



Case Study

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United Hospital Center: Improving Surgical Care Through Evidence-Based Education and Standardization

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Vital Signs

Location: Clarksburg, W.V.

Type: Private, not-for-profit hospital.

Beds: 375

Distinction: Top 3 percent in composite of five surgical care improvement process-of-care measures, among more than 2,300 hospitals (more than half of U.S. acute-care hospitals) eligible for the analysis.

Timeframe: April 2007 through March 2008. See [Appendix A](#) for full methodology.

This case study describes the strategies and factors that appear to contribute to high performance on surgical care improvement measures at United Hospital Center. It is based on information obtained from interviews with key hospital personnel and materials provided by the hospital during March and April 2009.¹



SUMMARY

In just a few years, the United Hospital Center (UHC) rose from being one of the lower-performing U.S. hospitals on process-of-care, or “core,” measures to being one of the top performers. The measures, developed by the Hospital Quality Alliance (HQA), relate to achievement of recommended treatment in four clinical areas: heart attack, heart failure, pneumonia, and surgical care.

This case study focuses on UHC’s achievement in providing recommended treatment related to surgical care. UHC’s rapid and significant improvement in this area can be attributed to hospital-wide strategies as well as policies and practices focused on the surgery department. Hospital-wide strategies include the creation of a subcommittee that reviews performance data and works across departments and disciplines to address performance gaps; careful data recording,

assessment, and validation to gain the trust of physicians; engagement of the CEO, medical staff chairman, and medical staff; and communication of progress as well as challenges. Strategies specific to surgical care include: emphasizing best-practice literature to bring surgeons on board; providing consistent data feedback, including to individual surgeons; using peer pressure when needed; and standardizing operating room (OR) procedures through standing orders, practice sets, and checklists.

ORGANIZATION

Located in Clarksburg, W.V., UHC has nearly 15,000 admissions and 49,000 emergency department visits a year. It has 1,800 active employees, 140 active medical staff, and 150 volunteers. UHC merged with West Virginia University Hospitals in 1997 to form the West Virginia United Health System.

UHC is in the process of expanding its electronic health information management systems. It now has electronic documentation systems for nursing, pharmacy, lab, and health information management as well as electronic physician portals. It is working toward fully computerized physician order entry. The hospital uses documentation fields within its nursing system to create broadcast reports, or daily quality checks focused on the core measures (described below).

UHC's quality department is quite small; it consists of director Mark Povroznik, Pharm.D., who also is in charge of clinical pharmacy and infection control, a performance engineer, and a clinical quality analyst.

HOSPITAL-WIDE STRATEGIES

When UHC joined the Centers for Medicare and Medicaid Services (CMS)/Premier Hospital Quality Incentive Demonstration in 2003, it had scores in the bottom deciles for most of the quality measures being tracked.² An internal assessment found that the hospital tended to react when problems occurred, rather than work proactively to improve quality. Moreover, staff failed to collaborate or set clear priorities. UHC was also "data rich, information poor," according to Povroznik, meaning that it did not sufficiently use the performance data it had to improve quality.

"We realized that improvement would require major changes in processes and communication," said CEO Bruce Carter. UHC leaders began to change by establishing hospital-wide priorities for improvement, focusing on infrastructure, standardized data processing, collaboration across departments, and engagement of medical staff.

UHC also participated in the CMS-sponsored Surgical Care Infection Prevention (SCIP) project, the Institute for Healthcare Improvement's (IHI) "bundle" initiatives, and other quality improvement efforts.³

Performance Analysis Subcommittee

The creation of UHC's Performance Analysis Subcommittee (which reports to the Performance Improvement Committee) established a strong foundation for quality improvement. Managers of all departments, including pharmacy, medical records, quality, patient safety, diagnostics, nursing, and lab, are members of this multidisciplinary group. Chaired by Eric Radcliffe, M.D., UHC's medical director, the subcommittee reviews performance data from across the hospital, identifies problem areas and potential ways to address them, establishes quarterly goals and objectives, and prepares summary reports on core measures and other quality indicators on a monthly basis.

