

Systemwide Transformations that Improve Healthcare Quality and Efficiency



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Navigating a New Healthcare Climate: Targeting Efficiency and Quality Care

Improving systemwide management and patient flow are key drivers to reducing waste and focusing on patient safety

By Evan Sweeney

Historically, healthcare institutions have been astonishingly inefficient, as evidenced by a 2012 Institute of Medicine (IOM) [report](#) that estimated that inefficiencies contributed to the industry wasting \$750 billion in 2009, representing one-third of its total spending. As a result, the shift toward efficiency and high reliability requires broad, systemic changes that start with the hospital CEO and senior leaders.

Although these cultural changes can be onerous, it is a proven method for sustainable and meaningful progress in quality care and efficiency.

Take Inspiration From the Auto Industry

When Gary Kaplan, M.D., became CEO of Seattle's Virginia Mason Medical Center (VMMC), which includes a 336-bed acute care hospital and a large multispecialty group practice of 460 physicians, in 2000, he realized that in order to become a high reliability organization and leader in quality and patient safety, VMMC would have to undergo dramatic systemic changes.

Kaplan looked for a new management system, one that would focus on eliminating waste and improving efficiency. But he wouldn't find it in the healthcare industry. Instead, Kaplan turned to the automobile manufacturer, Toyota.

By 2002, Virginia Mason had created the Virginia Mason Production System, based on the Toyota Production System. The Virginia Mason Production System empowers front-line staff members to use prescribed principles and tools to remove waste, which reduces the burden of work for staff members and directly benefits patient safety.

These changes have produced tangible results. The system helped reduce the time it takes to report lab test results to patients by 85 percent, reduced inventory costs by \$2 million and increased productivity by 93 percent by creating kits of frequently used supplies, according to VMMC. In August 2014, an article [published](#) in *The Joint Commission Journal on Quality and Patient Safety* described how the system used "jidoka," or automation with a human touch, which is an element of the Virginia Mason Production System, to



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reduce medication errors from 5.9 per 100 doses, to three.



“I’m not sure I’ve heard or seen, in my 36 years in healthcare, a better system for doing this.”

GARY KAPLAN, M.D., CEO OF VIRGINIA MASON MEDICAL CENTER, SEATTLE

“I don’t want to overdramatize it, but in many ways it’s an answer to what the industry is looking for,” Kaplan says. “I’m not sure I’ve heard or seen, in my 36 years in healthcare, a better system for doing this.”

Use “kaizen” Activities

The Virginia Mason Production System operates on the idea that staff members are best equipped to solve issues related to efficiency and patient care since those problems impact their daily work environment. In order to empower staff members to affect change, VMMC uses three “Kaizen”—or continuous improvement—activities:

- **Rapid Process Improvement Workshops (RPIW):** This is a four-and-a-half day improvement event that includes physicians, nurses, medical assistants and patient care technicians. A senior leader sponsors the event and during the week, using data collected prior to the workshop, the team will redesign a care process that it will implement by the following Monday or soon thereafter. For example, in 2005, VMMC redesigned nursing workflow in order to work with a patient-care technician in “cells,” or groups of rooms located near

one another. As a result, nurses walked fewer steps each day (1,200 compared to 10,000) and spent more time with the patient (90 percent versus 35 percent).

- **Kaizen Events:** One- or two-day events that use the same principles and are often used to supplement or complement the RPIW.
- **3P Workshops:** 3P stands for Production, Preparation and Process. These one-week workshops are used to redesign a new facility or hospital floor. VMMC has used 3P Workshops in the past to redesign the pediatric department to improve waiting times and increase patient capacity at its Center for Hyperbaric Medicine.

Since 2002, VMMC has conducted more than 1,280 kaizen activities involving more than 5,500 staff members. The quick implementation time is a key element of efficiency. Once a care process is redesigned through a RPIW, the team measures data after 30, 60 and 90 days to track its effectiveness, and help identify targets for the next round of process improvement changes.

“That’s very different than the traditional CQI [continuous quality improvement] or TQM [total quality management] models that would take weeks or months, and maybe never happen,” Kaplan says. “It’s a pretty rapid cycle of change and engages the people closest to the work that are qualified to redesign the work.”

The lean management principles drawn from the Toyota Production System allow health systems to prioritize



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initiatives, says John Toussaint, M.D., CEO of the ThedaCare Center for Healthcare Value in Appleton, Wisconsin. Even if they are well-intentioned, too many initiatives overwhelm middle management and clinical staff.

“You have to decide what is important,” he says. “It’s not 262 things; it’s a few things. So, what are those few things that really matter to patients?”

Develop Patient Safety Alerts

When Kaplan visited Toyota factories in Japan in 2002, he was intrigued by the Toyota Stop Line system, which empowered every worker to halt production rather than pass a defect downstream.

