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*“We focused on designing a whole-system performance improvement approach that cascades from national to regional to facility levels as staff focus on a collaborative effort to improve performance”*  
—Schilling et al. (p. 487)



## Reinventing a Performance Improvement System

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## Performance Improvement

# Kaiser Permanente's Performance Improvement System, Part 1: From Benchmarking to Executing on Strategic Priorities

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Almost 10 years ago, the Institute of Medicine established a framework for building a 21st-century health care system by identifying six aims for improvement in health care: safety, effectiveness, patient-centeredness, timeliness, efficiency, and equity.<sup>1</sup> Despite the efforts of dedicated clinical and support staff, administrators, and patient advocates, as well as public and private national quality groups, we have not yet seen sweeping advancements since these aims were established. The reasons for our slow process are myriad and complex, reflecting the structure of our health care system and the realities of competing demands in patient care. Achievements in measurement have contributed to our ability to evaluate our progress—which has been modest at best.<sup>2</sup> It has become increasingly apparent that performance measurement in isolation, without accompanying culture change, is not sufficient to drive improvement. Moreover, improvement typically relies on designated quality departments and councils or committees overseeing efforts largely conducted as isolated projects.<sup>3</sup>

Integrating quality improvement (QI) activities and operations at all levels—from frontline teams to senior leadership—is necessary for achieving the Institute of Medicine's six aims for improvement and yet difficult to achieve.<sup>4</sup> In this article and the subsequent articles in this series, we describe Kaiser Permanente's experience in embedding improvement into operations throughout the entire organization through the development of a performance improvement (PI) system. Subsequent articles in this series examine the value framework, including return on investment, for the Kaiser Permanente PI system; the PI system's application to reducing sepsis mortality; and our experience in creating a learning organization.

Kaiser Permanente, based in Oakland, California, is the largest not-for-profit health plan in the United States, serving 8.6 million members in eight regions. Three organizations cooperate to provide all care the members need: the Kaiser Foundation Health Plan, Inc.; Kaiser Foundation Hospitals, overseeing 35 medical centers in the United States; and

### Article-at-a-Glance

**Background:** By 2004, senior leaders at Kaiser Permanente, the largest not-for-profit health plan in the United States, recognizing variations across service areas in quality, safety, service, and efficiency, began developing a performance improvement (PI) system to realizing best-in-class quality performance across all 35 medical centers.

**Measuring Systemwide Performance:** In 2005, a Web-based data dashboard, "Big Q," which tracks the performance of each medical center and service area against external benchmarks and internal goals, was created.

**Planning for PI and Benchmarking Performance:** In 2006, Kaiser Permanente national and regional continued planning the PI system, and in 2007, quality, medical group, operations, and information technology leaders benchmarked five high-performing organizations to identify capabilities required to achieve consistent best-in-class organizational performance.

**The PI System:** The PI system addresses the six capabilities: leadership priority setting, a systems approach to improvement, measurement capability, a learning organization, improvement capacity, and a culture of improvement. PI "deep experts" (mentors) consult with national, regional, and local leaders, and more than 500 improvement advisors are trained to manage portfolios of 90–120 day improvement initiatives at medical centers.

**Impact:** Between the second quarter of 2008 and the first quarter of 2009, performance across all Kaiser Permanente medical centers improved on the Big Q metrics.

**Conclusions:** The lessons learned in implementing and sustaining PI as it becomes fully integrated into all levels of Kaiser Permanente can be generalized to other health care systems, hospitals, and other health care organizations.

Table 1. Measures in “Big Q” Data Dashboard\*

Domain	Measure	Definition
Clinical Effectiveness	Hospital Standardized Mortality Ratio <sup>26</sup>	Ratio of observed to expected mortality, after adjustment for selected patient-mix and community variables, among Medicare patients with diagnoses accounting for 80% of inpatient mortality
	Healthcare Effectiveness Data and Information Set (HEDIS) composite <sup>27</sup>	An averaged aggregation of 33 HEDIS outpatient measures into a single measure that spans conditions and types of care
	The Joint Commission composite <sup>28</sup>	An averaged aggregation of 21 Joint Commission indicator measures into a single measure that spans conditions and populations
Safety	Serious Reportable Event (SRE) <sup>29</sup> composite	Mean number of days elapsed between SREs, charted quarterly, programwide for Kaiser Permanente. It is comprised of 12 serious reportable event incident types.
Resource Stewardship	Total care delivery costs	Year-to-date percentage change in total costs of care delivery per member per month, programwide
Service	Health plan rating	Programwide assessment of health plan by commercial HMO members using the Consumer Assessment of Healthcare Providers and Systems (CAHPS) 4.0 H questionnaire. <sup>30</sup> The numerator reflects overall ratings of 9 or 10 on a scale of 0–10.
	Health care rating	Programwide assessment of health care by commercial HMO members using the CAHPS 4.0 H questionnaire. <sup>30</sup> The numerator reflects overall ratings of 9 or 10 on a scale of 0–10.
	Hospital rating	Programwide assessment of hospitals by patients on the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey. <sup>31</sup> The numerator reflects overall ratings of 9 or 10 on a scale of 0–10.

\* References are listed on p. 498.

regional Permanente Medical Groups, which include nearly 15,000 physicians representing all medical and surgical specialties.

Kaiser Permanente has a history of innovation in prevention and population care. Nevertheless, by 2004, senior leadership recognized that variations across service areas existed in quality, safety, service, and efficiency. Best-in-class performance (top decile on externally benchmarked indicators) existed within the organization, but it was far from uniform. Leaders also recognized the immense challenge of creating systemwide improvement to reduce performance variations.

Kotter’s model, which presents a sequence of eight steps leaders can undertake to plan for and build a foundation for lasting organizational change,<sup>5</sup> provided a framework for undertaking this challenge. The Kaiser Permanente national quality committee, composed of health plan, medical center, and medical group leaders, was the initial guiding coalition and had the collective power to undertake transformative change. The coalition formulated and communicated a clear vision for quality—that Kaiser Permanente would provide best-in-class

care—and used internally transparent performance data to create a sense of urgency about the need for improvement to build collective will for change.

### Measuring Systemwide Performance

In 2005, the national quality committee created a data dashboard known as “Big Q,” which distilled hundreds of performance measures into a vital few, high-level measures to allow leaders to answer the question, “As a system, are we improving?” Dashboard measures were selected in consultation with organizational clinical, operational, and financial leaders and in collaboration with the Institute for Healthcare Improvement (IHI),<sup>6</sup> creating a view of systemwide performance (Table 1, above). Displayed over time and across regions and facilities, the measures are benchmarked to external best-in-class performers.

Initial domains included clinical effectiveness, safety, care experience, and resource stewardship; equitable care and population health are under development. Some top-level measures with external benchmarks already existed, such as hospital stan-

standardized mortality ratios (HSMRs). In other cases, composite indices were developed that preserved the ability to drill down to specific components; for example, The Joint Commission composite aggregates The Joint Commission's individual measures, each of which can also be displayed.

A Web-based platform, the Big Q dashboard provides all leaders on-demand access to system performance data via desktop computer. It tracks the performance of each medical center and service area against external benchmarks and internal goals, thereby enabling executives to gauge their medical center's performance against best-in-class organizations and other Kaiser Permanente service areas. Viewers can drill down from organizationwide indicators to a single medical center's metrics to understand each facility's comparative performance and improvement opportunities and create customized graphical reports on demand. The dashboard focuses organizational attention on a few vital performance indicators and reduces ambiguity and confusion that can result from disparate data sources. Creating transparency in overall performance, coupled with leadership attention, had the intended effect; in less than two years, performance improved as a result of focused efforts.

## Planning for PI

In April 2006, a small work group of Kaiser Permanente national and regional stakeholders convened to develop an approach to assessing needs, identifying gaps in skills, and planning a PI system to drive enhanced performance in the Big Q measures. In July 2006, national and regional quality leaders agreed to pursue a uniform methodology to create a common organizational language and approach to improving quality, safety, service, and efficiency. In late 2006, the chief executive officer and senior executives requested that the improvement approach focus on and start with the front line of care, supporting unit-based teams created under the Labor Management Partnership agreement signed in 2005, an innovative partnership between managers, frontline workers, and physicians that covers approximately 92,000 union-represented employees across eight states. PI would integrate and align macrosystem (senior leadership) strategic goals, mesosystem (regional and medical center leadership) management priorities, and microsystem (frontline teams) daily improvement activities.