Most important, the subcommittee provides consistency and uniformity of data analysis, and sets clear quality expectations and priorities across departments. "Not only does this group keep everyone on track and focused," Radcliffe says, "but it occasionally results in unified process changes." For example, the subcommittee launched a "Clean Hands for Cookies" campaign to encourage staff to wash their hands, created Rapid Response Teams, and sought to minimize the need for urine cultures, resulting in a protocol by which a urine culture is not done if urine analysis is normal.

This combination of data analysis and collaboration across departments broadens the scope of performance improvement, reduces duplication of efforts, and fosters hospital-wide performance improvement initiatives and policies.

Careful Data Recording, Assessment, and Validation

Documentation of adherence to core measures is the first step in the data measurement process at UHC. In addition to educating staff on the importance of this step, UHC uses the McKesson Horizon Expert Documentation System, an electronic nursing documentation system. Twice daily, each hospital unit receives an automated report identifying patients whose treatment is related to the core measures and outlining their chief complaints, working diagnoses, and relevant information on patient education and infection control. These reports highlight instances in which information is missing from patients' records, identify deviations from recommended care processes, and prompt case managers and nurses to follow up. Such deviances are mostly related to discharge education and vaccine compliance. In addition to the reports, case managers and a sticker reminder system prompt physicians to deliver recommended care.

After discharge, data abstractors conduct full chart reviews of the handwritten medical records.

Any measure that does not meet the care standards undergoes a structured review by the quality team and is reported to the quality director for validation. Povroznik notes the value of having more than one person review a "failed" case. Most such cases are related to problems with data abstraction or data location. When a failure is discovered, quality improvement staff send a letter to the responsible physician and approach the responsible nurse, therapist, or other clinician to determine whether there was a failure in clinical practice or a lack of documentation, and to educate them on ways to avoid either situation. According to Povroznik, this process is "collaborative, not punitive. The focus is learning and educating in a time-efficient manner, but most importantly minimizing the failure from reoccurring."

In addition, quality improvement staff review trends to identify problems with care processes and work with the Performance Analysis Subcommittee to develop solutions.

Executive and Clinical Staff Engagement

UHC's clinical staff take part in quality improvement committees, fostering their sense of ownership in the improvement process. Victoria Shuman, M.D., medical staff president, links the growth in the number of elected medical staff officials at the hospital with the strength of the quality program. "At each phase of their leadership, they serve as chairman on a designated quality committee," says Shuman. In addition, a physician champion is selected to assist with each quality initiative.

Each department's performance goals are built into quarterly objectives, which are then reviewed in discussions between the department managers and the CEO and COO. When necessary, the CEO or COO reviews practice patterns with physicians to determine obstacles to achieving goals and offer encouragement. This type of direct executive involvement "is not something we want to abuse, but we realize it is integral to a successful quality program," said Mike Tillman, COO.

Communication of Progress

UHC promotes its culture of quality improvement through regular communications to staff and the public. Performance is reviewed at meetings, through monthly reports to managers and the Board, and through newsletters, announcements, and celebrations. For example:

- Computers on Wheels, or "COWs," are located throughout the hospital. About every two weeks, the quality department creates a new screensaver message citing achievements and/or providing quality-related reminders.
- The Hospital-Wide Scorecard, a large screen in the cafeteria visible to both visitors and staff, displays performance data in areas such as patient satisfaction, patient safety, and clinical outcomes.
- Luncheons and an annual banquet celebrate successes.

SURGICAL CARE IMPROVEMENT STRATEGIES

The following strategies were particularly critical to improvement in surgical care at UHC.

Bringing Surgeons on Board

Improving surgical care began with efforts to enlist the cooperation of surgical and anesthesia staff. The first improvement initiative, in 2003, focused on stopping antibiotics within 24 hours after hip or knee surgery. The quality improvement director held one-on-one discussions with the orthopedic surgeons, during which he shared clinical evidence from the professional literature supporting this practice and solicited ideas on how to develop a process to ensure compliance. In addition, the chair of surgery emphasized the importance of this initiative at the OR committee and Department of Surgery meetings. As a result, a universal standing order regarding antibiotic administration was created for the orthopedic surgeons. The first dose of antibiotic is administered in the post-anesthesia care unit, a second dose is given after eight hours, and a final dose is given eight hours later, ensuring completion within 24 hours after surgery.