Kaplan reasoned that VMMC should treat its patients at least as well as Toyota treats its cars, so he transferred that same idea to VMMC by creating a patient safety alert system. Every staff member is empowered to report patient safety concerns online or by phone to a patient safety team that is staffed 24 hours a day, seven days a week. A member of that team immediately triages that report and then collaborates with senior leaders and staff members to determine additional steps to prevent future events.

In the 12 years that the system has been in place, VMMC has recorded nearly 50,000 patient safety alerts, according to Kaplan. Currently, it averages 1,000 alerts each month, a statistic that supports the organization’s culture of safety that is predicated on the ability of every individual in the system to take action and get an immediate response.

“It’s what we call ‘real time quality assurance,’ instead of what we’ve done historically in healthcare, which is retrospective quality assurance,” Kaplan says.

Improve Patient Flow

While lean management principles provide broad, systemic changes, patient flow is one specific area of healthcare that directly impacts both efficiency and quality.



“Mother Nature is more predictable than our scheduling system.”

EUGENE LITVAK, PH.D., PRESIDENT AND CEO OF THE INSTITUTE FOR HEALTHCARE OPTIMIZATION IN NEWTON, MASSACHUSETTS

Hospitals can solve most of their waste by smoothing patient flow and bed occupancy, says Eugene Litvak, Ph.D., president and CEO of the [Institute for Healthcare Optimization](#) (IHO) in Newton, Massachusetts, and an adjunct professor in operations management in the Department of Health Policy and Management at the Harvard School of Public Health. Peaks and valleys of bed occupancy can vary as much as 80 percent. Health systems that attempt to staff according to these large, unpredictable variations often waste tremendous resources during the valleys, or stretching staff and resources thin during the peaks, which leads to increased mortality rates, medical errors, and hospital-acquired infections.



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By the Numbers

Statistic	Explanation
1,200	The number of steps nurses at Virginia Mason Medical Center in Seattle, walked each day after transitioning toward team-based “cells” (groups of rooms located near one another). Before the transition, nurses walked 10,000 steps each day.
90 percent	The increase in the amount of time nurses spent with patients as a result of team-based cells. Before the transition, time spent with patients was 35 percent.
29 per 100 doses	When the Virginia Mason Production System used jidoka or automation with a human touch to integrate bar code medication technology into the nursing workflow, the medical center reduced safe practice violations from 54.8 to 29 per 100 doses. Medical errors dropped from 5.9 to three errors per 100 doses.
25 percent	By re-categorizing admissions and discharge criteria in the telemetry unit, Newark Beth Israel Medical Center in New Jersey reduced the average bed assignment time by 25 percent and saved an estimated \$18 million from January 1, 2013 to April 1, 2013.

Surprisingly, elective admissions are to blame for this variation. Studies show that elective admissions actually vary more than emergency admissions, Litvak says.

“That means that Mother Nature is more predictable than our scheduling system,” he says.

By separating scheduled and unscheduled patient flow and minimizing artificial variability whenever possible, hospitals can save millions of dollars while improving patient care. This methodology can save between \$17,000 and \$300,000 per bed, per year, according to Litvak. For example, Cincinnati Children’s Hospital decreased operating room waiting time by 34 percent (despite a 37 percent rise in patient volume), increased

surgical throughput by 5 percent and saved \$115 million in annual revenue by implementing various phases of the IHO variability methodology.

In December 2011, the New Jersey Hospital Association (NJHA) received a two-year \$7 million grant from the Centers for Medicare & Medicaid Services to help 14 hospitals in the state improve quality care. One of those hospitals was Newark Beth Israel Medical Center (NBIMC), which used the IHO variability methodology to specifically target patient flow in the telemetry unit, a common bottleneck in the hospital, says John A. Brennan, M.D., MPH, president and CEO of NBIMC and Children’s Hospital of New Jersey.


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Using input from cardiology and internal medicine physicians, NBIMC developed a set of criteria that helped determine whether to admit patients to the telemetry unit. The hospital trained physicians and gave them laminated, pocket-sized cards that listed the criteria for admission or discharge. NBIMC also instituted a SWOT (Strengths, Weaknesses, Opportunities and Threats) team, consisting of a case manager, social worker, one or two nurses and a physician, who made rounds on the telemetry unit twice a day to determine whether patients met the criteria.

The SWOT team is particularly effective in lowering length of stay, Brennan says, which is a major driver of both quality and efficiency.

“When I say it’s a driver of quality, I’m talking about if someone is laying in a bed for four days, versus two days, the chances of having an decubitus ulcer increase, the chances of having a medical error increase, the chances of slipping and falling increase, the chances of a medical error increase; so being more efficient is a major driver of quality in any hospital,” he says.

