A Learning Community to Measure and Improve Costs and Outcomes for Joint Replacements (2015-2016)

Executive Summary

Overview

The Institute for Healthcare Improvement (IHI) invites you to participate in the Joint Replacement Learning Community of provider organizations to measure and improve costs and outcomes for knee and hip replacements, with the aim of ensuring high-value care. Faculty from IHI and leading health care organizations (see Appendix A) will teach participants how to measure their costs of care using Time-Driven Activity-Based Costing (TDABC), while coaching organizations on continuous improvement, rapid-cycle testing, and outcomes measurement (including both clinical and patient-reported outcomes). While focusing on hip and knee replacement, participants will learn and adapt a methodology that can be broadly applied to other procedures and serve as a precursor for bundled payments.

This will be the second year the Learning Community is offered. Teams participating in this program in 2015-2016 will benefit from the learning from the first year, including being able to compare their cost and outcomes data with the benchmark data collected during 2014. For a list of 2014 participating teams, please see Appendix B.

Timeline

A virtual kick-off meeting for the IHI Joint Replacement Learning Community will launch the program on May 7, 2015. Organizations will begin the program by submitting baseline data and building an infrastructure for the collection and integration of patient-reported measures. The first in-person meeting will be held in late May 2015, focusing on how to apply the TDABC methodology and how to begin implementing outcomes measures. The cost and outcomes measurement work will take place from June 2015 through August 2015 to establish the measurement framework and obtain baseline outcomes data. The second in-person meeting in September 2015 will explore the reasons for variation in outcomes measures among the participants, and participants will learn how top-performers achieved their results. Teams will then focus on performance improvement during the fall and winter of 2015 and early 2016. The Learning Community activities will continue through April 2016, and a summative virtual meeting will convene in July 2016 to present the results from the 14-month program.
Prospectus: IHI Joint Replacement Learning Community, 2015-2016

Participation Criteria

Organizations interested in participating in the Learning Community will need to complete the letter of intent, available on the IHI website at [www.IHI.org/JRLC](http://www.IHI.org/JRLC) or by clicking here. To be eligible for participation, organizations must perform at least 200 primary total joint replacement procedures per year, indicate senior-level commitment to improving the value of their care, staff the requisite project team, and commit to send the core team to the two in-person and two virtual meetings. Letters of intent will be accepted on a rolling basis through **April 10, 2015**.

Program Fee

The fee for participation in the 14-month IHI Joint Replacement Learning Community (May 2015 through July 2016) is $24,500 per participating hospital and affiliated orthopedic surgeons. Organizations participating from the same hospital system are eligible for a 15% discount on the program fee for each organization. This fee does not include travel to or accommodations for in-person meetings.

Contact

If you have questions about this program, or are interested in learning more, please contact IHI Project Coordinator, Leigh Carroll at lecarroll@ihi.org.
Why Participate?

Increasing value, understanding costs, and developing alternate payment models are critical imperatives for the new health care environment.

- **High-Potential ROI:** Primary knee and hip replacements are about a $10M service line for the average hospital participating in the Joint Replacement Learning Community in 2014. The Learning Community’s goal is to help hospitals achieve a 5% annual reduction in costs, which would amount to $500,000 annually for a $10M service line. Even a 2% reduction in costs would be about $200,000, which is 10 times more than the program fee.

- **High-Growth Service Line:** Major joint replacement or reattachment of the lower extremity (MS-DRGs 469 and 470) are the most common conditions in the Medicare population, and account for the highest total Medicare episode payments (6.3%).\(^1\) It is predicted that by 2030, the number of primary total knee replacements will increase by 673%, to 3.48 million procedures annually, and the number of primary total hip replacements will increase by 174%, to 572,000 procedures annually.\(^2\)

- **Declining Revenue per Case and Increasing Supply Cost Pressure:** Since the introduction of MS-DRGs, average Medicare payments for DRG 470 have declined. Physician payments for primary knee and hip replacements have continued to decline as well—by an average of 2.5% since 2000. Despite declining Medicare payments, over this same time period, average list prices for implants have continued to increase by an average of over 5%.\(^3\)

- **Imperative to Demonstrate Quality of Care:** In the face of growing pricing pressure, it is becoming even more important to demonstrate superior outcomes. There is no statistically significant difference between most providers with respect to risk-adjusted readmission and complication rates. Patient-reported measures (PRMs) will become the basis for differentiating providers from one another with respect to care quality.