## BENCHMARKING ORGANIZATIONAL PERFORMANCE

The planning phase included benchmarking high-performing organizations for best practices.<sup>7,8</sup> The goal was to identify capabilities required to achieve consistent best-in-class performance and create an internal program to develop them.

Senior leaders shared two convictions— (1) that the PI system would engage staff from the front line of care through senior executives and (2) focus on achieving organizational performance goals and not be limited to a single methodology, such as Six Sigma<sup>9</sup> or Lean.<sup>10</sup>

Between February and August 2007, quality, medical group, operations, and information technology leaders from several regions benchmarked five high-performing organizations. Criteria for choosing benchmarked sites included organizational achievements, training programs for improvement, approach to improving operations, and culture (Table 2, page 487). Selected sites represented each level of accountability for medical centers' performance within Kaiser Permanente: single medical centers (Cincinnati Children's Hospital), integrated service areas (Jönköping, Sweden), and large integrated systems (SSM Health Care). They included a Baldrige Quality Award-winning integrated system, two Robert Wood Johnson Foundation Pursuing Perfection grant participants that achieved outstanding performance on selected measures, a health system with a fully developed clinical improvement system focused on the front line of care, and a site that integrated into improvement measurement an electronic health record similar to Kaiser Permanente HealthConnect™. Specific attributes of three other ongoing Kaiser Permanente partners were included in informal benchmarking—(1) the Department of Defense's robust and mature training program, (2) Ascension Health's impressive progress toward a goal of zero preventable harm and death, (3) and the large, complex delivery system of England's National Health Service.

We focused site visits and interviews on how organizational infrastructure, processes, and behaviors supported capability leading to high performance in six areas: leadership priority setting, systems approach to improvement, measurement capability, learning organization, improvement capacity, and culture. Although no single organization demonstrated all six capabilities or consistently achieved top performance on all measures, each created transformational change. For example, Cincinnati Children's Hospital Medical Center linked system-level strategic priorities with hospitalwide measures. Setting performance targets was followed by testing and spreading interventions that dramatically reduced variation and improved overall performance.<sup>11</sup> Its top-down and bottom-up approach was adopted from the framework used in the Pursuing Perfection project.<sup>12</sup> Ascension Health focused first on a call to action that included a bold vision. Focusing on a single goal of no preventable injuries or deaths by a specified date, a leadership group defined metrics and established an approach to learn and manage

Table 2. Selection of Benchmarking Sites

Organization	Rationale
Cincinnati Children's Hospital Medical Center (CCHMC)	Participated in Robert Wood Johnson Foundation–funded Pursuing Perfection in Healthcare initiative;* came closest to best-in-class specifications; improvement infrastructure, physician leadership, and improvement curriculum in place
Jönköping County Health System, Sweden	Participated in Robert Wood Johnson Foundation–funded Pursuing Perfection in Healthcare initiative; came closest to best-in-class specifications; improvement infrastructure, long-standing training program (Qulturum), and culture of continuous improvement among staff
SSM Health Care	First health delivery system to win the Baldrige National Quality Award; includes 20 hospitals; 15+ years of experience with training curriculum; ability to focus on vital few areas for improvement; strong leadership culture
Intermountain Healthcare (IHC)	Pioneer in applying evidence-based processes and decision support; physician leadership; 15+ years experience with training curriculum
Geisinger Health System†	Electronic health platform; physician leadership; improvement curriculum uses 90-day cycles

\* Institute for Healthcare Improvement: *Pursuing Perfection: Overview. Raising the Bar for Health Care Performance.* <http://www.ihl.org/IHI/Programs/StrategicInitiatives/PursuingPerfection.htm> (last accessed Oct. 4, 2010).

† Because of scheduling conflicts, Geisinger Health System was not benchmarked.

knowledge. Testing improvements at alpha sites engendered more robust and sustainable strategies, and adoption and spread to new sites became a vehicle for whole-system improvement.<sup>13</sup>

Table 3 (page 488) summarizes the core capabilities of benchmarked organizations, and Appendix 1 (available in online article) presents additional detail on benchmarking and organizational examples of core capabilities. Benchmarking allowed us to design the Kaiser Permanente PI system by adapting best practices to our organization.

### Developing the Performance Improvement System

We focused on designing a whole-system PI approach that cascades from national to regional to facility levels as staff focus on a collaborative effort to improve performance. With autonomy and innovation as enduring organizational values, the PI system allows regions and medical centers to independently set goals to close performance gaps on dashboard measures and national and regional leadership to create vision, set direction, and establish accountability to reduce variation across sites.

During the benchmarking period, several Kaiser Permanente leaders participated in a workshop on executing strategic improvement initiatives.<sup>14</sup> We adopted an execution framework specifying the necessary elements of medical center leadership and infrastructure for the design of our PI system (Figure 1, page 489).

### LEADERSHIP PRIORITY SETTING

Improvement to achieve best-in-class performance became a key business strategy owned by operational leaders. Annual national-level targets are set to shift performance into top-deciles of external benchmarks. For example, incremental annual targets set in January 2008 focused regions and medical centers on closing gaps in performance to achieve uniform top 10th percentile performance on the Joint Commission composite index, an averaged aggregation of 21 indicator measures into a single measure that spans conditions and populations (Table 1).

In the first year, the target was halfway between the 50th and 90th percentiles; the following year, the target increased to halfway between the 75th and 90th percentiles, and the third-year target was the 90th percentile. Regional leaders review Big Q dashboard metrics and identify priority areas for breakthrough improvement opportunities; for instance, in early 2008, one region identified a pivotal opportunity to reduce inpatient mortality by improving the early identification and treatment of sepsis (which will be described later in this series).

In reviewing their facilities' performance on Big Q metrics, medical center leaders collaborate with their quality, safety, and improvement teams to further analyze the data to identify and understand potential areas of opportunity that align with regional and national strategic priorities.

### SYSTEMS APPROACH TO IMPROVEMENT

Leaders at all levels readily adopted driver diagrams to iden-

**Table 3. How Benchmarked Organizations Exhibited Core Capabilities**

Leadership Priority Setting	<ul style="list-style-type: none"> <li>■ Leadership team engaged and aligned</li> <li>■ Sets clear priorities based on vital few breakthrough performance areas</li> <li>■ Priority areas move the organization's business strategy by focusing on clinical, financial, employee, and patient indicators</li> <li>■ Cascading system to communicate from macro- to microsystem level</li> </ul>
Systems Approach to Improvement	<ul style="list-style-type: none"> <li>■ Leadership teams identify core business processes</li> <li>■ Establish process map for these core areas and align improvement priorities based on vital business needs</li> <li>■ National and local organization establishes oversight infrastructure to manage improvement priorities and monitor progress</li> </ul>
Measurement Capability	<ul style="list-style-type: none"> <li>■ Set outcomes and improvement process metrics for key areas</li> <li>■ Set performance targets to achieve best in class with national best as target</li> <li>■ Use balanced scorecard system allowing front line units/departments to view performance on process as priority</li> </ul>
Learning Organization	<ul style="list-style-type: none"> <li>■ Surface best practice based on evidence of performance</li> <li>■ Create sharing, learning, spread systems, and capability to drive performance across organization</li> <li>■ Focus on top-down and bottom-up execution</li> </ul>
Improvement Capability	<ul style="list-style-type: none"> <li>■ Establish oversight system at macro and meso levels</li> <li>■ Create improvement infrastructure and staff</li> <li>■ Able to execute from testing through spread of practice at all levels</li> <li>■ Unified internal methodology for improvement representing multiple methods</li> <li>■ Internally designed and delivered improvement curriculum focused at several levels of staff and physicians</li> <li>■ Improvement skills applied immediately to improvement priority</li> </ul>
Culture	<ul style="list-style-type: none"> <li>■ Engage staff in improvement, make process change meaningful</li> <li>■ Teach operational-level leaders (e.g., stewards, directors) deeper improvement skills using fellowship model</li> <li>■ Leaders walk around and understand local-level work</li> <li>■ Accountability at all levels for practice and performance</li> <li>■ Data, posters, communications to help frontline staff understand the importance of their improvement work to organizational priorities</li> <li>■ Microsystem approach most often stated as strategy for engagement, bottom-up approach</li> <li>■ Improvement training to teach staff about system mission and priorities and create safe space to explore and learn</li> </ul>

tify factors influencing performance. Each driver diagram is organized around one high-level aim, such as quality (Figure 2, page 490; color version available in online article). Driver diagrams provide a systems view that helps leaders prioritize multiple initiatives, clarifies necessary sequencing of initiatives, and exposes the scale of effort required to achieve ambitious goals. They also provide an additional benefit in facilitating the shift from a focus on individual initiatives to a portfolio/systems approach. For example, if a top-level goal was to reduce inpatient mortality, key drivers were to provide care in appropriate settings, provide evidence-based care, and eliminate needless harm. Secondary drivers—capacity in alternative settings, seamless end-of-life care, and population-based programs—were then identified to drive the ability to provide care in appropriate settings. As processes of care are analyzed at increas-

ingly granular levels, leaders identify areas where lower organizational investment and energy contributes to suboptimal performance and identify initiatives (with champions and measures) to improve performance. Improvement efforts were “scoped” (charted) in a series of 90-to-120-day initiatives, with resulting system-level improvements. A checklist, shown in Table 4 (page 491), helped leaders support execution on strategic goals.