NBIMC piloted the program from January 1, 2013 through April 1, 2013 and immediately saw the average time for telemetry bed assignment decrease by 25 percent and savings of an estimated \$18 million. Since then, NBIMC instituted a similar process in the cardiothoracic intensive care unit (ICU) and the medical ICU, and plans to smooth patient flow in the OR and catheterization lab.

But even those initial changes in the telemetry unit had a noticeable impact on operations throughout the medical center, says Robert Lahita, M.D., Ph.D., chairman of medicine and vice president at NBIMC.

“The spinoff from lowering the number telemetry beds, tightening the way patients are admitted and discharged and lowering the length of stay affects holds in the emergency room, it affects wait times in the emergency room, it affects wait times on beds within the inpatient hospital, it affects people leaving the ICU,” he says. “It’s a ripple effect.” ■



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How to Effectively Choose and Assign Clinical Staff

By Barry P. Chaiken, M.D., MPH, CMIO, Infor



On average, hospitals devote close to 60% of their budgets to labor costs with the large majority of those costs associated with nurse staffing. Until robots replace humans in the delivery of patient care, selection of the proper skill mix and number of professionals remains a significant factor that determines cost in provider organizations.

Although information technology cannot replace the staff delivering care to patients, it can assist organizations in choosing the best talent available, help develop that talent, and determine the best way to utilize the skills of these professionals. In addition, once the proper employees are chosen, information technology can apply evidence-based workloads to ensure each patient receives all necessary care driven by the correct staffing levels.

First, to identify the best talent, Information technology tools can identify an employee's "behavioral DNA"—his or her behavioral, cognitive, and cultural traits. Organizations then compare this prospective employee's "DNA" to the "DNA" of existing high-performing employees within the organization in an effort

to identify individuals who possess a high probability of exceling.

These tools leverage the big data research of behavioral science PhDs in human traits that include ambition, discipline, energy, acceptance of authority, attention to detail, flexibility, conscientiousness, and empathy. By combining behavioral and performance data, organizations generate a performance profile for a specific position that provides a consistent structure and a common language for evaluation.

Once organizations create and validate a unique position profile, prospective hiring managers compare a candidate's a pre-employment assessment generated "DNA" to the "DNA" of an ideal candidate for the position. This method helps identify the best nursing candidates and also suggests the areas of the hospital where each nurse candidate is mostly likely to perform at a high level.

Once proper staff members are identified, recruited, and placed in their appropriate roles, organizations must identify the proper tasks for these caregivers so that they are utilized efficiently to deliver the required patient care. Initially, the healthcare industry focused on nurse staffing as a key criteria driving patient care

as evidenced by legislation targeting nurse to patient ratios.

Although staffing to patient census provides a blunt instrument to identify the nursing needs of patients, it ignores the availability of valuable evidence-based care workloads that link patient care delivery requirements with a patient's diagnosis and related acuity. Utilizing this methodology, patient data collected within electronic medical records (EMRs), including diagnosis, physician orders, and test results, drives care workloads to quantify the care needed by each patient. In turn, nurse managers assign patients to nurses based upon the objective evaluation of patient needs, balancing workloads across all available nurses. This method allows for more accurate clinical staffing and reduces the probability of dangerous under-staffing or wasteful over-staffing.

Unlike other industries that may cut staffing in ways that may negatively impact the consumer experience, healthcare providers must consistently deliver exceptional service to patients who rely upon them for their wellbeing. Utilizing newly available information technology tools offers a way to honor patient needs efficiently and effectively. ■

The Dollars and Sense Behind **Hospital Resource Allocation**

UPMC, Geisinger efforts highlight creative best practices for cutting costs and improving care

By Aine Cryts

Whether healthcare executives are remarketing medical equipment, reengineering care provided to diabetes patients or are being critical about the cost of medical devices, they have no choice but to be smart, nimble and creative when cutting costs and making the best possible use of resources.

Passage of the Affordable Care Act (ACA) in 2010 forced hospital brass to take a hard look at all expenses—while always keeping an eye on the real priority: Delivering high-quality patient care.

“The first bit of advice is, do not wait,” says David Hargraves, vice president of clinical supply chain at University of Pittsburgh Medical Center (UPMC), an integrated global nonprofit health enterprise with 21 hospitals and more than 5,100 licensed beds. “There is money today; there is money this month that you are likely leaving on the table.”

Remarketing Obsolete Medical Equipment

UPMC began its remarketing of obsolete medical

equipment initiative two years ago and receives more than \$200,000 annually in revenue, while avoiding landfill fees.



“The first bit of advice is, do not wait. There is money today; there is money this month that you are likely leaving on the table.”

