



Case Study

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Holland Hospital: Improving Pneumonia Care by Hardwiring Process Enhancements

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HEALTH MANAGEMENT ASSOCIATES

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Vital Signs

Location: Holland, Mich.

Type: Private, nonprofit hospital

Beds: 209

Distinction: Top 3 percent in composite of seven pneumonia process-of-care measures, among more than 2,800 hospitals (more than half of U.S. acute-care hospitals) eligible for the analysis.

Timeframe: July 2007 through June 2008. See [Appendix](#) for full methodology.

This case study describes the strategies and factors that appear to contribute to high performance on pneumonia process-of-care measures at Holland Hospital. It is based on information obtained from interviews with key hospital personnel, publicly available information, and materials provided by the hospital during June through September 2009.



SUMMARY

Holland Hospital has significantly improved its performance on the pneumonia process-of-care, or “core” measures, over the last five years. The core measures, developed by the Hospital Quality Alliance, relate to provision of recommended treatment in four clinical areas: heart attack, heart failure, pneumonia, and surgical care. Holland Hospital performs in at least the top 20 percent in all four areas, and particularly well in pneumonia and surgical care.

When the Centers for Medicare and Medicaid Services (CMS) adopted the pneumonia care core measures in 2004, Holland Hospital was achieving only 50 to 60 percent compliance on some of them. Since then, it has become one of the top performers in the country in terms of delivering recommended pneumonia care. To improve performance, Holland Hospital made process improvements and hardwired them into its electronic medical record system. Strong management support and a core measures leadership team dedicated to providing root-

cause analysis, oversight, and direction also played a significant role.

ORGANIZATION

Holland Hospital, in Holland, Michigan, has 209 acute-care beds; it is not part of a larger health care system. Holland Hospital's medical staff includes over 300 physicians, representing 34 medical specialties.

Holland Hospital serves more than 7,500 inpatients each year, with 43,100 annual emergency room visits, 367,400 annual outpatient visits, 28,600 urgent care visits, and 9,200 surgeries. In 2007, Holland became the first hospital in Western Michigan to earn Magnet designation, an honor recognizing excellence in nursing and patient care. It has received other honors and designations, including the Governor's Award of Excellence for Improving Care in the Hospital Setting, the Total Benchmark Solution Best Acute Care Hospitals Award, and the National Kidney Foundation of Michigan Innovations in Health Care Award. For the last four years, Holland Hospital also has been listed as one of the "100 Top Hospitals" by Thomson Reuters (formally Solucient).

HOSPITAL-WIDE STRATEGIES

Beginning in 2005, when CMS began publicly reporting hospital performance data and Holland Hospital hired a new director of quality and risk, the hospital has been paying close attention to the core measures—working them into its information systems, education, and employee financial incentives.

Using the MIDAS system, Holland Hospital sets internal benchmarks against which to measure its performance.¹ Each year, the bar is set higher, with targets moving from the 75th to the 90th percentile.

Rob Schwartz, M.B.A., M.H.A., M.S./M.I.T. (master of science in the management of information technology), director of quality and risk, credits Holland's administrators with providing the support needed to raise performance levels and create a culture of quality improvement. Schwartz drew on his background in information technology to strengthen the hospital's computer systems. As he and his

team identified ways to automate processes and enable performance reporting, hospital leaders provided the support needed to make such changes. These advancements have improved performance on all of the core measures, not just the pneumonia set.

Core Measures Teams

A core measures leadership team oversees the hospital's performance on these measures. Because the team includes physicians as well as clinical directors and other leaders, it helps secure physicians' buy-in for new initiatives.

The team reviews "opportunities for improvement" (OFIs), including cases involving noncompliance with core measures, on a monthly basis. Instead of focusing on the clinicians involved in a noncompliant case, the team focuses on the system factors that may have contributed to the error. According to Schwartz, "the hospital's patient safety culture means being blame-free. Unless the case is egregious, we assume mistakes occurred because the established care process failed our staff and/or physicians."

In addition, the hospital created teams focused on core measures related to cardiology, surgery, and respiratory disease (discussed below).

Concurrent Review

All patients are assessed for possible inclusion in the core measure population. The assessment is built into the hospital's electronic medical record (EMR), a system known as Quadramed CPR. When patients exhibit symptoms of a core measure diagnosis, their nurse will flag them as potential core measure patients. This automatically notifies analysts in the quality department, who initiate a concurrent review. One analyst is dedicated to reviewing the pneumonia care core measures.

Clinical managers and directors also receive daily status reports about the patients in the core measure population. Keeping multiple pairs of eyes on these records means that noncompliant cases can be flagged and most issues can be addressed before patients leave the hospital.

Financial Incentives for All Staff

All full-time staff members, from janitors to emergency room clinicians, have a stake in the hospital's performance on the core measures—demonstrating that all staff have a role to play in quality improvement.

