand-alone hospital, and noted that administrators are responsible for implementing and maintaining gainsharing agreements, vendor contracts, and agreements with PAC providers without the resources and economies of scale that come with being part of a larger organization. Still, the hospital is optimistic that they will overcome early administrative challenges, hire a new CJR Coordinator and address the limitations in their current data collection and analysis capabilities.

E. Results

Hospital B identified several priorities needed to resolve the challenges presented by administration turnover and fragmented data management practices that impacted its response during the first year of the CJR model. The hospital recently hired a new CMO to provide a strategic response to current and upcoming initiatives, including the CJR model. The new CMO identified data management as a problem preventing the administrators from implementing responses to the CJR model. As a result, Hospital B plans to deploy a new EMR system across all units of the hospital, which was forecasted to be fully implemented in the latter half of 2017. Interviewees were hopeful that the new EMR system will allow the hospital to accurately identify areas of opportunity in their response to the CJR model. Interviewees plan to implement physician report cards that will include metrics such as cost, PAC utilization, discharge location, and readmissions to improve accountability. Interviewees also plan to implement report cards for preferred PAC providers to provide performance feedback. Hospital B is also working to gain access to a patient discharge tracking system that will automatically update the hospital on patient discharge location and progress, which would be a needed improvement over the current spreadsheet-based system.

F. Summary

Interviewed hospitals often discussed the various administrative responsibilities entailed by the CJR model, either by the model directly or as a result of related care redesign activities. At many hospitals, these additional responsibilities motivated the hiring of new staff, or the redistribution of workload with existing staff. In this context, Hospital B's early struggles with data and patient tracking are certainly not unique. However, turnover in several key hospital leadership positions hampered the Hospital B's ability to address these responsibilities, and to respond to the model more generally. This case study highlights the challenges faced under the CJR model by hospitals that may lack the resources, experience, or staff to fully engage with the CJR model.

III. Hospital C Case Study – Preferred Provider List

A. Background

Hospital C is a private, not-for-profit facility owned by a larger health system that serves a geographic area where approximately 50 percent of area residents are enrolled in Medicaid. The hospital's staff reported that many of their lower extremity joint replacement (LEJR) patients live in remote rural areas with poor housing and no running water or electricity. Hospital C has more than 600 beds, much higher than the CJR average of 263. In 2015, Hospital C had a higher number of LEJR discharges for Medicare beneficiaries and a higher percentage of LEJR discharges out of total discharges for Medicare beneficiaries than the average for all CJR hospitals (688 vs. 190 discharges, 8.5% vs. 7.4%).

Exhibit G-4: Hospital C Characteristics Compared to Average for all CJR Hospitals

	Bed Count	# of LEJR Discharges	LEJR discharges as a % of total Medicare discharges
Hospital C	651	688	8.5%
CJR Hospital Average	263	190	7.4%

Prior to the implementation of the Comprehensive Care for Joint Replacement Payment (CJR) model, Hospital C engaged in several initiatives to control internal costs, including standardization of implants and a pre-operative class with the cooperation of orthopedic surgeons to help prepare patients for discharge. The CJR model provided the hospital with the incentive to examine costs outside of the inpatient stay. The most significant driver of non-inpatient costs was post-acute care; nearly 40 percent of the hospital's LEJR patients were discharged to a skilled nursing facility (SNF) prior to CJR and the length of stay was between 14 and 21 days.

B. Topic

This case study examines Hospital C's process for establishing a SNF preferred provider list. The topic was chosen because, due to unique challenges in its patient population, the hospital identified working closely with SNFs as key to succeeding under the CJR model. Information from this case study was collected through a site visit during the second year of the CJR model.

C. Implementation

1. Preferred provider lists

Under CJR, Hospital C is attempting to send as many LEJR patients as possible to outpatient care or to home health (HH), although discharge to a SNF following surgery will continue to be an important option for the complex populations served by the hospital. Some of the hospital's patients live in substandard conditions and lack, for example, electricity or running water. In these situations, a SNF stay may be necessary to ensure safe recovery. As a result, the hospital established partnerships with a select group of SNFs in their MSA to redesign and standardize care for LEJR patients.

Hospital C's home and transitions care staff began the process of identifying preferred SNF providers by interviewing employed and independent orthopedic surgeons to document the reasons their patients preferred SNFs over outpatient care and which SNFs their patients used. The staff then worked with hospital care managers to identify those SNFs that had a track record of good communication with the hospital, high star ratings through Nursing Home Compare², and overall positive perceptions based on prior experience working with the hospital.

As a result of this process, Hospital C chose to partner with three local SNFs. LEJR patients who require a SNF stay are presented with a list that includes the preferred SNFs at the top, along with the remaining seven SNFs in the area. The hospital's staff reported that a majority of beneficiaries choose one of the three preferred SNFs. Hospital staff did not feel they currently had a need to establish gainsharing relationships with preferred SNF providers.

2. Care redesign

Prior to CJR, Hospital C began the process of redesigning their approach to patient and rehabilitative care with a goal of earning a Center of Excellence designation from The Joint Commission. Prior to 2014, post-operative rehabilitation focused on patient rehabilitative exercises. As a result of redesign initiatives, the hospital transitioned to focusing on an outcomes-based approach to patient rehabilitation, encouraging its physical therapists and care transition staff to work on patients' functional rehabilitative goals, such as meal preparation or recreational activities.

After the announcement of CJR, Hospital C worked with their three preferred SNFs to set expectations regarding patient length of stay and how the facility should communicate expectations to patients and their family members. The hospital urged preferred providers to reduce length of stay from the pre-CJR average of 14 to 21 days to a target of seven days, which was based on literature reviews as well as Hospital Administrators' experience in other care settings. To achieve this goal, Hospital C's home and transitions care staff worked with SNFs to identify strategies, such as focusing on functional outcomes and skills to prepare patients for a return to self-sufficiency at home rather than focusing on traditional rehabilitative exercise programs. The hospital encouraged preferred SNFs to provide frequent physical therapy to patients, based on their experience that more frequent, intensive therapy over a shorter period of time was better than less intensive therapy over a longer period. Physical therapy sessions are spread throughout the day in 15 minute increments, increasing to 30 minutes as the patient's mobility improves. In addition, when patients are discharged from the hospital to any SNF, regardless of whether or not the SNF is a preferred partner, Hospital C's case managers provide the SNF with patient and discharge information. SNFs are able to contact the hospital for clarification about the patient's discharge. Partner and non-partner SNFs have read-only access to the hospital's EMR to receive discharge instructions from the hospital.

² Nursing Home Compare has detailed information about every Medicare and Medicaid certified nursing home in the country. <https://www.medicare.gov/nursinghomecompare/search.html>

Finally, Hospital C worked with its preferred SNFs to create patient score cards, which tied patient functional outcomes to metrics, such as length of stay at the SNF, use of durable medical equipment, and use of rehabilitative services to ensure that a patient was receiving as much physical therapy as possible during their seven day target stay. Score cards were used to gauge patient outcomes during the target period and to provide a justification to patients and their families for lengthening or shortening a length of stay as needed.

D. Challenges

Although partnering SNFs appreciate the additional communication and coordination, they feel discouraged that increases in patient volume do not compensate for decreases in length of stay. Staff from a partnering SNF noted that without a gainsharing agreement, which the hospital reported they are not interested in pursuing, the major incentive to reducing length of stay and implementing hospital requests (such as score cards, which SNFs noted were slightly burdensome) is the potential for increased referrals. This is particularly notable given that while the hospital's goals for beneficiaries discharged to SNFs are to improve outcomes and reduce length of stay, the hospital has the overall goal of increasing the proportion of patients discharged to HH or outpatient care while reducing the proportion discharged to SNFs.

In addition, several interviewed staff members expressed concern about whether the proportion of patient discharges to home with HH or outpatient care can be increased, given the socioeconomic climate in the area. Many hospital staff noted that while they believe the best patient outcomes occur at home, they are hesitant to discharge patients to home who may be medically complex or reside in substandard living conditions. Given these socioeconomic realities, it remains to be seen whether further reductions in SNF admissions or length of stay are possible for Hospital C.