DAVID HARGRAVES, VICE PRESIDENT OF CLINICAL SUPPLY CHAIN AT UNIVERSITY OF PITTSBURGH MEDICAL CENTER

UPMC has three options when medical equipment is no longer useful to a particular facility:

- It can refurbish and reuse the equipment at another facility (the best value)
- It can refurbish and sell it to another healthcare organization (the next best value)
- It can recycle and dispose of the medical equipment (the least desirable option)



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To be assured of the true value of the equipment, UPMC partnered with a nearby company that gives the organization an independent, third-party assessment.

UPMC now pre-identifies years in advance when it will need to replace equipment and aggregates demand across its hospitals so that it can negotiate a better price with vendors.

Hargraves says there is an unintended benefit with this initiative: When physicians want to purchase medical equipment from UPMC, he refers them to the third-party assessing company, which can facilitate the sale. “That keeps our relationship with the physician intact, and it ensures proper governance of any transaction that would occur,” he says.

Designing Evidence-Based Diabetes Care

The lifetime expenses of a patient with type 2 diabetes and diabetic complications is \$850,200, according to a September 2013 [study](#) published by *The American Journal of Preventive Medicine*.

To that end, Geisinger Health System, a Danville, Pennsylvania-based integrated health services organization comprised of a 1,000-member multi-specialty group practice, seven hospital campuses, two research centers and a 448,000-member health plan, wanted to reengineer its approach to deliver care for such patients.

“When you reduce the variation in care and you give people best practice, just about everything gets better,”

Expense and Resource Benefits of Geisinger’s ProvenCare

A few of the expense and resource benefits of Geisinger’s ProvenCare, a portfolio of evidence-based care programs—which includes angioplasty, bariatric surgery and hip and knee surgeries*:

Fewer readmissions, complications and operative death

- 6 percent of ProvenCare group readmitted within 30 days—compared with 6.6 percent in the conventional care group

Lower length of stay (LOS) and costs

- Average total LOS was 5.3 days in the ProvenCare group—compared with 6.3 days in the conventional care group

More likely to be discharged home

- 91 percent of the ProvenCare group was discharged home—compared with 81 percent of the conventional care group

Internal studies conducted by Geisinger Health System

says Steven Strongwater, M.D., chief transformation officer at Geisinger. “Your outcomes are better, their length of stay in the hospital is better, the total cost of care goes down, the readmission rates go down and their complication rates go down. That has been the strategy that we have taken.”


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As part of Geisinger's reengineered approach to treating type 2 diabetes, clinicians assess patients for their status related to nine critically important measures, including blood pressure, cholesterol, blood sugar and smoking status.

The primary concern with this initiative was not the cost of care, Strongwater says. Rather, it was the strong body of evidence-based care for the treatment of type 2 diabetes.

"Obviously, it does not take a brilliant mathematician to figure out that if patients are not having heart attacks, strokes and diabetic kidney disease, that is going to reduce the total cost of care," says Thomas Graf, M.D., chief medical officer for population health and longitudinal care service lines at Geisinger.



"When you reduce the variation in care and you give people best practice, just about everything gets better."

STEVEN STRONGWATER, M.D., CHIEF TRANSFORMATION OFFICER AT GEISINGER HEALTH SYSTEM, DANVILLE, PENNSYLVANIA

Today, physicians—the highest-paid resource—focus on complex clinical decision-making and patient relationships. Nurses draw blood. Front-desk staff ensure that patients book follow-up appointments. "The hardest part is the culture change: Getting physicians comfortable with delegating and helping

the patients understand the bundled care and the automation and the delegation," says Graf.

He advises any healthcare organization that undertakes this type of project to start working with the care teams early and to be consistent. "Make sure people understand that they are building cathedrals and not bricks," he says. "Make sure all the staff know that this is about ... preventing heart attacks and strokes," he says.

Early Successes at Henry Ford Health System

In January 2014, Detroit-based Henry Ford Health System (HFHS), which includes six hospitals, seven medical centers and a group practice of 1,200 physicians practicing in more than 40 specialties, kicked off an initiative called "One Henry Ford: Our Three-Year Strength and Sustainability Plan." The health system describes the program as helping to prepare for increased reductions in payments from government and commercial payers.

Nearly a year in, the initiative boasts some early successes. Its goal is to drive efficiency and introduce lean processes to cut costs by \$300 million, which represents a 10 percent reduction in overall expenses over the three-year time period.

"We are placing a bet that, as more and more patients are spending their own personal income on their own healthcare, they are going to migrate to systems that can prove they are doing the right thing," says Bob Riney, president and COO at HFHS, a nonprofit integrated health system founded in 1915.



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One early success has been its work on standardizing sourcing for pacemakers, implantable cardioverter-defibrillators (ICDs) and defibrillators. Historically, the system deferred to physicians on the type of devices it purchased because such equipment was considered clinically complex and specialized.

