The Severyn Group

Hospitals Are Leading the Way on Improving Care, Enhancing Health, and Reducing Costs

Prepared for the American Hospital Association

Introduction

Hospitals continually seek to improve patient care quality, while promoting efficiency. The launch of the Triple Aim in 2007 by the Institute for Healthcare Improvement provided a framework for categorizing ongoing multifaceted quality improvement efforts to achieve consistent, high-quality care. The Triple Aim calls for the simultaneous pursuit of three goals: improving the patient experience of care (including quality and satisfaction), improving the health of populations and reducing the per capita cost of health care. As hospitals throughout the country aggressively tackle performance improvement within their own organizations, and with others in their local communities, evidence shows that their efforts are helping the nation meet the goals of the Triple Aim. This report highlights several key areas where hospitals are improving care, providing resources for healthier lifestyles and reducing costs.

Aim #1: Improving the Patient Experience of Care

Of the three goals included in the Triple Aim, hospitals are most able to directly affect quality through care provided to patients while in the hospital and, hence, have spent the lion's share of their time and effort focused on improving inpatient care.

Progress toward this goal can be evaluated through two different sets of metrics—those measuring key dimensions of quality (namely patient safety and the timeliness and effectiveness of care) and those measuring the patient's degree of satisfaction with the care experience.[1] This section details the progress hospitals have made in both areas.

Improving Key Dimensions of Quality

Care quality has improved across the continuum of health care settings, with hospitals in particular illustrating progress in improving patient safety and the provision of evidence-based care known to lead to better patient outcomes.[2] An examination of trends in performance on quality measures between 2000-2002 and 2010-2011 shows that hospitals are making large strides in improving the quality of care. During this period, just under 74 percent of hospital quality measures (29 out of 39) exhibited annual rates of improvement of 1 percent or more, compared to 60 percent of home health/hospice measures, 58 percent of nursing home measures, and 52 percent of ambulatory care measures.[3]

Safer Care through Reduced Risk of Hospital-acquired Conditions

In 1999, the Institute of Medicine (IOM) released its landmark report, *To Err Is Human*, which brought significant attention to the issue of patient safety in hospitals and other settings.[4] A few years later, IOM's *Crossing the Quality Chasm* report highlighted the important role of revamping systems and processes (rather than relying solely on blaming and disciplining individuals) as the key to improving safety.[5] These reports served as a "wake-up" call for individual hospitals and the field as a whole. Since their release, hospital leaders have redoubled their efforts, investing tremendous time and effort into understanding the root causes of safety problems and designing systems and processes to prevent them. As the data and illustrative examples in this section make clear, that work is paying off in a meaningful way and patients are now receiving significantly safer care. This progress is best seen through examination of hospital-acquired conditions (HACs). A HAC is an undesirable situation or condition that arises during a hospital stay that negatively affects a patient. HACs include falls, adverse drug events and any of various types of preventable infections and other problems that can arise during an inpatient stay. Each year, an estimated 3 million of these potentially preventable adverse events occur in U.S. hospitals, exacting a large human and financial toll.[6] Working collaboratively and on their own, hospitals have made

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significant progress in recent years in reducing the risk of HACs. Nationwide, a composite measure of 28 different HACs fell by 17 percent between 2010 and 2013, from 145[7] to an estimated 121 per 1,000 discharges.[8] This reduction translates into an estimated 1.3 million fewer HACs over this period, which, in turn, has prevented an estimated 50,000 deaths and saved $12 billion.[9]

While multiple factors are likely responsible for this decline, it is clear that hospitals are making a concerted effort to reduce HACs, in part due to the Centers for Medicare & Medicaid Services' (CMS) Partnership for Patients campaign ("the Partnership"). Launched in April 2011 by CMS's Center for Medicare and Medicaid Innovation, the Partnership campaign set the goal of reducing preventable HACs by an additional 40 percent over the three-year period from 2011 to 2014. (The Partnership also set the target of reducing 30-day hospital readmissions by 20 percent; further discussion of hospital efforts to reduce readmissions appears later in this paper.) To that end, the Partnership has provided more than $218 million in funding to 26 Hospital Engagement Networks (HENs) that, collectively, include more than 3,700 hospitals, which translates into roughly 70 percent of general acute care hospitals in the U.S. (These hospitals handle roughly 80 percent of all admissions in the country).[10,11] HENs work at various levels (hospital, system, region, state and/or nation) to identify solutions that are already working and disseminate them to hospitals and other providers. To that end, they develop and sponsor learning collaboratives, provide intense training and technical assistance, establish and implement monitoring and tracking systems to gauge progress toward established goals, identify leaders of high-performing facilities to serve as coaches and advisers to peers in other hospitals and otherwise support initiatives and activities that promote patient safety. The campaign focuses on 11 specific areas of patient harm. For five of these, clear evidence exists that meaningful progress has been made in the past three years. For the other six areas, the evidence is mixed, although for at least some of these the preponderance of data suggests improvement.[12]

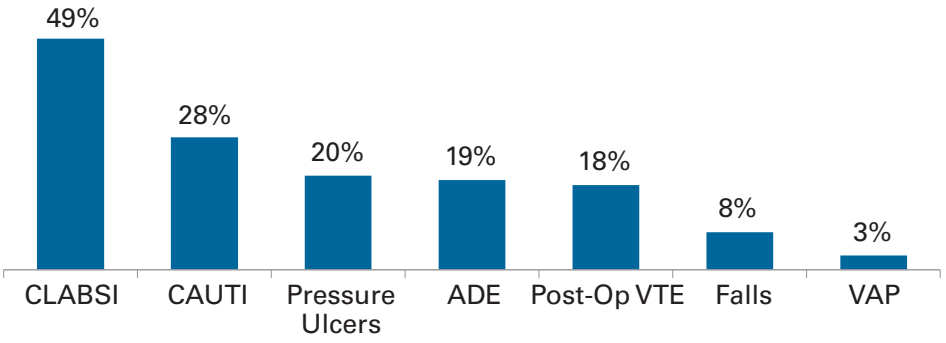
Chart 1 summarizes the progress being made within individual types of HACs, using estimates from a single data source over a specific time period (2010 to 2013).

For Additional Information and Case Studies:

A variety of tools, case studies and other materials related to many of the patient safety areas covered in this report are available at *http://www.hret-hen.org*.

Hospitals Are Significantly Reducing Hospital-acquired Conditions.

Chart 1: Estimated Reductions in HACs, for Selected Conditions, 2010-2013



Source: U.S. Department of Health and Human Services. Interim Update on 2013 Annual Hospital-acquired Condition Rate and Estimates of Cost Savings and Deaths Averted From 2010 to 2013. Available at: *http://www.ahrq.gov/professionals/quality-patient-safety/pfp/interimhacrate2013.pdf*.
CLABSI=Central Line-associated Bloodstream Infection, CAUTI=Catheter-associated Urinary Tract Infection, ADE=Adverse Drug Event, VTE=Venous Thromboembolism, VAP=Ventilator associated Pneumonia

Central-line Associated Bloodstream Infections (CLABSI)

Bloodstream infections can increase length of stay, risk of mortality and costs. In the inpatient setting, bloodstream infections and other complications are often associated with the placement and use of central venous lines into vessels leading to the heart. These lines are used to administer medications or fluids, draw blood for tests or directly obtain cardiovascular measurements. Once thought to be an inevitable outcome for some patients, CLABSIs are now considered by many hospitals to be preventable events that should rarely, if ever, occur. This cultural transformation – i.e., from viewing infections as inevitable to unacceptable – has led to significant progress in preventing CLABSIs. In fact, between the 2006-2008 period and 2011, the nationwide incidence of CLABSIs fell by roughly 40 percent.[13]

Much of this progress resulted from the Comprehensive Unit-based Safety Program (more commonly referred to as CUSP). Funded by the Agency for Healthcare Research and Quality (AHRQ), CUSP began in Michigan with 127 intensive care units (ICUs) that worked with the Michigan Health & Hospital Association (MHA) and patient safety experts at Johns Hopkins Hospital. These hospitals changed their culture to view CLABSIs as preventable and implemented five relatively simple interventions known from research to significantly reduce the risk of infection: removing unnecessary central lines, washing hands prior to

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inserting central lines, using the maximum barrier precautions so as to keep the line sterile during insertion, cleaning skin with chlorhexidine, and avoiding the femoral site when inserting lines. Through these actions, the participating ICUs virtually eliminated CLABSIs over an 18-month period and subsequently sustained these gains.[14]

Buoyed by this success, AHRQ began working with the Health Research & Educational Trust (HRET), a division of the American Hospital Association (AHA), to roll out the *On the CUSP: Stop BSI* program in collaboration with MHA's Keystone Center for Patient Safety & Quality and Johns Hopkins Medicine's Armstrong Institute for Patient Safety and Quality. Representing hospitals from 44 states, the District of Columbia and Puerto Rico, the 1,800 units participating in this initiative reduced the CLABSI rate by 40 percent (from 1.903 to 1.137 infections per 1,000 central line days), which translates into more than 2,000 fewer CLABSIs, 500 lives saved and more than $34 million in avoided expenses each year.[15]

Encouraged by the success of CUSP, the HENs and other stakeholders are continuing to spread this cultural transformation and the five evidence-based practices throughout the nation. Substantial, continued progress is being made. Between 2010 and 2013, CLABSIs fell by an estimated 49 percent, from 18,000 to 9,200 per year, saving an estimated 1,628 lives and nearly $150 million.[16]

Surgical Site Infections (SSI)