E. Results

Hospital C's overall goal under the CJR model is to reduce SNF admissions in favor of patient discharges directly to home with HH or outpatient care to reduce costs and improve patient outcomes. During Year 1 of the CJR model, the hospital was successful in reducing the proportion of patients discharged to a SNF from 40 to 20 percent. However, some patients continue to require discharge to a SNF for a variety of reasons, including patient complexity and substandard conditions at home. For these patients, the hospital and its preferred SNFs were successful in reducing the average length of stay for patients from a reported average between 14 and 21 days prior to CJR to a target of seven days, with only a marginal, statistically insignificant increase in readmissions as reported by interviewed hospital staff.

In addition, hospital staff reported that their partner SNFs have been enthusiastic about the increased input and collaboration between their facilities and the hospital, resulting in additional communication. Quarterly meetings have been instrumental in addressing challenges that SNFs face in meeting length of stay targets for beneficiaries. For example, many patients and their families were, and continue to be, skeptical that a week-long stay at a SNF was a sufficient

period of time for rehabilitation. Preferred SNFs and Hospital C worked together to plan strategies to address these concerns, some of which included education for patients and their family members on the improved outcomes associated with earlier discharge to home and inviting family members to observe patients' physical therapy sessions. According to hospital respondents, non-partner SNFs are eager to join Hospital C's preferred provider list. However, the hospital is not likely to expand the preferred list because respondents noted that intensively working with a large number of SNFs would be challenging. Nevertheless, hospital staff report that non-partner SNFs are receptive to reducing length of stay and to standardizing care and have expressed interest in sharing data about outcomes and patient length of stay with the hospital.

F. Summary

Across site visits, the vast majority of hospital interviewees discussed developing networks or lists of preferred PAC providers. Despite identifying preferred providers, hospital interviewees reported that honoring patient choice made it difficult to steer patients to preferred providers. Interviewees mentioned that patients commonly selected PAC providers that were close to their home, or those that other patients, their family members, or friends had used. Interestingly, Hospital C also described the challenge with continued reliance upon SNFs to care for LEJR patients due to the complexity of the hospital's population. It is likely that other hospitals serving medically and socio-economically complex patient populations experience similar challenges.

IV. Hospital D Case Study – Patient Education

A. Background

Hospital D is a member of a small hospital system that serves nearly 900,000 people in its service area. Hospital D’s administrators noted that they are the market leaders in their service area, responsible for approximately one-third of all discharges. Government payers, including Medicare and Medicaid, accounted for 85 percent of the hospital’s income. Hospital D has nearly 500 beds, compared to the CJR average of 263. In 2015, Hospital D had a lower number of lower extremity joint replacement (LEJR) discharges for Medicare beneficiaries and a much lower percentage of LEJR discharges out of total discharges for Medicare beneficiaries than the average for all CJR hospitals (113 vs. 190 discharges, 2.5% vs. 7.4%).

Exhibit G-5: Hospital D Characteristics Compared to Average for all CJR Hospitals

	Bed Count	# of LEJR Discharges	LEJR discharges as a % of total Medicare discharges
Hospital D	475	113	2.5%
CJR Hospital Average	263	190	7.4%

B. Topic

This case study examines Hospital D’s process for increasing the volume of discharges directly to home through patient education and information. This topic was selected because patient education was an important theme that emerged during our provider telephone interviews and Hospital D reported a particularly comprehensive effort to overhaul their education program in response to CJR. Information from this case study was collected through a site visit during the second year of the CJR model.

C. Implementation

Hospital D’s administrators stated that they were not prepared for the CJR model. The hospital did receive an industry Center of Distinction award in 2014 and 2015, signifying demonstrated success in care quality, expertise, and overall positive patient results in orthopedic care. However, despite the quality of their orthopedic care, the hospital did not feel prepared to make process improvements to its orthopedic service line. Hospital D’s administrators viewed the CJR model as an opportunity to streamline their orthopedic surgery process and to analyze inefficiencies throughout the entire care continuum. As the hospital’s administrators began reviewing their LEJR service line, they reported that only approximately 20 percent of their LEJR patients were discharged to home, with the large majority discharged to skilled nursing facilities (SNFs). In comparison, upon reviewing comparative data, administrators learned that other hospitals in the area were able to discharge 70 to 80 percent of their LEJR patients to home.

Prior to the CJR model, Hospital D did not have a consistent approach to patient education. While they did have a pre-surgical class, it was not required. Administrators redesigned their

patient education and engagement materials to prepare patients and their families for discharge to home after their procedure. Administrators explained that they started the process by updating the material included in their pre-surgical class, which is now mandatory. In the previous version of the class, the hospital emphasized SNFs and the transitional care unit (TCU) as the primary destinations post-discharge, but only made a small reference to home health at the bottom of slide towards the end of the presentation. The updated class now describes home health as the preferred discharge destination. At the center of the patient education redesign effort was a booklet the hospital referred to as the patient’s “passport” for the episode of care, which was distributed to every LEJR patient and was meant to serve as a guide for the patients and their families. Patients receive their passport when the decision to proceed with surgery is finalized and the content is designed to reinforce and expand upon topics covered in the pre-surgical class. It is printed in English and Spanish, which are the primary languages used by patients they serve; there were also plans to translate the passport into Mandarin. Hospital D’s office staff review the passport with each patient and inform the patient that they are required to bring it to every appointment during their time in Hospital D’s orthopedic surgery care continuum; patients and providers sign the passport after each class or appointment to verify attendance. Patients are encouraged to identify a buddy—a family member or friend—with whom they can share their passport and who can assist them upon their discharge to home. The passport includes the following sections:

- An overview of Hospital D’s orthopedic program
- An appointment tracker
- An FAQ document with information on joint replacement and what the patient can expect during their stay in the hospital
- Information on the role of Hospital D’s care navigator
- A review of the pre-surgical class
- Pre-operative therapy exercises the patient can do at home
- Directions for preparing the home prior to surgery
- Expectations during the patient’s hospital stay
- Instructions for post-surgical care, as well as common side effects from medications.

The passport prepares the patient for discharge to home and indicates that discharge to a SNF or TCU is uncommon and generally unexpected. For example, the passport notes that upon discharge, the patient can expect to receive, “Further therapy at home or at an out-patient community based center.” Patients without a caregiver are told that they may either be discharged to home with assistance from a home health nurse or to Hospital D’s TCU, but only if they qualify. For patients who will be transferred to the TCU, the passport indicates that the patient can expect to stay five to seven days. Patients are told to expect a two to three day hospital stay, after which they can expect to be discharged to home. The passport also informs

patients about common side effects from medications and complications to help patients feel confident about being discharged to home.

The orthopedic care pathway, outlined in the passport, is posted on white boards in each patient's room so the patient and their care team receive a consistent message about the goals and expectations during their hospital stay. Patients are also presented with a sheet titled, "My Joint Replacement Surgery Goals." It contains spaces for the patient to mark the distance walked during morning, afternoon, and evening physical therapy sessions, as well as space to rank their pain and note questions to ask of their surgery team.

D. Challenges

Although Hospital D reported increasing its home discharge rate to nearly 80 percent, the remainder of its patients are discharged either to the hospital's TCU or to another SNF. It is unclear whether patient education will be a sufficient method to continue increasing the rate of discharges to home for LEJR patients. Additionally, while many of the orthopedic surgeons working with the hospital are enthusiastic about orthopedic surgery care redesign and are participating in gainsharing, some physicians are resistant to changing their care practices. As a result, Hospital D may be challenged to continue its current pace of care redesign, including patient education.

E. Results

During the first year of the CJR model, Hospital D's administrators reported that they were successful in increasing LEJR discharges to home from 20 to 80 percent. Additionally, both administrators and surgeons reported that hospital length of stays were reduced. Patients who were discharged to the hospital's TCU had an average stay of five to seven days, as outlined in the guidance provided in the patient passport. One administrator noted that the passport and pre-surgical class encouraged patients to involve family members in their care in a way that they had not done before. Administrators also discussed plans to make bringing a care buddy to the class mandatory in future years. One administrator from Hospital D said that a managed care program learned of the patient passport and was enthusiastic about adapting it for their own use.

F. Summary

Like many other interviewed hospitals, Hospital D invested heavily in patient education during the first year of the CJR model. In its efforts to minimize confusion and uncertainty for LEJR patients, Hospital D designed a standardized care pathway and created patient resources to answer common questions and set expectations. These actions taken by Hospital D were generally successful in increasing patient satisfaction and helping to shift PAC utilization from SNFs to home health.

