



Report of the Executive Summit to Accelerate Operational Efficiency in California Safety Net Hospitals

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Introduction

Over the past three years, the California HealthCare Foundation has funded several initiatives to improve the operational efficiency of safety net hospitals. Safety net hospitals are public and not-for-profit institutions that serve large proportions of MediCal, county indigent program, and/or low-income uninsured patients along the continuum of care from primary to specialty to emergency and inpatient. These operations improvement initiatives have demonstrated significant gains in short periods of time, and illustrate the potential that improvements in operational efficiency can have on the financial, clinical and operational well-being of health care organizations as well as on patient access to health care and services. Amongst other things, these programs demonstrate proof of concept that operational efficiency can be successfully applied as a change management approach in health care institutions. The information contained in this report is based on discussions and findings generated at the two part Summit to Accelerate Operational Efficiency in California Safety Net Hospitals sponsored by the California HealthCare Foundation and conducted by the California Health Care Safety Net Institute (SNI) and Convergence Health Solutions.

The Context

The United States spends more per person on health care, 53% more in 2002, than any other country in the world¹. Yet despite the billions of dollars spent annually on health care, the United States has poorer health outcomes compared to other countries. In an era of dwindling resources and economic recession, it is more important than ever to look closely at the US health care system and identify ways to reduce costs and improve quality. Despite the current economic recession, health care spending is projected to grow faster this year than in years past,² and the increased demand for services will tax already strained safety net hospitals. According to a study published in *Health Affairs*, public payers will be the largest funding source for medical care by 2016³. At the same time, with growing numbers of uninsured and a limited supply of safety net services, some providers and patients are expressing

¹ Anderson GF, Hussey PS, Frogner BK and Waters HR. 2005. *Health Affairs*, 24(4): 903-914.

² Sisko A, Truffer C, Smith S, Keehan S et al. 2009. *Health Affairs*, 28(2): w346-w357.

³ Ibid.

dissatisfaction with care and more clinics are reporting longer wait times for patients⁴. One reason for this is that the US health care system is rife with waste and inefficiency. A report by the US Agency for Healthcare Research and Quality found that workers experience an average of two problems per hour and that the cost of waste can be as high as \$18.98 per worker per hour⁵.

Several operations improvement approaches hold promise as strategies to improve quality and satisfaction while reducing waste in health care. Programs that improve efficiency apply principles of engineering to improve the productivity of a system (clinic, operating room) while eliminating unnecessary work and processes. Increasing the efficiency with which hospitals operate has cascading effects on provider satisfaction and retention, patient satisfaction and cost reduction. Safety net hospitals are particularly well-positioned to benefit from improvements in operational efficiency. For example, public hospitals are health care systems that provide the continuum of care, from preventive public health, to primary and specialty care, emergency/trauma, medical/surgical and, in some cases, long-term care. Safety net hospitals are under more pressure than ever to keep costs low, improve their bottom line, and keep patients healthy and safe. These hospitals experience high medical utilization by safety net patients and low commercial utilization. Safety net hospitals are being asked to take care of more patients with fewer resources, so the promise of operational efficiency, improved outcomes by optimizing existing resources holds tremendous appeal. In addition, public hospitals, because most employ their physicians, can more effectively achieve alignment with physicians in efforts to improve operations. Unique challenges for safety net hospitals include the complexity of and challenges faced by patient populations, and governance structures.

The projects funded by the California HealthCare Foundation, and described herein, can be viewed as case studies that illustrate three ways in which operations improvement can be successfully applied by any public hospital or other safety net provider that wants to improve efficiency. Of the many methods to improve efficiency and productivity, the ones used in this portfolio include LEAN, management engineering, and Patient Visit Redesign. The projects that used these methods not only sustained marked improvements in care and processes in the clinical areas in which they were implemented, but are now being replicated and spread to other areas of the hospitals. Continuing to evaluate these programs and to track their outcomes over time will be important to assessing the viability of operations improvement programs in health care on a larger scale.