At each medical center, interdisciplinary leadership teams were identified to provide regular oversight of improvement portfolios. Team participants include the chief executive officer, chief medical officer, medical group administration, union staff, finance leaders, and others. Leaders learned to rapidly review projects using a two-page format that all teams completed as improvement efforts were initiated.<sup>15</sup> The over-

## Leadership and Infrastructure Requirements for Improvement at the Level of Medical Centers



**Figure 1.** The execution framework, which was based on the Institute for Healthcare Improvement (IHI)'s "Framework for Execution" (Source: Nolan T.W.: Execution of Strategic Improvement Initiatives to Produce System-Level Results. IHI Innovation Series white paper. Cambridge, MA: Institute for Healthcare Improvement; 2007: p. 5. [available on <http://www.IHI.org>]. Used with permission.), features the necessary elements of medical center leadership and infrastructure for the design of the Kaiser Permanente performance improvement system.

sight team also assigned leadership champions to maintain accountability for improvement portfolios by reviewing progress weekly.

### MEASUREMENT CAPABILITY

The Big Q data dashboard provided consistent, timely, actionable data that could be viewed at national, regional, and facility levels. Facility leaders may also identify a family of measures to monitor improvement on specific efforts.

### LEARNING ORGANIZATION

Top-down, systemwide goal setting must be balanced against bottom-up learning and application. Table 5 (page 492) details PI activities at different system levels. The Kaiser Permanente PI system concentrates on mesosystems (medical centers) and microsystems (frontline teams), whereas the Big Q dashboard, data transparency, and annual target setting address macrosystem (national and regional levels) improvement needs. Through the development of strong unit-based teams, significant organizational energy and resources were devoted to providing clinical microsystems with skills to measure daily work performance, and efforts focused on incremental improvement were primarily performed by frontline staff. These first-order improvements did not change the system. For example, an emergency department (ED) goal might be to ensure that all

radiology diagnostics are completed within 30 minutes of a written order. An ED unit-based team can scope a 90-day effort to achieve it by collaborating with radiology, creating service-level agreements, and testing readily applied changes.

Second-order improvements can improve performance on a larger scale by changing the system but consume more resources and take longer. For example, admitting a patient from the ED to an ICU within a given time frame requires facilitywide mesosystem changes: redesigning flow and matching demand to capacity via staffing, resources, and other administrative means. Flow and demand/capacity management work requires executive leadership to establish improved flow as a strategic priority, measured by patient day rates and other metrics. A sequenced series of 90-to-120-day projects during the course of a year, in which frontline teams serve as problem-solvers, creates sustained improvement. A case study (Appendix 2, available in online article) provides a more detailed view about this process at one medical center.

Frontline teams use existing knowledge to develop and refine initiatives in specific departments. Collaborative learning across sites also occurs. An effort focused on eliminating health care-associated pressure ulcers (HAPUs) among 20 medical centers in one region had a positive impact on performance across sites, reducing their average prevalence. Regional and national systems helped identify better-performing medical

Sample Driver Diagram

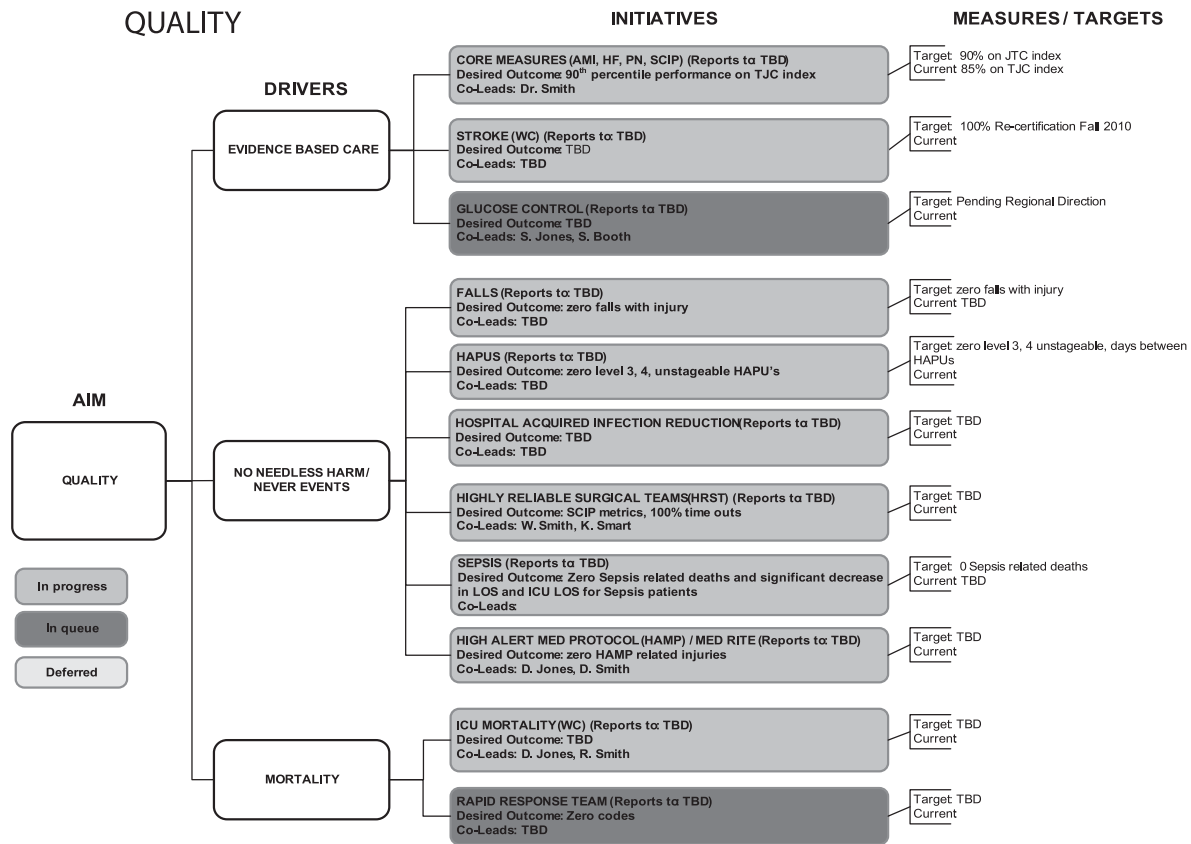


Figure 2. This sample driver diagram demonstrates medical-center levels of quality and prioritized projects, owners, and measures. AMI, acute myocardial infarction; HF, heart failure; PN, pneumonia; SCIP, Surgical Care Improvement Project; TBD, to be determined; WC, Walnut Creek; HAPUs, health care-associated pressure ulcers; LOS, length of stay.

centers and spread successful practices.

IMPROVEMENT CAPABILITY

The pivotal role of clinical microsystems led us to place the majority of resources and full-time employees (FTEs) at the level of medical centers.<sup>16</sup> However, leaders and staff needed new improvement capabilities. Medical center executives selected key staff to be trained as improvement experts and report to senior operational leaders; these individuals were often existing quality, safety, nursing, or risk management leads. Most medical centers first identified one full-time improvement staff person and subsequently trained additional quality and operational staff who were dedicated part-time to improvement. The number of individuals trained as improvement experts depended on the number of initiatives at and size of each medical center.

The Kaiser Permanente Improvement Institute was created

in 2008 at the organization's headquarters to teach medical center improvement experts (called improvement advisors [IAs]) and leadership teams new skills and approaches, including systems thinking, statistical process control, and Lean and Six Sigma. Training focused on four audiences, building deeper knowledge as the audience became more expert (Figure 3, page 493). Frontline staff received training in the Kaiser Permanente improvement model (to be described in a later article), testing changes using Plan-Do-Study-Act (PDSA) cycles, and assessing systems issues using observation, basic flow mapping, Six Sigma, Lean, and other tools. The Improvement Institute helped executives develop their PI systems and implementation plans to align with operational structures.