V. Hospital E Case Study – Prior Experience with Bundles

A. Background

Hospital E is a for-profit, physician-owned surgical specialty hospital. About 43 percent of Hospital E’s patients are Medicare fee-for-service beneficiaries, 25 percent are covered by private insurance, and 22 percent are covered by an HMO. The rest of Hospital E’s patient population are covered by workers’ compensation, or they pay out of pocket. Hospital E has less than 100 beds, compared to the CJR average of 263. In 2015, Hospital E had a markedly higher number of lower extremity joint replacement (LEJR) discharges for Medicare beneficiaries and percentage of LEJR discharges out of total discharges for Medicare beneficiaries than the average for all CJR hospitals (1,291 vs. 190 discharges, 66.9% vs. 7.4%).

Exhibit G-6: Hospital E Characteristics Compared to Average for all CJR Hospitals

	Bed Count	# of LEJR Discharges	LEJR discharges as a % of total Medicare discharges
Hospital E	75	1,291	66.9%
CJR Hospital Average	263	190	7.4%

Hospital E has prior experience with commercial bundled payments and previously implemented several care redesign initiatives in response to those bundles. As a result, they felt well-prepared for the CJR model. Hospital administrators explained that participation in these commercial bundles required enhanced collaboration and alignment between the hospital and the surgeons. In addition, interviewees noted that Hospital E has a strong culture of mentorship among its physicians.

B. Topic

This case study examines how Hospital E’s prior experience with bundled payment models helped prepare them for the CJR model, as well as their attempts to work more closely with PAC providers once the model began. This topic was chosen to explore how prior experience in commercial bundled payment models could greatly influence responses to the CJR model. Information from this case study was collected through a site visit during the second year of the CJR model.

C. Implementation

1. Prior experience with bundled payments

Hospital E had prior experience with commercial bundled payment models, which exclusively covered elective surgeries and utilized a prospective, rather than retrospective payment system. Interviewees from the hospital stated that they had previously developed patient selection criteria, based on guidelines from commercial payers, to better manage risk. Patients in commercial bundles were included if: their body mass index (BMI) was below 31, they had a

willing and able caregiver, they had an American Society of Anesthesiologists Rating³ below a certain threshold, and they were not diagnosed with end-stage renal disease or cancer. For patients outside of these parameters the hospital was paid using traditional fee-for-service rates. Patients with high BMI were referred to nutritionists, dieticians, or primary care physicians to lose weight before the surgery.

In addition, interviewees from Hospital E noted that many changes to their pre-admission screening and pre-operative education processes were already underway or implemented prior to the start of the CJR model. The hospital's care pathway starts 30 days prior to surgery. The hospital has a pre-admission screening department that collects clearances from physicians and their care navigation team calls patients in advance of the surgery to reconcile patient medications prior to their admission into the hospital. The hospital also hosts an elective pre-operative education class that was implemented prior to the onset of the CJR model.

2. Redesigns as a result of the CJR model

The introduction of the CJR model incentivized Hospital E to develop relationships with skilled nursing facilities (SNFs), explore the creation of gainsharing arrangements for non-ownership physicians, and analyze cost data more extensively. The hospital began by analyzing the different SNFs in their immediate area to understand availability. Administrators identified 10 facilities as high-quality partners through the use of Medicare star ratings, facility tours, and interviews with administrators. Of those 10 facilities, administrators selected five to become preferred SNFs, one for each of the four corners of the hospital's county and a fifth located in the center. Preferred SNFs were selected based on a Medicare rating of at least three stars, as well as being a facility where hospitalists conducted rounds.

Administrators met with SNF directors to educate them about the CJR model. Physician committees also worked with SNF personnel to develop standards of care, which consisted of three physical therapy sessions per day and a discharge goal of five to seven days. Hospital E's administrators and staff were careful to emphasize that discharge goals were guidelines, rather than mandates. In the past, the hospital's physicians discharged a larger portion of their patients to SNFs. The onset of CJR encouraged them to consider the benefits of home discharge and communicate to patients about the importance of being discharged to home. For those patients who are on the cusp of needing SNF care, a physician will often opt to keep them in the hospital for an additional day rather than discharging them to a SNF.

³ The American Society of Anesthesiologists (ASA) rating, or the ASA Physical Status Classification System, is used to evaluate the degree of a patient's physical state before selecting an anesthetic or performing surgery. It is generally used for recordkeeping, communicating between colleagues, and to create a uniform system for statistical analysis and is not intended for use as a measure to predict operative risk. The scale include 6 categories, with ASA I signifying a normal, healthy patient and ASA VI signifying a patient declared brain dead whose organs are being removed for donor purposes. For more information, see <https://www.asahq.org/resources/clinical-information/asa-physical-status-classification-system>

As a result of the CJR model, Hospital E adopted gainsharing agreements for physicians without an ownership stake in the hospital. Gainsharing physicians are held to certain quality metrics, including patient reported outcomes (PROs), pre-operative class participation, Methicillin-resistant Staphylococcus aureus (MRSA) screenings, 30-day readmissions, surgical site infections, attendance at quarterly CJR meetings, and Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) scores. The metrics were selected based on conversations with executive hospital leadership, lawyers, physician champions, and compliance personnel to ensure that agreements followed CJR guidelines. In total, eight surgeons participate in gainsharing agreements at Hospital E. Hospitalists will soon be invited to participate in a gainsharing arrangement as encouragement to continue preparing patients for discharge and visiting patients who were discharged to SNFs. Interviewees noted that there was an increased emphasis on encouraging patients to attend the pre-operative education class.

Hospital E analyzes internal cost data and CMS-provided claims data to identify potential areas for improvement. Internal cost data is used to examine implant cost by physician and analyze high and low demand implants to predict potential cost savings that could occur by switching implant types. CMS-provided data is used to study episode costs, readmissions, and complications. These data are regularly presented to the hospital's finance committee to inform continuous improvement efforts.

D. Challenges

Hospital E continues to focus on building strong relationships with the SNFs on their preferred provider network, but significant challenges still remain. While the hospital and SNFs established a shared goal for reducing SNF length of stay, the hospital administrators believe that the incentives for hospitals and SNFs under the CJR model are not aligned. Interviewees noted that SNFs have a financial incentive to maximize length of stay, because SNFs are still paid a per diem rate. Respondents from SNFs, on the other hand, were concerned about the dramatic reduction in length of stay and the change in the goals of physical therapy. Previously the goal was to rehabilitate patients to their previous level of functioning; however, currently they are focusing on getting the patient to a level of functioning where they can be safely discharged home. SNFs were informed that being part of Hospital E's preferred provider network would increase patient volume enough to offset the lost revenue from shorter lengths of stay. SNF administrators report that this has not been the case. Additionally, they are having to make staffing adjustments to accommodate the intense physical rehabilitation schedule. SNF administrators expressed concern regarding the long-term viability of their institutions if they continue participation in the CJR model.

Hospital physicians and administrators are also concerned about patient perceptions to the changes that the hospital has made to their care pathway as a direct result of their mandatory participation in the CJR model. Some patients have the expectation to be discharged to a SNF for 20 days or longer. The hospital has had to spend a lot of time educating patients regarding the benefits of being discharged directly home or spending less time in a SNF. Even with the additional education, some patients feel they are being discharged too soon and receiving a lower level of care compared

to other patients. Hospital E’s administrators noted that there continues to be pushback from patients and their families concerning direct discharges to home. This feedback from patients is a major concern for hospital administrators and has strongly influenced their decision to not gainshare with SNFs. They are concerned that gainsharing could result in the perception of conflicts of interest arising from financial relationships between hospitals and SNFs.

E. Results

As a result of the CJR model, Hospital E further improved upon pre-existing care redesigns that were implemented as a result of prior participation in commercial bundled payment models. In the first year of the CJR model, the hospital was successful in meeting their goal of discharging the majority of patients directly home, either with or without home health. During the first year, about 81 percent of its Medicare fee-for-service patients were discharged home and approximately 18 percent were discharged to a SNF. This is a considerable change compared to nearly 70 percent of SNF discharges in the prior year. Additionally, Hospital E was largely successful in working with their SNF partners to shorten length of stay to five to seven days. The average inpatient length of stay ranges between two to three days, depending on patient complexity. Approximately 80 percent of patients attend the pre-operative education class, compared to 59 percent in the prior year. Surgeons reported that patients seem to be more informed about the care process as a result of the patient education classes.