Case Studies in Operations Improvement

Case Study 1: Management Engineering

In response to an RFP issued by the California HealthCare Foundation, the University of Southern California (USC)'s Viterbi School of Engineering worked with twelve California hospitals to reduce turnover time and improve patient flow in radiology and surgery departments using principles of management engineering. Management engineering applies engineering principles and mathematical

⁴ Gorman A. Health clinics in danger of needing life support. March 22, 2009. The Los Angeles Times.

⁵ Wallace J and Savitz L. 2006. Appendix C: Estimating Waste in Frontline Health Care Worker Activities. AHRQ

models to reduce inefficiencies and improve patient and work flow in health care. The objectives for these programs were to spread understanding and create support for operations improvement, and generate interest in the field of management engineering. Projects also sought to produce generalizable materials for use by others and to train students and expose them to health care. Case studies from two of those hospitals are described below.

Valley Presbyterian Hospital, a 350-bed acute care hospital in Southern California, had several improvement goals for its Surgery Department. Undergraduate and graduate engineering students studied the department and found several factors contributing to operational inefficiency. Based on their findings, the team at USC made several concrete, actionable recommendations. In response to these recommendations, Valley Presbyterian hospital made changes that dramatically improved their efficiency and productivity. A chart of some of the changes and the operations improvement goals they addressed is below:

Operations Improvement Goal	Action
Maximize room utilization	Developed scheduling guidelines for room utilization (i.e., block assignment revisions, earlier patient movement)
Improve communication	Use walkie-talkies; Implement an electronic tracking system; relocate OR Nurse Manager's office to a central location
Improve patient flow	Implement electronic patient flow dashboard
Improve accuracy of first surgical case start time	Patients now prepped in PACU not SDS

In response to these and other changes, and despite a concurrent increase in patient volume, room utilization improved from 59% to 81%. The percentage of on-time starts for the first surgical case of the day increased from 67% to 74%. Overall surgical volume increased by 6.8%. Physician, staff, and patient satisfaction also improved.

San Francisco General Hospital sought to improve the efficiency of its surgery department in the context of increased demand, a cap on OR hours and diminishing financial resources. Again, the team at USC came to observe the operations of the department and provide recommendations. San Francisco General Hospital implemented several changes including: tracking and displaying metrics for efficiency, assigning responsibility for patient turnover to an individual OR circulating nurse, rearranging room logistics and nurse responsibilities to prevent redundancy, assigning a resident to make sure that their services' patients were adequately pre-opped, and implementing a "three strikes" rule whereby any physician that failed to start their first case on time lost their 7:30 am start time, with the risk that continued violations would result in the loss of the 7:30 start time for the entire service.

These changes resulted in dramatic improvements. The average first case start time moved up from 7:55 am to 7:35 am. Room turnover times improved from 55 minutes to 38 minutes. Starting the first case earlier and reducing room turnover time meant that the hospital could accommodate more surgeries,

bringing in more revenue. The team cites the leadership of the Departments of Surgery and Anesthesia as an important facilitator of success.

Case Study 2: Patient Visit Redesign (PVR)

Patient Visit Redesign, pioneered by Coleman Associates, is a process designed to decrease patient cycle times and medical errors and increase provider productivity in primary care. The seven key steps to PVR include direct observation of patient experiences, mapping of patient flow, collection of baseline cycle time and productivity data, creating, and subsequently testing an ideal patient visit paradigm, determination of final patient visit model, and implementation of the final model⁶. Teams engaging in PVR conduct root cause analyses to understand causes of patient delays. Thirteen public hospital systems worked with Coleman Associates to implement PVR in their 48 outpatient clinics through a Safety Net Institute initiative.