**Medical Center Leaders.** Medical center leadership teams were provided with two resources: two-day executive leadership seminars at the Improvement Institute and a mentor—a “deep expert” in improvement and systems thinking—who assisted



Table 4. Execution Checklist

- Walk the work with staff members and patients.
- Review your safety culture and survey results and ensure that leadership walk-arounds and improvement are occurring.
- Design tempo; use half-lives and spread plans in oversight and coach leaders on new skills.
- Lead by asking questions, not solving problems.
- Develop a learning system: How will you learn from what works elsewhere? Who is best? How is knowledge transferred?
- Define how you will learn from best practices and sentinel events across Kaiser Permanente.
- Ensure oversight responsibility includes planning for spread and celebration.
- Link finance department with operation and quality: Gather cost and quality information together.
- Assess organizational capability to improve and develop a system plan.

**First 90–120 Days**

- Plan to close first 90-to-120-day projects and move to sustain gains.
- Expect outcomes and financial data, even if smaller gains from first cycle, and plan to communicate results with staff and community at large.
- Develop plan for larger service-line portfolios of projects using multiple improvement methods.
- Determine whether initial work needs to be spread or sequenced with additional work in other areas of process.
- Identify additional improvement advisor–trained staff needed to lead multiple large improvement portfolios.
- Plan to send new students through Improvement Institute.
- Ensure planning for expanded portfolio includes developing skills in all staff to ensure results.
- Revisit prioritization plan and assess baseline data to ensure team is focused on appropriate levers for improvement.

with planning and execution for up to two years. Leaders were provided with an individualized road map for initial implementation, which guided them to choose a priority, identify an IA student, and work together as a medical center to get results in the first six months before expanding to more significant and complex portfolios for improvement. IAs learned to take a portfolio of 90-to-120-day initiatives and, along with frontline teams, implement them to achieve system-level results.

**Regional Department Staff.** Individuals in regional departments were selected to develop improvement skills, including the skill of how to spread effective practices. In addition, deep experts in improvement were hired at the regional level to mentor medical center leaders in applying systems thinking and to develop infrastructure and oversight to implement strategically important efforts. They also helped the IA students to apply their new skills in advanced improvement methods to projects at the medical-center level.

The expansion of improvement capability in operations made it necessary to consider new roles for quality leaders. At the medical-center level, the role of quality leaders broadened to include serving as expert advisors and consultants to the entire leadership team and leading major quality initiatives identified by regional leaders (for example, pressure ulcer reduction or sepsis care improvement), in addition to being accountable for quality, regulatory, and accreditation performance.

A phased approach to move from testing to instituting an improvement system in all eight regions and 35 medical centers began in January 2008. By October 2010, all regions and facilities will have initiated their improvement systems, although they will be at various levels of implementation given that some started implementation in 2008, whereas others began implementation in 2010. Phased implementation allowed initial experimentation with the Improvement Institute design-and-mentor-student system in three medical centers and regions. The number of IAs throughout Kaiser Permanente subsequently expanded from 3 to more than 500 in three years.

**CULTURE**

To achieve systemwide improvement, ownership of quality and service performance needed to shift from quality-content experts (for example, quality or risk management consultants) to operational leaders and managers and frontline staff (for example, nurse manager accountable for practices that reduce pressure ulcer incidence). Performance goals are woven into leaders' evaluation and incentive plans. As operational leaders were held accountable for improvement, their knowledge of the status of improvement goals, initiatives, and barriers was found to grow keener. Leadership rounding—in the form of executive rounds or daily operational rounding in departments and on clinical units<sup>17</sup>—incorporates questions about quality, safety, service, and efficiency and helps identify opportunities for rapid improvement. Understanding the nature of local work helps senior leaders to move beyond traditional roles as financial and policy experts.

Leaders and managers become adept at communicating the relationship between the efforts of frontline staff and larger improvement goals. For example, a manager would help an environmental services worker to understand the link between terminal cleaning of an inpatient room and reducing mortality. Medical centers or regions also translate system goals into "lives saved" to help staff understand the importance of daily improvement work and build passion for PI.

If PI is to occur, it must do so at the front line. Clinical teams test and implement initiatives and assess the success of

Table 5. Performance Improvement Activities at Macro-, Meso-, and Microsystem Levels

Macro (National/regional)	Multihospital System	Single Hospital
	<ul style="list-style-type: none"> <li>■ Create dashboard of measures.</li> <li>■ Establish goals to improve performance and reduce variation across sites.</li> <li>■ Ensure financial and other incentives reward performance toward goals.</li> <li>■ Manage multifacility collaborative improvement efforts.</li> <li>■ Scan broadly for better practices and encourage adoption internally.</li> </ul>	<ul style="list-style-type: none"> <li>■ Create dashboard of measures that include publically available data and benchmarks.</li> <li>■ Determine desired long-term performance and establish goals and targets over time.</li> <li>■ Financial incentives include pay for performance and nonpayment for serious reportable events.</li> <li>■ Participate in collaboratives led by national, regional, or statewide organizations focused on priority areas for improvement.</li> </ul>
Meso (Medical center)	<ul style="list-style-type: none"> <li>■ Set organizational performance vision.</li> <li>■ Determine performance against benchmarks and vision.</li> <li>■ Establish annual goals to achieve results.</li> <li>■ Determine key drivers of improved performance.</li> <li>■ Charter portfolios of projects.</li> <li>■ Provide resources to achieve goals within specified time period.</li> <li>■ Establish oversight and monitoring process to set pace and monitor progress.</li> <li>■ Establish cascading metrics to insure alignment.</li> <li>■ Communicate broadly and surface better performers.</li> </ul>	
Micro (Department)	<ul style="list-style-type: none"> <li>■ Determine daily performance against measures.</li> <li>■ Develop team-based capability and culture.</li> <li>■ Engage multidisciplinary team in rapid tests of change.</li> <li>■ Learn and share while monitoring local metrics.</li> <li>■ Celebrate learning and success.</li> <li>■ Adopt practices from other sites to assist in improving department performance.</li> </ul>	

their efforts. Perhaps the most profound shift in culture is the effort to move away from a perception by staff that they were experiencing “death by a thousand initiatives.” It resulted from the opportunistic selection of improvement projects, poor alignment of multiple competing priorities, and, most importantly, the lack of a systems view. When frontline staff understand how all the parts of a system work together and how 90-day projects relate to improved patient outcomes, ownership of and passion for PI are cultivated.

### Impact

Between the second quarter of 2008 and the first quarter of 2009, performance across all 35 Kaiser Permanente medical centers improved on the Big Q metrics. The Healthcare Effectiveness Data and Information Set (HEDIS) composite measure (Table 1) improved from approximately the 80th percentile to exceed the 90th percentile. The overall HSMR (observed-to-expected deaths) improved by 0.15 (Figure 4, page 494). The prevalence of hospital-acquired pressure ulcers decreased by more than 50% (Figure 5, page 494), and patient ratings of ambulatory and hospital care improved by approxi-

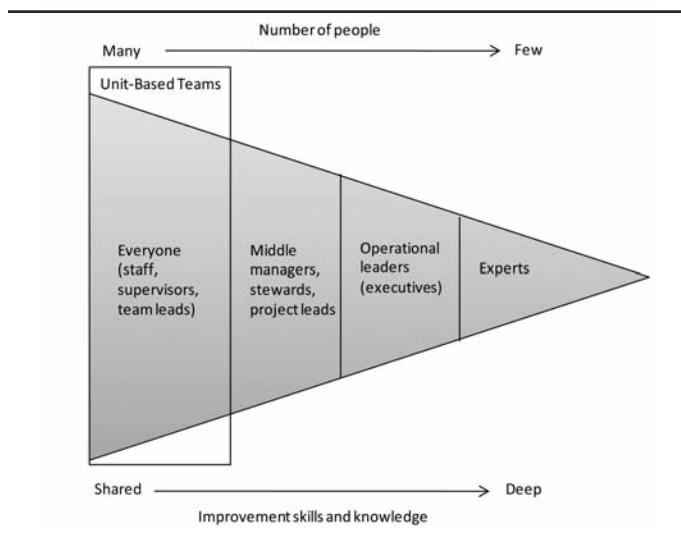
mately 4% and 14%, respectively. Performance on the Joint Commission composite measure improved from the national average to between the 75th and 90th percentile across 35 facilities (Figure 6, page 495).