F. Summary

Across site visits, several interviewees described prior hospital initiatives or other payment and delivery models that helped them prepare for the CJR model. Overall, staff at hospitals with relevant prior experiences indicated more capacity than interviewees from hospitals with no noted relevant experience to identify areas for improvement and implement care redesign changes to succeed under the CJR model. Similarly, Hospital E attributed much of their early success under the CJR model to their prior experience with bundles.

VI. Hospital F Case Study – Lean Methodology

A. Background

Hospital F is a not-for-profit hospital owned by a large health system. Approximately half of Hospital F’s lower extremity joint replacement (LEJR) patients are covered by Medicare and the other half are covered by commercial insurers. Hospital F has more than 300 beds, compared to the CJR average of 263. In 2015, Hospital F had a higher number of LEJR discharges for Medicare beneficiaries, but a lower percentage of LEJR discharges out of total discharges for Medicare beneficiaries than the average for all CJR hospitals (228 vs. 190 discharges, 6.2% vs. 7.4%).

Exhibit G-7: Hospital F Characteristics Compared to Average for all CJR Hospitals

	Bed Count	# of LEJR Discharges	LEJR discharges as a % of total Medicare discharges
Hospital F	335	228	6.2%
CJR Hospital Average	263	190	7.4%

Hospital F’s parent hospital system has a philosophy of continuous process improvement. In 2009, the hospital’s health system began working with external consultants to train employees in Lean methodology, a continuous process improvement strategy that focuses on delivering positive outcomes with minimal resources and waste.

B. Topic

This case study examines Hospital F’s use of Lean methodology as a process improvement strategy prior to the onset of the CJR model, as well as Lean initiatives that have been implemented in response to the CJR model. The topic was chosen for a case study because the use of Lean methodology was identified by those interviewed at Hospital F as influential to their CJR model experience, and a goal of the CJR evaluation is to examine different approaches to care redesign and process improvement. Information from this case study was collected through a site visit during the second year of the CJR model.

C. Implementation

1. Lean methodology for process improvement

Lean, formally known as The Toyota Production System, is a methodology for quality improvement that emphasizes the importance of positive outcomes while minimizing resources and waste. In particular, waste can be minimized by reducing unneeded resources, disorganization, and unnecessary work. As applied to hospitals, the Lean methodology focuses on generating positive outcomes for both providers and consumers while minimizing the resources and waste derived from poor organization, excess process steps, and unnecessary costs and equipment. Hospitals generally utilize the Lean methodology to map the care process and eliminate unnecessary work. They redesign the process based on the needs of the patient and then focus on continuous improvement to make small, but significant optimizations to the care pathway.

2. Lean initiatives prior to the onset of the CJR model

Hospital F began redesigning its orthopedic service line using aspects of Lean methodology prior to the onset of the CJR model. Administrators indicated that their priorities focused on examining and redesigning their orthopedic surgical process from patient intake to discharge by mapping the care process and interviewing surgeons, nurses, and care managers about the then-current orthopedic service line. Administrators and surgeons had collaborative quarterly meetings where they shared information with each other.

After meeting with staff members, Hospital F's administrators implemented changes to the orthopedic service line, starting with the scheduling process. Nurses now make pre-operative phone calls to patients before admission to proactively answer any questions or concerns the patient might have, as well as to verify individuals' medical histories. Administrators encourage physicians and nurses to complete charts in a timely manner during the patient's stay to prevent wasted time during patient handoffs and discharges.

Nurse practitioners were shifted into newly created nurse navigator roles, and they are responsible for patients' progress through the orthopedic service line from admission through discharge. The role was established to maximize the utilization and skillset of Hospital F's nurse practitioners. Navigators serve as partners for patients, performing pre-admission assessments and patient education through a pre-operative joint class, in addition to performing clinical rounds. Nurse navigators also perform post-operative wellness checks 24 to 48 hours after discharge.

Hospital F was one of the first hospitals in their hospital system to standardize orthopedic implants. The hospital's parent system asked surgeons to narrow their list of preferred implants to two or three options, from which system administrators chose a preferred vendor. Narrowing the vendor list allowed the hospital and its parent system to negotiate reduced prices and minimize waste associated with maintaining a large inventory of implants.

3. Lean initiatives after the CJR model

The CJR model served as a catalyst to continue redesigning the orthopedic service line, with an eye towards maintaining the spirit of Lean process improvement. Hospital F's administrators continued focusing on improving the orthopedic service line from pre-admission to discharge.

Administrators modified the orthopedic pre-admission process to better prepare the patient for admission to the hospital. During pre-admission calls, the nurse navigators review discharge expectations and prepare the patient for discharge to home. The navigator and patient discuss the layout of the patient's home (e.g., the presence of stairs or throw rugs), and review any equipment that the patient might need. Necessary equipment is delivered to the patient ahead of surgery to prevent delays in patient discharge and emphasize the goal of discharge directly home.

While in the hospital, the patient has a multidisciplinary care team consisting of physicians, nurse practitioners, transitional care nurses, charge nurses, and physical therapists. The multidisciplinary team meets regularly to review the patient's needs, expectations, pain level,

and physical therapy goals in order to simplify the patient’s experience at the hospital. White boards in each patient room list the patient’s care team, along with the daily care plan and pain management protocol, to prevent confusion during transitions. Nurse navigators and physicians perform medication reconciliation to manage pain for each CJR patient to prevent medication errors from keeping the patient from receiving immediate physical therapy.

The operating room was the focus of a comprehensive review by Hospital F’s administrators, who ultimately standardized the instruments, dressings, and vendors available to each surgeon. The nurse navigator and the orthopedic service line manager were also empowered to modify the layout of the operating room and the location of equipment to improve efficiency and safety for the surgical team. In the future, the hospital’s administrators will build an orthopedic team that continuously addresses surgeons’ needs and it plans to implement a debriefing tool to identify gaps in high-value areas and develop interventions to address them.

D. Challenges

While Hospital F’s Lean approach to redesigning their orthopedic service line is promising, Administrators are concerned that patient choice and preference may limit the possible opportunities available. For example, one interviewee expressed a desire to discontinue the use of continuous passive motion (CPM) machines, noting that they are not shown to be effective. However, he noted that patients enjoy using them, which currently presents a barrier to halting their use. Patient preference is also important when considering discharge location; while Hospital F continues to encourage discharge to home with outpatient physical therapy, some patients may prefer or require care in a SNF or from a home health aide. Surgeons sometimes face pushback from families or patients with strong post-acute care preferences. In addition, patients with hip fractures continue to present particular challenges for the hospital. Hip fractures have a unique care process, which has not received the same level of optimization as elective hip and knee replacements; this difference in processes was a source of frustration for interviewees.

E. Results

Hospital F implemented aspects of a Lean methodology to redesign their orthopedic service line. While it is still too soon to tell whether the hospital’s care redesigns have resulted in measurable, quantifiable success, interviewees expressed considerable excitement over the process changes. One interviewee noted that, “For rehabilitation, it’s exciting to see patients on day zero. That used to be a great goal, but we’ve gotten much more strategic about it.” Other interviewees report feeling empowered to provide better care for patients. One interviewee reported increased job satisfaction, stating, “We see our actions benefit the patient and it makes us feel good about what we do.”

F. Summary

Hospital F, like many interviewed hospitals, implemented a process improvement methodology to accelerate and standardize their efforts to redesign care processes. Many hospitals, including Hospital F, had implemented these methodologies prior to the onset of the CJR model, but found

them to be particularly helpful in adapting to the requirements and goals of the model. Generally, Hospital F's experiences with a formalized process improvement methodology mirrored those of other hospitals, with the methodology proving generally successful in quickly and efficiently redesigning care.