San Mateo Medical Center calls the result of their PVR “nothing short of a culture shift.” Cross disciplinary teams focused on leveraging current technology and existing personnel and implemented PVR in six primary care clinics over five years. Continuous monitoring of data and quarterly transformation meetings, where participants discuss successes and identify next steps for improvement, allowed San Mateo Medical Center to reduce their cycle times across all clinics. The hospital also reduced the number of “no show” appointments by 40%. Next steps for this hospital include continuing to reduce cycle times towards the goal of 45 minutes and implementing PVR in the Emergency Department (ED) and in specialty care clinics.

For Alameda County Medical Center, it was imperative that their work with PVR be embedded into the strategic plan of the hospital. This, the team believes, is what made their engagement in PVR so successful. The Medical Center reports numerous benefits attributable to PVR including:

- Creating teams and empowering staff
- Developing a uniform format for goals and milestones
- Moving from reactive to proactive—anticipating problems
- Continuous monitoring and reporting of data to sustain gains
- Training staff in PVR, engaging physician support, and working collaboratively with labor partners

Hospital leaders report improvements in morale and greater accountability for results. After implementing PVR, the hospital’s culture is one of “hard work and results with no excuses.”

Rancho Los Amigos National Rehabilitation Center was initially rejected for participation in the PVR portfolio because their patient population was so unique and their services were not predominantly primary care. Once they did participate, an interdisciplinary team implemented PVR in the facility’s spinal cord injury clinic with goals to improve team work, support providers, eliminate wait times,

⁶ Coleman Associates (www.patientvisitredesign.com)

improve access, and maximize use of technology. Baseline data revealed an average patient cycle time of 84 minutes with only 12 minutes of provider time. Post-implementation data showed a cycle time low of 24 minutes with a small increase to 33 minutes 9 months after implementation. In addition to reducing cycle times, the clinic was also able to increase the average number of patient visits per provider per hour from 1 to 2.3. Staff and patient satisfaction increased dramatically, with patients indicating improved process and services. Since their initial success, the facility has implemented PVR in additional clinics, with plans to spread PVR to all clinics.

Three very diverse public hospital systems were able to successfully implement PVR and embed it within the culture of their institutions to affect lasting change. This methodology holds great promise as a way to increase productivity and satisfaction.

Case Study 3: LEAN

LEAN is a production strategy that was made famous by Toyota Production Systems. As both a management strategy and a set of tools, LEAN seeks to eliminate waste and reduce time and resources that do not add value to a process or product. Any activity or process that uses resources and adds cost or time without adding value becomes a target for elimination. In health care, LEAN systems are ones that deliver high quality care in the most efficient way possible. Led by Rona and Associates in collaboration with SNI, four California public hospitals implemented LEAN in an effort to improve processes and quality of care for patients with Congestive Heart Failure (CHF) and one additional CMS core quality measure chosen by each hospital.

Each hospital created a multidisciplinary team that led the effort to improve care for CHF patients. Teams first conducted both current and future state “value stream mapping”, which identified and tracked the process of care for, in this case, CHF patients. After identifying desired optimal care processes, teams then participated in three week-long on-site quality improvement intensives (“Kaizen”) led by certified LEAN experts. During these workshops, teams identified goals towards their future state value stream map, created and tested plans for change in small quality improvement cycles, and at the end of the week, deployed revised systems and processes of care that they determined would help meet the goals. Each hospital reported that this process allowed them to eliminate care processes and time spent in ways that did not provide value to the patient.

Ventura County Medical Center implemented LEAN “huddles”, created a discharge plan using national standards, created an educational guide to CHF patient goals to standardize patient education, and simplified their patient education packages in both English and Spanish. Through Kaizen improvement cycles, the team determined that the white boards in patient rooms had too much information on them that didn’t add value. The team set a goal to improve communication between caregivers, and between caregivers and patients, and used the white board to communicate education goals and discharge goals to both patients and providers.