### Discussion

In 2006, Kaiser Permanente aligned system-level measures and leadership goals for PI. In 2008, we began implementing an organizationwide PI system entailing six capabilities to move all Kaiser Permanente medical centers to top-decile performance. Lessons learned from three years of experience in implementation pertain to what was effective in implementing and sustaining PI, hurdles we identified along the way, and challenges we continue to face as PI becomes fully integrated into all levels of our organization. Many of these lessons can be generalized to other health care systems, hospitals, and other health care organizations.

The benchmarking process was invaluable. It helped us understand relatively quickly what “good” looks like in health care organizations—namely, the six capabilities we identified. We adapted some of the practices included in the capabilities to

### Improvement Skills by Audience



**Figure 3.** Training provided at the Kaiser Permanente Improvement Institute focused on four audiences, building deeper knowledge as the audience became more expert.

our system. For example, senior executives in the benchmarked organizations typically selected improvement goals and strategies in a top-down model, but we did not believe that such an approach would work in the Kaiser Permanente shared-ownership model. Instead, we selected the metrics of the Big Q dashboard and, in concert with regional leadership, identified a trajectory to achieve best-in-class performance on them in a three-year period. Regions independently selected their own goals and strategies. For example, one region formed collaboratives involving all regional medical centers, another shared data and encouraged site visits to high-performing medical centers, and a third formed a collaborative improvement effort with provider systems outside Kaiser Permanente.

We were fortunate enough to have the resources and executive support to develop all six capabilities simultaneously. Although we believe that this was essential to making rapid improvements, organizations with fewer resources could develop capabilities sequentially. An effective sequence would start with frontline skill development, with leadership prioritization and alignment following rapidly, in turn followed by development of deeper improvement expertise within service lines. Developing a culture of improvement takes time, and teams must start with small improvements and develop the capacity to address more complex issues.

We now review challenges and lessons learned with respect to the six capabilities of high-performing organizations.

### LEADERSHIP PRIORITY SETTING

Leadership alignment with regional and national strategic PI goals is critical. Bringing together leaders from quality, operations, and labor was essential, requiring significant shifts in understanding systems and alignment. Previous PI efforts had long been the domain of designated quality leaders, but the PI system focused on shared responsibility with operational leaders. Integrating PI into operations through shared accountability was critical. This was a new practice for all leaders, and there was some initial resistance and discussion about how shared accountability could or should work. In addition, individualized rates of change mean that our leaders learn at different paces. One benefit of the phased implementation approach was that it allowed the concept of shared accountability—as well as the balance of the PI system—to permeate the organization more gradually.

Substantial variation occurred in the speed at which medical centers implemented the PI system. When a significant lag resulted from a lack of leadership will, more engagement or, at times, a change in operational leadership was necessary. Occasionally, urgent business needs, such as senior-leadership turnover or system-level rollout of electronic medical records, required some operational leaders to postpone or slow the development of their PI systems; waiting for resolution of those needs was the most appropriate response.

A barrier to creating shared accountability which was identified at some of the medical centers was the chief executive officer's and chief operating officer's reliance on the quality director or administrator for quality to implement the PI system without strong linkages back to operational executives. When oversight was assigned solely to quality leaders, performance measures reflected suboptimal implementation. In the best case, regional executives were able to address this issue with the medical center, clarifying the need for robust operational involvement and helping operational and quality leaders forge new working relationships for improvement accountability.

From the beginning, we benefited from a strong partnership with labor leaders, reflecting the chief executive officer's charge that PI begin at the front line. Because PI was built into the Labor Management Partnership bargaining agreement, frontline personnel perceived PI as valuable to their daily work, leading to nearly universal buy-in at the front line of care. Nevertheless, some labor leaders and managers have experienced difficulty in shifting traditional roles to shared governance and collaboration. Several approaches have helped mitigate this barrier. Frequent internal communications promote shared responsibility for organizational performance, as

do Kaiser Permanente national labor forums and senior labor leaders. Operational leaders learn how to support and coach middle managers on working with frontline staff in a shared governance model; national and regional labor and operational leaders actively attempt to spread best practices from high-performing sites to those where shared governance is more problematic.

We began implementing the PI system before federal legislation to overhaul the health care system was enacted in early 2010.<sup>18</sup> Ongoing pressure to meet internal goals and improve the cost structure, coupled with the need to prepare for the implications of health care reform, such as an expanding number of members under the health insurance exchange and bundling of payments for inpatient and postacute care, has increased pressure on Kaiser Permanente leaders. The coordination of PI with other key initiatives is critical in the current economic and political environment.

Health care reform represents an opportunity for the medical centers' senior leaders to address demands from multiple fronts through exemplary PI efforts aligned with national and regional priorities. However, there is a risk that pressures to manage more members or reduce costs may lead to fragmentation or redundancy in improvement work. The instinct would be to manage by project at the department level to improve service availability or reduce cost—which, if not coordinated from a systems perspective, could lead to work imbalances in other areas and suboptimal service overall, especially in regions or service areas that are increasing capabilities more slowly. For example, reducing an infusion clinic's hours can increase inpatient hospital admissions during nonstandard hours. Ongoing commitment from senior leadership to the PI system is more critical than ever.

**SYSTEMS APPROACH TO IMPROVEMENT**

One of our goals in developing Kaiser Permanente's PI system was to help leaders shift their perspective from a view of improvement

**Hospital Standardized Mortality Ratios (HSMRs), All Kaiser Permanente (KP) Hospitals, Second Quarter (Q2) 2008–First Quarter (Q1) 2010**

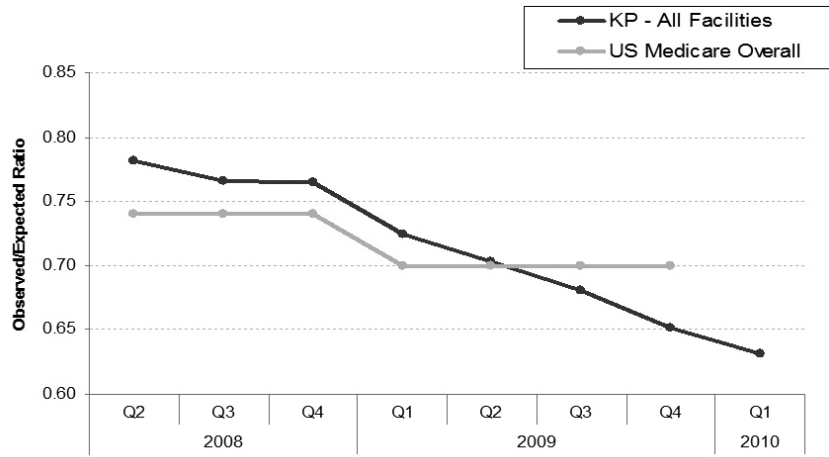


Figure 4. Between the second quarter of 2008 and the first quarter of 2010, the overall HSMR (observed to expected deaths) improved by 0.15

**Hospital-Acquired Pressure Ulcers, Stage 2 and Above, All Kaiser Permanente (KP) Hospitals, Second Quarter (Q2) 2008–First Quarter (Q1), 2010**

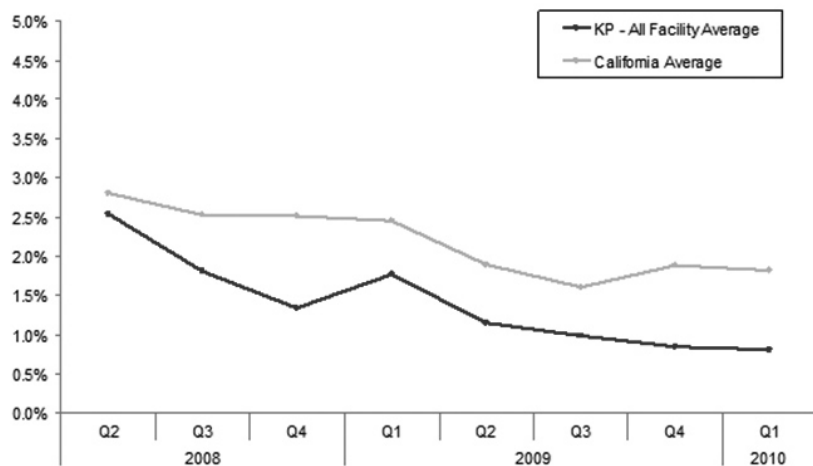


Figure 5. The prevalence of hospital-acquired pressure ulcers decreased by more than 50% in this period. Source for California average: California Hospital Assessment and Reporting Taskforce (CHART).

