



Case Study

High-Performing Health Care Organization • April 2009

The mission of The Commonwealth Fund is to promote a high performance health care system. The Fund carries out this mandate by supporting independent research on health care issues and making grants to improve health care practice and policy. Support for this research was provided by The Commonwealth Fund. The views presented here are those of the authors and not necessarily those of The Commonwealth Fund or its directors, officers, or staff.

For more information about this study, please contact:

Sharon Silow-Carroll, M.B.A., M.S.W.
Health Management Associates
E-mail ssilowcarroll@healthmanagement.com

To download this publication and learn about others as they become available, visit us online at www.commonwealthfund.org and register to receive Fund e-Alerts.

Commonwealth Fund pub. 1251
Vol. 14

Oklahoma Heart Hospital: Clinician Leaders Establish Culture of Quality

SHARON SILOW-CARROLL, M.B.A., M.S.W.
HEALTH MANAGEMENT ASSOCIATES

Vital Signs

Location: Oklahoma City, Okla.

Type: Small, physician-owned, for-profit hospital specializing in cardiac care.

Beds: 78

Distinction: Top 1 percentile (with a score of 99.1% compliance) in a composite of 24 process-of-care quality measures, among more than 2,000 acute-care hospitals—about half of the acute-care hospitals in the U.S.—eligible for the analysis.

Timeframe: January through December 2007. See [Appendix A](#) for full methodology.

This case study describes the strategies and factors that appear to contribute to high adherence to process-of-care, “core” measures at Oklahoma Heart Hospital. It is based on information obtained from interviews with key hospital personnel, publicly available information, and materials provided by the hospital during October 2008 through January 2009.¹



SUMMARY

Since its inception in 2002, Oklahoma Heart Hospital (OK Heart) has consistently demonstrated high adherence to process-of-care or “core” measures and high patient satisfaction.² Reinforced by positive financial performance, OK Heart leaders are dedicated to pursuing and maintaining optimal quality and patient service. Key strategies behind their excellent scores in core measure standards include:

- Physician leaders’ commitment to quality;
- Physician offices housed within the hospital, providing greater access to nurses and patients;
- Flat organizational structure that allows quick implementation of operational changes;
- Highly experienced nurses and high nurse-to-patient ratios;

- Standardization of care processes through computerized “care sets”;
- Electronic tools (e.g., electronic medical records, computerized physician order entry) that provide immediate access to patients’ medical information and feedback about appropriate orders, thereby reducing errors;
- Continuous examination of existing practices and introduction of new practices; and
- An “e-Bucket” tool for communicating staff concerns and addressing them quickly.

ORGANIZATION

Oklahoma Heart Hospital, which opened in 2002 in Oklahoma City, is the state’s first dedicated heart hospital. It is a physician-owned cooperative arrangement between the Oklahoma Cardiovascular Associates, the state’s largest group of cardiologists, and the Sisters of Mercy Health System. OK Heart contains 78 patient beds and has an average daily census of about 75 patients. Average length of stay for patients is 3.25 days. Patient mix is 63 percent Medicare, 2 percent Medicaid, 30 percent commercial insurance, and 4 percent uninsured, with patients from all 77 Oklahoma counties. OK Heart describes itself as the first all-digital, or paperless, hospital in the United States.

In addition to its success with core measure quality scores, OK Heart has achieved optimal patient satisfaction. It was ranked in the top 1 percent nationally in 2006, 2007, and 2008, according to Press Ganey Associates, an organization that measures patient satisfaction. Some critics argue that small, specialty hospitals score better on quality measures because they tend to have healthier patients and simpler cases. However, OK Heart administrators state that their patients tend to have complex conditions and are sicker than average, with a case-mix index of 2.19 for fiscal year 2009 (higher figures signify more complexity), compared with a nationwide average of 1.37.³

OK Heart Hospital performs 12,000 interventions and 3,000 surgeries annually. It offers a full-service

emergency room and admits more than 1,000 patients annually from this service. OK Heart also has four open-heart/peripheral vascular surgical suites and five cardiac and peripheral vascular catheterization labs.