Each quarter, there were improvements in compliance with the 24-hour standard and no adverse effects on rates of infections. “Orthopedic surgeons were the pioneers—their successes were shared at each department meeting first to honor them and secondly to demonstrate a safe and effective change to an old practice,” said Povroznik. By 2006, all UHC surgeons had accepted standing orders for timing of post-operative antibiotics.

After this success, other surgical care improvement efforts began by educating staff about the validity of recommended care processes through a review of the literature, followed by data sharing, collaborative reviews, and other strategies. Collaborative reviews involve one-on-one discussions between the quality improvement director and each of the surgeons or other specialists regarding the core measure definitions, recommended treatment options, and instances where the appropriate documentation was not evident in patients’ charts.

When these efforts failed to change a surgeon’s practices, UHC found that peer pressure was effective. The quality department tracks performance at the individual surgeon and department levels. Once, when it was clear that a particular surgeon was negatively affecting a department’s performance, Povroznik announced in a department meeting that, “Your group efforts are noted and appreciated, but achievement of the Department’s goal is being held back by one of your colleagues; we’re hoping we won’t have to disclose who this is.” According to Mark Hrko, M.D., chairman of the department of surgery, the surgeon’s compliance improved immediately. For UHC, publicly reproaching individual physicians would be a method of last resort.

Standardizing O.R. Procedures

Standardization of care processes through standing orders, practice sets, and checklists has greatly improved performance in surgical care measures at UHC. “It is important to make it easy for the clinicians,” according to Hrko. “They generally appreciate your packaging [the standards] for them.” Through order sets, the best-practice standard becomes the default and limits the potential for human error. When clinicians deviate from the care standards, they must document the reasons for doing so. This system leaves room for physicians’ independent judgments while enabling ongoing review of variances.

Practice Improvements

Pre-Operative Antibiotic Selection and Timing

UHC struggled for years with appropriate selection and timing of pre-operative antibiotics. Improvements in the late 1990s in meeting recommended guidelines were not sustained over the following few years, after vigilance in measurement and communication declined. Jean Coger, chief certified registered nurse anesthetist, said, “The practice of waiting for the surgeon to give antibiotics orders in the OR had proven a failure. It was time for anesthesia to take a more supporting role.” The HQA process-of-care measures recommend antibiotic administration one

Exhibit 1. UHC Process for Pre-Operative Antibiotics

1. Modification to Pre-Op Checklist.
2. Intra-operative standing orders in the event advance orders were not given.
3. Once the patient is transported to the Operating Room, the circulating nurse (CN) will review the pre-operative checklist.
 - a. If an antibiotic is ordered, the CN communicates the antibiotic to be ordered to the certified registered nurse anesthetist (CRNA) and Anesthesia.
 - b. If no advance orders, the CN will review the poster and select which antibiotic will be given. This is documented as a physician order and communicated to Anesthesia.
4. If there is no order for an antibiotic and the surgery type is not listed, or if there is a question, the circulating nurse will contact the physician for the appropriate order and document on the physician order sheet.
5. Anesthesia will administer the antibiotics prior to induction to assure appropriate timing before incision.
6. Once the surgeon enters the room, the CRNA will read back the antibiotic that was administered.

Source: United Hospital Center, 2009.

hour prior to surgery. In late 2004, one of five UHC patients received antibiotics after an initial incision was made—prompting the decision to transfer responsibility for antibiotic selection and administration from the surgeons to the anesthesiologists. Although surgeons initially balked, they acquiesced when presented with data demonstrating significant variance with recommended care.

Now, before surgery, operating room staff review a “time out” sheet with several patient safety checks, including verbal recognition by the team that an antibiotic was administered within 60 minutes before incision.

UHC anesthesiologists developed antibiotic selection guidelines according to surgery type, based on national guidelines. The surgeons approved and adopted them as standing orders, to use whenever pre-operative orders are not written by the surgeon. The guidelines are displayed on posters in the OR, and additional checks are built into the pre-operative checklist and physician order sheet. Exhibit 1 lists the process for pre-operative administration of antibiotics.