VII. Hospital G Case Study – Increasing Collaboration

A. Background

Hospital G is part of a private, not-for-profit health system. The majority of Hospital G’s patient population is economically disadvantaged; approximately 85 percent of the patient population is covered by a government payer, the majority of whom are covered by Medicaid managed care. Only a small portion of Hospital G’s business is derived from traditional Medicare fee-for-service. Hospital G has more than 300 beds, compared to the CJR average of 263. In 2015, Hospital G had a much lower number of lower extremity joint replacement (LEJR) discharges for Medicare beneficiaries and percentage of LEJR discharges out of total discharges for Medicare beneficiaries than the average for all CJR hospitals (41 vs. 190 discharges, 1.7% vs. 7.4%).

Exhibit G-8: Hospital G Characteristics Compared to Average for all CJR Hospitals

	Bed Count	# of LEJR Discharges	LEJR discharges as a % of total Medicare discharges
Hospital G	310	41	1.7%
CJR Hospital Average	263	190	7.4%

With the implementation of the CJR model, Hospital G felt significant pressure from its parent health system to reduce costs and improve quality outcomes. Failure to achieve significant improvements could result in the health system relocating the hospital’s orthopedic service line to other system hospitals in the area.

B. Topic

This case study examines Hospital G’s experience in reducing costs and improving quality by increasing trust and collaboration between orthopedic surgeons and hospital administrators. This topic was chosen because surgeon engagement in care redesign emerged as a key theme in our provider telephone interviews and was discussed at length by administrators from the hospital. Further, stakeholder engagement is important for implementing care redesigns of the orthopedic service line to reduce costs and improve quality. Information from this case study was collected through a site visit during the second year of the CJR model.

C. Implementation

1. Existing gaps in trust and credibility

According to Hospital G’s administrators and physicians, there were initial barriers to forging partnerships between the two groups. The most significant barrier the hospital administration encountered was gaining trust and demonstrating credibility to the affiliated orthopedic surgeons. While average physician tenure at the hospital has been long, the hospital has experienced significant turnover in its administration staff. Due to the significant turnover, orthopedic surgeons reported feeling ignored by administrators, which led to a lack of trust in hospital leadership. Hospital G took steps to identify a CJR physician champion who, while supportive of

the hospital's goals under the CJR model, was initially skeptical of their plans to follow through with significant changes to their orthopedic service line.

2. Trust building

To begin repairing the credibility gap, Hospital G's administrators began visiting surgeons' offices to understand individual scheduling processes, which left administrators better prepared to address the surgeons' concerns. Hospital administrators also listened to feedback from their CJR physician champion, as well as other orthopedic surgeons, who urged the hospital to provide better access to the operating rooms, institute patient ambulation on day zero, and reestablish the patient pre-operation class. While addressing these issues did not require substantial investment from the hospital, it demonstrated to surgeons that the current administration was highly responsive to their input.

Operating room schedulers began rearranging schedules to allow orthopedic surgeons to operate earlier in the day, allowing patients to start post-operative physical therapy on day zero. At the same time, administrators accommodated surgeries ending later in the day by extending physical therapy shifts into the evening. Physical therapists were also alerted to upcoming patient surgeries 24 hours prior to the surgery occurring, so that physical therapists could arrange time to see patients for day zero post-operative care. These changes were implemented for all LEJR patients, not just those involved in the CJR model.

Pre-operative classes were also reestablished with the support of the CJR physician champion and orthopedic surgical staff. The classes are mandatory for all LEJR patients, offered twice a month, and are supplemented with new patient brochures and educational books. In addition, patients are provided with a DVD that includes pre-habilitation exercises developed by the hospital's rehabilitation team. Education materials are framed to prepare the patient for discharge to home rather than to a skilled nursing facility (SNF). Patients are also now required to quit smoking prior to surgery, as recommended by affiliated orthopedic surgeons.

These activities encouraged the CJR physician champion and the hospital administration to work more closely together on cost reduction and quality improvement initiatives. For example, the physician champion used his relationships with implant vendors to negotiate discounted rates on their most commonly used implants, saving the hospital approximately \$2,000 per implant. Hospital G also began sharing data with its orthopedic surgeons through an internal report card on indicators such as patient ambulation on day zero, discharge destination, complications, and readmissions, all collected in real time. Administrators and surgeons compare this data in real time to CMS-provided data and use it to identify opportunities for further intervention.

Hospital G, with the support and guidance of its parent system, will be establishing a gainsharing agreement with all seven orthopedic surgeons operating at the hospital. Neither the surgeons nor hospital administrators expect to realize any significant income from the agreement, however, due to the historically low volume of Medicare fee-for-service LEJR discharges. Nevertheless, interviewees noted that the gainsharing agreement was an important step towards building trust

and commitment between the surgeons and the hospital. The agreement was largely viewed as symbolic by interviewees.

D. Challenges

An atmosphere of improved trust and collaboration has enabled the hospital and orthopedic surgeons to achieve quality improvements and cost reductions for LEJR patients. It remains to be seen whether administrators and orthopedic surgeons capitalize on the improved collaborative atmosphere to continue redesigning their orthopedic care pathways to further improve quality and reduce costs for LEJR patients. Hospital interviewees noted that the primary challenge to successfully reducing total episode payments below the target price by reducing discharges to SNFs is the socioeconomic challenges faced by their patient population. This is particularly significant for Hospital G, which faces the removal of its orthopedic service line to other system hospitals the service line becomes unprofitable under CJR.

E. Results

Hospital G worked to build trust between hospital administration and independent orthopedic surgeons to improve quality and reduce costs for LEJR procedures. During the first year of the CJR model, the hospital was successful in increasing the number of patients discharged to home from a self-reported 10 to 15 percent in 2015 to 60 to 70 percent in 2016. A patient pre-operative education class was implemented, which prepares patients for discharge to home as opposed to a SNF or inpatient rehabilitation facility (IRF). In addition, orthopedic surgeons reported improved outcomes as a result of the newly re-implemented pre-operative education classes. Interviewees also reported a savings of \$2,000 per implant due to negotiations between hospital administrators, the CJR physician champion, and the hospital's orthopedic device distributors. Interviewees noted that cooperation during these negotiations was the result of increased collaboration between the hospital and orthopedic surgeons.

In addition, hospital administrators and orthopedic surgeons reported improved relationships between Hospital G and orthopedic surgeons. Orthopedic surgeons appreciated the increased attention and involvement by the hospital. Surgeons felt that changes made by the hospital demonstrated that administrators were serious about improving quality and outcomes for the hospital's LEJR patient population. Administrators were pleased that surgeons were utilizing the report card provided by the hospital to identify areas of opportunity to improve care for LEJR patients. The gainsharing agreement, under development, is also seen as a positive, if largely symbolic gesture towards improving trust and collaboration between the hospital and orthopedic surgeons.

F. Summary

Hospital G dedicated considerable resources during the first year of the CJR model toward developing and strengthening their relationships with orthopedic surgeons. Like many other interviewed hospitals, Hospital G recognized the vital role that surgeons could play in improving outcomes and decreasing utilization throughout the 90 day episode, two major goals of the CJR

model. Hospital G found that their efforts to build trust with orthopedic surgeons, including working with them to resolve ‘pain points’ in current processes and entering in to a largely symbolic gainsharing agreement, proved successful in increasing dialog and collaboration. These successes seem to mirror those of other hospitals that have taken steps to collaborate with surgeons.

VIII. Hospital H Case Study – Discharge Planning

A. Background

Hospital H is a small hospital with a unique ownership arrangement. The majority of its ownership is held as a joint venture between a large, local Catholic Hospital and a large national network. The other remaining share of the hospital is physician-owned. Approximately 15 percent of Hospital H’s patients are covered by traditional Medicare fee-for-service, 12 percent are Medicare Advantage or HMO, 10 percent are covered by workers compensation, 6 percent are self-pay, 2 percent are Medicaid, and the remaining are covered by commercial and other payers. Interviewees reported that a majority of its patients live within 12 miles of the facility. Hospital H has under 50 beds, compared to the CJR average of 263. In 2015, Hospital H had a smaller number of LEJR discharges for Medicare beneficiaries, but a much higher percentage of LEJR discharges out of total discharges for Medicare beneficiaries than the average for all CJR hospitals (89 vs. 190 discharges, 31.4% vs. 7.4%).