STRATEGIES FOR SUCCESS

Based on conversations with OK Heart leaders, the hospital’s achievements in core measure scores and other quality measures can be attributed to the following factors and strategies.

Culture of Quality and Flat Organizational Structure

Oklahoma Heart was established by a group of about 40 physicians who wanted to provide quality care and were frustrated with the bureaucracy in conventional health care settings. Their commitment to quality was the foundation of OK Heart’s culture. “Quality and patient service are the reason for OK Heart’s existence,” said Peggy Tipton, chief operating officer (COO) and chief nursing officer.

Leaders attribute the ongoing quality focus to clinician and caregiver leadership at the executive and board levels. The CEO is a practicing cardiologist, the COO is a nurse, and the board is composed largely of physicians. “Every decision we make is based on: ‘how will it affect the patient?’ Financial and productivity considerations are secondary,” said Tipton.

So far, the focus on quality has resulted in favorable financial performance. “We spend more money on what helps patient care and less on secondary items such as other lines of business, new buildings, and administrators,” said CEO John Harvey, M.D.

Limiting the size of the hospital and scope of services allows for a relatively flat organizational structure, without a need for a large committee structure or bureaucracy. This enables the hospital to implement operational changes based on new clinical evidence or internal decisions quickly and efficiently.

Finally, physicians’ offices are housed in the hospital, which enhances nurse–physician relationships and physicians’ accessibility to patients.

Optimal Nurse Experience and Ratios

The quality and quantity of nursing staff are key contributors to the high-quality care at OK Heart. The hospital hires slowly and carefully, making sure it acquires compassionate individuals who can make a contribution to quality, rather than using productivity or cost ratios in staffing decisions. The average nurse at OK Heart has nearly 10 years of experience.

Despite nursing shortages, OK Heart maintains optimum nurse-to-patient ratios of one nurse per patient in critical care units, one nurse per three patients in step-down care, and one nurse per four patients in medical–surgical units. This ratio amounts to fewer patients per nurse than is the norm in most hospitals.⁴ “These staffing levels allow nurses to really concentrate on high-quality patient care,” said Tipton. The staffing levels also illustrate the administration’s claim that finances do not come first; quality is the top priority.

The staffing levels, along with nurse education and involvement in decision-making, have benefited the hospital financially. OK Heart ranks in the 90th percentile in nursing satisfaction, according to a 2008

National Database of Nursing Quality Indicators survey, and has a 98 percent nurse retention rate, reducing the need for expensive recruitment and training.

Standardization through Care Sets and High Volume

OK Heart has developed and uses approximately 124 care sets, based on disease or procedure. They are written by OK Heart physicians with the collaboration of nurses, often building on best practices developed by national experts. If a patient with chest pain is admitted through the emergency room, for example, the physician on duty will request a chest pain care set. The care set may be modified, if the situation warrants it, but the default is evidence-based protocol. The care sets provide checklists for clinicians to standardize care, reduce errors, and ensure compliance with evidence-based procedures. See Figures 1 and 2 for OK Heart’s heart failure and acute coronary syndrome care sets.

Though small in bed size, OK Heart is a large-volume hospital, performing about 1,200 open-heart surgeries per year and about 500 cardiac catheterizations