Clipping Practices

One HQA core measure monitors the method of hair removal prior to surgery; use of clippers, rather than razors, has been shown to reduce infection rates. Making this switch required educating staff on the

clinical evidence, as well as a directive from the Infection Control Committee that all razors be removed from the OR. At first, there was resistance to the initiative because staff disliked the clippers the hospital had ordered to replace razors. However, once better clippers were ordered, staff adopted the new practice. “As an additional check, the supply department kept a list of everyone who called and asked for a razor, and those associates were reeducated on the evidence-based best practice,” said Paul Carter, R.N., director of surgery.

Normothermia

Keeping surgery patients at the appropriate temperature, called normothermia, has been shown to reduce incidence of wound infection. Although performance on this care process is not publicly reported, the Surgical Care Improvement Project and IHI’s 5 Million Lives Campaign brought UHC’s attention to it. UHC developed a task force to examine practices related to normothermia and found a number of problems: inaccurate thermometers; varying practices for obtaining a patient’s temperature; patient transport through cool corridors; and OR staff adjusting the room temperature for their own comfort. These problems were addressed by the purchase of more accurate thermometers, incorporation of patient warming devices, and implementation of a room temperature monitoring system. In the rare cases when patients’ core temperature drops below

36 degrees Celsius, a nurse manager and OR director approach the clinicians involved to reinforce the importance of following these proactive measures.

VTE Prophylaxis

Improving scores on the two core measures related to prevention of blood clots (venous thromboembolism, or VTE) presented a challenge at UHC. The hospital’s VTE treatment protocols were outdated, and clinicians were not fully aware of the risk factors and perceived difficulties in assessing patients’ risk. An improvement initiative led by the quality department and post-anesthesia care unit educated clinicians in best practices for VTE prevention. The National Guidelines for Surgical Prophylaxis were incorporated into physician order forms for post-anesthesia care. The Surgical Deep Vein Thrombosis/VTE Assessment and Prophylaxis Orders form has four sections:

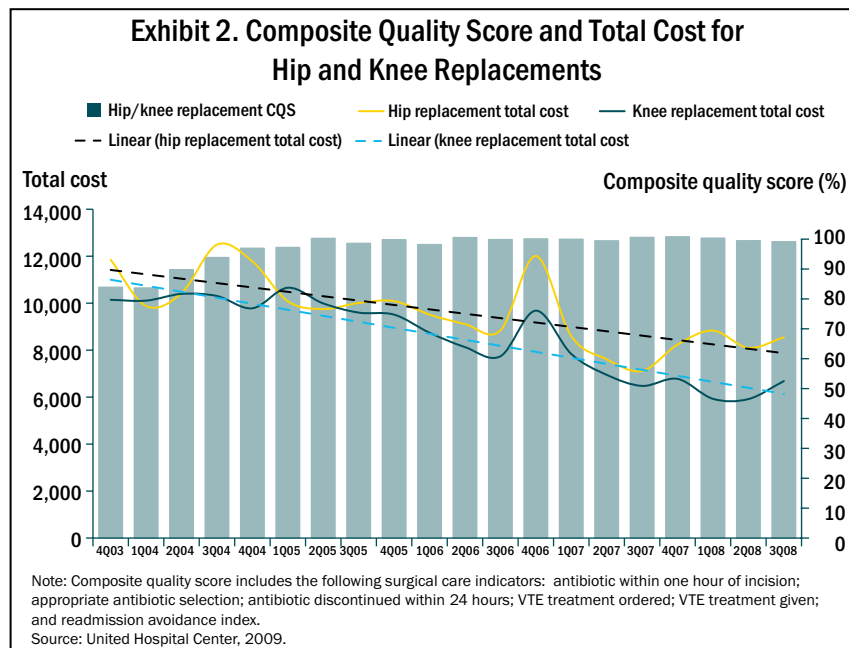
- a revised risk assessment that mirrors the assessment utilized for non-surgical medical patients;
- a physician documentation/orders section that specifies exclusions to standards and provides an opportunity for the physician to explain why one of the exclusions applies;