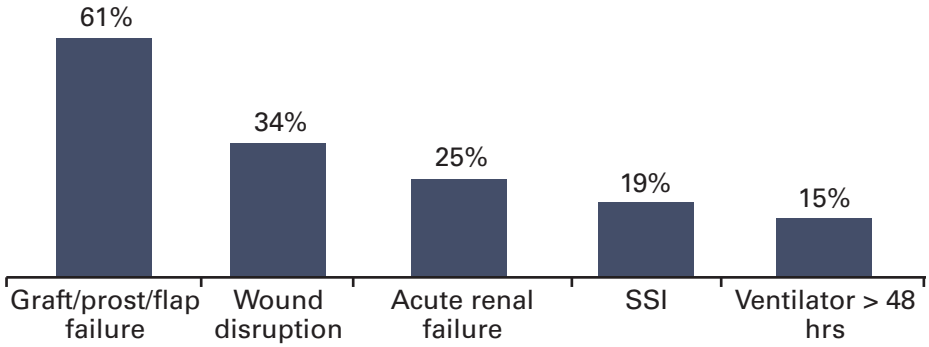
SSIs can occur at the site of surgical incisions and in deeper tissues affected by the procedure, and, like CLABSIs, they can lead to increased length of stay, mortality and costs.[17] Also like CLABSIs, SSIs were once considered to be an inevitable outcome for some patients following surgery. That is no longer the case. Between 2006-2008 and 2011, SSIs fell by 17 percent.[18] Since that time, SSIs have continued to occur less often – between 2010 and 2013, SSIs fell by a similar amount (19 percent), meaning that 18,000 infections were avoided, saving an estimated 508 lives and $378 million.[19]

This national reduction in SSIs is the product of collaborative efforts and working independently. For example, as part of the American College of Surgeons National Surgical Quality Improvement Program (ACS NSQIP®), the 10-hospital Tennessee Surgical Quality Collaborative used ACS NSQIP data to reduce SSIs by 18.9 percent. As depicted in Chart 2, participating hospitals also had success in eliminating various other types of surgery-related complications, including acute renal failure (25.1 percent), graft/prosthesis/flap failure (60.5 percent), being on a ventilator longer than 48 hours (14.7 percent), and wound disruption (34.3 percent). Collectively, these reductions led to $2,197,543 in costs avoided per 10,000 general and vascular surgery cases.[20]

Another example comes from Kaiser Sunnyside Medical Center, a 329-bed facility in Clackamus, Ore., which formed a multidisciplinary SSI Prevention Committee to tackle the issue. This committee discovered that the organization needed to create a new culture that viewed SSIs as preventable rather than inevitable. To that end, the committee created Pathway to Zero, a standardized program based on recommendations from multiple expert sources that were tailored to the medical center. The program features standardized procedures and processes for timing of antibiotics, appropriate surgical preparation, hand hygiene, operating room attire and use of chlorhexidine gluconate wipes. It also features standardized communication processes, including regular briefings and debriefings, and the ability of any staff member to "stop the line" if something appears wrong. To promote culture change, the program uses simulation-based training for surgeons, staff education and communication, and continuous performance feedback. Between 2006 and 2012, the program generated a 45 percent reduction in SSIs.[21]

The Tennessee Surgical Quality Collaborative Reduced Surgery-related Complications.

Chart 2: Percent Reduction in Surgery-related Complications for Tennessee Surgical Quality Collaborative Participants



Source: Guillamondegui OD, Cofer JB, et al. Using the National Surgical Quality Improvement Program and the Tennessee Surgical Quality Collaborative to Improve Surgical Outcomes. Journal of the American College of Surgery. Apr 2012; 214(4):709-14

Catheter-associated Urinary Tract Infections (CAUTI)

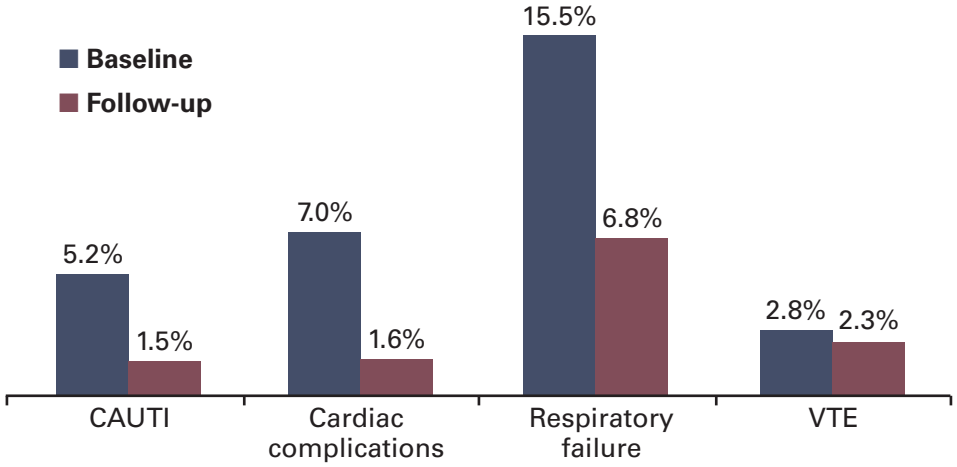
Many hospitalized patients (particularly those with certain comorbid conditions) develop infections in their urinary tract, often due to use of a urinary catheter. Up to a quarter of hospitalized patients have a short-term urinary catheter placed during their stay, and CAUTIs account for roughly 40 percent of all hospital-acquired infections.[22] Complications from CAUTI lead to increased length of stay, discomfort, excess costs, and sometimes death. Yet as with CLABSIs and SSIs, CAUTIs can often be prevented.[23]

At a national level, hospitals are trying to achieve the same level of success in preventing CAUTI as they have with CLABSI. In fact, some hospitals are applying the same approach used with CLABSI to CAUTI. Funded by AHRQ and led by HRET, *On the CUSP: Stop CAUTI* is being used by many hospitals that were part of a HEN, including the AHA/HRET HEN. Unit-based hospital teams joined this 18-month effort, which requires participation in content and coaching teleconferences, in-person learning sessions, data collection and submission, use of improvement tools, and monthly safety meetings to review process and outcomes data. A September 2013 AHRQ interim report showed that units participating in the program for at least 14 months reduced CAUTI rates by an average of 16 percent.[24,25] At the national level, CAUTI declined by an estimated 28 percent between 2010 and 2013. This decline translates into 110,000 avoided CAUTIs, which in turn has saved more than 2,500 lives and $110 million.[26]

Individual hospitals have had even greater success. For example, working as part of ACS NSQIP, Saint Francis Hospital and Medical Center, a 600-bed hospital in Hartford, Conn., reviewed the 74 inpatient cases of post-surgical UTIs that occurred over the previous four years. Using ACS NSQIP data, the hospital identified and addressed issues that commonly led to UTIs, allowing it to reduce the rate by 62 percent over a three-year period, from 2.6 percent in 2008 to 1.5 percent in 2011.[27] Similarly, Berkshire Medical Center, a community hospital in Pittsfield, Mass., implemented twice-a-week multidisciplinary rounds for surgical patients, with teams making real-time adjustments in clinical care, documentation and other patient support based on the observations of the team during the rounds. As depicted in Chart 3, the program contributed to substantial reductions, not only in CAUTI (from 5.2 to 1.5 percent) but also in cardiac complications (7.0 to 1.6 percent), postoperative respiratory failure (15.5 to 6.8 percent) and venous thromboembolism (2.8 to 2.3 percent); length of stay also fell, from 6.1 to 5.1 days.[28]

Berkshire Medical Center Has Reduced Surgical Complications.

Chart 3: Percent of Surgical Patients Experiencing Complications for Selected Conditions



Source: Counihan T, Gary M, Lopez E, et al. Surgical Multidisciplinary Rounds : An Effective Tool for Comprehensive Surgical Quality Improvement. Am J Med Qual. September 10, 2014. Epub ahead of print.

Early Elective Deliveries (EEDs) and Other Adverse Obstetric Outcomes

A recent study found that 8.9 percent of Medicaid single births were EEDs during the period between 2010 and 2012; this figure translates into 160,000 Medicaid EEDs nationwide each year.[29] EEDs increase the risk of both maternal and infant complications. While long-term trend data on EEDs is not available, reports from the HENs suggest that substantial improvement has occurred since the program began, with EEDs having fallen by 44.8 percent between the baseline period (the first quarter of 2012 or earlier, depending on the HEN) and the follow-up period (usually the second and third quarter of 2013). This magnitude of decline translates into more than 16,000 EEDs having been avoided at HEN-participating hospitals.[30]

In some cases, hospitals have been successful in nearly eliminating EEDs. For example, working as part of IHI's Perinatal Improvement Community, several state-level cohorts of hospital-based teams worked collaboratively to reduce EEDs by implementing an elective induction protocol that calls for gestational age greater than or equal to 39 completed weeks, unless medically necessary. Between June 2011 and June 2013, one cohort of 12 teams reduced the average (mean) rate of EEDs from 15.3 percent to 1.2 percent. A separate cohort of seven teams reduced the EED rate from a baseline of 40.0 percent to a mean of 2.6 percent over a slightly shorter time period. The improvements generated by these cohorts have, in turn, led to a reduced need to transfer neonates into higher levels of care and fewer maternal and perinatal adverse events.[31]

A similar approach was used at CoxHealth Systems, a 729-bed facility in Springfield, Mo. After a voluntary program generated modest progress in reducing