Figure 1. Heart Failure Care Set

| Admission Type | |
|---|--|
| <input checked="" type="checkbox"/> Admit to Hospital | T;N, Admit Type: Inpatient |
| Clinical Pathway - Required for All Patients | |
| <input checked="" type="checkbox"/> Initiate Pathway | T;N, CHF Pathway |
| Consults/Education | |
| <input checked="" type="checkbox"/> Consult to Cardiac Rehabilitation | T;N |
| <input type="checkbox"/> Consult to Dietitian | T;N, Diet Explanation (specific diet), Low NA Diet Education |
| <input checked="" type="checkbox"/> Smoking Cessation Education | T;N |
| <input checked="" type="checkbox"/> Risk Factor Modification Education | T;N |
| Nursing Orders | |
| <input checked="" type="checkbox"/> Notify Provider | T;N, OHH, Other (see comment), Systolic BP less than 85 |
| <input checked="" type="checkbox"/> Saline Lock Insertion | T;N |
| <input checked="" type="checkbox"/> Vital Signs | T;N, Routine unless ordered otherwise |
| <input checked="" type="checkbox"/> Blood Pressure Orthostatic (Orthostatic Blood Pressure) | T;N, Every Day, With AM Vital Signs - Sitting & Standing |
| <input checked="" type="checkbox"/> Telemetry | |
| <input checked="" type="checkbox"/> Oxygen | T;N, Nasal Cannula, PRN Order, Maintain O2 Sats Equal to or Greater than 90% |
| <input checked="" type="checkbox"/> Intake & Output (I&O) | T;N, Strict |
| <input checked="" type="checkbox"/> Daily Weight | T;0500, Q24Hr, Using Same Scale |
| <input checked="" type="checkbox"/> Urinary Catheter (Foley Catheter) | T;N, Insertion, PRN Order |
| <input checked="" type="checkbox"/> Up ad lib | T;N |
| <input checked="" type="checkbox"/> Notify Provider | T;N, Attending Physician, Patient Admitted |
| <input checked="" type="checkbox"/> Identify Home Medications-Contact Physician to Verify | T;N |
| Diet | |
| <input type="checkbox"/> Diet | T;N, Low Sodium, Low Sodium Diet 2gm Na |
| <input type="checkbox"/> Diet | |
| <input type="checkbox"/> Diet | T;N, Healthy Heart |
| <input type="checkbox"/> Diet | T;N, Diabetic |
| <input type="checkbox"/> Diet | T;N, Clear Liquid |
| <input type="checkbox"/> Diet | T;N, NPO |
| <input type="checkbox"/> Diet | T;N, NPO, After Midnight |

per month. This combination of standardization and high volume has contributed immensely to high-quality care, according to Cindy Miller, multi-department director.

Technology Allows for Quick Feedback, Assessment, and Correction

The founders of OK Heart invested in information technology (IT) systems to reduce errors, improve communication, and maximize evidence-based practice. As an entirely paperless organization, OK Heart has bedside computers in every room so nurses and physicians can access test results and care sets while they are with patients. The systems include and integrate care sets, computerized physician order entry, and electronic medical records. For example, if a physician writes an order, the nurse’s task list is immediately updated, and the pharmacist verifies the order and sends the medication to the floor within about 10 minutes.

Electronic measurement also allows for continual feedback, with rapid assessment of compliance with core measures. This, in turn, allows the staff to correct situations and implement proper procedures quickly. The core measures are reported in all staff meetings, reinforcing staff success at complying with the standards. “Electronic medical records transform the way OK Heart clinicians practice medicine,” said Miller.

The electronic system does require maintenance. An IT team meets regularly with the clinical staff to maintain and revise the electronic medical record and support systems. The rapidly changing technology and evidence-based practices require users to be nimble and to adapt to changes quickly. Downtimes, primarily for system updates, are scheduled, with performance during the downtimes reviewed to ensure safety and patient care.