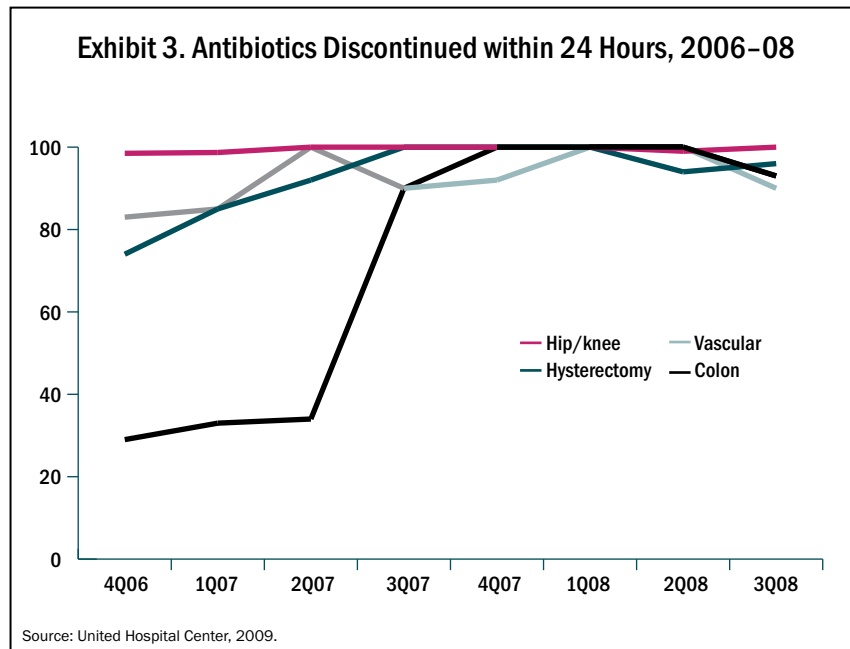
- National Quality Forum standards for VTE Prophylaxis by surgery type; and
- post-operative post anesthesia care unit (PACU) verification.

During this final step, the PACU nurse identifies patients who should have had VTE prophylaxis ordered. In cases where this has not been done, the nurse either confirms that exclusions apply or ensures an order is placed for timely pharmacological therapy.

RESULTS

With the adoption of standardized care processes, UHC saw significant improvement on measures of surgical care. In addition, as performance improved, the costs associated with hip replacement and knee replacement surgeries declined (Exhibit 2). The reduced costs were due to multiple factors, including system-wide contract pricing, equipment standardization, and shorter periods of antibiotic utilization. The successes in surgery have made it easier to initiate other quality improvement and cost-saving projects. For example, consensus was quickly achieved that the use of thigh-high SCD sleeves could be eliminated and the use of intra-op urimeters reduced, resulting in savings of nearly \$15,000 annually.





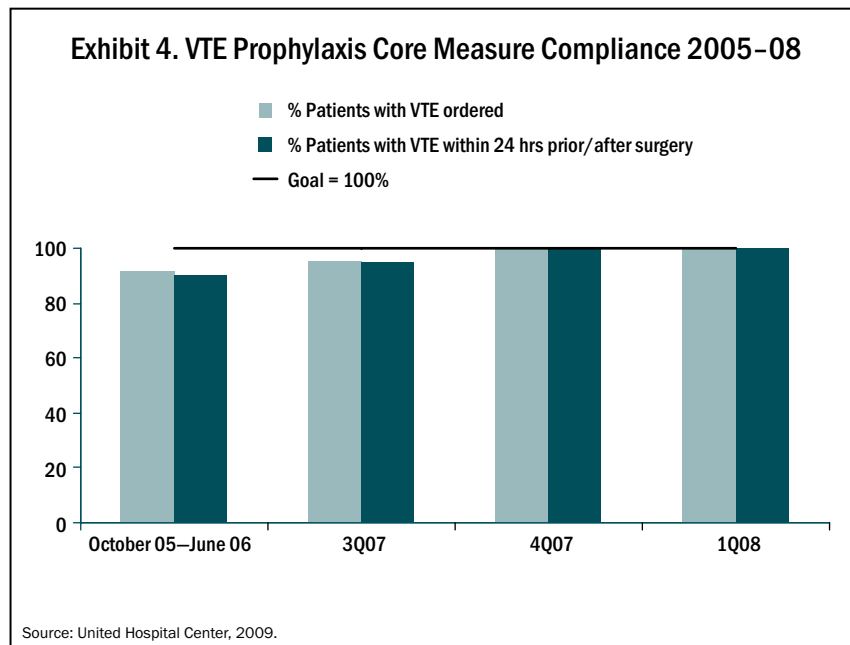
Following the staged approach described above, improvement across other measures of surgical care followed. On one measure—discontinuation of antibiotics within 24 hours after surgery—improvement was slower for colon surgery than for other types of surgery, due to one surgeon’s initial non-compliance with the standards for post-operative antibiotic timing (Exhibit 3).