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• **Participant Satisfaction:** IHI and the Learning Community faculty have a strong commitment to customer service and satisfaction. In the first year of the program, 96% of participants rated their experience in the program as excellent or good. Three-quarters through the program year, more than one-half of participating teams indicated they achieved their 5% cost-reduction goal.

**Who Should Participate?**

Beginning the program’s second year in May 2015, the IHI Joint Replacement Learning Community seeks to enroll provider organizations that are committed to improving the value of their care. Organizations will learn the answers to the following questions:

• What is an accurate way to measure the value of care a provider delivers?
  o What does it cost to provide elective joint replacements (hips and knees) over the full care cycle, from consent for surgery through post-surgical follow-up?
  o What outcomes should a provider track, and how should they be measured?
• How do the costs and outcomes from my organization compare with those from a range of other provider organizations?
• What is the most cost-effective way to deliver exceptional outcomes at the lowest cost?
• What specific changes in the design and delivery of care will allow a provider organization to reduce avoidable cost while maintaining or even improving care quality and outcomes?
• How can an organization leverage cost and outcomes data to develop models for bundled payments?

**Program Components and Timing**

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To fulfill the learning described above, the Learning Community activities will include:

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**Measure Costs Using the TDABC Methodology**

Providers will learn to measure their underlying costs of delivering care using the guiding principles of Time-Driven Activity-Based Costing (TDABC), co-developed by Harvard Business School Professor Robert S. Kaplan, through coaching and mentoring from clinical and finance leaders successfully applying the methodology. The 2015-2016 Learning Community will build on the experiences of the 2014 program teams to provide participants with a template to complete the costing work. Learning Community members will be able to measure and compare with one another their cost and care process information.

**Analyze Outcomes Data and Accelerate Integration of Patient-Reported Measures**

An important way to reduce costs is to improve quality. To achieve cost reduction while maintaining or improving quality, organizations must measure, understand, and manage variation of clinical processes that underlie care treatment. Learning Community participants will work together to collect, analyze, and compare patient-reported measures (PRMs). Outcomes data from participating institutions and physicians will be analyzed to define areas of excellence as well as areas for improvement. The results from outcomes measurement will serve

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Prospectus: IHI Joint Replacement Learning Community, 2015-2016

as a starting point for performance improvement work within the Learning Community. Data collection for these measures will provide participants with a view of performance that can be adapted to other conditions.

Clinical and Process Measures

As teams reduce costs for their care cycle based on the analysis from the adapted TDABC methodology, local clinical measures should improve or, at a minimum, remain stable over time. In order to assess performance at baseline, participating teams will be asked to submit their most recent data by providing one data point for the year for each of the measures. Sample measures include:

- Percent of patients discharged to home
- Average length of stay (in days)
- Percent pre-surgery patient-reported measure tool administration
- CMS Risk-Adjusted THA/TKA 30-day Readmission Rate
- CME Risk-Adjusted THA/TKA Complication Rate

During the first in-person meeting we will present the baseline performance of the Learning Community as a whole, identify variation among organizations, and highlight areas of strengths and opportunities for improvement. A subset of this data set will be collected and shared monthly within the Learning Community as part of ongoing outcomes tracking and improvement efforts.

Patient-Reported Measures

Patient-reported measures (PRMs) are vital to success in the Joint Replacement Learning Community. Without PRMs, participants will be limited in their comparisons and ability to measure improvement. However, many organizations currently do not collect PRMs data despite their importance. The Learning Community will provide organizations currently collecting PRMs data, and those interested in starting to collect such data, with support to help them on their journey, as described below.