Exhibit G-9: Hospital H Characteristics Compared to Average for all CJR Hospitals

	Bed Count	# of LEJR Discharges	LEJR discharges as a % of total Medicare discharges
Hospital H	37	89	31.4%
CJR Hospital Average	263	190	7.4%

Operational activities are highly influenced by Hospital H’s 23 individual physician partners. While Hospital H has three orthopedic surgeons, one of them (referred to here as the lead orthopedic surgeon) is responsible for performing a large majority of the lower extremity joint replacement (LEJR) procedures. The lead orthopedic surgeon is one of the physician-owners whose preferences heavily influence how Hospital H cares for LEJR patients.

B. Topic

This case study examines an approach to discharge planning that relies almost solely on outpatient post-discharge care. The topic was chosen because of Hospital H’s strong belief that positive patient outcomes are realized when home health (HH) and skilled nursing care are dramatically reduced or eliminated. Information from this case study was collected through a site visit during the second year of the model.

C. Implementation

Interviewees reported that the response to the CJR model is largely driven by the health system, which administers the management-related components of the ownership model. Prior to the CJR model, the large national health system developed and disseminated a LEJR care protocol to CJR model hospitals in their network (including Hospital H). However, the interviewees reported that while the health system provided a standardized approach, it was not intended to be a, “one-size-fits-all” protocol for LEJR procedures, given the distinct challenges facing individual hospitals in

the health system. Interviewees from the health system reported that their organization provides each facility with guidance and templates (e.g., patient education materials, discharge instruction recommendations, guidelines for developing streamlined care pathways), but allows each hospital to tailor its own processes and materials. As a result, Hospital H's staff, especially the lead orthopedic surgeon, had substantial flexibility in customizing the response to the CJR model.

Notably, Hospital H's administrators and the lead orthopedic surgeon described a customized approach to discharge planning and post-discharge care. The approach combines guidance provided by the health system with the hospital's specific emphasis on serving elective surgery patients, remaining mindful of the limited resources available to a low-volume hospital focusing on its immediate catchment area. Prior to the CJR model, the majority of patients were discharged to home with home health (HH) care. Patients were referred for an average of 12 HH visits. The lead orthopedic surgeon felt the CJR model provided him with an opportunity to move patients to outpatient care more quickly by eliminating skilled nursing stays completely and reducing the number of HH visits. He prefers this care pathway due to his experience with outpatient therapists communicating more quickly and effectively regarding patients' progress.

In contrast, other programs and processes in Hospital H were active long before the onset of the CJR model and continue to be carried out. For example, interviewees indicated that low patient-nurse ratios and frequent physical therapy were ongoing prior to CJR implementation. Administrators also negotiated agreements with three of Hospital H's vendors to reduce implant costs. In addition, patient education was already being adapted for Hospital H's specific needs; prospective patients received an educational booklet (based on health system guidance and tailored for the hospital) that describes the LEJR process as well as the steps to take prior to surgery, such as preparing the home in advance of discharge.

Orthopedic surgeons at Hospital H participate in gainsharing. While physicians are part-owners of the hospital, administrators felt that it was important to incentivize the three orthopedic surgeons performing LEJR procedures to remain cognizant of the costs associated with an episode of care. Respondents noted that gainsharing physicians were already owners of Hospital H and that the low volume of Medicare fee-for-service LEJR procedures in the hospital limited the potential for shared savings, however the gesture was appreciated.

D. Challenges

Interviewees from a local HHA expressed concern about discharging the majority of LEJR patients home without HH services. First, obtaining outpatient physical therapy may not be feasible for some patients. For example, accessing outpatient care can be complicated and difficult for those who do not have reliable transportation, have homes that are difficult for an LEJR patient to navigate, or have difficulty affording outpatient therapy co-payments. Interviewees had some concerns that these barriers might hinder patients from receiving the full benefits of outpatient therapy, which could potentially impede their recovery.

Second, HHA interviewees reported that outpatient care may not appropriately meet the needs of all patients. Some patients require specialized, one-on-one therapy. An outpatient center focusing on a wide variety of patients may not have the resources to customize therapy, making that setting inappropriate for some LEJR patients. Finally, HHA respondents indicated that it is financially unsustainable to provide fewer than five visits to a LEJR patient. As a result, the current model may not be feasible for HHAs working with Hospital H in the long-term.

Hospital respondents expressed concern that smaller hospitals are at a major disadvantage in the CJR model because low numbers of CJR procedures result in outliers having a disproportionate impact. These interviewees feared that the only way to survive in this type of model is to become part of a bigger system. Hospital respondents also identified concerns with the current restrictions put on gainsharing, stating that many of the top performing surgeons hit the max cap with gainsharing very early, leaving little incentive to do anything else for cost savings. These respondents indicated a preference for hospitals to set maximums.

E. Results

The combination of physician- and system-ownership allowed Hospital H to customize discharge planning and rehabilitation to suit the needs of its patient population. During the first year of the CJR model, Hospital H reported reducing the average number of HHA visits per patient from an average of 12 to three, with a shift to outpatient physical therapy as needed. According to interviewees, hospital readmissions have not increased for their CJR patients. In addition, interviewees reported that patients and their family members were more involved in discharge planning and recovery as a result of the CJR model. This enhanced engagement may be an effect of increased focus on discharging to home and reducing HH visits, because patients were now required to find family members or caregivers to provide transportation to outpatient therapy and assist with daily activities at home.

F. Summary

When asked about discharge planning, many hospitals indicated that they had made changes in response to the CJR model, while others said that their existing discharge planning policies were sufficient to maximize patient outcomes. Hospital H's orthopedic program was well-developed prior to the CJR model, with the vast majority of its LEJR patients being discharged to HH or outpatient care. Under CJR, the hospital took additional steps to decrease PAC utilization, decreasing reliance on HH and transitioning patients to outpatient therapy more quickly. Although Hospital H experienced success in these efforts, the typical CJR hospital is fairly reliant upon SNFs for LEJR beneficiaries, and would likely not be able to make such a drastic shift in utilization. Additionally, with LEJR procedures comprising more than 30% of its total Medicare discharges, Hospital H is likely able to dedicate more resources to its orthopedic program than the typical CJR hospital.

IX. Hospital I Case Study – Surgical Supply Chain

A. Background

Hospital I is the flagship campus of a large regional hospital system. Hospital I performs the majority of lower extremity joint replacement (LEJR) surgeries for its system. Administrators estimated that Hospital I performs approximately 1,100 LEJR surgeries annually for all payers. Hospital I has nearly 650 beds, compared to the CJR average of 263. In 2015, Hospital I had a higher number of LEJR discharges for Medicare beneficiaries, but a lower percentage of LEJR discharges out of total discharges for Medicare beneficiaries than the average for all CJR hospitals (363 vs. 190 discharges, 3.9% vs. 7.4%).

Exhibit G-10: Hospital I Characteristics Compared to Average for all CJR Hospitals

	Bed Count	# of LEJR Discharges	LEJR discharges as a % of total Medicare discharges
Hospital I	649	363	3.9%
CJR Hospital Average	263	190	7.4%

In 2013, Hospital I's parent system implemented a new program which aimed to take a holistic view of surgical procedures through the entire care continuum, including the supply chain. The program incorporates multidisciplinary workgroups to understand how the hospital can bring greater value to its patients, physicians, staff, and vendors, which would translate into improved outcomes and reduced costs while reducing resources and waste.

B. Topic

This case study examines Hospital I's process for transforming its surgical supply chain. The topic was chosen because the hospital's leadership team reported that their supply chain management was critical to ensuring long-term sustainability of its orthopedic service line redesign efforts and to providing added value to its patients and vendors. Information from this case study was collected through a site visit during the second year of the CJR model.

C. Implementation

1. Hospital supply chain background

Hospital I's parent system hired a management consultant to assess the hospital's processes and propose recommendations for improvement. Two key recommendations were made: create/prioritize a physician and vendor engagement strategy, and adopt the just-in-time (JIT) model for inventory management.

The consultant first advised the hospital system to engage more directly with its providers and vendors in order to enhance negotiations. For provider engagement, the consultant suggested that hospital and system leadership inform physicians and surgeons about supply costs and pricing trends. While this recommendation requires leadership staff themselves to stay up to date on trends and determine appropriate education channels, it is an opportunity to strengthen collective

knowledge of costs and ultimately enhance the system's negotiation capabilities. For vendor engagement, the consultant encouraged hospital and system leadership to negotiate consignment agreements with vendors to store supplies and implants onsite. The rationale for this agreement is that it would reduce shipping and warehousing costs for Hospital I's vendors and help to mitigate the risk of damage or mishandling while in-transit.