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EEDs, medical leaders instituted a "hard stop" to scheduling elective inductions prior to 39 weeks. They created a list of acceptable medical indications for delivering prior to this time, and now require all exceptions to be approved by the chief of obstetrics or a perinatologist. Any physician who performs an elective delivery that does not meet hospital criteria receives a letter signed by the chief of obstetrics and the chief medical officer reiterating hospital policy and delineating possible consequences if more violations occur. Physicians receiving three such letters must appear before a peer review board. Within two months of implementing the new approach, the rate of EEDs fell from 9 percent to 2 percent, and within six months the rate fell to near zero (0.03 percent). The policy is now generally accepted as a best practice by most physicians in the system.[32]

Hospitals also have had success in reducing other types of obstetric trauma. Between 2004 and 2010, the overall rate of birth-related trauma involving a third or fourth degree perineal laceration (a tear to the vagina or surrounding tissue) fell by nearly 25 percent, from 30 to 22.8 per 1,000 vaginal deliveries not involving instrument assistance. Rates fell for patients of all ages, racial/ethnic groups and types of insurance.[33] Since 2010, there appears to have been continued improvement in this measure.[34]

Ventilator-associated Pneumonia (VAP)

VAP is a type of pneumonia that can occur in hospitalized patients receiving mechanical ventilation. Patients with VAP face an increased risk of death and generally end up spending longer on the ventilator and in the hospital.[35] VAP affects a significant number of patients receiving mechanical ventilation, with ICU patients and those who are intubated being at highest risk.[36] VAP can be prevented through implementation of known-to-be-effective practices, including appropriate oral care, use of multidisciplinary rounds and daily goal-setting designed to wean the patient from the ventilator as quickly as possible.[37]

Hospitals have made good progress in recent years in preventing VAP. Among the more than 1,100 facilities that contribute data to the National Database of Nursing Quality Indicators (NDNQI), VAP rates fell by 47.1 percent between 2011 and the third quarter of 2013.[38] Other data sets show a more modest level of improvement, including one suggesting a 16.7 percent decline between 2010 and 2012[39] and another estimating a more modest 3.0 percent decline between 2010 and 2013.[40] Even this more modest decline, however, translates into tangible benefits in terms of lives saved (144) and costs avoided ($21 million).[41]

An example of an effective approach to reducing VAP comes from Central DuPage Hospital, a 373-bed facility in Winfield, Ill. After several years of unsuccessful efforts to reduce VAP, the hospital launched a new set of care protocols in 2007, with the goal of eliminating VAP within the facility. Key changes included implementing a set of standardized practices related to oral care (e.g., cleansing and application of moisturizer every two hours, twice-a-day brushing of teeth and gums with suction toothbrush), keeping beds elevated to at least 30 degrees at all times, daily "sedation vacations" (where the patient is weaned off of sedation so that he/she can wake up and follow simple commands), daily assessments of readiness for weaning, and regular checks of patient equipment, including cuff pressure and the stability of endotracheal tubes. To promote compliance with these protocols, the hospital developed training and education materials for clinicians and patients/family members (e.g., posters placed in patient rooms) and a tracking and monitoring system. The new approach proved to be quite effective. Compliance with the protocols jumped significantly, while the VAP rate fell by 85 percent by the end of 2008. Gains have been largely sustained since that time with few, if any, VAP cases occurring in the hospital each year.[42]

Success with Infants, Too: Care Bundles Adopted from Adult ICUs Reduce CLABSI and VAP

In an effort to prevent both CLABSI and VAP in newborns, neonatal nurse leaders at the University of Colorado Hospital in Aurora developed tailored educational modules and care "bundles" based on evidence from literature on adult ICU patients. ("Bundles" refer to a set of care processes or practices that are known to be effective in treating certain conditions and patients.) The program featured practice guidelines, updated supply carts and checklists to ensure that nurses understood the bundles and could easily comply with them. Nurse leaders performed weekly audits on compliance with the bundles and provided real-time feedback and quarterly performance reports to nurses and neonatal nurse practitioners. The program reduced CLABSI by 92 percent and central line days by 27 percent, resulting in 84 fewer hospital days and estimated cost savings of $348,000. VAP fell by 71 percent and ventilator days by 31 percent, leading to 72 fewer hospital days and estimated savings of $300,000.[43]

Pressure Ulcers

More than 2.5 million patients in U.S. acute care facilities suffer from pressure ulcers (also commonly referred to as bed sores) each year, and 60,000 die from related complications. In addition to increasing the risk of mortality, hospital-acquired pressure ulcers cause patients pain and often necessitate additional treatments and longer stays. Yet, as with so many other HACs, pressure ulcers can often be prevented through use of known-to-be-effective interventions.[44]

Several sets of national data suggest that hospitals have made significant progress in preventing hospital-acquired pressure ulcers over the past few years. National estimates suggest a 20 percent drop between 2010 and 2013, with more than 260,000 hospital-acquired pressure ulcers avoided, saving nearly 19,000 lives and more than $4.4 billion.[45] Both NDNQI and HEN data also show meaningful improvement between the 2010-2011 baseline period and the second and third quarters of 2013, with one dataset showing a 26.3 percent reduction and another showing a 29.1 percent improvement.

Individual organizations are making great strides in eliminating hospital-acquired pressure ulcers. For example, Memorial Medical Center in Springfield, Ill., used Lean and Six-Sigma methodologies[i] to identify hospitalized patients at risk of pressure ulcers and created a series of interventions to reduce that risk, including a prevention bundle and associated bedside communication tools, a standardized approach to turning patients, and an enhanced role and training for unit-based "champions." Since the initiative began, prevalence rates for pressure ulcers have fallen by 79 percent (well above the 50 percent goal), from 6.0 percent during the baseline period (November 2007 to August 2011) to 1.3 percent (January-June, 2013).[46] Since then, that rate has dropped further to 1.1 percent as of March 2015.

Leaders at BJC HealthCare in St. Louis, Mo., found that pressure ulcers constituted 65 percent of all preventable harm events within the system. To address the issue, a multidisciplinary team applied Lean tools to review existing practices and identify barriers to improvement. The team discovered that 25 units accounted for 80 percent of the problem, with the biggest issues being inadequate pressure redistribution, lack of data transparency and lack of standard training and education on how to prevent pressure ulcers. The team developed a bundle of evidence-based standards to address the problem, including repositioning of patients every two hours, regularly checking and adjusting endotracheal tubes for intubated patients, real-time pressure ulcer event identification, enhanced ownership over the problem and problem solving and prevention education for patients and staff. The bundle was initially implemented on three units, which, over a two-year period, experienced a 56 percent decline in pressure ulcers. The program as since been expanded to other units across BJC experiencing a significant problem with pressure ulcers, leading to a 77 percent drop in overall incidence of pressure ulcers between 2009 and 2014,[47] demonstrating both the effectiveness and sustainability of this approach.

Falls and Fall-related Injuries

Falls are the most commonly reported adverse event in hospitals, with rates ranging from 1.3 to 8.9 falls per 1,000 patient days; the risk of falls is highest on units that focus on neurology, rehabilitation and/or geriatric care. While many of these falls do not result in patient injury or harm, fall-related injuries can lead to prolonged and/or more complicated hospital stays.[48]

Much is known about the risk factors for falls and how to effectively address them.[49] Some falls may be impossible to prevent, as the need to restore patient mobility must be balanced against the increased risk of a fall. However, some falls and fall-related injuries can be prevented. In fact, the Partnership program estimates that a quarter of all fall-related injuries that occur in the hospital can be prevented, and has set the goal of cutting preventable fall-related injuries in half, which would translate into 43,750 fewer injuries in U.S. hospitals over a three-year period.[50] Hospitals appear to be making meaningful progress toward this goal, with multiple datasets showing modest declines in falls over the past several years, including one showing a 7.9 percent drop between 2011 and the third quarter of 2013 (and an 11.3 percent improvement in falls that lead to injury), a second showing an 8.9 percent improvement between 2010 and 2012, and a third showing an 8.0 percent drop in falls between 2010 and 2013.[51,52] This latter 8.0 percent estimate translates into 20,000 avoided falls between 2010 and 2013, which in turn translates into an estimated 1,100 lives saved and $144 million in avoided costs.[53]

Progress toward the Partnership goal has been much faster at some hospitals, with success generally being driven by the consistent application of known-to-be-effective protocols for identifying and monitoring at-risk patients. For example, St. Catherine's Hospital, a 189-bed facility in East Chicago, Ind., established a falls prevention committee composed of nursing staff and their managers. Based on research into best practices, the committee created a falls risk assessment used by nurses on all patients, and introduced a series of interventions to reduce identified risks, including visual/audible cues to alert staff about high-risk patients (e.g., having them wear yellow

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[i]Six Sigma is a quality improvement methodology that seeks to improve quality by identifying and removing the causes of defects (errors) and minimizing variability. Lean is a similar methodology that takes a systematic approach to eliminating waste within a process.

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armbands), bed alarms, non-skid footwear, medication reviews, keeping beds in a low position and placing call lights at the patient bedside. For high-risk patients, the hospital began hourly rounding (i.e., staff checking on the patient every hour) with an emphasis on addressing pain, physical needs such as trips to the bathroom and repositioning for greater comfort. In a major cultural change, St. Catherine's also instituted a "no passing zone" that requires all hospital-based personnel (including physicians) to respond to any call light they see when walking by a patient's room in the halls. The program has worked, as total falls declined by 26 percent and the fall rate per 1,000 days dropped by 23 percent in the first year after program implementation.[54]

Venous Thromboembolism (VTE)

VTE refers to either of two related conditions caused by blood clots: deep vein thrombosis (DVT) and pulmonary embolism (PE). DVT is a blood clot that develops in a deep vein, such as the lower leg, thigh or pelvis. PE refers to when all or part of one of these clots breaks off and travels through the bloodstream to the lungs, an event that can be fatal if not diagnosed and treated in a timely manner. Estimates vary on the number of people affected by VTE, ranging from 300,000 to 900,000 annually. An estimated 60,000 to 100,000 Americans die of VTE each year.[55]

In many instances, the onset of DVT and PE has nothing to do with hospital care, such as when patients develop a blood clot after a long trip on an airplane. However, some people develop VTE in the hospital or shortly after discharge, with the condition related to their hospital care. In many cases, these patients have undergone surgery while in the hospital. VTE related to hospital care often can be avoided through administration of appropriate preventive (also known as prophylactic) treatment to at-risk patients. Examples of such preventive treatment include use of clinically indicated drugs (typically blood thinners) and mechanical devices (such as pressure stockings) that reduce the risk of a clot.