HFHS' supply chain management team actively engaged with the physicians who implant such devices, to compare, rate and score product quality and outcomes across competitors. As a result, the health system can quantify the value of each device and establish criteria to more accurately categorize competitive devices.

Riney says that the market benchmark research provided by his supply chain management team allows the health system to establish "baseline, market-low" pricing for these devices, while outlining protocols for implanting specific devices. Though unwilling to point to specific cost savings, HFHS says it has driven significant cost reductions on procedures requiring devices.

Transforming for the Future

UPMC and Geisinger are in different stages of their transformation as they focus on being nimble and mindful of their expenses.

UPMC began in 2006 to transform the way it uses its resources; since then, the organization has saved more than \$100 million through product standardization, waste reduction and efficiency gains, among other initiatives. Since 2001, Geisinger, which has a consulting arm devoted to best practices gleaned from the health system's experience, has focused on efficient management of expenses and resources.

"It is a hill-by-hill battle," says Strongwater. "People have to come together and see the results of using evidence-based practice and then understand how it can be applied to their own setting. It does not happen overnight, but it does happen if you stay with it." ■



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3 Ways Pioneering Healthcare Organizations Can Harness Technology Systemwide to Reduce Costs and Improve Outcomes

By Marla Durben Hirsch

As the healthcare industry shifts to a model that reimburses based on value over volume, provider organizations must take a hard look at available technology and assess how they can best use it on a large scale to lower costs and improve care quality.



“The industry is so focused on Meaningful Use. But we’ve barely cracked the surface of the potential of EHRs. There are tremendous opportunities beyond that to improve care for our patients.”

ERIC GOODWIN, VICE PRESIDENT OF INFORMATION SERVICES AT CAROLINAS HEALTHCARE SYSTEM, CHARLOTTE, NORTH CAROLINA

One of the best ways to take advantage of technology is to turn to your organization’s electronic health record (EHR) system, which most hospitals and health systems have adopted in order to participate in the Meaningful Use incentive program. But it’s not enough to use only

a few of its capabilities; you must leverage the system to its greatest potential—and not just to earn government incentive money. The [Healthcare Information and Management Systems Society \(HIMSS\)](#) reports that [very few hospitals take full advantage of their systems](#). In contrast, hospitals using [advanced EHRs](#) boasted significantly lower costs on a per patient basis.

“The industry is so focused on Meaningful Use. But we’ve barely cracked the surface of the potential of EHRs. There are tremendous opportunities beyond that to improve care for our patients,” said Eric Goodwin, vice president of information services at Carolinas HealthCare System in Charlotte, North Carolina.

Carolinas is among three systems that shared their EHR-innovation strategy with *FierceHealthcare*.

Novant: Build a Single System Around the Patient

Novant Health’s barrier to improve patient care was, to a great extent, its geography and composition: an integrated system based in Winston-Salem, North



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Carolina, with 15 hospitals, 400 clinics and 1,700 providers located throughout Virginia and the Carolinas. Its officials realized in 2010 that it had 100 different billing offices and used 48 different EHRs—and still had a few clinics using paper records.



“If you share data with patients, they are remarkably connected to their health.”

RICHARD “HANK” CAPPS, M.D., CHIEF MEDICAL INFORMATION OFFICER AND SENIOR VICE PRESIDENT OF PHYSICIAN SERVICES, NOVANT HEALTH, WINSTON-SALEM, NORTH CAROLINA

“We had a math problem,” said Richard “Hank” Capps, M.D., chief medical information officer and senior vice president of physician services.

Novant’s solution was to jettison its hodgepodge of electronic solutions and transition to just one EHR and one billing system. “We went from zero on HIMSS’ ambulatory electronic EHR scale to seven in two years. It was supposed to take six,” Capps said.

While an accelerated rollout can be problematic for many providers, in Novant’s case it was a good way to get staff used to the changes quickly and maintain the system’s revenue cycle. Consolidating into one EHR and billing system saved Novant’s medical group \$8.4 million in net transcription fees alone. Novant has also seen a 38 percent decrease in ambulatory revenue cycle

EHR Benefits: By the Numbers

Here are a few examples of how leveraging an EHR’s capabilities beyond Meaningful Use can have a positive impact on healthcare organizations:

Novant: Consolidated 48 EHRs and 100 billing offices into one EHR and billing system

- Net transcription fees savings of \$8.4 million
- Ambulatory revenue cycle services expenses decreased 38 percent
- Collection rate increased 5 percent

Carolinas HealthCare: Added virtual critical care program

- Patients receiving remote intensivist review increased from 21 percent to 69 percent
- Length of stay in the ICU dropped from about 0.81 observed to expected (o/e) ratio to less than 0.73

Advocate: Customized alerts

- Immunization for pneumonia increased from 68 percent compliance to 100 percent
- Flu vaccinations rose from 72 percent compliance to 98 percent
- Heart-failure discharge instruction dissemination rates rose from 76 percent to 96 percent
- Beta-blocker alert decreased readmissions from 12 percent to 9 percent



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services expenses and increased its collection rate by 5 percent.