Arrowhead Regional Medical Center's LEAN team was successful in gaining consensus among physicians around CHF order sets, developing evidence-based clinical pathways, reducing the readmission rate for CHF patients on pilot units by more than 50%, decreasing mortality from CHF from 3.5% to 1.6%, and decreasing the length of stay for CHF patients from 4 days to 2.7 days. Next steps for this facility include sustaining the gains made, continuing to track and improve all metrics, and training teams in other work areas to implement the LEAN strategy.

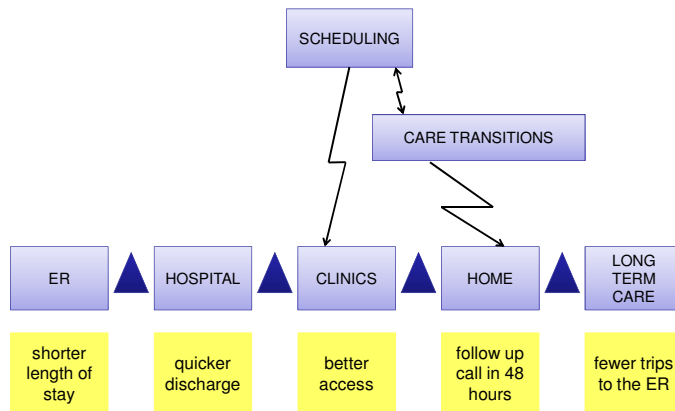
Contra Costa Regional Medical Center's value stream mapping revealed that patients were being re-admitted within days of discharge and were frequently anticipating their readmission. The team determined that their patient education was incomplete, that there were language barriers for patients, and that patients were having difficulty obtaining medications and follow-up appointments. The LEAN team developed a process whereby a CHF "bridge" nurse facilitates patients' transition from inpatient to outpatient status. The CHF nurse communicates with both the patient and their community-based provider within 72 hours of discharge. Interdisciplinary rounds and continuous revisions to forms and documentation also helped to reduce waste and improve the quality and efficiency of care for CHF patients. The team counts among its successes: one hour weekly "stand-up" meetings, improved CHF discharge instructions, and home visits to patients.

San Mateo Medical Center's data showed that their baseline readmission rate for CHF patients was 15% at a cost of \$7,000 per admission. They developed a target goal statement that included a 30% reduction in the readmission rate for CHF patients. The team adapted a pre-existing call-back system to meet the needs of CHF patients. The ED and med surg unit historically both treated CHF patients but worked independently and with inadequate communication and collaboration. Through their Kaizen work, the team improved the working relationship between these two units and created standardized patient education. Teamwork among other groups also improved, and physicians were able to agree upon standing orders for CHF. Most recently, the facility created a Kaizen team for H1N1. The team mapped out an ideal ED floor plan to manage patients with H1N1 symptoms that has enabled them to better manage patient flow and increase ED capacity by 30% without additional resources or extending the length of stay. The hospital plans to focus on sustaining the improvements made, which includes debriefing any deviation from the ideal process within 24 hours.

Going forward, these hospitals hope to better understand the impact of LEAN on readmission rates. Because of the lag time in administrative data coding and reporting, measurement of the impact of LEAN on readmission will not be known for some time to come.

An image of San Mateo Medical Center's Future State Map for CHF care is below.

CHF Future State Map



Using the LEAN method, these facilities improved the quality and efficiency of care delivered to CHF patients. These improvements have tremendous implications for patient and provider satisfaction as well as cost savings.

Next steps for Operations Improvement

With knowledge gained from these projects, and new systems in place, it is important that hospitals sustain their gains in efficiency. Once the initial improvements are solidly embedded and have been maintained, hospitals can then identify other work areas to which they can spread operations improvement work. Valley Presbyterian plans to use management engineering techniques to improve the efficiency of the Labor and Delivery unit. Going forward, San Francisco General Hospital will continue to work to keep surgery turnover times low by constantly tracking and analyzing data to understand the causes of delays. They also plan to address other operational challenges using management engineering techniques including anesthesia induction time, surgical positioning time, and surgical case duration. Other facilities have similarly strategic and ambitious plans to move their work out into other areas of the hospital and, in some cases, begin to address problems that occur across the institution and impact multiple departments.