Various data sources suggest that hospitals are doing a better job in administering such treatment in a consistent fashion, as evidenced by declining VTE rates. Between 2010 and 2013, post-operative VTE cases declined by an estimated 18 percent, which translates into 5,000 fewer cases, 520 lives saved and $40 million in avoided costs.[56] An analysis of Medicare claims data between 2011 and the third quarter of 2013 shows that VTE rates fell by 13.5 percent, with the pace of improvement accelerating during this period. HEN-reported data shows a 15.5 percent improvement between baseline periods (usually 2010) and follow-up (typically the second or third quarter of 2013). [57]

Illustrative examples from individual organizations show how hospitals are ensuring that more patients receive appropriate prophylaxis and, hence, face a reduced risk of VTE. One example comes from the performance improvement committee at Research Medical Center in Kansas City, Mo., which assigned a workgroup to improve adherence with recommended care to prevent VTE, with the goal of reducing complications and related readmissions and deaths. Finding that prophylactic treatment was inconsistently applied across the organization, the workgroup tested and implemented a new standardized care process. Key components include: a dashboard to measure compliance with VTE prophylaxis within the first 24 hours of admission, updated VTE documentation in the hospital's computerized decision support system, training for nurses about the new documentation procedures, mandatory use of preprinted order sets placed on every chart at admission, and mandatory use of new sequential compression devices for ICU patients without contraindications. The approach also included a process for identifying patients who do not receive appropriate care. These new protocols led to a dramatic increase in the proportion of ICU patients receiving VTE prophylaxis within 24 hours of arrival, from 42 percent in the second quarter of 2011 to 96 percent a year later, and then to 100 percent shortly after that. The rate for non-ICU patients also more than doubled (40 to 91 percent). As a result of these efforts, the number of VTEs has fallen dramatically, with just one case occurring over a 12-month period.[58]

The University of Kansas Hospital (Kansas City) used a similar approach, creating a multidisciplinary team to address an unacceptably high incidence of VTE. The team evaluated 261 charts of patients who developed VTE in the hospital, identifying common themes and root causes. The team then reviewed various evidence-based strategies for educating clinicians on existing prophylactic guidelines, and created an educational plan for doing so, along with systems-based changes to assist clinicians with compliance. Examples of specific interventions include active surveillance of VTE prophylaxis by the pharmacy department and distribution of a pocket-sized reference tool to clinicians to assist with VTE risk assessment and to remind them about prophylaxis guidelines and contraindications. Over an 18-month period (November 2010 to June 2012), VTE incidence fell by 51 percent, from 12.7 to 6.1 per 1,000 patients.[59]

Adverse Drug Events (ADE)

ADEs refer to injuries resulting from medication use, including physical harm, mental harm or loss of function.[60] A 2007 IOM report estimated that between 380,000 and 450,000 preventable ADEs occur each year, at a cost of $3.5 billion.[61] In many cases, ADEs result from lack of knowledge about all conditions and risk factors a patient may have, and/or all medications he or she may be taking. As a result, patients may develop side effects, drug-related symptoms and/or drug-drug interactions that lead to injury, either while still in the hospital or shortly after discharge. When these events occur after discharge, they often quickly lead to an emergency department (ED) visit and/or readmission to the hospital. To reduce ADEs, The Joint Commission in 2005 established a national patient safety goal that requires health care organizations to implement comprehensive medication reconciliation at every transition point (e.g., admission, transfer across units, discharge home or to another facility) along the continuum of care.[62] (Medication reconciliation is the process of comparing a patient's medication orders to all of the medications the patient has been taking; it is done to avoid medication errors such as omissions, duplications, dosing errors or drug interactions.)[63]

National trends suggest that hospitals have made some progress in recent years in reducing ADEs, with the inpatient rate having fallen by 19 percent between 2010 and 2013; this decline means that roughly 301,000 ADEs were avoided during this time period, saving an estimated 6,020 lives and $1.5 billion.[64] This progress has stemmed in large part from hospitals focusing closely on improving medication reconciliation processes, a strategy that reduces not only ADEs but related readmissions as well. For example, Hennepin County Medical Center in Minneapolis, Minn., implemented a multidisciplinary medication reconciliation process for patients discharged to skilled nursing facilities, with the goal of ensuring that multiple reviews occur in a timely manner. As part of each discharge order, the physician writes medication orders and performs the initial medication reconciliation within four hours of a nursing home bed becoming available. A clinical coordinator and pharmacist then review the order, with the pharmacist meeting with the physician if needed to resolve discrepancies. As a final check, the bedside nurse reviews the orders and communicates pertinent information to the nursing home. The program has virtually eliminated medication errors and cut readmissions and ED visits nearly in half, leading to significant cost savings.[65]

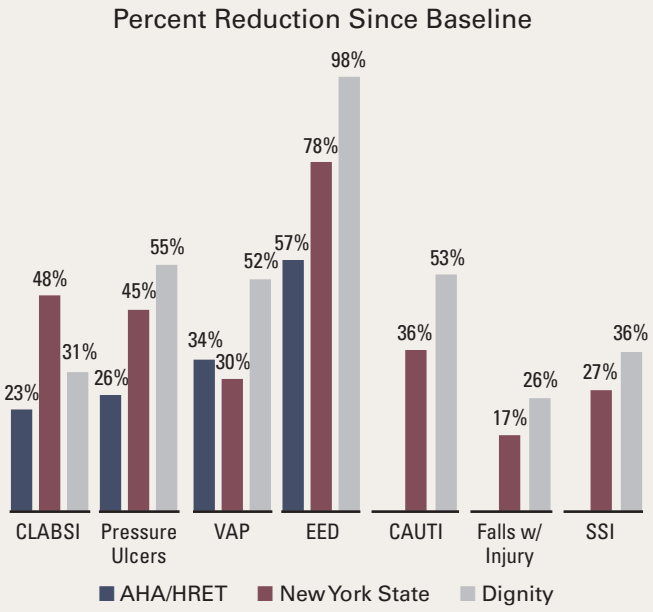
Comprehensive Programs Address Multiple Components of Safety

While the previous sections describe examples of hospital programs that focus on a particular type of HAC, some of the most successful programs simultaneously target multiple types. For example, several HENs have made care meaningfully safer for patients along multiple dimensions, as detailed below:

- Over a 28-month period, the more than 1,500 hospitals that are part of the AHA/HRET HEN collectively prevented nearly 19,000 EEDs, more than 110,000 readmissions, and more than 8,500 HACs, generating associated cost savings of $1.3 billion.[66] As of December 2013, hospitals participating in the AHA/HRET HEN had improved quality in all core areas targeted by the Partnership, resulting in better care for more than 69,000 patients. As a whole, these hospitals significantly reduced EEDs (57 percent), pressure ulcers (26 percent), CLABSIs in the ICU (23 percent) and VAP (34 percent). Part of this success can be attributed to the creation of periodic reporting of performance on a single measure known as Harm Across the Board, or HAB, that tracks overall hospital progress in reducing the HACs targeted by the Partnership.[67]
- The 152 hospitals participating in the Healthcare Association of New York State HEN significantly reduced EEDs (78.2 percent), ICU-based CLABSIs (48.0 percent), CAUTIs (36.1 percent), pressure ulcers (45.5 percent), VTEs (20.1 percent), possible VAPs (30.4 percent), SSIs in hip prosthesis patients (27.0 percent), falls resulting in injury (16.6 percent) and ADEs for high-alert drugs (6.5 percent).[68]
- Dignity Health (a HEN consisting of 35 hospitals) experienced similar improvements, including in EEDs (97.6 percent), CAUTIs (52.7 percent), pressure ulcers (55.3 percent), VAP (52.1 percent), CLABSIs (31.4 percent), falls with injury (25.5 percent) and SSIs in targeted procedures (36.3 percent).[69]

HENs Have Helped Member Hospitals Significantly Reduce HACs.