Figure 2. Acute Coronary Syndrome Care Set

| Admit to Hospital | |
|---|--|
| <input checked="" type="checkbox"/> Admit to Hospital | T,N, Admit Type: Inpatient |
| <input checked="" type="checkbox"/> ACS Admission Diagnosis | |
| <input checked="" type="checkbox"/> Initiate Pathway | T,N |
| Nursing Orders | |
| <input checked="" type="checkbox"/> Vital Signs | T,N, Q6Hr, Per Unit Protocol |
| <input checked="" type="checkbox"/> Intake & Output (I&O) | T,N, Strict |
| <input checked="" type="checkbox"/> Oxygen | T,N, Nasal Cannula, 2-4 L/min, PRN Order, PRN Chest Pain or SAO2 < 90% |
| <input checked="" type="checkbox"/> Pulse Oximetry Single Check | T,N, Q6Hr, With VS |
| <input checked="" type="checkbox"/> Saline Lock Insertion | T,N |
| <input checked="" type="checkbox"/> Identify Home Medications-Contact Physician to Verify | |
| <input type="checkbox"/> Pulse O ₂ Continuous | T,N, CONT |
| Activity | |
| <input type="checkbox"/> Bedrest | T,N |
| <input type="checkbox"/> Bedrest w/ Bathroom Privileges | T,N |
| <input type="checkbox"/> Up ad lib | T,N |
| <input type="checkbox"/> Ambulate | BID |
| Diet | |
| <input checked="" type="checkbox"/> Diet | T,N, Healthy Heart |
| <input type="checkbox"/> Diet | T,N, Diabetic |
| <input type="checkbox"/> Diet | T,N, Clear Liquid |
| <input type="checkbox"/> Diet | T,N, NPO |
| <input type="checkbox"/> Diet | T;2359, NPO, After Midnight |
| Medication | |
| Aspirin Therapy | |
| <input checked="" type="checkbox"/> Aspirin | 325 mg, PO, Every Day, Acute MI |
| <input type="checkbox"/> Aspirin | 324 mg, PO, NOW, T,N, Acute MI, Chew Tab |
| <input type="checkbox"/> Aspirin | 81 mg, PO, Every Day, Acute MI |
| <input type="checkbox"/> Contraindication to Aspirin Therapy | T,N |
| ***Protocol Order & CareSets will open after clicking OK below | |
| <input type="checkbox"/> Protocol Order Heparin | |
| <input checked="" type="checkbox"/> Protocol Order Medications PRN | |

Continually Examining and Introducing New Practices

The minimal bureaucracy, ongoing feedback through IT, and overall culture of quality allow OK Heart to respond to problems and new clinical evidence and quickly and efficiently incorporate new practices. Problem identification and implementation of best practices are illustrated in the following examples.

Depression Screening and Treatment

The medical literature documents a clear connection between depression and heart disease. Consequently, OK Heart senior staff examined current practices and recognized the need to improve patient care. The hospital hired a full-time psychologist to help identify, treat, and refer patients, when necessary. A depression screening tool was added to the initial nursing assessment. Patients requiring help are referred to the psychologist for assessment and follow-up. Medical and nursing staff may also make referrals if patients exhibit signs and symptoms of depression after the initial assessment. In 2007, the psychologist received referrals in over 25 percent of the patient population. The psychologist also educates medical and nursing staff in prevention, assessment, treatment and follow-up of patients. Miller believes that these efforts are reflected in their high patient satisfaction scores and low mortality rates.

Addressing Diabetes

Noticing that many patients were diabetic or had elevated blood sugars during hospitalization, OK Heart conducted a systematic examination of blood sugar levels as part of an effort to improve outcomes for surgical and medical patients. In 2006, staff performed a hemoglobin A1c test on every admission and found that over 15 percent of the patient population had uncontrolled blood sugar and over 35 percent of patients experienced elevated levels during hospitalization. Half of the latter group had undiagnosed diabetes. Administration began a mandatory education program, hiring a nurse specialist and diabetes dieticians to educate staff, patients, and families regarding the importance of blood sugar control during hospitalization.

They established protocols to treat both surgical and medical patients with elevated blood sugar. Patients with blood sugar levels greater than 200 or less than 50 are seen in consult by the nurse specialist. The hospital continues to educate patients and staff as evidence-based practice in controlling glucose evolves. These efforts are reflected in a core measure, which is reported to the Centers for Medicare and Medicaid Services (CMS). At OK Heart, the percent of all heart surgery patients with blood sugar (blood glucose) under good control in the days right after surgery is 96 percent, compared with 90 percent in Oklahoma and 90 percent nationwide.⁵

Induced Hypothermia (“Big Chill”) for Cardiac Arrest Patients

An article was presented to the nursing leadership about the success of induced hypothermia—reducing patient core temperature to 32°C to 34°C for 12 to 24 hours—for cardiac arrest patients. Clinical trials of induced hypothermia indicate this treatment may improve survival and neurological recovery in patients who have cardiac arrest under certain conditions.⁶ Within two weeks of introducing the concept, OK Heart used the practice on a patient. Soon after, OK Heart was one of the first hospitals in the nation to initiate an induced hypothermia protocol for patients meeting certain conditions.