Additionally, Novant has taken the proactive step of incorporating patients into the new consolidated system. Novant opts to share its new technology with its patient population through a robust patient portal tied into its EHR. The consolidated system makes it simpler for patients to use online tools, make appointments and access care coordination notes and other records; it also reduces wait times to get to a portal and receive responses to online chat.

Patient use of the portal has skyrocketed since its inception in 2011. More than 357,000 patients now use the system; the portal funnels 60,000 emails from patients a month.

“If you share data with patients, they are remarkably connected to their health,” Capps said. In addition to improving patient involvement and satisfaction, the portal decreases staff time in playing “phone tag” to contact patients about appointments, lab tests and the like.

“The goal is to engage the patient with new tools and technology. If you don’t leverage the EHR to allow the patient to connect to you, you’re spending a lot of work and effort just for an electronic paper record,” he said. “We’ve made the experience simple and more marketable. Being a patient isn’t easy, so we leverage etools to make it a better experience.”

One challenge Novant faced was its physicians’ concern with the concept. “You need to show them it’s part of

the new normal. Make [patient inclusion] part of the whole package, not EHR as an a la carte,” Capps said.

The new EHR also contains new advanced quality measure dashboards on 20 conditions, such as hypertension and diabetes, so that clinicians can—with one click of their mouse—better monitor their now more-engaged patients and plug gaps in care.



“We’re seeing more appropriate use of the ICU, earlier detection of incidents, and fewer ventilator days as we move beds to virtual management.”

BRENT LAMBERT, M.D., CHIEF MEDICAL INFORMATION OFFICER, CAROLINAS HEALTHCARE SYSTEM, CHARLOTTE, NORTH CAROLINA

“Imagine the work involved to do that on paper. This lays the foundation for population health,” Capps said.

The dashboards also create graphs to compare patients within the organization to see which ones are not meeting quality measures.

“We’ll always have brick-and-mortar and personal interaction, but here it’s an opportunity to expand. It’s been exciting times around here,” he said.

Carolinas: Add Virtual Critical care Services

North Carolina-based Carolinas HealthCare System



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has 552 intensive care unit (ICU) beds throughout its more than 40 hospitals, but was constrained by a limited number of physicians who were board certified in critical care. To address the gap, the system implemented a virtual critical care program in 2013 to support and augment care provided within the facilities.



“Once you establish a culture that embraces technology, you can tackle barriers.”

VERONICA JONES, MANAGER OF CLINICAL INFORMATION, ADVOCATE ILLINOIS MASONIC MEDICAL CENTER, CHICAGO

The program was built by purchasing products from vendors and then customizing them, with the help of the system’s internal Dickson Advance Analytics Department. The virtual critical-care program—which provides monitoring 24 hours a day, seven days a week, and full audio/video connectivity—allows for earlier recognition of, or subtle changes to, patients’ conditions so staff can more quickly offer interventions, assure better adherence with evidence-based care, and decrease unnecessary interfacility transfers. More than 100 ICU beds are now on the virtual system, which is staffed by one to two physicians and three to four nurses at a time.

“We’re seeing more appropriate use of the ICU, earlier detection of incidents, and fewer ventilator days as we move beds to virtual management,” said Brent Lambert, M.D., Carolinas’ chief medical information officer.

The program has already reaped results. The overall percentage of patients receiving remote intensivist reviews has jumped from 21 percent prior to inception to 69 percent. Perhaps more importantly, the length of stay in the ICU dropped from about .81 observed to expected (o/e) ratio (the actual number divided by the expected number) to less than .73.

There also is early evidence that the program—through increased monitoring of these patients at risk and more timely interventions—is reducing readmissions, according to Goodwin.

It is now one of the largest virtual critical care programs in the country.

One pleasant early surprise has been the degree of satisfaction by clinicians.

“It’s additional team support they didn’t have before, for things like witnessing medications and night vent weaning,” Goodwin said.

Advocate: Customize Alerts

Sometimes just a simple change to a system’s technology is enough to have a huge impact. Chicago-based Advocate Illinois Masonic Medical Center, a 408-bed teaching hospital, opted to improve its use of clinical decision support alerts to boost patient care, launching an initiative to reassess—and in some cases, revamp—alerts to put them to better use.

“Originally we just implemented alerts. It was too much,” said Dennis Giles, the hospital’s interim director of information systems.