Chart 4: Reduction in HACs Since the Start of HEN Programs



Sources: Veseley R, Collaboration and Shared Learning Help Hospitals Achieve Safety Metrics. Trustee Magazine. October 13, 2014. Available at: *http://www.trusteemag.com/display/TRU-news-article.dhtml?dcrPath=/templatedata/HF_Common/NewsArticle/data/TRU/Magazine/2014/Oct/cov-reducing-harm-patient-safety*; U.S. Department of Health and Human Services. New HHS Data Shows Major Strides in Patient Safety, Leading to Improved Care and Savings. May 7, 2014. Available at: *http://innovation.cms.gov/Files/reports/patient-safety-results.pdf.*
SSI=Surgical Site Infection, EED=Early Elective Delivery

Similarly, individual hospitals have launched comprehensive programs that have resulted in dramatic improvements in patient safety. For example, Nationwide Children's Hospital in Columbus, Ohio, implemented a hospital-wide quality improvement (QI) program focused on the implementation of proven, high-reliability practices that enhance patient safety. The program features unit-based multidisciplinary teams that use known-to-be-effective QI tools, along with extensive training in error prevention for all employees. Between 2010 and 2012, the effort resulted in an 83.3 percent reduction in all serious safety events (SSEs), from 1.2 to 0.2 events per 10,000 adjusted patient days. Harm events that could have been prevented fell by 53 percent, from 150 in the first quarter of 2010 to 71 in the fourth quarter of 2012. Collectively, these improvements contributed to a 25 percent decline in observed hospital mortality (from 1.0 to 0.75 percent) and a 22 percent decline in harm-related hospital costs.[70]

Audit/Feedback, Reminder Systems Are Critical to Reducing HACs

A systematic review of the evidence on hospital strategies for reducing HACs found that adherence to evidence-based care processes improve and infection rates decline when provider audit/feedback is added to the core strategies of organizational change and provider education, either on its own or in combination with provider reminder systems. Provider audit and feedback refers to internal strategies such as reminders embedded in EHRs, concurrent chart reviews to identify patients who might benefit from certain evidence-based care processes, and comparative performance feedback to clinicians (versus peers). The core strategies alone do not appear to be effective, and adding only reminder systems to them appears to be less effective than adding audit/feedback.[71]

Greater Adherence to Evidence-based Care Processes

As a field, health care is doing a better job in providing patients with care that the evidence shows clearly leads to better health and outcomes. Across all care settings, Americans received 70 percent of recommended, evidence-based services for treating or preventing particular medical conditions in 2010, up from 66 percent five years earlier,[72] and well above the approximately 55 percent rate found in a landmark RAND study from the early 2000s.[73]

Hospitals appear to be leading the way when it comes to improving the provision of evidence-based care. For example, cardiac patients (especially those experiencing a heart attack) entering the hospital today have much better odds than they did a decade ago of receiving recommended care, as evidenced by the following improvements between 2007 and 2013:

- The proportion of heart attack patients receiving angioplasty within 90 minutes of their arrival at the hospital rose from 60 to 96 percent (matching the accepted "achievable benchmark" of 96 percent).[74]
- The percentage of heart attack patients receiving drugs that break up blood clots blocking a major artery, known as fibrinolytic or thrombolytic therapy, rose from 39 to 58 percent.[75]
- The percentage of hospitalized heart failure patients given complete written discharge instructions increased from 66 percent to 94 percent, meeting the maximum achievable benchmark.[76]

During this same time period, the odds that a hospitalized pneumonia patient age 50 and over received an assessment of his or her influenza immunization status—and got the vaccine if appropriate—also increased substantially, from 55.2 percent to 94.1 percent, with improvement occurring across all age groups and both sexes.[77]

Improvement in the provision of evidence-based care has not been confined to isolated interventions, like heart attack care or providing a flu shot. Rather, hospitals have made significant strides in providing all recommended care across and within clinical areas. In fact, in 2013, Joint Commission-accredited hospitals provided 97.6 percent of care processes closely linked to positive patient outcomes, as measured by a composite score that aggregates 44 separate care processes. This figure is up from 81.8 percent in 2002 on a similarly constructed measure that took into account only 15 care processes. Put another way, in 2013 accredited hospitals provided recommend care in 17,080,000 out of 17,500,000 opportunities to do so.[78]

Hospital performance within specific clinical areas has similarly improved over time. Nationwide performance by all Joint Commission-accredited hospitals on a composite measure of heart attack care increased from 88.6 percent in 2002 to 99.0 percent in 2013; the composite measure covers the provision of all care known to improve the outcome of patients

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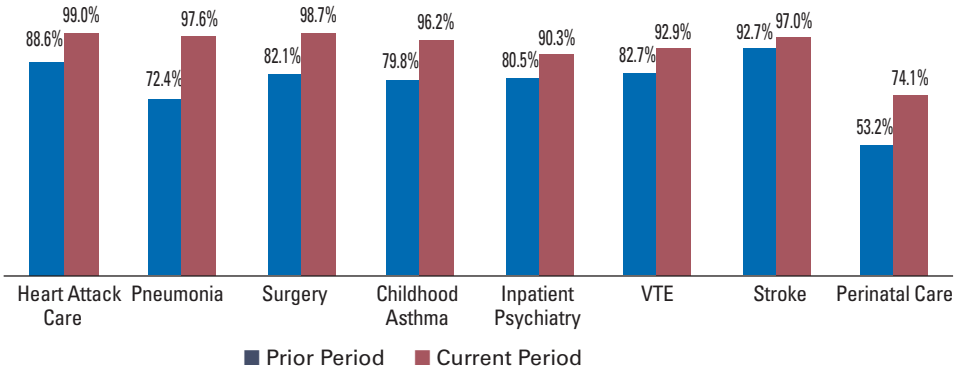
experiencing a heart attack, including all appropriate medications and therapy.[79] Similar improvements have occurred in performance on composite measures related to evidence-based care for pneumonia (72.4 percent in 2002 to 97.6 percent in 2013), surgery (82.1 percent in 2005 to 98.7 percent in 2013), childhood asthma (79.8 percent in 2008 to 96.2 percent in 2013), inpatient psychiatry (80.5 percent in 2009 to 90.3 percent in 2013), VTE (82.7 percent in 2010 to 92.9 percent in 2013), stroke (92.7 percent in 2010 to 97.0 percent in 2013) and perinatal care (53.2 percent in 2011 to 74.1 percent in 2013).[80,81]

Hospitals Are Increasing Adherence to Evidence-based Practices.

Chart 5: Percent Adherence to Evidence-based Practices



Sources: The Joint Commission. America's Hospitals: Improving Quality and Safety. The Joint Commission's Annual Report, 2014; The Joint Commission. Improving America's Hospitals. The Joint Commission's Annual Report on Quality and Safety, 2013.

Many More Hospitals Are Achieving High Performance on The Joint Commission Composite Accountability Measure.

Chart 6: Percent of Accredited Hospitals with 95%+ Performance on Composite Accountability Measure

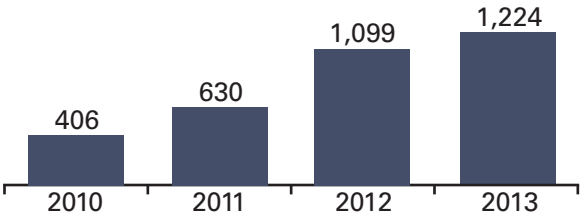
Sources: The Joint Commission. America's Hospitals: Improving Quality and Safety. The Joint Commission's Annual Report, 2014; The Joint Commission. Improving America's Hospitals. The Joint Commission's Annual Report on Quality and Safety, 2013.

As a result of these improvements, 81.1 percent of all Joint Commission-accredited hospitals achieved a composite accountability score of 95 percent in 2013, meaning they provided 95 percent or more of recommended care across these clinical areas. This figure is more than double the 33.8 percent that met this threshold on a less comprehensive measure in 2008. (The 2008 measure covered only four types of care: heart attack, pneumonia, surgery and childhood asthma.)[82,83]

In 2013, 36.9 percent of Joint Commission-accredited hospitals achieved the highest level of recognized performance with respect to providing evidence-based care. To qualify for this designation (known as Top Performer on Key Quality Measures®), an accredited hospital must not only achieve an overall accountability score of 95 percent, but also must achieve performance of 95 percent or above on each and every measure where the hospital has at least 30 cases in the denominator, and score 95 percent or above on at least one core measure set for a given clinical area and on each measure within that set. As depicted in Chart 7, 1,224 hospitals met these very stringent criteria in 2013, more than triple the number that did so in 2010. Another 718 hospitals (21.6 percent of all accredited hospitals) may join this group next year, as these organizations did not achieve Top Performer designation only because they missed achieving 95 percent performance on one measure.[84,85]

Many More Hospitals Are Earning Top-performer Designation from The Joint Commission.

Chart 7: Number of Top Performer Hospitals



Source: The Joint Commission. America's Hospitals: Improving Quality and Safety. The Joint Commission's Annual Report, 2014.

Health System Achieves Near-perfect Adherence to Process-of-Care Measures in Four Clinical Areas

As the statistics cited above indicate, many hospitals have achieved very high levels of performance when it comes to providing evidence-based care to patients. Some have even achieved near-perfect adherence. For example, St. Mary's Health Center in Jefferson City, Mo., implemented a program specifically designed to increase adherence to 24 process-of-care measures (known as "core measures") developed by CMS in four clinical areas: heart attack, heart failure, pneumonia and surgical care. A full-time nurse reviews patients' charts each day during their inpatient stay and after discharge to ensure adherence in these areas. The program also incorporates internal and external reporting of performance data, department-specific goal setting and measurement of progress toward those goals, and a physician-led committee to promote adherence by doctors. Within two years of the program's launch, the hospital achieved near-perfect adherence (98 percent or higher) on composite scores within each targeted clinical area; three years after implementation, the hospital scored in the 99th percentile nationally on overall adherence to core measures in the four areas.[86]