**The Joint Commission (TJC) Composite, All Kaiser Permanente (KP) Hospitals, First Quarter (Q1) 2008–First Quarter (Q1) 2010**

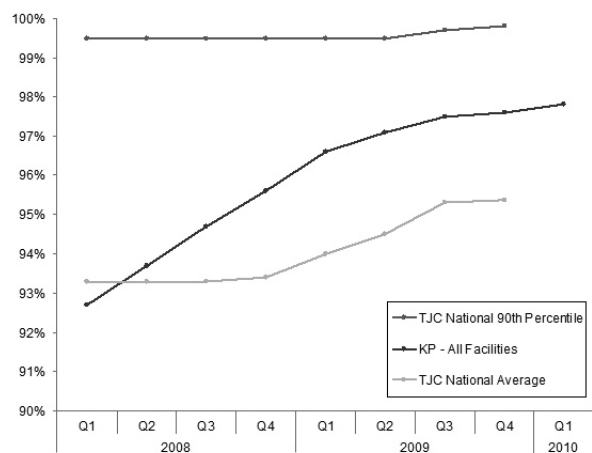


Figure 6. Performance on the Joint Commission composite measure improved from the national average to between the 75th and 90th percentile across 35 hospitals.

projects in isolation to a view incorporating the interaction of systems and infrastructure in improving overall performance. The use of driver diagrams was very effective in helping the leaders to develop a systems-level view and in understanding the scope of the PI work required to make progress on key outcomes. We also coached leaders on how to overcome the “one and done” mentality that often applies to improvement projects. We asked them to continually plan for expansion of PI activities; as projects are completed, efforts expand into new areas.

However, it is also true that driver diagrams provide a limited amount of information at the microsystems level, particularly in terms of interactions among multiple high-priority projects. Even the most elegant diagram cannot address all aspects of PI, such as how to make an initiative work at the front line of care or what daily performance measures to monitor in addition to the Big Q metrics (Table 1). We believe that driver diagrams are necessary but not sufficient for planning PI portfolios, particularly for how to sequence efforts in a department. We have developed additional PI tools to help leaders prioritize multiple initiatives and monitor improvement work by department.

In addition, driver diagrams can inaccurately depict the relationships between systems. For example, the aims of improving quality (Figure 2) and patient service would be represented in separate diagrams, even though they are integrally related.

Remaining challenges are to learn how best to integrate improvement efforts at the level of care delivery by staff and physicians and how to help medical centers and regions map out major initiatives so that operational leaders can optimize resource allocation.

**MEASUREMENT CAPABILITY**

As noted earlier, data transparency through the Big Q dashboard was a significant lever for building organizational will to improve. In addition, for some checklist-based measures, such as the Joint Commission composite measure, organizational outcomes data were sufficient to stimulate quality improvement.<sup>19</sup>

Quality transparency efforts in health care typically meet with some resistance, and our experience was no exception.<sup>20</sup> Some leaders initially questioned the validity or reliability of Big Q data for their assigned areas of responsibility. Over time, they began to rely on its accuracy and appreciate its value for monitoring performance.

However, integrating performance data into daily operations remains an ongoing challenge. One barrier is the inability of some leaders to link goals conceptually to organizational data so that performance assessment is based on evidence rather than general impressions. Some leaders incorporate data collection and analysis into daily operations; for example, one medical center chief financial officer sends current metrics for demand and capacity automatically to all unit-level managers, who use them extensively for decision making and “huddles” regarding bed assignments. In contrast, other leaders and managers do not regularly use performance data in their management repertoire, relying instead on retrospective and infrequent reporting and global opinions about performance.

Another barrier to improvement is a lack of data for front-line teams to use to monitor performance. IAs facilitated the collection and distribution of data for initial improvement projects, and a perception still lingers that they, not managers, are responsible for providing data to frontline teams. We are exploring ways to continue to increase data for managing daily operations, such as allocated resources for data analysis or by mentoring managers. Potential sources include analytic reports and KP HealthConnect. For example, for a national initiative focusing on eliminating harm from HAPUs, KP HealthConnect documents the performance of specific nursing practices to prevent HAPUs, and we are in the process of linking nursing documentation to outcomes. Future work will focus on other ways of linking frontline processes and practices to outcomes and reporting requirements. It is a challenge to

provide real-time metrics to the frontline while maintaining simple data-collection processes and avoiding overloading personnel with tracking requirements.

## LEARNING ORGANIZATION

From the beginning, we viewed the implementation of the PI system as a multiyear strategy that we could refine and add to as we learned. Implementing a phased approach to move from testing to instituting an improvement system in all eight regions and 35 medical centers in phases allowed us to mirror what we wanted frontline teams to do: test changes and refine our approach. In each new implementation phase, we capitalized on what we had learned from the previous one, allowing us to scale up much faster than if we had initiated a systemwide program all at once. For example, the timing and delivery of training at the Improvement Institute changed after the first day. We shifted from an educational approach that overloaded participants with information to an interactive model that met their immediate information needs so that they could quickly put knowledge into action.

A common language and standardized approaches are pivotal to a PI system spanning multiple disciplines and settings. Consistently available, high-quality training was also important, which led us to create our own internal Improvement Institute. Yet, smaller health care systems and individual health care organizations can seek out educational resources, including publications, for skill development. To avoid “training for training’s sake,” we continually linked skill-building and capacity enhancement to applications to improve care on the basis of Kaiser Permanente’s regional and national strategic priorities. Other organizations could identify opportunities for improvement based on identified priorities and ensure the application of PI skills by developing internal dashboards and oversight processes to maintain the pace of improvement.

It remains a challenge to ensure that service-line and departmental managers sufficiently support frontline teams’ PI efforts lest those efforts progress too slowly or aim at changes too small to make a measurable impact. The managers should provide time for staff to huddle and plan for improvement, communicate key priorities, provide data, and remove barriers to implementation. They should also communicate how the different departments need to work together on improvement. When frontline teams from different departments operate in isolation, one team could inadvertently make a change that interferes with another team’s project. The Improvement Institute provides courses to help guide operational leaders at the level of department directors on how to assess and support PI efforts.

In addition, mentors help run “rapid improvement events” on site to jumpstart improvement projects and provide a successful experience in sites that are having difficulty.

Future opportunities for improving PI at Kaiser Permanente include drawing on the experience of medical centers with rapidly expanding PI capacity to help those that are maturing more slowly. In more general terms, we now are facing the challenge of developing PI knowledge management to help spread best practices between medical centers and regions. As Nolan and Schall have stated, organizations need to develop a spread plan to outline “the methods an organization or a community intends to use to link those who have knowledge and experience with a new set of ideas and practices and the potential adopters of those ideas and practices.”<sup>21(p. 116)</sup> In addition, the spread plan should address organizational structure, communication, and measurement and feedback.<sup>21</sup>

Kaiser Permanente is a large and geographically dispersed organization, with innumerable information sources that are impossible to consolidate into a single repository. In addition, much informal and tacit knowledge is exchanged through social networks or communities of practice.<sup>22,23</sup> We are experimenting with the use of collaborative wiki Web sites and social media sites as platforms for knowledge exchange, as well as continuing to build out more formal knowledge repositories. A later article in the series will explore what it takes to create a learning organization and how we are continuing to refine our system to promote rapid learning, knowledge sharing, and adoption of effective practices.

## IMPROVEMENT CAPABILITY

We have found that if Kaiser Permanente medical centers have well-prepared leadership and frontline teams and dedicated IA time, PI occurs. The amount of dedicated IA time required to successfully complete initial PI projects was surprisingly low—as little as 0.2 FTEs were effective.

A key success factor relates to the person assigned to the lead IA role at each medical center. We encouraged leaders to select a full-time operational leader for this position, but this was sometimes interpreted as “project management,” and personnel were chosen and reporting lines established accordingly. These individuals were less successful than were IAs with sole responsibility for implementing a PI system in a medical center who reported directly to the chief executive or chief of operations.

IAs are talented individuals who are often in turn promoted into operations and leadership positions—which, in the long run, should help ensure that leadership has PI knowledge and skills. However, in the short run, turnover within IA roles

requires hiring of new personnel and additional training to maintain improvement capacity. Even when new individuals with previous certification in Six Sigma or Lean methodologies are hired to fill lead IA positions, they are required to complete training at the Improvement Institute.

Mentors, which constitute permanent positions, are also essential for supporting leaders, IAs, and frontline teams. Part of their charge is to conduct, in collaboration with medical center operational leaders, periodic organizational assessments of improvement capacity, which will be described later in the series.