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The hospital created a committee, led by the chief medical information officer, to evaluate each alert, ensuring that they were not overly or overwhelming to staff. Some alerts were tweaked; others rebuilt. “We’re trying to keep our finger on the pulse,” said Veronica Jones, manager of clinical information.

The changes worked. Immunization for pneumonia increased from 68 percent compliance to 100 percent; flu vaccinations rose from 72 percent compliance to 98 percent. Heart-failure discharge instruction dissemination rates went from 76 percent to 96 percent. The beta-blocker alert decreased readmissions from 12 percent to 9 percent.

The hospital also plans to add new alerts, such as a modified early warning system on patients that will score a patient’s risk factors as a nurse administers vital signs, according to Giles.

“[To get the most out of alerts] you have to do a lot of work on them to really reap their benefit,” he said.

Keys to Success

All of the healthcare leaders agreed that the following action items led to their success in launching systemwide technology:

- Have a single EHR as the fundamental building block. “The EHR is foundational to help quality and patients. That’s step one. Then use that to build,” Carolinas’ Lambert said.
- Don’t feel compelled to use “off-the-shelf” software. Advocate refined its clinical decision support alerts and still tinkers with them; Carolinas bought products from vendors and then customized them; each ICU on the virtual critical care system has a different set up and algorithms, depending on needed resources, according to Lambert.
- Make sure you have executive and physician buy in, and that both sides work with the IT team to create a level of trust. “Once you establish a culture that embraces technology, you can tackle barriers,” Advocate’s Jones said. ■



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Evidence-Based Protocols Drive Quality Improvement

Recommendations outline the best way to treat patients based on clinical evidence

By Joanne Finnegan

Delivery of high-value, quality care is dependent on physicians having the best information on what treatment works best, for which patients and under what circumstances.

One way to accomplish this is by focusing on evidence-based care protocols—the clinical care recommendations supported by the best available evidence in the clinical literature.



“Intermountain can also document it saves more than 1,000 lives per year as a result of its use of evidence-based protocols.”

BRENT C. JAMES, M.D., EXECUTIVE DIRECTOR OF INTERMOUNTAIN'S INSTITUTE FOR HEALTH CARE DELIVERY RESEARCH, SALT LAKE CITY

Although there may be 200 ways to do something, in some cases clinicians have strong evidence that reveals the best way to do it, says David J. Ballard, M.D., Ph.D.,

chief quality officer for Baylor Scott & White Health, a not-for-profit healthcare system based in Dallas that includes 46 hospitals and more than 500 patient care sites. For instance, Baylor implemented a standardized heart failure order set, which has the potential, if it were deployed across the country, to save \$2 billion in annual hospital costs and prevent 1,500 in-hospital deaths annually.

Intermountain Healthcare and Geisinger Health System have similar success stories. By implementing evidence-based protocols at their organizations, Intermountain, a non-profit health system based in Salt Lake City that includes 22 hospitals, saw its caesarean section rates drop below the national average. Geisinger, a physician-led system based in Danville, Pennsylvania that is comprised of a 1,000-member multi-specialty group practice, seven hospital campuses, two research centers and a 448,000 health plan, boasts a 67 percent decline in operative mortality for patients undergoing elective coronary artery bypass.

The use of evidence-based protocols results in two major benefits: better care for patients and savings



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Intermountain Healthcare

Evidence-based protocol project	Better care for patients	Savings
<ul style="list-style-type: none"> • Elective induction of labor 	<ul style="list-style-type: none"> • Inappropriate elective induction rate fell from 28 percent to less than 2 percent • Women spend 750 fewer hours in delivery per year, freeing up resources for delivery of an additional 1,500 infants • C-section rate 40 percent lower than national average 	<ul style="list-style-type: none"> • Overall cost savings of \$50 million • \$10 million reduction in maternal and newborn variable costs per year

for organizations. In almost all cases, higher quality costs less, says Brent C. James, M.D., executive director of Intermountain's Institute for Health Care Delivery Research, which teaches healthcare leaders about clinical quality improvement. Intermountain can also document that it saves more than 1,000 lives per year as a result of evidence-based protocols, he says.

Intermountain's Protocols

Evidence-based protocols are essential to healthcare delivery at Intermountain Healthcare. The organization has implemented evidence-based protocols for more than 60 clinical processes that represent roughly 80 percent of care delivered in its facilities.

For example, in 2001, Intermountain implemented an evidence-based protocol for the elective induction of labor. When women arrive at an Intermountain facility, labor and delivery nurses use the electronic medical record system to

demonstrate that the patients meet all criteria for elective delivery, including the gestational age of the baby. Nurses review the nine criteria established by the American College of Obstetrics and Gynecology for appropriate elective induction. If the patient does not meet all of the criteria, the nurses contact the referring obstetrician and the guideline requires consultation from the department chair or a high-risk pregnancy specialist to approve the procedure before healthcare personnel may proceed.