Historically, patients who have out-of-hospital cardiac arrest have had high mortality and morbidity rates; more than 90 percent of these patients die before reaching the hospital, and severe neurological impairment often develops in those who do survive after resuscitation.⁷ An examination of OK Heart’s early experience with the hypothermia protocol found survival and neurologic recovery comparing favorably with clinical trial outcomes.⁸

Since 2004, OK Heart has used its “Big Chill” protocol on over 150 patients, with a survival rate of 38 percent. Over one-half of the survivors have returned to their pre-arrest quality of life. OK Heart is the only hospital in Oklahoma that offers induced hypothermia protocols for patients experiencing “un-witnessed” cardiac arrest (e.g., situations involving a delay of at least 10 minutes before heart function is restored).

Strategies to Reduce Surgical Site Infections

The rate of surgical site infections for implantable devices should be less than 1 percent. In 2006, OK Heart experienced rates above this benchmark and instituted an epidemiological investigation that found the increased incidence of infection was physician-specific. Further investigation found problems with long cases, inappropriate administration of prophylactic antibiotics, issues with preoperative skin preparation, and basic surgical asepsis.

In response, the hospital implemented a series of prevention strategies including: educating staff, observing cases by infection control personnel, supervising physicians, and monitoring surgical asepsis by operating room staff. Rates of infection returned to benchmark levels in less than six months, and incidence of surgical site infection now remains at an acceptable level.

Prevention Bundles to Reduce Ventilator-Associated Pneumonia

In an effort to reduce rates of ventilator-associated pneumonia, OK Heart implemented “prevention bundles” for ventilated patients that include elevating the head of the bed, extubation, and mouth care. The bundles were incorporated into nurses’ practices, with infection rates closely monitored by infection control personnel. Infection rates have not changed since the bundles were implemented, though they continue to be at acceptable levels—lower than 25th percentile of National Safety Health Network rates. Still, the hospital is continuing efforts toward further infection reduction.

Addressing Staff Concerns

Staff members are encouraged to communicate concerns, including those involving core measures, through an “e-Bucket,” a designated e-mail address. The quality improvement staff review items in the bucket each day and address problems within 24 hours. This tool is particularly helpful in enabling nurses to report concerns about quality related to patient care, management, or safety without fear of retribution.

RESULTS

OK Heart has excelled in creating quality outcomes and generating patient satisfaction since it opened in 2002. High scores have been connected to positive financial performance: the hospital received the maximum payment from CMS for performance in evidence-based core measures and was recently selected as a cardiac referral center for Medicare’s Acute Care Episode project.⁹ These experiences have reinforced the hospital’s commitment to quality.

Based on data reported to CMS, OK Heart received the Total Benchmark Solution Top 100 Quality Award for Best Acute Care Hospitals in 2006.¹⁰ It has reached 100 percent compliance on the majority of core measure indicators, far surpassing both state and national averages (Figure 3).

Despite excellent scores and recognition, OK Heart has, over the years, identified areas in need of improvement. These have included prevention of complications with implantable devices and reduction in ventilator-associated pneumonias. Efforts to address these areas, described in this case study, have led to changes in practices that have largely been successful. OK Heart continues to work on ensuring that patients are comfortable with home care and after-care, by carefully monitoring the discharge processes and readmission rates.

Lessons Learned

Though OK Heart is small and specializes in cardiac care, CEO John Harvey thinks the strategies that have contributed to its success are replicable in other hospital settings. “The key is to put practitioners back in the role of decision-making and to put patients back on top as a priority,” he said.