- Participants already collecting PRMs data will be asked to collect and submit their data to the Learning Community. Participants will be asked to track pre-op and 6-month post-op PRMs in order to measure change in PRMs over time. Data will be tracked at the patient level, in surgical order. The Learning Community will focus on use of HOOS and KOOS condition-specific tools, but will also work with general health surveys (e.g., VR-12, PROMIS-10). Participants will be expected to provide baseline data and demonstrate their ability to analyze PRMs data as part of the value assessment.

- The Learning Community faculty will work with participants that are not currently collecting PRMs data to help build the organizational will and infrastructure to collect such data for a subset of at least 20 patients by September 2015. Organizations that enroll in the Learning Community will be granted access to the materials and recordings from the IHI Expedition: Using Patient-Reported Measures to Improve the Value of Care to support their work early in the year. Based on experience from the first year of the
Learning Community, specifying, testing, and deploying a system of PRMs can easily demand several days per month, over several months, from the project leader or other dedicated staff person.

**Review Data and Establish Improvement Targets**

Once participating organizations understand their cost structure and have a coherent view of their desired outcomes measures, the Learning Community will turn its focus to improving performance. IHI has spent more than 25 years working with organizations to improve care processes and patient outcomes through transparency and shared learning. Participants will apply the Model for Improvement (figure below), the framework IHI uses to guide improvement work, to accelerate change in their local environment and learn to embed improvement into their day-to-day work.

**Aims (What are we trying to accomplish?):** Aims are time-specific, measureable, and focused on a specific population. During the Learning Community, participants will set aims for cost reduction and improvements in outcomes.

**Measures (How will we know that a change is an improvement?):** Change and improvement don’t always go hand in hand, so teams will specify how they will use measures to gauge their progress toward their desired outcomes. Improvement ideas are tested through the use of sequential, observable Plan-Do-Study-Act (PDSA) cycles, and participants gather “just enough” data to understand if the changes are leading to improvement. Improvement focuses on small tests of big changes, rather than big tests of small changes, and successful changes are rapidly scaled up.

**Improvement Ideas (What changes can we make that will result in improvement?):** Change ideas represent our best current theory about which improvements will allow participants to reach their aims. We often develop driver diagrams to represent the change ideas and their relationship to each other. As more is learned through testing change ideas, driver diagrams evolve to encompass new insights. For the driver diagram from the 2014 Joint Replacement Learning Community, see Appendix C.

**Generate Improvements to Increase Value**

Through decades of facilitating ambitious improvement initiatives, IHI has confirmed the value of collaborative learning in accelerating teams’ progress. Transparency of testing and results is a

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hallmark of these designs, and often participants learn to relate to each other as a powerful “brain trust” of improvement partners.

Stage 1: Identify high-value practices. IHI will work with organizations in the Learning Community to identify practices at each level of the care process that deliver notable value. High-value practices will be determined by analyzing both costs and outcomes. IHI will also leverage examples of high-value practices collected in the previous cohort of this program and will share this learning throughout the program year.

Stage 2: Engage in the learning system. Participants will be part of a Learning Community of organizations focused on sharing insights from the data, and identifying and testing changes based on high-value practices. The Learning Community is supported by subject matter experts such as orthopedic clinicians and change management experts. Within the Learning Community, participants will:

- **Identify change opportunities from high-value practices.** IHI will facilitate in-depth discussion of the high-value practices identified. From this discussion, participants will be able to identify approaches that they can test and adapt to their local settings.

- **Share lessons from testing the application of high-value practices.** IHI will provide coaching on how to test approaches in the local setting using improvement methods such as the Model for Improvement. Participants will share what has or has not worked for them at the local level and undertake shared problem-solving.

Examples of high-value practices implemented by teams participating in the first year of the Learning Community include:

- Increasing the percentage of patients discharged to home
- Pre-surgical optimization, including rehabilitation, screening protocols, updated class content and schedules
- Consumables management, including cement and implants
- Developing local systems to analyze patient-reported measures by patient

Learning Community activities that support this work include the following:

- **Monthly all-team calls** provide an opportunity for shared learning, networking, and refinement of action plans.
- **An email distribution list (project listserv)** provides a virtual discussion space for participating organizations to ask questions of one another.