Second, the consultant recommended the just-in-time (JIT) model for inventory management, in which manufacturers maintain only a bare minimum of available supplies in order to reduce inventory and materials costs. Notably, JIT is a core component of the Lean and Six Sigma production methods. While it is attractive to hospital and health system senior management in theory, JIT presents several challenges in practice. In particular, it requires management to accurately predict the frequency of procedures in a given time period. Such precise predictions are especially difficult in a healthcare setting given the variation in patient needs; inaccuracies may be particularly costly. An incorrect estimate can lead to funds being inappropriately dedicated to excess inventory, or costly delays for procedures in cases where needed supplies are not available. In relation to LEJR, incorrect joint sizing for a new hip or knee could result in a rescheduled surgery, costing the hospital additional resources and potentially putting the patient at risk for a poor outcome. Thus, the impact of the JIT model on Hospital I remained uncertain.

2. Identifying opportunities and building value through supply chain reform

In 2013, Hospital I's parent system began a new program to improve the experience, or value generated, for each patient's stay in the hospital and other hospitals in the regional health system. The program was based on the Lean and Six Sigma principles of maximizing outcome and value with a minimum investment of resources. Under this program, the hospital and its parent health system implemented mandatory pre-operative education classes and screening appointments with anesthesiologists. Day zero physical therapy was also encouraged in order to improve patient outcomes and reduce hospital length of stay.

Furthermore, a group of surgeons and administrators at Hospital I realized there were opportunities to create additional value by improving their supply chain and inventory management systems. Hospital administrators stated that prior to the program, the hospital's supply chain and inventory management system was summarized by a single philosophy "to keep surgeons happy." The onset of the program encouraged the hospital and its parent system to adopt a holistic approach to generating value by understanding "pain points" for the hospital, its patients and its vendors. Hospital I began by interviewing vendors to discover difficulties they experienced during the distribution process that resulted in increased prices for hospitals and decreased revenues for vendors.

Vendors informed Hospital I that they often experienced significant financial losses as a result of supplies damaged in transit. Vendors send small surgical instruments to hospitals as needed for individual surgical procedures in pre-sealed surgical trays. The trays include every instrument that could potentially be needed during a surgery and were prone to damage or contamination while in-transit. In addition, vendors noted that their sales representatives were responsible for

distributing implants directly to hospitals on the day of surgery. These implants were often stored in representatives' garages or car trunks and were always at-risk of mishandling or damage.

Vendors also informed Hospital I that implant sales representatives often attended surgeries to help surgeons select implants and provide technical assistance and advice during complex procedures. Rather than measuring the surgical site to determine the exact size and type of implant needed, surgeons often determined the correct implant by trying one of the many implants provided by a sales representative, leading to thousands of dollars in wasted product. Hospital staff reported that one vendor estimated a loss of 20 percent of supplies due to damage, loss, contamination or mishandling.

Hospital I's parent system saw an opportunity to improve the value that its vendors derived from their relationship together while reducing costs for the hospital. The hospital asked its surgeons to identify the top vendors that its surgeons preferred for joint implants and medical devices. Hospital administrators then negotiated 'consignment agreements' with those vendors in which the hospital's parent system agreed to store surgical instruments and implants onsite at their own warehousing facility and be responsible for distribution, cleaning, sanitizing, and inventory management, in exchange for a discount on supplies, implants, and other equipment.

Given this reform, administrators realized that Hospital I would need a system for tracking and maintaining its consigned inventory. It worked with its parent system and a software consultant to develop a new application that automatically manages implant and surgical supply inventory. The new system allows hospital administrators to see their current in-house inventories and request JIT delivery from the parent system's distribution location. The hospital's parent system trained its surgical technicians on the new system to ensure that supplies would be delivered on-time and accurately.

Hospital administrators learned that vendors believed that the sales representative model (i.e., the vendor attends each surgery to provide technical assistance) would not be sustainable in the long term. Hospital I's parent system therefore conducted a pilot study to understand the effect of removing sales representatives from low- and medium-complexity surgical procedures.

D. Challenges

While Hospital I and its parent system were successful in reducing its own costs and its vendors' costs through a supply chain redesign, significant challenges still remain. Consignment agreements with vendors were responsible for generating value for the hospital's parent system and its vendor, but will require considerable negotiation and reevaluation between the health system and its vendors to maintain the negotiated discounts. In addition, the initial capital expenditure required to store, distribute, clean, and sterilize surgical instruments may be more substantial than Hospital I or its parent health system is willing to assume in the long term.

E. Results

The new hospital program, implemented prior to the onset of the CJR model and directed at the system level, led to reduced costs and resources utilized by Hospital I, its sister hospitals, and its vendors. Supply chain and inventory control initiatives — such as provider and vendor engagement — were seen as notable successes. For example, the consignment agreements with vendors (which shifted supply storage to be onsite) resulted in a five to 25 percent discount on surgical supplies and implants for the systems' hospitals. As a result of this agreement, the hospital and its parent system were not only able to lower their purchasing costs, but they were able to customize the surgical trays to include only the tools needed for individual surgical procedures. Prior to the onset of their consignment agreement, Hospital I purchased eight trays of surgical supplies for each surgical procedure, regardless of whether or not the individual supplies were needed. After instituting the agreements, the hospital was able to reduce the number of needed trays to two per procedure, which reduced costs for each surgical procedure. The consignment agreements were additionally credited with reducing the hospital system's costs and vendor losses due to damage, loss, contamination, or mishandling. Overall, this newer negotiated arrangement improved the relationship between vendors and the hospital's parent system.

The ongoing vendor engagement also reduced costs in other ways. For example, Hospital I's system helped vendors reduce their reliance on expensive sales representatives. The hospital carried out a pilot study that demonstrated an optimal orthopedic surgical pathway, which provided justification to vendors for excluding sales representatives from the operating room for less complex procedures. By working with vendors as partners, the hospital and its parent system were able to reduce their own costs.

Inventory control was also noted as a success at Hospital I. Hospital administrators are able to see their current in-house inventories and request JIT delivery from the systems' distribution center. The new inventory management process allows hospitals to rely on the parent system's internal distribution network rather than depend on sales representatives and last-minute deliveries as they did in the past. The regional system's greater control over inventory in each of its hospitals enables the delivery of supplies as required. In addition, the management system also allowed hospital administrators to review supply and device utilization data to determine usage patterns to predict needed supply delivery dates.

Findings from Hospital I's pilot study helped administrators and vendors determine a more efficient way to carry out LEJRs. After analyzing the entire surgical process flow, the hospital's parent system determined that excluding the sales representative from these types of procedures streamlined the care process and reduced costs for the hospital. The pilot study was implemented in Hospital I as well as other hospitals in the parent system, and results demonstrated streamlining of low- and medium-complex procedures across the system. In addition, surgeons began measuring the surgical site prior to inserting implants, which prevented the hospital from mishandling and wasting costly implants; this additional step saved Hospital I time and money.

F. Summary

Hospital I's investigation into supply chain and inventory management lead to a number of investments that have proven successful for the hospital and its system. Redesign of inventory management and surgical practices at the hospital and system level has reduced financial and resource costs. Although likely to affect similar change at other hospitals, the investments made by Hospital I and its system may not be feasible within standalone hospitals or smaller systems, which lack the ability to invest in warehouse facilities, autoclaves, sterilization procedures, and a customized inventory control system to organize and execute a similar arrangement.