Providing Evidence-based Care Translates into Better Patient Outcomes

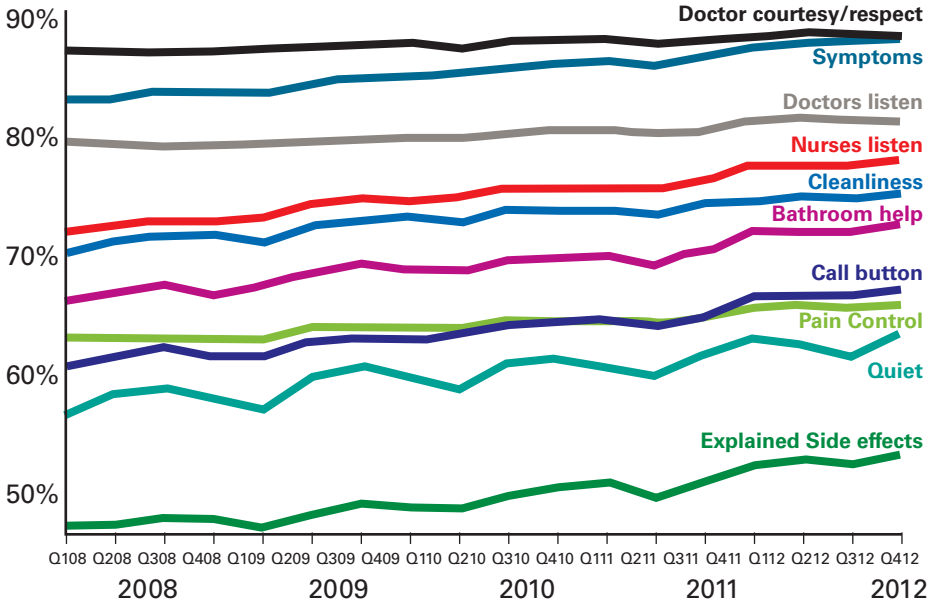
Not surprisingly, the consistent provision of evidence-based care translates into lives saved. For example, the risk-adjusted inpatient mortality rate for heart attack patients fell significantly between 2004 and 2010, from more than 80 to just over 50 deaths per 1,000 admissions (just above the achievable benchmark of 48). Significant gains occurred for both sexes and across all expected payment sources.[87] More recently, trends in 30-day mortality rates after admission for a heart attack also are exhibiting a downward trend, from 16.0 percent in 2008 to 15.2 percent in 2013.[88]

Higher Satisfaction with the Care Experience

In response to public reporting of performance data, hospitals are making strides in improving scores on various measures of patient experience. For example, between March 2008 and June 2012, nationwide scores reported by Medicare's Hospital Compare website show modest, steady improvement across all measures of patient experience captured by the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS)[ii] survey, as illustrated in Chart 8.[89]

Hospitals are Improving Performance on Patient Experience of Care Measures.

Chart 8: Quarterly Report of Top Box Score Measures



Source: Cohea C, Elliott MN, Lehrman WG, Goldstein E., Giordano LA. Presentation at Academy Health Research Meeting. June 2013. Washington, DC.

[ii] HCAHPs is a national, standardized, publicly reported survey of patients' perspectives on hospital care. More information is available at: http://hcahpsonline.org/files/HCAHPS%20Fact%20Sheet%20May%202012.pdf.

Another example comes from the 16 communities participating in Robert Wood Johnson Foundation's Aligning Forces for Quality (AF4Q) program. Chart 9 depicts improvements in HCAHPS scores across the 16 communities (referred to as "Alliances") participating in AF4Q. It shows that, within each of the 10 HCAHPS measures, at least 13 of the 16 Alliances improved between 2009 and 2011. In addition, the degree of improvement within the Allliances exceeded the national average for seven of the 10 measures.[90]

Communities Participating in the Aligning Forces for Quality Program Experienced Improved Performance on HCAHPS Measures.

Chart 9: Change in HCAHPS Performance Across AF4Q Alliances, 2009 to 2011

Measure	# Increased	# Decreased	# Unchanged	Alliance % change	National % change
Nurses always communicated well	16	0	0	3.59%	2.67%
Doctors always communicated well	13	3	0	0.84%	1.25%
Patients always received help as soon as they wanted	16	0	0	3.73%	3.17%
Pain was always well controlled	14	1	1	1.85%	1.45%
Staff always explained new meds	16	0	0	3.87%	3.33%
Room was always clean	15	1	0	3.84%	2.86%
Always quiet at night	15	1	0	4.03%	3.51%
Yes, staff did give patients discharge information	15	1	0	2.36%	2.47%
Patients who gave a rating of 9 or 10 (high)	15	1	0	4.00%	4.55%
YES, patients would definitely recommend the hospital	13	3	0	2.13%	1.45%

Source: Zema, C, Shaller D. "Improvements in Patient Experience of Care in AF4Q Alliances." Presentation to the Robert Wood Johnson Foundation. November 1, 2013.

While macro-level data show modest, steady improvement in patient experience scores over time, illustrative examples from individual facilities suggest that hospitals that focus on the issue can significantly improve in a relatively short period of time. For example, in 2010-2011, patients reported not being pleased with their experiences at Long Island Jewish Medical Center in New Hyde Park, N.Y., as evidenced by scores in the 6th percentile on a survey question about patients' willingness to recommend the hospital to someone else. To improve this performance, hospital leaders looked outside of health care, to the hotel industry, with the goal of transforming the hospital's culture to one focused on hospitality. To that end, the hospital brought in an outside company to design a customer-focused curriculum modeled after best practices from the hospitality industry (e.g., going out of one's way to offer extraordinary service). The company taught a team of 10 "master trainers" from the hospital using multi-modal methods. These master trainers, in turn, led two-hour courses with interdisciplinary staff from throughout the organization, typically teaching 15 to 20 people at a time. All staff completed the course over a 13-month period, and each year all employees take a review course to ensure they continue to exhibit behavior befitting the hospitality industry. In addition, a Hospitality Observation Team observes staff on a real-time basis in the clinical environment, recognizing and rewarding positive behaviors and holding staff accountable for negative ones. Since implementation of this program, patients are much more likely to recommend Long Island Jewish Medical Center to others, with scores reaching the 51st percentile in 2012 on the same Press Ganey survey question; scores for a similar question on HCAHPS rose from the 27th to the 86th percentile between 2011 and 2012.[91]

While Long Island Jewish Medical Center implemented a comprehensive program designed to change staff culture related to customer service, other hospitals have chosen to tackle specific aspects of the customer experience. For example, South Pointe Hospital in Ohio revamped its discharge planning processes to reduce delays between a physician ordering a

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patient's discharge and the patient leaving the hospital. A multidisciplinary group implemented a variety of changes to address the root causes of delay, leading to a more than 50 percent decline in the time between the order and the discharge (from 11.73 to 5.48 hours) and a significant increase in the proportion of patients giving the hospital the "top-box" (i.e., highest possible) score on discharge-related questions included on the patient survey, from 79.2 percent to 87.7 percent.[92]

Another example comes from Santa Barbara Cottage Hospital in California, which implemented a teach-back approach to patient education on medications and side effects. First implemented on a pilot unit, this approach resulted in large improvements on top-box scores for HCAHPS questions related to medications, from the 11th percentile in July 2012 to the 82nd percentile by the fourth quarter of 2013. This success led to roll-out of the program to the rest of the medical-surgical units, after which scores across these units improved from the 47th to the 62nd percentile between the first and fourth quarters of 2013.[93]

Additional Tools and Resources

The Association for Patient Experience website provides access to case studies, best practices and other resources for improving patient satisfaction with their care experience, available at: *http://www.patient-experience.org/Resources/Best-Practices.aspx*.

Drivers of an Exceptional Patient Experience

IHI has identified the following as the primary drivers of an exceptional inpatient experience for patents and family members:[94]

- Leadership: The hospital board and administrative leaders demonstrate that everything in the culture focuses on the provision of patient- and family-centered care, i.e., at the level of the individual patient, the microsystem (e.g., unit or department), and the organization as a whole.
- Hearts and minds of staff and providers: Staff and providers are fully engaged through respectful partnerships with everyone in the organization and committed to the provision of patient- and family-centered care.
- Respectful partnership: Every care interaction is anchored in a respectful partnership with the patient and family, anticipating their physical, emotional, informational, cultural, spiritual and learning needs.
- Reliable care: Hospital systems deliver reliable, high-quality care 24 hours a day, 7 days a week.
- Evidence-based care: The care team instills confidence by providing collaborative, evidence-based care.

Aim #2: Improving the Health of Populations

Compared to their ability to improve the patient care experience (including quality and satisfaction) (Aim #1), hospitals historically have had less ability to influence the overall health status of the population of patients they serve. Under the Triple Aim framework, this aim incorporates measures such as disease incidence, life expectancy, years of potential life lost, risk status and health/functional status. Obviously, many community-level issues, including income levels, education and other sociodemographic factors, play a major role in influencing these health outcomes. The ability to meaningfully affect these metrics during the typical, short inpatient stay is generally limited, particularly when compared to the influence of other stakeholders, such as health plans, primary care physicians and other ambulatory care providers.

That said, in recent years, hospitals have begun to take on increasing levels of accountability and responsibility for population health. For example, the Affordable Care Act requires not-for-profit hospitals to conduct community health assessments every three years and to develop and implement plans to address identified needs.[95] In addition, Medicare's accountable care organization (ACO) programs offer opportunities for groups of hospitals, doctors and other providers to come together voluntarily to offer more coordinated care to Medicare patients, with the goal of providing the right care at the right time, while avoiding unnecessary duplication of services and preventing medical errors. Medicare offers several ACO programs, including one

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for early adopters (the Pioneer ACO Program, which no longer accepts applications), one that shares savings with Medicare fee-for-service providers (the Medicare Shared Savings program) and the Advance Payment ACO Model (for selected participants in the Shared Savings Program).[96] Finally, in October 2012 CMS began reducing Medicare payments for hospitals with higher-than-expected readmission rates, thus giving hospitals an additional incentive to manage the health status of patients after discharge.

Given these new opportunities and requirements, hospitals are taking steps to meaningfully improve the long-term health of their patient populations. For example, a growing number of hospitals are investing in community-based initiatives designed to improve the health-related behaviors of local residents by offering or sponsoring farmers markets, exercise classes, health fairs and other activities. It is difficult to gauge the impact of these efforts, as changing health-related behaviors takes a long time, and the benefits of doing so may not pay tangible dividends for many years.