“In order to thrive in health care reform, best practices are no longer enough. Driving the value equation requires hospital teams to focus simultaneously on quality, cost, and continuous process improvement throughout the continuum of care. The IHI experts teach progressive techniques such as Time-Driven Activity-Based Costing and process improvement methods that Hoag Orthopedic Institute deploys throughout our entire organization. IHI leaders facilitate dialogue and comparative data analysis that result in highly effective, actionable plans for all the participants of the Learning Community.”

Dereesa Purtell Reid, MBA, CPA, Chief Executive Officer, Hoag Orthopedic Institute, LLC, Irvine, California
The Learning Community faculty will provide training and feedback through a variety of methods, including in-person meetings, all-team webinars, small group calls, and one-on-one feedback to participating organizations.

Timeline

November 2014 – April 2015

Letter of Intent Submissions and Selection of Participating Organizations: IHI is seeking a diverse range of applicants to ensure that learning is captured from different types of facilities. The goal is to include a mix of academic centers, community hospitals, urban and rural facilities, and participants from multiple countries. Applicants will be selected based on their hospital demographics and their demonstrated personnel and financial commitment. Letters of Intent will be reviewed and accepted on a rolling basis. The deadline for Letter of Intent submissions is April 10, 2015, to allow time for organizations to complete the required pre-work before the start of the Learning Community. The Letter of Intent is available on the IHI website at www.IHI.org/JRLC or by clicking here.

Informational Calls: Informational calls will be held for organizations that are interested in learning more about the Learning Community. The schedule will be posted to the IHI website at www.IHI.org/JRLC when available.

Pre-work: Upon acceptance into the Learning Community, organizations will be required to complete pre-work. Pre-work will be available starting February 2, 2015. The Learning Community faculty will be available to begin work and training with organizations upon enrollment. If organizations choose to start work prior to April 2015, they will receive support from the Learning Community faculty in pre-work completion and analysis.

May 2015

Project Team Virtual Learning Session 1: On May 7, 2015, there will be a 75-minute virtual training for project teams. The training will introduce patient-reported measures, set the pace for the upcoming Learning Community activities, and introduce Time-Driven Activity-Based Costing (TDABC).

Project Team In-Person Learning Session 1: A one-day, in-person meeting will be scheduled at the end of May 2015. The project leader and finance lead from each participating organization is expected to attend. Organizations are allowed to include up to two additional people from the local frontline team to attend this meeting. The Learning Session will cover how to apply the TDABC methodology and how to begin implementing the selected outcomes measures.

June–August 2015

Cost and Outcomes Measurement: Organizations will complete the cost measurement work and provide their outcomes data for analysis. Organizations will receive feedback on their work from the Learning Community faculty.
September 2015

Data Synthesis: During September, the Learning Community faculty will synthesize and analyze the cost and outcomes data provided by each participating organization.

Project Team In-Person Learning Session 2: In late September 2015, there will be an in-person meeting to discuss the results of the cost and outcomes measurement work, and to help participating organizations develop and prepare to execute their performance improvement plans.

September 2015 – April 2016

Performance Improvement: The Learning Community faculty will work with the participating organizations to move toward actual testing of improvements, and to help with implementation and scale-up of locally successful improvements. In addition to monthly all-team calls, faculty will be available for calls with participating organizations every few weeks to provide coaching on strategies for accelerating change.

May–June 2016

Re-Measure and Synthesize: Organizations will re-measure their outcomes and costs to see how much they have improved the value of their care during the Learning Community.

Project Team Virtual Learning Session 2: The 14-month Learning Community will culminate in an integrated comparison of costs, outcomes, and care processes across participating organizations. In 2016 the comparison will also integrate available PRMs data to better examine the overall value of the care being delivered. The results of the comparison will be featured during the June 2016 virtual meeting. Prior to this meeting, organizations will be given personalized feedback that highlights their strengths and opportunities for further improvement based on the data comparison.