Another lesson emerging from OK Heart’s experience, according to COO Peggy Tipton, is that “improving quality is a journey that never ends.” It requires persistence, commitment, and a clear message from the top of the organization. “The quest for quality must permeate what we do and communicate,” said Miller.

OK Heart leaders admit there are challenges. Changing physician and nurse behavior requires

Figure 3. Oklahoma Heart Hospital Scores on 24 CMS Core Measures Compared with State and National Averages, April 2007–March 2008

| Indicator | National Average | Oklahoma Average | Oklahoma Heart Hospital |
|---|------------------|------------------|-------------------------|
| Heart Failure | | | |
| Percent of heart failure patients given discharge instructions | 71% | 60% | 100% of 295 patients |
| Percent of heart failure patients given an evaluation of LVS function | 87% | 75% | 100% of 315 patients |
| Percent of heart failure patients given ACE inhibitor or ARB for LVS dysfunction | 88% | 86% | 100% of 160 patients |
| Percent of heart failure patients given smoking cessation advice/counseling | 90% | 79% | 100% of 45 patients |
| Pneumonia | | | |
| Percent of pneumonia patients given oxygenation assessment | 99% | 99% | 100% of 20 patients* |
| Percent of pneumonia assessment patients assessed and given pneumococcal vaccination | 80% | 78% | 100% of 37 patients |
| Percent of pneumonia patients whose initial emergency room blood culture was performed prior to the administration of the first hospital dose of antibiotics | 90% | 90% | 92% of 13 patients* |
| Percent of pneumonia patients given smoking cessation advice/counseling | 87% | 80% | 100% of 19 patients* |
| Percent of pneumonia patients given initial antibiotics within six hours after arrival | 93% | 93% | 100% of 14 patients* |
| Percent of pneumonia patients given the most appropriate initial antibiotic(s) | 87% | 84% | 91% of 11 patients* |
| Percent of pneumonia patients assessed and given influenza vaccination | 79% | 78% | 100% of 32 patients* |
| Heart Attack | | | |
| Percent of heart attack patients given aspirin at arrival | 94% | 84% | 100% of 82 patients |
| Percent of heart attack patients given aspirin at discharge | 91% | 87% | 100% of 288 patients |
| Percent of heart attack patients given ACE inhibitor or ARB for LVS dysfunction | 89% | 88% | 100% of 35 patients* |
| Percent of heart attack patients given smoking cessation advice/counseling | 93% | 87% | 100% of 134 patients |
| Percent of heart attack patients given beta blocker at discharge | 92% | 81% | 100% of 270 patients |
| Percent of heart attack patients given fibrinolytic medication within 30 minutes of arrival | 41% | 36% | 0 patients* |
| Percent of heart attack patients given PCI within 90 minutes of arrival | 70% | 69% | 83% of 18 patients* |
| Surgical Care Improvement | | | |
| Percent of surgery patients who were given an antibiotic at the right time (within one hour before surgery) to help prevent infection | 85% | 80% | 100% of 256 patients |
| Percent of surgery patients who were given the right kind of antibiotic to help prevent infection | 92% | 86% | 100% of 265 patients |
| Percent of surgery patients whose preventative antibiotics were stopped at the right time (within 24 hours after surgery) | 83% | 86% | 98% of 178 patients |
| Percent of all heart surgery patients whose blood glucose is kept under good control in the days right after surgery | 86% | 90% | 96% of 49 patients |
| 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% | 93% | 100% of 96 patients |
| Percent of surgery patients whose doctors ordered treatments to prevent blood clots after certain types of surgeries | 82% | 74% | 50% of 2 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 | 79% | 72% | 50% of 2 patients* |

Note: ACE = angiotensin-converting enzyme; ARB = angiotensin receptor blockers; LVS = left ventricular systolic; PCI = percutaneous coronary intervention.

*The number of cases is too small (<25) to reliably tell how well a hospital is performing.

Note: The majority of OK Heart's community-acquired pneumonia cases present to their Emergency Department and are admitted or referred to another facility depending on bed availability.