Holland's goal-sharing program targets core measure performance as well as patient satisfaction scores. Each year in which the hospital achieves a margin that exceeds budgeted projections, a bonus pool is established. If certain performance goals are met, up to \$500,000 will be distributed from the bonus pool. This can amount to an annual bonus of approximately \$300 to \$400 for each staff member. The amount of funds distributed varies, based on the hospital's performance on targeted quality indicators. However, if the hospital fails to meet a threshold performance level, no funds are distributed. This year, the threshold performance level for the core measures was set at 90 percent compliance and the "stretch" goal, which triggers a greater distribution of funds, was set at 96 percent. The targets have increased since the first year of the program, when the stretch performance level was set at 90 percent.

When bonuses are available, they are incorporated into annual staff performance reviews. Staff members who do not meet a certain performance level or are on a corrective action plan are not eligible. Vice presidents and other hospital executives are also not eligible.

All patient cases, not just Medicare cases, are assessed for compliance with the core measures. Because hospital leaders believe that providing all recommended care at all times is the true test of quality, performance on "all-or-none" care bundles is also tracked. Under this measure, only cases in which the care delivered meets each applicable core measure are counted as compliant.

A Focus on System Factors

There is an underlying philosophy at Holland Hospital that core measure performance is strongly linked to system factors and solutions. This philosophy is

embedded in the hospital's patient safety culture. Rather than blame an individual for a case that falls out of compliance, leaders look for failures in the established care processes and seek potential system solutions. For example, when Holland's quality staff found that nurses were not consistently screening for and administering the pneumonia vaccine, they realized that a system factor was contributing to the failures. "The electronic nursing record was allowing nurses to skip the vaccine screening questions," Schwartz says. "Once we reprogrammed the computer system to require an answer to the vaccine screening questions before the nurse could proceed, our vaccination administration scores improved tremendously."

Despite the focus on such system-based solutions, physicians and other hospital staff are held accountable when necessary. Some cases require one-on-one meetings with noncompliant staff to provide education and ensure follow-up steps are taken. Before the meeting, quality department staff will make certain that the case was in fact noncompliant and not merely a mistake in documentation or some other system-related error.

Individual physician performance is monitored and compiled in a Physician Feedback Report. The quality department compiles this report and shares it with individual physicians. Any outliers are forwarded to the Peer Review Committee Chair and the Credentialing Committee Chair for review. The report includes numerous indicators, including performance in the core measures, patient safety, and citizenship (e.g., participation in hospital committees, presentations, grand round lectures, and similar activities.).

PNEUMONIA CARE IMPROVEMENT STRATEGIES

When the pneumonia core measures were introduced in 2004, Holland Hospital created a respiratory disease core measure team to focus on care processes related to them. The team, which included pharmacists, physicians, care managers, quality department staff, nurses, and hospital leaders (such as the pharmacy director and emergency room director), developed many of the

improvement strategies outlined below. A physician leader naturally emerged, helping to guide the team's efforts and keep energy levels high.

Hardwiring Quality Improvement

Holland Hospital made many changes to its care processes to improve performance in the pneumonia care core measures. The respiratory disease core measure team developed a preprinted order set to guide physicians in the provision of care, especially with the use of appropriate antibiotics. In developing the order set, the team solicited feedback from internists and emergency room physicians—the physicians whom they considered to be its primary users.

Development of the order set was facilitated by a physician champion, although even then it was difficult to achieve consensus. Holland's physicians maintained that, because patients could easily fall in and out of the criteria during a hospital stay, physicians should not be bound to a preset clinical pathway. Eventually, the physicians agreed to try the new system. Patients who exhibited symptoms indicating a strong risk of pneumonia were started on an evidence-based clinical pathway. Joe Bonello, R.N., director of emergency services, found that “pharmacists and nurses, empowered by the order set, were more likely to challenge orders that were outside of the recommendations and suggest items that appeared on the order set. This led to a change in physician ordering patterns.”

Once finalized, the pneumonia care order sets were hardwired into the hospital's EMR. The system requires physicians to document any departure made from the order set and explain their reasoning. According to Bonello, “a good order set minimizes the unwarranted variation in decision-making through standardization and reduces the potential for noncompliance.”

Reminders and other clinical pathways are built into the hospital's EMR. For example, a vaccination assessment is included in the nurse's assessment screen. If a patient meets certain age criteria, the assessment screen will prompt the nurse to ask if the

patient has had the appropriate vaccinations. The record will not move forward until the answers are obtained. This feature can be turned on and off according to the season. The EMR also keeps smoking cessation reminders visible until a staff member indicates that the required counseling has been provided.

Shifting Responsibilities

When the pneumonia core measures were introduced, Holland Hospital staff struggled with one measure in particular: blood culture prior to initial antibiotic administration. There were frequent delays in taking blood cultures, in part because phlebotomists had to be called to take the blood and in part because staff often mistakenly assumed that a blood culture had been taken if an IV infusion had been started. To avoid these problems, responsibility for taking blood cultures was transferred from phlebotomists to emergency room nurses. Because the nurses are also responsible for administering antibiotics, they can control the order in which the two interventions occur. When necessary, nurses can reach a phlebotomist devoted to the emergency room over the hospital's instant communications system.