At the conclusion of the Learning Community, information will be distributed on high-value practices across the full care cycle for primary total knee and hip replacements that draws from the insights generated from the cross-organization data comparison, as well as from input from organizations that are exhibiting the high-value practices.

Participation Requirements

Senior Leadership Support: Senior executive commitment is vital to the success of this program. The senior leader needs to ensure that the relevant clinicians, finance staff, and administrators participate fully in the analysis and improvement activities.

Project Team: The project team for this work typically consists of a project leader, a physician advisor, a financial analyst, and a clinical operations/performance improvement representative.

- Project Leader: The project leader will be the primary point of contact with the Learning Community. The project leader should be skilled at managing projects in both...
clinical and financial areas and have a close working relationship with the project team. Leaders that have been successful in this role in the past include roles similar to Executive Director, Ortho/Spine/Oncology; Joint Care Program Manager; Department Administrator, Orthopaedics; Director Orthopedic Services; or Administrator, Orthopaedic Surgery.

- **Physician Advisor:** The physician advisor’s role is to be a champion for the project with clinicians so they are excited to participate, and to provide the physicians’ input into the costing, outcomes, and performance improvement. Physician engagement was a key success factor for teams that participated in the first year of the program.

- **Financial Analyst:** The financial analyst is in charge of assembling the necessary information to develop the capacity cost rates for each type of clinician, and other key inputs into the financial model such as average lengths of stay, inpatient nurse staffing ratios, transfusion rates, etc. This person does not need to be a CPA, but should have access to accounting and payroll systems data. Typical roles or titles for this role may include Financial Analyst, Senior Cost Accountant, Decision Support/Financial Analyst, or Financial Services Administrator.

- **Clinical Operations/Performance Improvement Representative:** This person is in charge of driving day-to-day work for the project team. This includes operational activities like helping to arrange meetings with the relevant people and capturing potential ideas for performance improvement. This person should also have a close working relationship with frontline teams. The project leader could play this role, depending on how familiar he or she is with the relevant people and processes involved in care delivery. Again, typical roles or titles for this role may include Joint Replacement Program Coordinator, Operations Analyst, Clinical Nurse Specialist, Program Manager, Quality Improvement Specialist, Management Engineer, and Surgical/Ortho Clinical Nurse Coordinator.

It is expected that the workload for the project team will be heavier during the first four months than during the remainder of the program. During the first four months, it will take an average of 10 to 15 hours per week of the project leader’s time (the amount of work will depend on whether an organization is currently collecting PRMs data), 1 to 2 hours per week of the physician advisor’s time, 5 to 10 hours per week of the financial analyst’s time, and about 3 to 5 hours per week of the clinical operations/performance improvement representative’s time, depending on how the project leader and clinical operations leader share the effort. If the organization does not currently collect PRMs data, it is expected that the project leader or the clinical operations leader’s work will increase by an additional 10 to 15 hours per week.

As organizations begin the performance improvement work, it is expected that the estimated time allocation described above will change slightly to allow more support from the performance improvement leaders. The amount of time required will depend on how easy it is to schedule meetings with the relevant range of clinicians, the ease with which the financial information can be accessed, whether the organization is interested in accounting for physician variation in the costing, and whether the organization is already collecting PRMs data. The project team will also
need a modest amount of time over the course of the Learning Community from a range of clinicians involved in the care cycle, to gather their input.

**Data Sharing and Confidentiality Standards:** Within the Learning Community, organizations will be expected to share with one another information on the set of activities involved in the care cycle, the type of resources (people, supplies, drugs, etc.) involved in performing each activity, how long it takes to perform each activity, the total costs using standardized cost rates provided by the Learning Community faculty, and the outcomes achieved. Participating organizations will be expected to allow IHI and the program faculty to publicly use and disclose the following information: the names of the participating organizations, data and information from individual organizations as long as it is reasonably de-identified, and analyses and summaries of the data in aggregate across all or many of the participating organizations (e.g., comparisons of US to international organizations). Any organization-specific data that is not de-identified would only be shared publicly after approval by that organization. All participating organizations will sign a non-disclosure agreement with IHI.