How much capacity is necessary? A next step is to identify the required capacity within medical centers for continual and expanding PI efforts. Because the IAs are operational roles, not consultants, we suspect to find that it is necessary to have some dedicated staff time in the role of an IA in each medical center service line or department—on the basis of the amount of improvement needed and the number of portfolios being managed.

Similarly, we have not yet determined how many individuals with PI training and capacity are necessary for a self-sustaining PI system at a given medical center. We track the number of people who have completed Improvement Institute training or online PI learning programs. In addition to the more than 500 IAs trained as PI experts, thousands of operational and clinical leaders have been trained, and tens of thousands of frontline staff have developed basic skills in improvement. However, we have not quantified the critical mass for creating a self-perpetuating improvement culture. Some theories specify a number, for example, the square root of the total number of staff members, which we have already reached.<sup>24</sup> Our determination of this “tipping point” is different: We will know we have reached it when the entire system improves, shares knowledge, adopts improvements rapidly and effectively, and sustains them over time.

The long-term success of our capability to improve performance depends on leadership and management with accountability for the system at all levels, making system-level improvement unavoidable, monitoring performance, and changing improvements as needed.<sup>25</sup> Mentors, who report to regional and national PI leaders, monitor improvement capacity, IA progress, and achievement and sustainment of the results of completed projects at the level of medical centers. At the regional level, performance of all medical centers is monitored against a clear expectation that the PI system will result in progress on Big Q and operational metrics. In addition, some regions are standardizing the lead IA role in medical centers as a director of PI position. At the national level, we share costs of

maintaining mentors with regions, offer the Improvement Institute on an ongoing basis, and provide an advanced PI course taught by lead IAs.

A barrier to sustainability of the PI approach is the desire on the part of some leaders to strike out in new directions. This can arise from the urge to create on one's own or from the misperception that a subset of skills, such as change management, is more important than the PI system as a whole.

## CULTURE

Our focus was on embedding improvement capabilities into operations. Ideally, the culture of improvement thrives at the front line of care, as reflected in the Labor Management Partnership, instead of reflecting a top-down mandate. This is evident when we visit frontline care teams and see storyboards displaying their goals, projects, and progress or talk to individual managers or staff who tell improvement stories that include how they are aligned with local, regional, and national goals. Managers talk about frontline staff as being responsible for PI and can quickly point to the data the team uses to assess its effectiveness.

A continuing barrier to a culture of improvement at the front line is time. Even just-in-time projects require time for planning, as does huddling each shift to quickly check performance. It is also challenging to build in team time without making it a series of meetings—the difference between huddling for reflection versus sitting on a committee.

Our focus was improvement, not specific tactics, and our goal was to move beyond a project management mentality to create new leadership skills among staff and managers. Consequently, we chose not to pursue Six Sigma or Lean certification; we certified participants as IAs for completing a national training program incorporating a variety of approaches and then applying the training to achieve results. This approach to PI is firmly integrated into the Kaiser Permanente culture: In some instances, individual leaders have attempted to bring in other methods for change, only to meet with great resistance from frontline teams.

PI training and a track record of its successful application confer credibility and respect. A welcome benefit of our internal approach is the incorporation of Improvement Institute training into the criteria for moving through leadership ranks in some regional human resources systems. We believe that any high-quality internal or external improvement training could have similar effects when matched with an internal system that integrates new skills into human resources and operational expectations.

## Conclusion

Kaiser Permanente embedded PI into operations by making performance data transparent, benchmarking external organizations, and designing a PI system to develop six capabilities of high-performing organizations. Improvement has occurred in systemwide composite measures of care. Although we have accomplished a great deal, much remains to be done. **J**

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## Online-Only Content

See the online version of this article for

Appendix 1. Benchmarking

Table. Examples of Capabilities Identified at Benchmarked Organizations

Appendix 2. Case Study: Improving Hospital Throughput and Managing Resources

Figure 2. Sample Driver Diagram (color version)

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**Appendix 1. Benchmarking**

Approximately 20 leaders from Kaiser Permanente attended each site visit. They prepared for the visits by examining background material on the organizations and arrived with a list of questions and materials to gather. At each site, leaders focused on the following:

- The primary audience for any improvement training
- The degree to which improvement and training were focused on the front line of care and the modalities by which training occurred (e.g., face-to-face, Web-based)
- Whether physicians function as key leaders in the improvement process
- The presence of collective bargaining units in the workforce and/or physician groups
- The catalyst for decision to become a high-performing organization
- Organization size and structure
- Quality organizational chart, structure, and strategy
- Board of directors reporting relationship
- Data dashboard and monitoring elements
- Performance improvement framework, how it is taught, and target audience
- Materials containing examples of successful strategy and implementation
- Web-based information, such as the following:
  - Quality data postings
  - Information about quality strategy and patient engagement
  - Publically available information about quality

The results from each site visit were analyzed to identify examples of the six identified core capabilities (see Table, below).

**Table. Examples of Capabilities Identified at Benchmarked Organizations\***

Capability	Element	Example
Leadership Priority Setting	Identifying breakthrough opportunities	<ul style="list-style-type: none"> <li>■ Strategic plan identifies high-leverage opportunity areas (CCHMC).</li> <li>■ Business strategy integrates exceptional evidence-based care subsets based on The Joint Commission standards (SSM).</li> <li>■ Strategy and business group identify highest-leverage breakthrough opportunities based on volume and intensity of service (IHC).</li> </ul>
	Priority areas drive business strategy	<ul style="list-style-type: none"> <li>■ Selects top breakthrough priorities addressing clinical performance, financial performance and staff/physician engagement (SSM)</li> <li>■ Selects breakthrough priorities based on highest volume/intensity and measures of impact, including clinical and financial performance (IHC)</li> </ul>
Systems Approach to Improvement	Map organizational process for high priority functions	<ul style="list-style-type: none"> <li>■ Identifies single core process all care delivery uses, improvement focused on strengthening ability in this core process (SSM)</li> <li>■ Identifies nine core practices mapped as a system of driver, mainstay, and support processes. Improvement is focused on strengthening ability in these processes (IHC).</li> </ul>
Measurement Capability	Use of Web-based and other modalities to display time-trended outcomes and unit- and process-level data	<ul style="list-style-type: none"> <li>■ Measures cascade from top down: strategic breakthrough goals, facility goals, and frontline unit goals addressing organizational priorities. Measure of success is statistically significant improvement for goal setting and performance evaluation (SSM).</li> <li>■ Control charts evaluate improvement (CCHMC).</li> <li>■ Run charts in Web-based application drill down to unit- and provider-level process data. Year-end performance evaluation is based on statistically significant improvement (IHC).</li> </ul>

(continued on page AP2)

Table. Examples of Capabilities Identified at Benchmarked Organizations\* (continued)

Capability	Element	Example
Learning Organization	Oversight committees and unit capabilities create potential for spreading practices with the greatest impact	<ul style="list-style-type: none"> <li>■ Top third of performers asked to benchmark best-in-class nationally to reach top performance, all others benchmark with top third. Conferences to share practices (SSM).</li> <li>■ Builds ability at unit level to manage test through spread and monitors initiatives via a hospital integration committee that makes decisions about sharing and spreading practice (CCHMC)</li> <li>■ National guidance council oversees integration of work in the nine core process areas. Spread decisions and activities are managed through priority setting and central process/outcomes measurement and accountability (IHC).</li> </ul>
Improvement Capability	Oversight	<ul style="list-style-type: none"> <li>■ National (analogous to KP regional) and local facility integration committees and specific priority work groups (all)</li> </ul>
	Infrastructure/FTEs	<ul style="list-style-type: none"> <li>■ National (analogous to KP regions) deep improvement experts manage improvement projects and teach improvement skills; at least 1.0 FTE (SSM and IHC).</li> <li>■ Facility level: 9.0 FTEs for improvement and research (CCHMC)</li> <li>■ Facility level: 1.0 FTE at each facility focused on improvement. Operations managers develop skills by working on projects and dedicate 0.2–0.3 FTEs to overseeing improvement projects and managing work groups. Frontline staff and managers learn by doing improvement work (SSM and IHC).</li> </ul>
	Training and methodology	<ul style="list-style-type: none"> <li>■ Migrating CQI to Six Sigma training and methodology, using 90-day improvement cycles of (SSM)</li> <li>■ Integrates CQI, Lean, and DMAIC into methodology and focuses expert training for clinical staff during an ATP program using a mini-fellowship model. Lower-level experts receive mini-ATP training, and project leads receive facilitator training (IHC).</li> <li>■ Integrates Deming Lean DMAIC into methodology. Initially used IHC's ATP program to train clinical improvement team, now has own internal program called I2S2 (CCHMC).</li> </ul>
Culture	Microsystem engagement	<ul style="list-style-type: none"> <li>■ Multidisciplinary teams at the front line focused on improvement projects led by unit managers and physicians as warranted (all).</li> <li>■ Adopted Dartmouth's microsystem approach to embed measurement and other capabilities at the front line (CCHMC)</li> <li>■ Teach unit-level managers to manage as if they were running a small business. Used a strategic engagement process with 3,000 staff to create a 13-word mission statement; executives walk around at facilities and ask about unit performance to stated annual goals (SSM).</li> <li>■ Uses its ATP program to share organizational vision and priorities and engage hearts and minds (IHC)</li> </ul>

\* CCHMC, Cincinnati Children's Hospital Medical Center; IHC, Intermountain Healthcare; SSM, SSM Health Care; KP, Kaiser Permanente; FTE, full-time employee; CQI, continuous quality improvement; ATP, advanced training program; DMAIC, Define, Measure, Analyze, Improve, Control.