As a result of the protocol, the rate of inappropriate elective inductions fell from 28 percent to less than 2 percent. The C-section rate at Intermountain facilities is 40 percent lower than the national average, with an overall cost savings of \$50 million. Women spend about 145,000 fewer minutes in delivery each year, freeing up Intermountain's resources for the delivery of an additional 1,500 babies per year with the same number of delivery staff.


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Geisinger Health System

Evidence-based protocol project	Better care for patients	Savings
<ul style="list-style-type: none"> • Elective coronary artery bypass graft surgery 	<ul style="list-style-type: none"> • 67 percent reduction in operative mortality • 1.3-day decrease in length of stay 	<ul style="list-style-type: none"> • Revenue minus expense improved by more than \$1,900 per case • Cost per case for Geisinger Health Plan decreased by 4.8 percent • 23 percent increase in contribution margin for the episode of care

To develop its evidence-based protocols, Intermountain gathers all its health professionals involved in a particular clinical process as a team. Whoever has fundamental knowledge and is involved in the delivery of care participates, says James. A team may include physicians, nurses, pharmacists, therapists, technicians and administrators. The team develops an evidence-based, best-practice guideline, which is then incorporated into the clinical workflow, using standard order sets, clinical worksheets and other tools that are built into the electronic health record.

Geisinger's Cardiac Protocols

Geisinger Health System is also nationally recognized for its development and implementation of innovative care models.

One of its first evidence-based protocols involved cardiac patients, says Glenn D. Steele, Jr., M.D., Ph.D., president and CEO at Geisinger.

Cardiac surgeons at Geisinger identified evidence- or consensus-based practices from nationally published guidelines for patients undergoing electric coronary artery bypass. The surgeons agreed on 40 best practices and then the entire surgical team of providers redesigned the process from initial evaluation of a patient to postoperative rehabilitation. Geisinger created a variety of standardized order sets, decision-support tools and reminders in its electronic health record. It tracked and reported adherence to the provision of each element of care.

The protocol resulted in a 67 percent reduction in operative mortality and a 1.3-day decrease in the length of stay in the hospital. The protocol also lowered costs, with revenue minus expense improving by more than \$1,900 per case. Costs to Geisinger Health Plan decreased by 4.8 percent per case. Geisinger saw a 23 percent increase in contribution margin for the episode of care (decision to operate to 90 days post discharge).


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Evidence-Based Protocols: First Steps

One of the best ways for healthcare leaders who want to implement consensus-based practices is to talk to organizations that have already done so, says Steele. Whether it's the best practice for how to treat an array of health problems—hearts, hips, knees or gastric bypass—there are two outcomes: better results for patients and significantly decreased costs for organizations, Steele says. It also requires changing the behavior of those involved in the caregiving process.

However, once you can show better outcomes for a group of patients through consensus-based practice, you will get buy-in from healthcare professionals, he says. Healthcare organizations can start by choosing areas of care where they will have the highest probability of success.

Brett Stauffer, M.D., Baylor's director of clinical decision support, says another early step in the process is for organizations to identify the problems they want to address. For example, Baylor clinicians were concerned about over-sedation of patients given narcotics after surgery.

Baylor decided the problem resulted from the way staff used patient-controlled analgesia (PCA) pumps. The system looked at what tools it could develop to solve the problem and brought together patient safety, surgical and pain medicine specialists. They put together a PCA order set, which was built into its EMR. The final step was to evaluate the effectiveness of those steps. Baylor

monitored the results and found a reduction in sedation events.



“One of the best ways for healthcare leaders who want to implement consensus-based practices is to talk to organizations that have already done so.”

GLENN D. STEELE, JR., M.D., PH.D., PRESIDENT AND CHIEF EXECUTIVE OFFICER AT GEISINGER HEALTH SYSTEM, DANVILLE, PENNSYLVANIA DELIVERY RESEARCH, SALT LAKE CITY

That one example gets replicated over and over to solve other problems, Stauffer says. For instance, Baylor implemented a standardized heart failure order set, which, if it were deployed across the country, could save \$2 billion in annual hospital costs and prevent 1,500 in-hospital deaths annually, Ballard says. Implementation of a pneumonia order set resulted in one in-hospital death averted for every 30 patients compared to patients with no order set, he says. In other words, every 30 times the order set was used, it saved a life.

James cautions that Intermountain's protocols and guidelines aren't meant to fit every patient or take the place of a physician's judgment.

“The guideline is not a cookbook,” he says. “It doesn't step between the clinician and the patient.” ■



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