Appendix H: Claims-Based Results

Exhibit H-1: Risk-Adjusted DiD Results, All Episodes, Q2 2016 - Q4 2016

Domain	Measure	CJR		Control Group		CJR		Control Group		DiD	P-Value
		Baseline Episodes (N)	Intervention Episodes (N)	Baseline Episodes (N)	Intervention Episodes (N)	Baseline Risk-Adjusted Average	Intervention Risk-Adjusted Average	Baseline Risk-Adjusted Average	Intervention Risk-Adjusted Average		
Payments	Total payments	284,766	43,801	366,385	58,960	\$27,314	\$25,539	\$26,980	\$26,115	-\$910***	<0.01
	SNF payments	288,235	43,853	371,867	59,571	\$5,549	\$4,380	\$5,492	\$4,778	-\$455***	<0.01
	IRF payments	288,235	43,853	371,867	59,571	\$1,505	\$1,015	\$1,391	\$1,252	-\$350***	<0.01
	HH payments	288,235	43,853	371,867	59,571	\$2,167	\$2,224	\$2,059	\$2,030	\$86	0.14
	Part B payments	284,766	43,801	366,385	58,960	\$4,921	\$4,678	\$4,892	\$4,732	-\$83*	<0.10
	Readmission payments	288,235	43,853	371,867	59,571	\$1,059	\$974	\$1,027	\$1,051	-\$109*	<0.10
Utilization	Anchor hospitalization LOS	288,086	43,715	371,565	59,031	3.4	2.9	3.3	2.8	0.0	0.85
	First PAC SNF	288,242	43,857	371,873	59,571	38.9%	31.4%	39.7%	32.8%	-0.5	0.65
	First PAC IRF	288,242	43,857	371,873	59,571	8.9%	5.0%	8.2%	6.5%	-2.2***	<0.01
	First PAC HH	288,242	43,857	371,873	59,571	37.8%	43.6%	35.4%	37.4%	3.9*	<0.10
	SNF days	119,790	14,511	149,275	18,891	25.5	22.1	24.9	23.5	-2.0***	<0.01
	IRF days	28,961	2,556	32,309	4,085	11.4	11.2	11.5	11.5	-0.1	0.62
	HH visits	192,571	29,535	239,138	36,011	15.8	15.1	15.3	15.1	-0.5**	<0.05
Quality	Unplanned readmission rate	288,184	43,851	371,803	59,561	8.7%	8.3%	8.5%	8.2%	0.0	0.79
	ED use	288,184	43,851	371,803	59,561	13.2%	14.4%	13.3%	14.5%	0.0	0.94
	Mortality rate	268,622	42,792	343,776	57,299	2.6%	2.7%	2.7%	2.7%	0.1	0.44

Source: Lewin’s 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 2016 (intervention).

Notes: The estimates in this exhibit are the result of a difference-in-differences (DiD) model (* p < 0.10, ** p < 0.05, *** p < 0.01).

The change in separate provider payments do not sum to the change in total episode payments because separate models were estimated for total payments and each component payment.

Exhibit H-2: Risk-Adjusted DiD Results, Elective Episodes, Q2 2016 - Q4 2016

Domain	Measure	CJR		Control Group		CJR		Control Group		DiD	P-Value
		Baseline Episodes (N)	Intervention Episodes (N)	Baseline Episodes (N)	Intervention Episodes (N)	Baseline Risk-Adjusted Average	Intervention Risk-Adjusted Average	Baseline Risk-Adjusted Average	Intervention Risk-Adjusted Average		
Payments	Total payments	245,063	38,462	321,446	52,640	\$24,570	\$22,689	\$24,261	\$23,260	-\$880***	<0.01
	SNF payments	248,330	38,512	326,638	53,217	\$3,798	\$2,668	\$3,746	\$3,077	-\$461***	<0.01
	IRF payments	248,330	38,512	326,638	53,217	\$1,063	\$627	\$980	\$817	-\$273***	<0.01
	HH payments	248,330	38,512	326,638	53,217	\$2,150	\$2,196	\$2,035	\$1,995	\$85	0.20
	Part B payments	245,063	38,462	321,446	52,640	\$4,779	\$4,509	\$4,755	\$4,571	-\$86*	<0.10
	Readmission payments	248,330	38,512	326,638	53,217	\$855	\$781	\$829	\$843	-\$88	0.19
Utilization	Anchor hospitalization LOS	248,154	38,370	326,300	52,674	3.1	2.6	3.0	2.5	0.0	0.80
	First PAC SNF	248,334	38,516	326,642	53,217	34.3%	25.5%	34.9%	27.2%	-1.2	0.30
	First PAC IRF	248,334	38,516	326,642	53,217	7.0%	3.3%	6.4%	4.6%	-2.0***	<0.01
	First PAC HH	248,334	38,516	326,642	53,217	42.6%	49.1%	39.9%	42.0%	4.4*	<0.10
	SNF days	89,921	10,493	116,037	14,375	19.8	16.8	19.4	18.5	-2.1***	<0.01
	IRF days	19,862	1,543	21,726	2,601	10.3	10.3	10.5	10.5	0.1	0.59
	HH visits	167,375	26,123	211,077	32,016	15.2	14.4	14.6	14.5	-0.6**	<0.05
Quality	Unplanned readmission rate	248,286	38,511	326,585	53,209	7.1%	6.8%	7.0%	6.6%	0.0	0.96
	ED use	248,286	38,511	326,585	53,209	12.3%	13.6%	12.4%	13.6%	0.0	0.90
	Mortality rate	224,556	36,806	293,970	50,258	0.6%	0.6%	0.6%	0.5%	0.1	0.40
	Complications	248,286	38,511	326,585	53,209	2.1%	2.0%	2.1%	1.9%	0.0	0.77

Source: Lewin’s 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 2016 (intervention).

Notes: The estimates in this exhibit are the result of a difference-in-differences (DiD) model (* p < 0.10, ** p < 0.05, *** p < 0.01). The change in separate provider payments do not sum to the change in total episode payments because separate models were estimated for total payments and each component payment.

Exhibit H-3: Risk-Adjusted DiD Results, Fracture Episodes, Q2 2016 - Q4 2016

Domain	Measure	CJR		Control Group		CJR		Control Group		DiD	P-Value
		Baseline Episodes (N)	Intervention Episodes (N)	Baseline Episodes (N)	Intervention Episodes (N)	Baseline Risk-Adjusted Average	Intervention Risk-Adjusted Average	Baseline Risk-Adjusted Average	Intervention Risk-Adjusted Average		
Payments	Total payments	39,703	5,339	44,939	6,320	\$44,942	\$44,035	\$44,329	\$44,768	-\$1,345***	<0.01
	SNF payments	39,905	5,341	45,229	6,354	\$16,682	\$16,298	\$16,636	\$16,325	-\$73	0.84
	IRF payments	39,905	5,341	45,229	6,354	\$4,206	\$3,699	\$3,932	\$4,213	-\$787***	<0.01
	HH payments	39,905	5,341	45,229	6,354	\$2,262	\$2,402	\$2,207	\$2,304	\$43	0.39
	Part B payments	39,703	5,339	44,939	6,320	\$5,829	\$5,822	\$5,772	\$5,848	-\$83	0.31
	Readmission payments	39,905	5,341	45,229	6,354	\$2,341	\$2,250	\$2,265	\$2,418	-\$243**	<0.05
Utilization	Anchor hospitalization LOS	39,932	5,345	45,265	6,357	5.3	5.0	5.3	5.0	0.0	0.30
	First PAC SNF	39,908	5,341	45,231	6,354	68.2%	71.1%	69.9%	69.5%	3.3***	<0.01
	First PAC IRF	39,908	5,341	45,231	6,354	21.2%	16.8%	19.8%	19.1%	-3.6***	<0.01
	First PAC HH	39,908	5,341	45,231	6,354	6.6%	7.9%	6.4%	7.2%	0.5	0.37
	SNF days	29,869	4,018	33,238	4,516	42.2	37.9	41.2	38.5	-1.6***	<0.01
	IRF days	9,099	1,013	10,583	1,484	13.8	13.2	13.8	13.7	-0.5**	<0.05
	HH visits	25,196	3,412	28,061	3,995	20.2	19.9	19.7	19.4	-0.1	0.81
Quality	Unplanned readmission rate	39,898	5,340	45,218	6,352	19.1%	18.4%	18.7%	18.6%	-0.6	0.38
	ED use	39,898	5,340	45,218	6,352	18.5%	19.4%	19.2%	20.4%	-0.3	0.68
	Mortality rate	44,066	5,986	49,806	7,041	13.5%	14.2%	14.3%	14.5%	0.4	0.59

Source: Lewin’s 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 2016 (intervention).

Notes: The estimates in this exhibit are the result of a difference-in-differences (DiD) model (* p < 0.10, ** p < 0.05, *** p < 0.01). The change in separate provider payments do not sum to the change in total episode payments because separate models were estimated for total payments and each component payment.