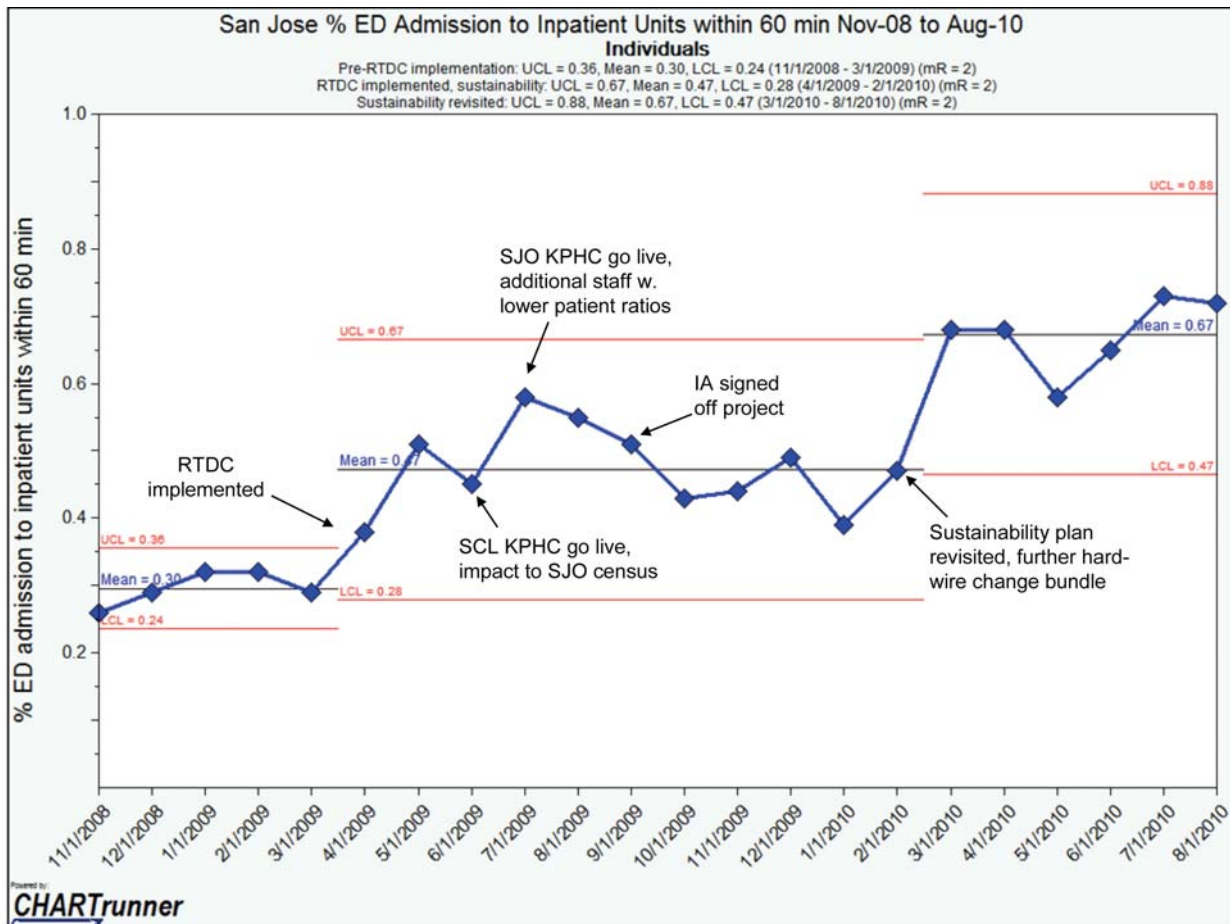
Appendix 2. Case Study: Improving Hospital Throughput and Managing Resources

Kaiser Permanente San Jose Medical Center created a performance improvement system using an oversight structure to identify improvement opportunities and charter strategic portfolios. The oversight group is composed of medical center senior leaders and the performance improvement mentor, who supports leaders and unit-based teams in building capacity to execute on important initiatives. In October 2008 this group identified a first critical improvement opportunity: increasing efficiency and hospital throughput. A driver diagram was created to outline the primary and secondary drivers to achieving this goal.

The initial performance improvement project focused on throughput from the emergency department (ED) to inpatient beds on all units; initially, admission occurred within 60 minutes of verbal order in only 28% of patients. The goal of the 90-day project was to increase this proportion to 50% by May 31, 2009. The improvement advisor (IA) assembled a frontline team to identify critical barriers to meeting this goal, create the change management and communication plan with staff and physicians, and begin running testing cycles.

(continued on page AP4)

Percentage of Emergency Department (ED) Admissions within 60 Minutes, Kaiser Permanente San Jose Medical Center, November 2008–August 2010.



By June 1, 2009, admission occurred within 60 minutes of verbal order in 47% of patients and in 60% of admissions by August 2010. RTDC, real-time demand capacity; SCL, Santa Clara; KPHC, Kaiser Permanente Health Care; SJO, San Jose; IA, improvement advisor.

Appendix 2. Case Study: Improving Hospital Throughput and Managing Resources (continued)

A detailed process map of how a patient moves from the ED to an inpatient bed was created by observing staff and the patient experience. It clearly identified the most important factors the frontline team needed to address; critical drivers included an effective handoff between ED and inpatient nurses, visibility of anticipated delays, ownership by all staff, and timely bed placement by the house supervisor.

On the basis of the volume of ED admissions, the project began in the telemetry unit and spread to other inpatient units as vital practices were identified and demonstrated sustained improvement. Sustained improvement was defined as reaching the goal and sustaining the improvement for at least six months using time-trended measurement. The entire portfolio of projects was sequenced in a six-month period. By June 1, 2009, admissions occurred within 60 minutes of verbal order in 47% of patients. By August of 2010, more than 60% of admissions were timely (Figure, page AP3).

Bed availability surfaced as a major barrier to timely admission, and a systems view demonstrated the need for overall bed management. Medical center leadership chartered a project on real-time demand-capacity management to match beds to volume and acuity demands. This effort includes structured daily bed meetings with nursing unit, ED, and operating room leadership to predict admissions, discharges, and transfers; create a plan to meet all demands; and coordinate necessary activities. Real-time demand and capacity

management was implemented on all units in April, after an initial, two-unit pilot to create learning and facilitate spread across all inpatient units.

To maintain improvement, a sustainability assessment examined vulnerabilities regarding long-term success, and a sustainability plan was created and agreed to by all process owners, champions, and sponsors. On a daily basis, teams collect data points relevant to maintaining overall system performance. These are reported at daily bed meetings and to leadership to maintain focus on reliable performance. Project performance is reviewed monthly by the oversight group. Accountability cascades from leadership to frontline staff, while creating a culture in which all staff understand how the entire system operates together to optimally serve patient care needs. As of August 2010, admission occurred within 60 minutes in 67% of patients.

In light of the sustained success of the initial two performance improvement portfolios, the oversight group began an assessment to determine the drivers of total length of stay and to map all core processes influencing hospital flow. The primary deliverable of this assessment will be a portfolio of projects that tackles key drivers to achieve best in class in total length of stay. The entire system's leadership, delivery, and support processes are intended to optimize the patient's care experience from the time of ED admission through discharge to home or long term care setting.

Figure 2. Sample Driver Diagram