Hospitals are complex systems and there exists a myriad of opportunities to improve work volume and productivity. According to David Belson, PhD, from USC's Department of Industrial and Systems Engineering, "there is no area that can't benefit" from improvements in operational efficiency. At a recent operational efficiency summit conducted by SNI and Convergence Health and sponsored by the California HealthCare Foundation, participants identified several hospital work areas that are ripe for operational efficiency work, including pharmacy, laboratory, primary care, bed management, outpatient clinics, and general patient flow. Continued support for operational efficiency work will be essential for these facilities to expand their improvements in efficiency.

Lessons Learned

Hospitals participating in the CHCF-funded operational efficiency initiatives identified several important lessons from their work. These lessons were common to all hospitals, regardless of whether they used LEAN, management engineering or PVR as their approach to improving operational efficiency.

All hospitals found that having the active involvement and support of hospital senior management was crucial. According to one hospital employee:

“You have to have leadership that holds the line. There’s a lot of unpleasantness that these changes engender. This created a lot of issues from a surgical standpoint since people had to do more work and do work differently. But with strong leadership you can move resistant people along to see the benefit of the changes.”

Support and active participation of staff on the front lines of care is also essential. According to one QI expert:

“You need both senior level support and frontline creativity and innovation.”

Hospitals also found that physician buy-in and leadership was crucial to the success of operations improvement initiatives. Also important, according to hospitals participating in operational efficiency work, is prioritizing and not trying to address too many problems at once. Continuous monitoring of data and efficiency metrics is an important part of sustaining success. Monitoring of quality and operations data allows hospitals to intervene when the data shows a regression. Many hospitals reported that they experienced a regression towards their baseline performance when data monitoring was interrupted. It is also important to publicly display the data being tracked, so that staff can see the results of their efforts.

An outsider, such as a consultant, can often provide an objective perspective that someone inside the organization cannot. One hospital leader expressed:

“Having an outside consultant means that traditional excuses don’t fly”

Finally, persistence is of utmost importance to the success of any quality improvement initiative. Changes take time and require consistent messaging by champions at all levels of the organization—nursing, physician, and administrative. Maximizing operational efficiency requires changing the culture of an organization and creating new standards of work along with new processes to accomplish that work. Transforming organizational culture takes time and patience and, according to one nurse champion, “overcoming the mental barrier that we can’t do this”.

Executive Response

Following the November operational efficiency summit, teams met with their hospital leadership to apprise them of project progress, accomplishments, and lessons learned. These hospital leaders then came together for a summit in February, 2010. The purpose of the leadership summit was to discuss the future of the operational efficiency projects and portfolio.

Participants in the meeting included CEOs, CNOs and Quality Managers from the systems and facilities participating in the CHCF-funded operational efficiency portfolio of projects. All attendees agreed that the operational efficiency work in which their staff had been engaged was so valuable and important, that even in an absence of financial and program support from CHCF and SNI, this work would continue to be supported and encouraged.

Leaders reported learning important lessons from their meetings with operational efficiency teams, including that goals and targets cannot be static, and that they must be constantly visible and continuously measured. They also reported learning the importance of integrating operational efficiency projects with ongoing work processes so that the projects and improvements become a part of the fabric of hospital work.

“Every time we do something it’s important to link it back to what we’ve done and how this is an evolution and continuation of what we’ve done previously, rather than a discrete project with endpoints. The challenge is to get staff to understand that LEAN is not a project, but is their job.”

Participants also reported that that operational efficiency projects highlighted the need to grow leaders within their organizations that could execute this type of improvement work. According to one executive:

“It’s the staff who will get things done every time.”