In addition to these long-term efforts to improve population health, hospitals are also targeting their efforts on patient populations where short-term improvements can be achieved—patients who suffer from one or more chronic illnesses and/or other conditions. These patients tend to use the hospital and/or ED on a regular basis, typically as their primary source of care. Often these patients face challenges in managing their conditions effectively, and hence experience acute exacerbations (e.g., asthma attacks, blood glucose levels spiking or dropping, a fall inside their home) that require an ED visit and/or inpatient admission. In many cases these episodes occur multiple times over a short period of time. These frequent visits give hospitals an opportunity to intervene, first by identifying these frequent visitors and then proactively providing them with self-management education in the hospital and various types of support after discharge, including home visits, care management, and access to needed community-based services (e.g., transportation services, affordable food and housing). The goal of these efforts is to help these patients get their chronic and other medical conditions under control, thus ending their continued reliance on expensive inpatient and ED care. From a monitoring perspective, the success of these efforts is generally seen through reductions in readmissions and ED visits. While the IHI considers these measures a part of Aim #3 (lower costs), hospital efforts to influence them are first and foremost an effort to improve the health and functional status of these frequent users of hospital services. For this reason, this paper discusses readmissions and ED visits in this section, as a part of Aim #2.

Hospital Readmissions

As noted, hospitals are increasingly focused on reducing avoidable readmissions, and trend data would suggest that they are having a modest degree of success in doing so. After fluctuating in a fairly narrow range of 19 to 19.5 percent between 2007 and 2010, the 30-day all-cause readmission rate among Medicare fee-for-service beneficiaries fell by 7.4 percent, to approximately 17.7 percent in 2013. This decline translates into an estimated 150,000 fewer readmissions over a two-year period (2012 and 2013), as compared to the historical average.[97,98] Other datasets, including HEN-reported data, show similar or greater degrees of improvement over this time period, and trends in these data suggest that the pace of improvement (i.e., reductions in readmissions) is accelerating.[99] Several HENs have made more significant strides in reducing readmissions, including the 152 hospitals participating in the Healthcare Association of New York State HEN (10.2 percent) and the 35 hospitals participating in the Dignity Health HEN (14.3 percent).[100] Another collaborative initiative involving 82 hospitals (80 in Minnesota, one in North Dakota and one in Wisconsin) reduced the ratio of actual to expected potentially preventable readmissions by 12 percent (from .98 to .86) between mid-2011 and the end of 2013; this reduction translates into the avoidance of 7,000 readmissions during this time period.[101] Known as the Reducing Avoidable Readmissions Effectively (or RARE) Campaign, this collaborative provided participating hospitals with the following resources and support: the opportunity to participate in any of three learning collaboratives; individualized support from a resource consultant; a monthly webinar to share best practices; periodic action learning days and celebratory events; a monthly newsletter and a campaign website.[102]

Individual hospitals also have made impressive strides, typically by investing in the type of post-hospital support that frequent users of the hospital need to better manage their chronic conditions and overall health. Palmetto Health in Columbia, South Carolina set a goal to reduce readmissions system-wide. They created a multidisciplinary team including representatives of post discharge care services. The team broke into 5 subgroups including preventing readmissions, post-acute care planning, discharge, enhanced teaching and learning and follow-up. They partnered with post-acute care providers to standardize transitions in care. Post-discharge, each patient is scheduled for a follow-up visit. RNs and MSWs, trained in utilization review and discharge planning including post-acute care resources are stationed in the hospital ED. They work to prevent unnecessary readmissions. When they do experience a readmission within 30 days, the readmissions team performs a root cause analysis and takes corrective action where needed. They have an Ambulatory Care Transition Team (ACTT) for high risk

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patients that includes home visits, phone contacts and physician appointments. Of the 200 patients served by the ACTT, staff kept 90 percent from having a 30 day readmission.[103]

Community First Medical Center in Chicago Illinois wanted to align the hospital ministry with the needs of the community and to reduce avoidable health care costs. They developed a multifaceted approach to reducing the number of potentially avoidable hospital readmissions for the heart failure population. This approach included: a focus on in-hospital patient education and adherence to clinical best practices; expanded care coordination focused on discharge planning and post-discharge communication; and extensive patient assessment at the time of possible hospital readmission in the ED. In February 2011, the 30 day all cause heart failure readmission rate peaked at 41.4 percent. A 92.5 percent reduction in rate has been achieved with a rate of 3.1 percent in May 2011 discharges with sustained improvement for eight of the following nine months.[104]

Children's Hospital in Boston took a similar approach with urban children with asthma who are part of low-income families. The hospital provided post-discharge nurse case management and home visits to these patients and their families. As shown in Chart 10, this effort has not only reduced asthma-related hospitalizations (which fell by 84.8 percent) and ED visits (68 percent), but also improved the health status of these children, as evidenced by fewer days with physical activity limitations (42.6 percent), missed school (41 percent), and missed work for parents (49.7 percent). By improving the health and functional status of these children, this program significantly reduced hospital costs (as compared to community averages) and generated a positive return on investment ($1.46 in savings for every dollar invested).[105]

"Purposeful Pause" to Reduce Readmissions

AF4Q in South Central Pennsylvania empowered staff within hospitals to take steps to avoid potential readmissions. For example, York & Gettysburg Hospital employs Lean QI methods commonly used by automobile manufacturers. Under the hospital's Purposeful Pause program, all staff have the power to "stop the line" if potential problems arise related to discharging a patient without adequate support in transitioning to the next phase of care (thus, increasing the risk of post-hospital problems and potential readmissions). For example, if family members indicate they are not comfortable caring for a loved one who will be discharged home with limited mobility, the staff member can delay discharge until the care management department finds an alternative, such as a temporary stay in a rehabilitation center until the patient regains his or her mobility.[106]

Critical Success Factors in Reducing Readmissions

Several studies have systematically examined programs that have successfully in reduced readmissions, with an eye toward identifying common strategies and approaches that appear to be effective. The first of these studies looked across four successful programs, highlighting the following as general lessons:[107]

- Invest in quality first by caring for patients correctly the first time.
- Use health information technology (e.g., electronic health records, patient registries, risk stratification software) to improve quality and integrate care across settings.
- Begin care management and discharge planning early, target high-risk patients and ensure frequent communication across the care team.
- Educate patients and their families on how to manage their conditions, teaching at the appropriate level and using teach-back methods to ensure they understand.
- Support high-risk patients after discharge through telephone calls, telemonitoring and/or other practices.
- Align hospital efforts with those of community providers to provide a continuum of care.

AF4Q program leaders performed a cross-community analysis and identified a very similar set of strategies, including use of the following: tools to identify high-risk patients; appropriate in-hospital education tailored to literacy level; care coaches for high-risk patients; and in-home visits after discharge to focus on appropriate follow-up and medication adherence.[108] In addition, both assessments highlighted the critical importance of payment reform to create financial incentives for providers to reduce readmissions, making it financially beneficial for hospitals to "do the right thing,"[109,110] such as investing in post-discharge support services that often go unreimbursed today. Since October 2012, CMS has been implementing financial penalties for hospitals by reducing Medicare payments for those with higher-than-expected 30-day readmission rates for patients admitted for a heart attack, pneumonia or heart failure. Beginning in fiscal year 2015, payment reductions will be extended to include readmissions for those initially admitted with chronic obstructive pulmonary disease and for those initially admitted for elective total hip arthroplasty and total knee arthroplasty.[111]

ED Visits

Nationwide trends show ED visits continue to increase. In fact, over the past several decades, the annual number of visits to community hospitals has steadily increased, from between 90 and 95 million in the late 1990s to more than 130 million in 2012.[112] Even after adjusting for population growth, ED visits still increased during this period, from around 350 to more than 400 visits per 1,000 persons.[113]

The growth in ED visits is not surprising, given community-level issues such as an inadequate supply of primary care physicians and behavioral health services in many areas. That said, hospitals do have a role to play in reducing unnecessary ED visits. In particular, individual hospitals have had success in connecting frequent users of ED services to more appropriate, less expensive sources of ongoing care. These hospitals have partnered with community-based organizations to reduce ED visits among the small group of high-cost patients who disproportionately use the ED, relying on it as their primary (sometimes only) source of care. Some estimates suggest that the top 1 percent of these frequent users accounts for 20 percent of all health care costs, and the top 5 percent accounts for 50 percent or more.[114] As part of AF4Q, several hospital-led, community-based collaboratives significantly reduced ED visits and inpatient admissions among those who historically relied on the ED for care. For example:

- In rural Humboldt County, Calif., St. Joseph Hospital launched its Care Transitions Program. Under this initiative, patients discharged from the ED are paired with coaches who evaluate and help manage their care, including the facilitation of a smooth transition (e.g., the transfer of all relevant information about the patient's health, living situation, etc.) to a community-based primary care program. A multidisciplinary team consisting of primary care providers, nurse care managers, community clinic staff, and ED clinicians meets regularly to discuss individual patients and their needs. As part of this team, a nurse is embedded in the ED to identify and work with frequent ED users at the point of care and determine if an ED admission is necessary or whether the patient can be better served by the care transitions team. The program led to a more than 60 percent decline in ED visits by these frequent users over a six-month period, from 160 to 60.[115]
- In south central Pennsylvania, Lehigh Valley Health Network, Lancaster General Health and PinnacleHealth (three local hospital-led systems) are working with a medical group and health plan on a two-year learning collaborative focused on reducing ED and inpatient use among frequent users. Under this program, some patients are being connected to patient-centered medical homes in the community, while others remain with their current primary care provider but also receive supplemental support, including home visits, social work services and connections to community resources, such as affordable housing. Early returns are promising; for the first 40 enrollees, significant declines occurred in average monthly hospital charges (60 percent) and inpatient events (74 percent). The collaborative is working with state representatives to access Medicaid data to further inform efforts to serve these patients.[116]

Aim #3: Reducing the Per Capita Cost of Health Care

Virtually all of the hospital progress described in the first two aims has not only resulted in higher quality care, a better patient experience and improved population health, but also has helped in achieving the third aim of reducing the per capita cost of health care. While health plans, employers, public and private payers, medical groups and other stakeholders play an equal if not larger role in controlling per-capita expenditures, hospitals clearly have a role and are doing their part to manage the costs of inpatient care. All of the aforementioned progress that hospitals have made in preventing CLABSI, CAUTI, pressure ulcers and other HACs directly translates into cost savings. Similarly, hospital efforts to reduce expensive readmissions and ED visits among super users also translate into lower costs. For example, as noted earlier, the progress that hospitals have made in reducing HACs translates into savings of approximately $12 billion during a three-year period.[117] Also, as described earlier, individual and collaborative efforts by hospitals to reduce HACs (e.g., CLABSI, SSI, VAP), readmissions and ED visits have generated significant cost savings, ranging from hundreds of thousands to billions of dollars.