In late 2007, UHC reached its goal of 100 percent compliance on VTE prophylaxis protocols (i.e., treatment ordered within 24 hours prior/after surgery) (Exhibit 4).

Exhibit 5 shows that UHC performance in all surgical care improvement measures surpasses national and West Virginia averages.

CHALLENGES AND LESSONS LEARNED

Despite its successes, UHC faces challenges in improving its performance. Povroznik believes that the multitude of quality improvement initiatives at the state, regional, and national levels places burdens on hospital administrators and clinicians, particularly when the standards are not coordinated and uniform. Further, the plethora of quality initiatives imposed by outside



organizations can distract the hospital’s quality team from focusing on priorities in their own institution and staying on track with established goals.

Staff turnover presents a challenge to sustaining performance improvement. To ensure new UHC employees are keeping up with other staff, their education begins at orientation and continues thereafter. “We set expectations high for new employees, and follow up on a day-to-day basis,” says Coger.

A number of lessons can be drawn from UHC’s experience in improving performance in surgical care as well as other clinical areas:

- The foundation of improvement is data extraction, assessment, and validation. Validating data is essential to get clinicians—particularly physicians—on board. If physicians do not trust the data used to support a quality initia-

tive, they are likely to dispute its premise and inhibit progress.

- A culture of quality helps ensure that improvement is embedded in an organization’s day-to-day routine. Performance results must be tracked and communicated to staff frequently and on an individual basis, including by approaching physicians, nurses, or therapists about specific cases. Similarly, individual and department-wide successes should be celebrated.
- Education is critical, but not enough. It is important to standardize care processes through checklists and reminders. New systems and practices must be incorporated into established workflows.

Exhibit 5. United Hospital Center Scores on Surgical Care Improvement Core Measures Compared with State and National Averages

Surgical Care Improvement Indicator	National Average	West Virginia Average	United Hospital Center
Percent of surgery patients who were given an antibiotic at the right time (within one hour before surgery) to help prevent infection	86%	84%	98% of 590 patients
Percent of surgery patients who were given the right kind of antibiotic to help prevent infection	92%	83%	99% of 590 patients
Percent of surgery patients whose preventative antibiotics were stopped at the right time (within 24 hours after surgery)	84%	76%	99% of 536 patients
Percent of all heart surgery patients whose blood glucose is kept under good control in the days right after surgery	85%	85%	N/A*
Percent of surgery patients needing hair removal from the surgical area before surgery, who had hair removed using a safe method (electric clippers or hair removal cream, not razor)	95%	91%	100% of 394 patients
Percent of surgery patients whose doctors ordered treatments to prevent blood clots after certain types of surgeries	84%	83%	98% of 536 patients
Percent of surgery patients who got treatment at the right time (within 24 hours before or after their surgery) to help prevent blood clots after certain types of surgery	81%	81%	98% of 536 patients

Source: www.hospitalcompare.hhs.gov. Data are from July 2007 through June 2008.
 * UHC treated patients in this condition, but no patients met the criteria for inclusion in the measure calculation.

While the CMS/Premier Hospital Quality Incentive Demonstration catalyzed UHC's initial improvement efforts, they have been sustained by support from the board of directors and staff. UHC's success has proven that small community hospitals can achieve top performance.

UHC's department of surgery will continue to strengthen care processes. It has recently incorporated the World Health Organization surgery guidelines into its checklists. Surgeons are working to reduce fragmentation in preoperative testing and prioritizing patient safety. A new facility set to open in August 2010 will help with these endeavors, enabling the expansion of electronic health records and the implementation of computerized physician order entry.

FOR MORE INFORMATION

For further information, contact Mark Povroznik, Pharm.D., director of quality initiatives, chairman of infection control, povroznikm@uhcwv.org.