Next Areas for Operational Efficiency Work

The hospital executives perceived that operational efficiency could have great value and benefit in many areas of hospital operations. Valley Presbyterian Hospital had begun using Management Engineering techniques in their Accounts Receivable Department. Operations improvement had helped them put new billing processes in place and add staff to improve the registration process and patient flow. Another facility discovered upon review of their OR flow that the number of minutes used preparing patients for surgeries that ultimately didn’t happen added up to the salary equivalent of 12 FTEs per year. Queuing times for patients waiting in beds represented another \$1.7 million in uncaptured revenue. Looking at use of time and converting patient flow into dollars helped highlight areas where improvements could be directly recaptured in dollars. Additional areas where executives felt operational efficiency could have tremendous impact included psychiatry and inpatient case management, communication, medical coding and documentation, and maintaining benchmarks in time between appointments.

Barriers to Deployment of Operational Efficiency Projects

After identifying clinical and operational areas of hospitals that were ripe for operational efficiency projects, hospital executives next discussed barriers to deployment of operational efficiency and potential ways these barriers could be overcome. One hospital executive expressed that constraints

from regulatory agencies, providers and payers represented significant challenges to increased deployment of operational efficiency projects. A laboratory where true innovation could be developed and tested was offered as a solution to some of these constraints. Several hospitals indicated that working with and engaging labor unions was a challenge. Los Angeles County and University of Southern California, in response, reported success engaging unions in process improvement and including them in the development of solutions. Other hospitals struggled with how to manage multiple operational efficiency initiatives across departments.

One of the biggest barriers felt by hospitals was how to support and encourage frontline staff to participate in quality improvement. All hospitals agreed on the importance of including frontline staff in operational improvement work. However, middle and senior managers' lack of training in how to manage change and engage frontline staff was cited as a barrier to fully utilizing them as key drivers of process improvement. Participants agreed that senior leaders need to provide training for middle managers to encourage and support leadership development at the frontlines.

Spreading Operational Efficiency: Costs and Opportunities

Leadership summit participants identified several key costs and opportunities associated with spreading and sustaining operational efficiency work. Operational efficiency provides an opportunity to maximize staff training and development dollars. Better management of development release time will result in higher and longer-lasting dividends for institutions. One hospital reported the successful creation of a leadership fellowship program that paired emerging front-line and middle-management leaders with a C-suite sponsor. Both the leader and the executive grow and benefit from investment in training and work as a team.

While participants agreed that management training is an important component of sustaining operational efficiency work, such training takes time, money, and takes key managers away from their regular duties. However the payoff is that institutions stop investing in training that is wasteful and invest in building capacity internally. Several hospitals and health systems reported success in training management in LEAN or other operational efficiency methodologies. Building capacity within the institution allows hospitals to decrease reliance on external consultants. Linking process improvement activities and metrics to executive evaluations was cited as an important opportunity to catalyze system-wide improvements in operational efficiency.

The Role of SNI: Now and Future

There is no doubt that SNI has played a crucial role in the success of the operational efficiency projects funded through the CHCF portfolio. As the quality improvement organization for California public hospital systems, SNI provides "connective tissue" for these 19 hospitals to more efficiently be exposed to promising practices, shared learning, and benchmarking. SNI's role includes developing the program concept, vetting consultants, securing funding, establishing peer networking and sharing of promising practices, and engaging leadership.

Participants recognized several areas where SNI could continue to play a leadership role in operational efficiency efforts going forward. SNI is focused on helping public hospitals that have participated to sustain and spread the gains.

SNI could also facilitate the spread of successful operational efficiency innovations and approaches to other safety net systems. Leaders also expressed interest in having SNI provide training and certifications, such as LEAN and Six Sigma for safety net hospitals. Participants were also interested in the possibility of an SNI-sponsored academy/fellowship program that could create opportunities to learn from other safety net hospitals. Leaders also indicated their interest in SNI possibly expanding its existing IHI scholarship program, funded by Kaiser Permanente, in order to expand its reach to more members.