Source: www.hospitalcompare.hhs.gov. Accessed Fall 2008. Data are from CY2007.

education and discipline, and such efforts by administration and superiors are not always welcome. It helps to examine data at the individual physician and nurse levels and then let providers know when their behaviors or outcomes fall outside expectations. It is also important for the physician governing board to intervene to encourage physicians to change behavior. Medical staff members know that their individual performance on quality measures affects peer review and recertification.

Providing feedback quickly and continually is critical. OK Heart medical staff view their own compliance data quarterly, but are informed of variances from standards when they occur. It is also helpful to inform physicians of how they compare with others. “Physicians are competitive; they want to take good care of their patients and be the best in among their peers,” said Miller.

FOR MORE INFORMATION

For further information, contact Cindy Miller, M.S.N., multi-department director, email: cmiller@okheart.com.

NOTES

- 1 This study was based on publicly available information and self-reported data provided by the case study institution(s). 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 The core measures are a set of care processes developed by The Joint Commission, the predominant accrediting body for health care institutions, to improve health outcomes. Also called “process-of-care” measures, hospitals’ adherence to the care processes is reported to the Centers for Medicare and Medicaid Services and made public on the Hospital Compare Web site (<http://www.hospitalcompare.hhs.gov>). High performance on these measures is the main criteria for selection for this publication series.
- 3 A hospital’s case mix index (CMI) represents the average diagnosis-related group (DRG) relative weight for that hospital. It is calculated by summing the DRG weights for all Medicare discharges and dividing by the number of discharges. Average CMI among 3,619 hospitals is 1.37 for fiscal year 2009 (Centers for Medicare and Medicaid Services, FY 2009 CMS Final Rule Case Mix Index, <http://www.cms.hhs.gov/AcuteInpatientPPS/FFD/itemdetail.asp?filterType=none&filterByDID=0&sortByDID=2&sortOrder=descending&itemID=CMS1214021&intNumPerPage=10>).

- ⁴ Recommendations for minimum nurse-to-patient ratios vary considerably, from one nurse per 10 patients (recommended by hospital associations), to one nurse per three patients (recommended by nurses' associations). California, the only state to mandate minimum nurse-to-patient ratios, has minimum ratios of 1:5 in medical/surgical units, 1:2 in critical care units and ICUs, and 1:3 in step-down units. For more information see: Nurse-to-Patient Ratios: Research and Reality, NEPPC, Conference Report Series No. 05-1, July 2005. <http://www.bos.frb.org/economic/neppc/conreports/2005/conreport051.pdf>.
- ⁵ Based on data reported for discharges January 2008 through March 2008. Hospital Compare Web site: www.hospitalcompare.hhs.gov.
- ⁶ For more information on hypothermia after cardiac arrest, see: Hypothermia After Cardiac Arrest Study Group, "Mild Therapeutic Hypothermia to Improve the Neurologic Outcome After Cardiac Arrest," *New England Journal of Medicine*, Feb. 21, 2002 346(8):549-56; S. A. Bernard, T. W. Gray, M. D. Buist et al., "Treatment of Comatose Survivors of Out-of-Hospital Cardiac Arrest with Induced Hypothermia," *New England Journal of Medicine*, Feb. 21, 2002 346(8):557-63; and B. D. Scott, T. Hogue, M. S. Fixley et al., "Induced Hypothermia Following Out-of-Hospital Cardiac Arrest; Initial Experience in a Community Hospital," *Clinical Cardiology*, Dec. 2006 29(12):525-29.
- ⁷ See: T. Kozik, "Induced Hypothermia for Patients with Cardiac Arrest: Role of a Clinical Nurse Specialist," *Critical Care Nurse*, Oct. 2007 27(5):36-43.
- ⁸ Scott, Hogue, Fixley et al., "Induced Hypothermia," 2006.
- ⁹ On Jan. 1, 2009, the Centers for Medicare and Medicaid Services launched a three-year acute care episode demonstration project that involves bundling Medicare payments to selected hospitals and physicians into a single payment. The project is designed to test the use of a single payment for an "episode of care," defined as both hospital and physician services furnished to a patient during an inpatient stay.
- ¹⁰ For more information see: <http://www.totalbenchmarksolution.com/index.php?id=86> .