**Program Fee:** The fee for participation in the 14-month IHI Joint Replacement Learning Community (May 2015 through July 2016) is $24,500 per participating organization. This fee covers the participation of one hospital and the clinical team that performs joint replacements at that institution (including physicians, even if they are not part of the hospital organization). Organizations participating from the same system are eligible for a 15% discount on the program fee for each organization. This fee does not include travel to or accommodations for in-person meetings.

**Application Process**

Organizations that are interested in participating in the Learning Community should submit the Letter of Intent by April 10, 2015, to IHI Project Coordinator, Leigh Carroll, at lecarroll@ihi.org. Letters of Intent will be reviewed and accepted on a rolling basis. Organizations will be selected based on the strength of their applications, including hospital demographics and demonstrated personnel and financial commitment, with the goal of engaging a diverse group of organizations in the Learning Community. The Letter of Intent is available on the IHI website at www.IHI.org/JRLC or by clicking here.

Informational calls will be held for organizations that are interested in learning more about the Learning Community. The schedule will be posted to the IHI website at www.IHI.org/JRLC when available.

**Contact**

If you have questions about the IHI Joint Replacement Learning Community, please contact IHI Project Coordinator, Leigh Carroll, at lecarroll@ihi.org.
Appendix A: Learning Community Core Faculty

**Jill Duncan, RN, MS, MPH**, Director, Institute for Healthcare Improvement (IHI), is currently engaged in content development and programming support for IHI’s Quality, Cost, and Value work. She is faculty for IHI’s Leading Quality Improvement: Essentials for Managers program, and she is engaged in program development and facilitation for many of IHI’s Expeditions, Web&ACTION webinars, and other workforce development initiatives. Her previous IHI responsibilities include daily operations and strategic planning for the IHI Open School and development and leadership of Impacting Cost + Quality, a two-year prototyping Collaborative. With nearly 20 years of health care experience, she draws from her learning as a clinical nurse specialist, pediatric nurse educator, and frontline nurse. Her clinical interests have developed through experiences in a variety of settings, including neonatal ICU, pediatric ER, clinical research, public health activism, and Early Head Start health programming. Ms. Duncan has contributed to a variety of collaborative publications in *The Journal of Pediatrics* and she is co-author of *Pediatric High-Alert Medications: Evidence-Based Safe Practices for Nursing Professionals* and *Stressed Out About Your Nursing Career*.

**Kevin Little, PhD**, Improvement Advisor, Institute for Healthcare Improvement (IHI), is a statistician specializing in the use of information to study, understand, and improve system performance. His experience in application of statistical methods includes direct work with scientists and engineers in a range of disciplines. He has also coached improvement teams in a range of industries. Dr. Little served as Improvement Advisor to the National Health Disparities Collaboratives from 2001 to 2006, and to IHI’s Hospital Portfolio of projects from 2010 to 2012. He was the Improvement Advisor for the first year of the IHI Joint Replacement Learning Community in 2013-2014. In related measurement system work, he developed the measurement strategy for the Healthier Hospitals Initiative (HHI) and consults with both HHI and Practice GreenHealth to define and deploy useful data analytics.

**Katharine Luther, RN, MPM**, Vice President, Institute for Healthcare Improvement (IHI), is responsible for furthering IHI’s work to help hospital leaders and staff achieve bold aims. Key to this work is developing strategic partnerships that leverage innovation, pilot testing, implementation, and continuous learning across organizations, systems, professional societies, and entire countries. Previously, she served as Executive Director at IHI, designing new programs to impact cost and health care quality. Ms. Luther has more than 25 years of experience in clinical and process improvement, focusing on large-scale change projects and program development, system improvement, rapid-cycle change, developing and managing a portfolio of projects, and working with all levels of health care staff and leaders. Her clinical experience includes critical care, emergency room, trauma, and psychiatry. Prior to joining IHI, she held leadership positions at the University of Pittsburgh Medical Center, MD Anderson Cancer Center, and Memorial Hermann–Texas Medical Center. She has experience in Lean and is a Six Sigma Master Black Belt.