Conclusions and Next Steps

Hospital leaders recognized the importance of creating change agents to lead operational efficiency efforts but also highlighted that the hospital work environment needs to be ready to support these leaders. Executives also universally agreed that middle managers needed to be trained to support emerging leaders in an effort to expand the cadre of change agents within a health system.

While frontline workers need to be supported and encouraged to fix some of the operational problems in hospitals, leadership also has to set the expectation that frontline staff are expected to participate in QI and bring forth solutions. A top-down strategy to guide organizational behavior is crucial in setting expectations for leadership and behavior at all levels of an organization.

The Success of Operations Improvement—A Promise for US Health Care

Hospitals that participated in the CHCF operational efficiency portfolio experienced significant and lasting improvements as a result of their operational efficiency work. Both patients and staff have reported improved satisfaction. A patient at a clinic that implemented PVR told the staff:

“I have been coming here for 12 years and this was my best visit.”

Across the board, all hospitals reported increased productivity. Many facilities saw results with even modest effort. One program reported:

“We found in a few weeks we could increase the number of mammograms we could do by 50%. This was dramatic.”

From ORs to outpatient clinics, improved productivity means increased access to care, more patient volume and potentially more revenue for the hospital. Greater operational efficiency is also associated with improved employee satisfaction.

Other significant successes included cost savings for hospitals. A public hospital system that implemented PVR attributed a savings of more than \$260,000 annually to changes that were the direct result of improvements in operational efficiency.

As discussed above, operational efficiency can be applied in any area of a hospital or clinic. It requires looking at systems to view their inefficiencies and implementing routines and systems to eliminate inefficiencies and improve productivity. One advantage of operational efficiency over other improvement methodologies is that the resources required to implement operational efficiency are not prohibitive. While additional FTEs and outside consultants can accelerate success and provide additional resources for improvement, operational efficiency can be achieved by leveraging existing human resources and building leadership among current staff. However, fundamental to the success of operational efficiency is the belief on the part of an institution that the long term savings generated from operational efficiency will offset any modest, short term investments in staff, consultants, or other resources.

Conclusion

Operations improvement is a viable strategy to improve quality and processes of care in hospitals and clinics. Deciding what type of operational efficiency program to implement is important since the program choice will depend on the types of inefficiencies a hospital is experiencing, and the type of improvement that they want to see. A good resource for entities interested in implementing a program in operations improvement is *Operations Improvement Methods: Choosing a Path for Hospitals and Clinics* by David Belson (2010).

The management engineering, Patient Visit Redesign, and LEAN projects outlined in this report have developed approaches that can be shared with other organizations considering implementation of operational efficiency programs. Continued operational efficiency efforts by California public hospitals would result in significant improvements in patient care, cost and provider satisfaction and retention. A key advantage of this type of work is that once individuals in a medical center have been trained in operational efficiency approaches, they can apply those skills in other areas of the organization.

Summit participants suggested developing a state-wide collaborative that would allow participating organizations to share best practices and operations improvement strategies, and allow for continued training and development of hospital teams engaged in this work. They also encouraged development of academic programs in health care management engineering. Such programs could train undergraduate, graduate and second career students in management engineering and partner with public hospital systems that would serve as practicum sites.

The future of health care in the US and in California is challenging. Operational efficiency offers hope as a viable method to improve the efficiency and effectiveness of public hospitals, and should be considered as a powerful tool to help reform health care delivery.

Additional Reading:

- *Operations Improvement Methods: Choosing a Path for Hospitals and Clinics* by David Belson (2010)
- *Improving Efficiency in the Safety Net: Management Engineering Practice and Cases* by David Belson with an appendix by Mary Kate Scott and Lisa Overton (2010)
- *Towards a Better Patient Experience: Reengineering California's Safety Net Clinics* by Ruth Brousseau (2010)

CHCF Website: <http://www.chcf.org/publications/2007/12/improving-efficiency-management-engineering-comes-to-the-safety-net>