Appendix A. Selection Methodology

Selection of high-performing hospitals in process-of-care measures for this series of case studies is based on data submitted by hospitals to the Centers for Medicare and Medicaid Services. We use 24 measures that are publicly available on the U.S. Department of Health and Human Services' Hospital Compare Web site (www.hospitalcompare.hhs.gov). The 24 measures, developed by the Hospital Quality Alliance, relate to practices in four clinical areas: heart attack, heart failure, pneumonia, and surgical infections.

Heart Attack Process-of-Care Measures

1. Percent of heart attack patients given ACE inhibitor or ARB for left ventricular systolic dysfunction (LVSD)
2. Percent of heart attack patients given aspirin at arrival
3. Percent of heart attack patients given aspirin at discharge
4. Percent of heart attack patients given beta blocker at arrival
5. Percent of heart attack patients given beta blocker at discharge
6. Percent of heart attack patients given fibrinolytic medication within 30 minutes of arrival
7. Percent of heart attack patients given PCI within 90 minutes of arrival
8. Percent of heart attack patients given smoking cessation advice/counseling

Heart Failure Process-of-Care Measures

9. Percent of heart failure patients given ACE inhibitor or ARB for left ventricular systolic dysfunction (LVSD)
10. Percent of heart failure patients given an evaluation of left ventricular systolic (LVS) function
11. Percent of heart failure patients given discharge instructions
12. Percent of heart failure patients given smoking cessation advice/counseling

Pneumonia Process-of-Care Measures

13. Percent of pneumonia patients assessed and given influenza vaccination
14. Percent of pneumonia patients assessed and given pneumococcal vaccination
15. Percent of pneumonia patients given initial antibiotic(s) within 4 hours after arrival
16. Percent of pneumonia patients given oxygenation assessment
17. Percent of pneumonia patients given smoking cessation advice/counseling
18. Percent of pneumonia patients given the most appropriate initial antibiotic(s)
19. Percent of pneumonia patients whose initial emergency room blood culture was performed prior to the administration of the first hospital dose of antibiotics

Surgical Care Improvement Process-of-Care Measures

20. Percent of surgery patients who received preventative antibiotic(s) one hour before incision
21. Percent of surgery patients who received the appropriate preventative antibiotic(s) for their surgery
22. Percent of surgery patients whose preventative antibiotic(s) are stopped within 24 hours after surgery
23. Percent of surgery patients whose doctors ordered treatments to prevent blood clots (venous thromboembolism) for certain types of surgeries
24. 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 all four quarters in 2007. To be included, a hospital must have submitted data for all 24 measures (even if data submitted were based on zero cases), with a minimum of 30 cases for at least one measure in each of the four clinical areas. Approximately 2,000 facilities—about half of 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 process-of-care measures was the primary criteria for selection in this series, the hospitals also had to meet the following criteria: 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 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 AUTHOR

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.

ACKNOWLEDGMENTS

We wish to thank John Harvey, M.D., chief executive officer; Cindy Miller, M.S.N., multi-department director; and Peggy Tipton, R.N., B.S.N., chief operating officer and chief nursing officer, for generously sharing their time, knowledge, and materials with us.

Editorial support was provided by Martha Hostetter.

This study was based on publicly available information and self-reported data provided by the case study institution(s). 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.

The aim of Commonwealth Fund–sponsored case studies of this type is to identify institutions that have achieved results indicating high performance in a particular area of interest, 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 institutions' experience that will be helpful in their own efforts to become high performers. It is important to note, however, that even the best-performing organizations may fall short in some areas; doing well in one dimension of quality does not necessarily mean that the same level of quality will be achieved in other dimensions. Similarly, performance may vary from one year to the next. Thus, it is critical to adopt systematic approaches for improving quality and preventing harm to patients and staff.