NOTES

- ¹ This study was based on publicly available information and self-reported data provided by the case study institution. The aim of Fund-sponsored case studies of this type is to identify institutions that have achieved results indicating high performance in a particular area, have undertaken innovations designed to reach higher performance, or exemplify attributes that can foster high performance. The studies are intended to enable other institutions to draw lessons from the studied organizations' experiences in ways that may aid their own efforts to become high performers. The Commonwealth Fund is not an accreditor of health care organizations or systems, and the inclusion of an institution in the Fund's case studies series is not an endorsement by the Fund for receipt of health care from the institution.
- ² Beginning in 2003, the CMS/Premier Hospital Quality Incentive Demonstration tested the impact of financial incentives on inpatient care in 250 hospitals. Many of the clinical indicators used in the demonstration became the measures currently reported to CMS by all hospitals, including hip/knee replacement surgical care measures.
- ³ "Bundles" are small, straightforward sets of evidence-based practices that, when performed collectively and reliably, have been proven to improve patient outcomes. See <http://www.ihl.org/IHI/Topics/CriticalCare/IntensiveCare/ImprovementStories/WhatIsaBundle.htm>.
- ⁴ Readmission avoidance index: numerator=actual readmission avoidance rate; denominator=expected readmission avoidance rate.
- ⁵ Two additional surgical care improvement measures were added in 2007 but were not included in the composite score for selection purposes because data were not available for four quarters.

Appendix: Selection Methodology

Selection of high-performing hospitals for this series of case studies on surgical care is based on data submitted by hospitals to the Centers for Medicare and Medicaid Services. We use five measures that are publicly available on the U.S. Department of Health and Human Services' Hospital Compare Web site, (www.hospitalcompare.hhs.gov). The measures, developed by the Hospital Quality Alliance, relate to practices in surgical care.

Surgical Care Improvement Process-of-Care Measures

1. Percent of Surgery Patients Who Received Preventative Antibiotic(s) One Hour Before Incision
2. Percent of Surgery Patients Who Received the Appropriate Preventative Antibiotic(s) for Their Surgery
3. Percent of Surgery Patients Whose Preventative Antibiotic(s) Are Stopped Within 24 hours After Surgery
4. Percent of surgery patients whose doctors ordered treatments to prevent blood clots (venous thromboembolism) for certain types of surgeries
5. Percent of surgery patients who received treatment to prevent blood clots within 24 hours before or after selected surgeries

The analysis uses all-payer data from April 2007 through March 2008. To be included, a hospital must have submitted data for all five measures (even if data submitted were based on zero cases), with a minimum of 30 cases for at least one measure, over four quarters.⁵ Approximately 2,300 facilities—more than half of U.S. acute-care hospitals—were eligible for the analysis.

No explicit weighting was incorporated, but higher-occurring cases give weight to that measure in the average. Since these are process measures (versus outcome measures), no risk adjustment was applied. Exclusion criteria and other specifications are available at <http://www.qualitynet.org/dcs/ContentServer?cid=1141662756099&pagename=QnetPublic%2FPage%2FQnetTier2&c=Page>.

While high score on a composite of surgical care improvement process-of-care measures was the primary criteria for selection in this series, the hospitals also had to meet the following criteria: not a government-owned hospital, at least 50 beds, not a specialty hospital, ranked within the top half of hospitals in the U.S. in the percentage of patients who gave a rating of 9 or 10 out of 10 when asked how they rate the hospital overall (measured by the Hospital Consumer Assessment of Healthcare Providers and Systems, HCAHPS), full accreditation by the Joint Commission; not an outlier in heart attack and/or heart failure mortality; no major recent violations or sanctions; and geographic diversity.

ABOUT THE AUTHORS

Sharon Silow-Carroll, M.B.A., M.S.W., is a health policy analyst with nearly 20 years of experience in health care research. She has specialized in health system reforms at the local, state, and national levels; strategies by hospitals to improve quality and patient-centered care; public–private partnerships to improve the performance of the health care system; and efforts to meet the needs of underserved populations. Prior to joining Health Management Associates as a principal, she was senior vice president at the Economic and Social Research Institute, where she directed and conducted research studies and authored numerous reports and articles on a range of health care issues.

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