**Lucy Savitz, PhD, MBA**, Director of Research and Education, Intermountain Healthcare, Institute for Healthcare Delivery Research, has more than two decades of applied health services research experience with a focus on the implementation and evaluation of clinical process innovations. Her applied research in diabetes, cardiovascular disease, and mental health service
delivery improvements is supplemented by her hands-on experience in making the business case for quality. She served for two years as a Malcolm Baldrige National Quality Award Program Examiner. Her research background is complemented by her work as a financial planner for a health system, together with longstanding involvement with the CDC Management Academy, contributing a rich, multifaceted perspective on innovation and spread of mental health integration.

Orthopedic Surgeon Faculty Advisors

Kevin Bozic, MD, is Professor and Vice Chair in the Department of Orthopaedic Surgery and a member of the core faculty of the Philip R. Lee Institute for Health Policy Studies at the University of California, San Francisco (UCSF). Dr. Bozic is a graduate of the UCSF School of Medicine and the Harvard Combined Orthopaedic Residency Program. Additionally, he holds a BS in Biomedical Engineering from Duke University and a MBA from Harvard Business School. Dr. Bozic has fellowship training in Adult Reconstructive Surgery from Rush University Medical Center in Chicago. His clinical interests are in adult reconstructive surgery of the hip and knee, with an emphasis on primary and revision hip and knee replacement. His research interests are broadly in the fields of health policy and health care services research, and specifically in the areas of health care technology assessment, cost-effectiveness analysis, shared medical decision making, and the impact of health care reform on cost and quality. Dr. Bozic is actively involved in numerous regional and national health policy initiatives, including the Agency for Healthcare Research and Quality’s (AHRQ) Effective Healthcare Stakeholder Group, the Integrated Healthcare Association’s Value Assessment of Medical Technologies Program, and the California HealthCare Foundation’s California Joint Replacement Registry Project. His regional and national leadership positions include President of the California Orthopaedic Association, Board of Trustees of the Orthopaedic Research and Education Foundation (OREF), Board of Directors of the American Joint Replacement Registry (AJRR), and Chair of the American Academy of Orthopaedic Surgeons (AAOS) Council on Research and Quality. Dr. Bozic has been the recipient of numerous awards and honors, including OREF’s Clinical Research Award, AAOS’s Clinician-Scientist Traveling Fellowship Award, the American Orthopaedic Association’s American-British-Canadian Traveling Fellowship, the American Association of Hip and Knee Surgeon’s James A. Rand Young Investigator Award, and the Orthopaedic Research Society’s William Harris Award. Since arriving at UCSF, he has received extramural funding for his research from the OREF, AHRQ, National Institutes of Health, Robert Wood Johnson Foundation, and the California HealthCare Foundation.

Anthony DiGioia, MD, is the Medical Director of The Orthopaedic Program and The Innovation Center at Magee-Womens Hospital of the University of Pittsburgh Medical Center (UPMC). He is a practicing orthopaedic surgeon at Renaissance Orthopaedics, PC, located at Magee-Womens Hospital of UPMC, and an engineer by training. He developed the Patient- and Family-Centered Care (PFCC) Methodology and Practice, which combines the art and science of performance for health care and is an innovation in the process of care delivery that dramatically improves patient outcomes, quality, safety, and efficiencies, and reduces costs while delivering exceptional care experiences. Dr. DiGioia collaborates with caregivers and health care leaders to export the PFCC Methodology and Practice for any care experience, anywhere.
Appendix B: List of 2014 Learning Community Participants

The following organizations participated in the 2014 offering of IHI’s Joint Replacement Learning Community:

<table>
<thead>
<tr>
<th>Organization</th>
<th>City, State</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adventist Medical Center</td>
<td>Portland, Oregon</td>
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<tr>
<td>Advocate Health Care</td>
<td>Downers Grove, Illinois</td>
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<tr>
<td>Central Dupage Hospital</td>
<td>Winfield, Connecticut</td>
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<tr>
<td>Connecticut Joint Replacement Institute</td>
<td>Hartford, Connecticut</td>
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<tr>
<td>Danbury Hospital</td>
<td>Danbury, Connecticut</td>
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<tr>
<td>Delnor Hospital</td>
<td>Geneva, Illinois</td>
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<tr>
<td>EvergreenHealth</td>
<td>Kirkland, Washington</td>
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<tr>
<td>Franciscan St. Francis Health–Moorseville</td>
<td>Mooresville, Indiana</td>
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<tr>
<td>Gundersen Health System</td>
<td>La Crosse, Wisconsin</td>
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<tr>
<td>Hackensack University Medical Center</td>
<td>Hackensville, New Jersey</td>
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<tr>
<td>Henry Ford West Bloomfield Hospital</td>
<td>West Bloomfield, Michigan</td>
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<tr>
<td>Hoag Orthopedic Institute</td>
<td>Irvine, California</td>
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<tr>
<td>Hospital Alvorada</td>
<td>Sao Paulo, Brazil</td>
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<tr>
<td>Hvidovre Hospital, University of Copenhagen</td>
<td>Hvidovre, Denmark</td>
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<tr>
<td>Jewish General Hospital</td>
<td>Montreal, Quebec, Canada</td>
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<tr>
<td>Johns Hopkins Bayview Medical Center</td>
<td>Baltimore, Maryland</td>
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<tr>
<td>Kadlec Regional Medical Center</td>
<td>Richland, Washington</td>
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<tr>
<td>Montefiore Medical Center</td>
<td>Bronx, New York</td>
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<tr>
<td>Moses Taylor Hospital</td>
<td>Scranton, Pennsylvania</td>
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<tr>
<td>Northside Hospital Forsyth</td>
<td>Cumming, Georgia</td>
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<tr>
<td>Northwestern Memorial Hospital</td>
<td>Chicago, Illinois</td>
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<tr>
<td>Orlando Regional Medical Center</td>
<td>Orlando, Florida</td>
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<tr>
<td>Palmetto Health</td>
<td>Columbia, South Carolina</td>
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<tr>
<td>Providence Alaska Medical Center</td>
<td>Anchorage, Alaska</td>
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<tr>
<td>Providence Sacred Heart Medical Center</td>
<td>Spokane, Washington</td>
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<tr>
<td>Regional Hospital of Scranton</td>
<td>Scranton, Pennsylvania</td>
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<tr>
<td>Sierra Medical Center</td>
<td>El Paso, Texas</td>
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<tr>
<td>Straub Clinic and Hospital</td>
<td>Honolulu, Hawaii</td>
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<tr>
<td>UMass Memorial Medical Center</td>
<td>Worcester, Massachusetts</td>
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<tr>
<td>University of California, San Francisco</td>
<td>San Francisco, California</td>
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<tr>
<td>University of Pittsburgh Medical Center</td>
<td>Pittsburgh, Pennsylvania</td>
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<tr>
<td>Wake Forest Baptist Medical Center</td>
<td>Winston-Salem, North Carolina</td>
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Appendix C: Driver Diagram for the IHI Joint Replacement Learning Community

A driver diagram is a pictorial display of a system and can be used as a method for breaking down problems and formulating a strategy and actions. The driver diagram below is from year one (2014) of the IHI Joint Replacement Learning Community.

**Aim:**

- Reduce costs of joint replacement surgery by 5% while maintaining or improving clinical and patient-reported outcomes
- Reduce waste and variation in process steps
- Reduce waste of personnel time
- Reduce waste of materials and supplies
- Manage the full care cycle of a patient
- Manage system-wide processes

**Primary Drivers:**

- Reduce waiting time
- Assure clinical excellence
- Assure smooth handoffs across transitions
- Develop standard work as foundation for improvement
- Avoid duplication of information asked of patients
- Assure clinicians work at top of license
- Reduce idle time of personnel
- Match personnel to demand
- Reduce unit costs of materials and supplies
- Rationalize materials and ordering
- Practice resource stewardship
- Manage pain across the care cycle
- Manage discharge destinations actively
- Assure effective project leadership and management
- Integrate patient-reported outcomes
- Monitor clinical and patient-reported outcome measures
- Align with strategic priorities