As a whole, these efforts are starting to make a difference at the national level. In fact, evidence is growing that the long awaited "bend" in the health care cost curve may be taking place. Between 2010 and 2013, annual growth in national health expenditures averaged 3.9 percent, well below the historical growth rate of 9.3 percent a year;[118] in 2013, national health spending grew by 3.6 percent, the lowest rate since CMS began tracking this figure in 1960.[119] While many factors have likely contributed to this decline (and debate continues about the relative importance of these factors), it seems reasonable to assume that the collective efforts of hospitals to provide safer, evidence-based care have begun to make a difference.

Comprehensive Obstetric Trauma Program Reduces Liability Costs

Programs that improve hospital safety reduce the risk of safety events, which in turn can translate into lower liability-related costs. For example, Yale-New Haven (Conn.) Hospital implemented a comprehensive obstetric safety program to standardize care, improve teamwork and communication, and optimize oversight. The program resulted in significant improvements in adverse outcomes and safety culture, which in turn led to a substantial reduction in liability claims and payments. Comparing the five-year period before and after program inception, the median number of annual obstetric-related claims at Yale fell by more than 50 percent (from 1.31 to 0.64), while the median annual liability payments per 1,000 deliveries fell by more than 90 percent, from over $1.1 million to approximately $63,000. During this same time period, statewide data for Connecticut indicate general stability in the number of claims and an increase in costs per claim.[120]

Putting It All Together: Hospitals Simultaneously Tackling All Triple Aim Components

While the previous sections provide numerous descriptions of hospital efforts to tackle discrete aspects of the IHI Triple Aim, some hospitals have chosen to tackle all three simultaneously in a comprehensive fashion. For example, Houston-based Memorial Hermann Health System decided to participate in the Medicare ACO Shared Savings Program. To that end, it formed the Memorial Hermann ACO, which began by selecting a group of physicians committed to the Triple Aim. The ACO used a 15-item checklist to screen physicians; the checklist evaluated whether physicians had taken or were willing to take concrete steps showing their commitment to the Triple Aim, including already having an electronic health record in place, being willing to accept some degree of financial accountability, and having other efforts underway to manage population health effectively. To support these physicians, the Memorial Hermann ACO invested in a comprehensive care management and risk stratification infrastructure, including a quality dashboard to track and share performance data at the medical group and individual physician level. This dashboard tracks performance on various metrics included in the Triple Aim, including measures of population health. Thus far, the strategy appears to be working; the Memorial Hermann ACO saved

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the Medicare program roughly $58 million in its first year, $16 million of which went back to the system as shared savings. While the $28 million does not yet cover Memorial Hermann's initial outlay, hospital leaders view these investments as being long term in nature. The ACO also appears to be popular with Medicare beneficiaries, as it grew from 24,000 members in its first year to 34,000 in its second.[121,122,123]

A second example of a hospital-led organization pursuing the Triple Aim comes from Genesys Health System, a nonprofit, integrated delivery system in Genesee County, Mich. The cornerstone of the system is Genesys Regional Medical Center, a 410-bed acute-care teaching hospital. To pursue the Triple Aim, the system developed the "Genesys HealthWorks" model of care that features three key elements:[124]

- Engaging community-based primary care physicians in a physician–hospital organization that emphasizes the importance of primary care and makes more efficient use of specialty care
- Promoting health through the deployment of health navigators who support patients in adopting healthy lifestyles to prevent and manage chronic disease
- Partnering with community organizations to extend the goals of the model to the entire local population

The model has reduced the use and costs of care while simultaneously improving performance on physician quality indicators. General Motors found that it spends 26 percent less on health care for enrollees who receive services at Genesys than for those served by other local providers. Several studies have found that Genesys health navigators help patients improve their health-related behaviors, and extension of the model to low-income, uninsured patients has improved health status and reduced hospital and ED use.[125]

A final example comes from Ascension Health, a large, Catholic not-for-profit health system with 69 hospitals located in 20 states and the District of Columbia. Ascension's commitment to the Triple Aim began over a decade ago (in 2003), when system leaders set the ambitious goal of eliminating all preventable injuries and deaths within five years. These leaders charged a planning team with focusing on the following priority areas: better performance on Joint Commission safety goals; preventing ADEs; avoiding birth trauma; and reducing mortality, pressure ulcers, falls (including those with injuries), HACs and peri-operative complications. As a way to gauge success, leaders focused on avoiding preventable deaths, setting the goal of avoiding 15 percent of the 6,000 deaths that occurred each year among patients not admitted to Ascension hospitals for end-of-life care. This goal translated into 900 lives saved each year. A clinical excellence team made up of leaders from across the system oversaw the initiative, which got formal approval from the Ascension board. For each priority area, one or two hospitals provided leadership for the system as a whole, creating and/or testing a package of interventions known to be effective in the area. Affinity groups then spread effective change packages across the system. Ascension's program has been very effective: over a six-year period (beginning of fiscal year 2005 to end of fiscal year 2010), system leaders estimate that more than 18,000 lives have been saved as a result of the program, with the number of lives saved steadily increasing each year. By the end of this period, Ascension's observed-to-expected mortality rate was 0.75, meaning that mortality rates were 25 percent below expected levels. Digging deeper, Ascension made substantial progress in all its priority areas, including neonatal mortality, birth trauma, pressure ulcers, VAP and bloodstream infections. Buoyed by this success, Ascension leaders launched a follow-on initiative, known as Healing without Harm, focused on preventing all types of safety events.[126]

Success Factors: Adequate Resources, Strong Leaders and Engaged Staff

As the illustrative examples in this paper make clear, many hospitals rely heavily on multidisciplinary teams that employ Lean, Six Sigma and other established methodologies as the basis of their QI efforts. Yet use of these methodologies alone is by no means a guarantee of success. While many hospital-led QI efforts prove effective, others do not. In fact, within a single organization, some unit-based QI teams may generate improvements while others struggle. As part of Robert Wood Johnson Foundation's *Improving the Science of Continuous Quality Improvement Program and Evaluation*, a team of QI experts sought to understand why. The team hypothesized that contextual factors account for the difference, and then reviewed 13,000 article citations from health care and other fields, abstracting data from 100 of these articles. In collaboration with 10 other QI experts, the team conducted a literature review and held two rounds of opinion gathering and an in-person meeting to identify the contextual factors that matter most to the success of QI efforts and the relationships between them. They tested the resulting model (known as the Model

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for Understanding Success in Quality, or MUSIQ) through a Web-based questionnaire answered by 74 project teams in three different settings. This process identified 25 contextual factors that influence the results of QI efforts, three of which appear to have the largest impact: resource availability; characteristics of the QI team, including leadership, skills and decision-making processes; and the motivation and QI capabilities of the micro-system in question, such as the unit, department or office leading the effort.[127] In efforts that fail, these contextual factors often have a negative impact. In particular, lack of dedicated time and resources (e.g., layering QI projects on staff with a full workload), lack of buy-in among front-line staff, and inadequate leadership support have been found to have a negative impact on program implementation and results.[128,129]

Leaders from Virginia Mason Medical Center in Seattle, Wash., one of the pioneers in the use of Lean in health care, have found that use of Lean QI tools in isolation tends to produce inconsistent results. Rather, QI programs that succeed in producing safer, more efficient and higher-quality care at Virginia Mason use Lean as only one part of a comprehensive initiative, and also operate within a supportive institutional culture with committed leaders.[130]

Conclusion

As this report makes clear, hospitals throughout the nation are working collaboratively and on their own to advance progress toward the Triple Aim. Thanks to these diligent efforts, substantial progress is being made. In fact, a patient entering the hospital today is much less likely to experience harm and much more likely to receive evidence-based care and achieve a positive health outcome than a decade ago. And because of hospitals' proactive initiatives to ease the transition back into the community after discharge, that same patient is less likely to be experience a relapse and hence need to visit the ED or be readmitted to the hospital. Collectively, these hospital activities are making a major contribution to the nation's efforts to improve the patient care experience (including quality and satisfaction), improve the health of populations and reduce the per capita cost of health care. The work, however, is not yet complete, as ample opportunity exists for further improvement. To that end, hospitals will continue their efforts, working with other key stakeholders to build on the substantial progress made in recent years.

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