In addition, the hospital is developing a system that will place a “hold” in the pharmacy on antibiotic orders for pneumonia patients until blood cultures are documented in the EMR.

Similarly, hospital leaders discovered that patients admitted to medical units from the emergency department experienced delays in antibiotic administration. Therefore, they decided to have the initial course of antibiotics administered and documented in the emergency room, making it much easier to meet the core measure standard requiring antibiotic administration within six hours of arrival. Charge nurses in the emergency room perform real-time chart audits to ensure the antibiotic has been administered and required documentation has been captured before the patient leaves the emergency room.

Finally, in cases where patients meet certain criteria, nurses have been given the power to administer vaccinations without a physician's order. As noted

Figure 1. Holland Hospital Scores on Pneumonia Care Core Measures Compared with State and National Averages

Pneumonia Care Improvement Indicator	National Average	Michigan Average	Holland Hospital
Percent of pneumonia patients given oxygenation assessment	99%	100%	100% of 265 patients
Percent of pneumonia patients assessed and given pneumococcal vaccination	83%	85%	100% of 240 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%	92%	99% of 233 patients
Percent of pneumonia patients given smoking cessation advice/counseling	88%	90%	100% of 62 patients
Percent of pneumonia patients given initial antibiotic(s) within six hours after arrival	93%	95%	100% of 173 patients
Percent of pneumonia patients given the most appropriate initial antibiotic(s)	87%	91%	100% of 121 patients
Percent of pneumonia patients assessed and given influenza vaccination	79%	84%	99% of 144 patients

Source: www.hospitalcompare.hhs.gov. Data are from July 2007 through June 2008.

above, a vaccination assessment is hardwired into the nursing assessment screen of the EMR system. Making vaccination administration part of the EMR and waiving the need for physician approval helps ensure compliance with recommended care.

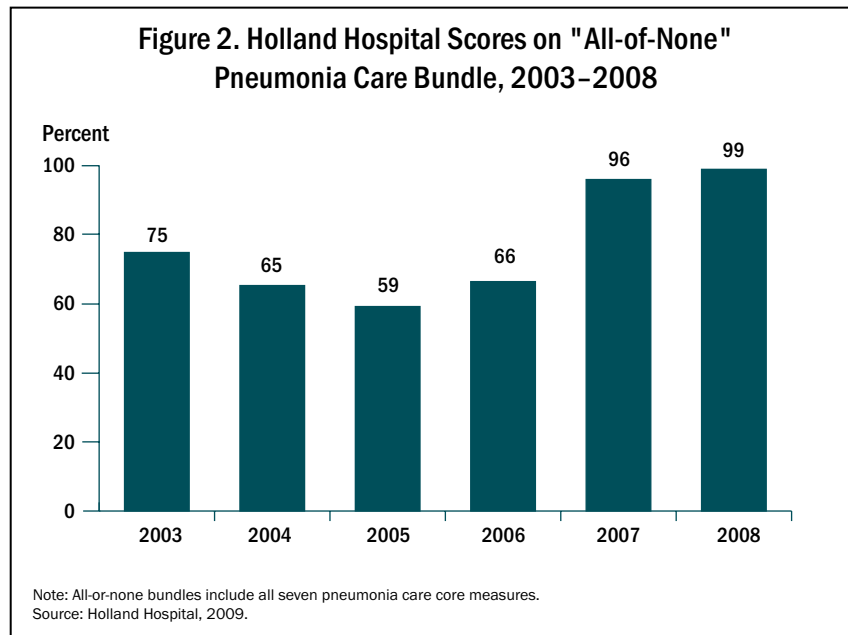
Education, Education, Education

Holland Hospital leaders emphasize the importance of education in improving performance. In conjunction with hardwiring new processes, the hospital devoted substantial resources to educating staff, particularly emergency room staff, about the core measures. Topics included the importance of performing a blood culture prior to the administration of antibiotics and the need to start antibiotics in the emergency room to ensure they are given within six hours of arrival. Evidence-based literature was used to convince physicians of the effectiveness of a new practice. In addition, social workers and nurses were trained to identify smokers who, for whatever reason, do not indicate during registration that they smoke. This helps ensure that all patients who need it are given smoking cessation counseling.

RESULTS

Holland Hospital outperforms most U.S. hospitals on all of the pneumonia care core measures. Figure 1 displays the most recent year of data, while Figure 2 shows the trends over time for the all-or-none pneumonia care bundle. According to Schwartz, “success breeds success”; each year it has become easier to make further improvements. For example, the hospital experiences so few cases that fall out of compliance that members of the core measure leadership team, including vice presidents and clinical leaders, can review each of them and develop strategies for solving underlying problems.

As shown in Figure 2, Holland Hospital experienced a dip in its performance in the all-or-none pneumonia care bundle in 2004 and 2005, with solid improvement thereafter. This was related, in part, to the introduction of new pneumonia care core measures within that timeframe (antibiotics within four hours of arrival, appropriate antibiotic selection, and the influenza vaccine). According to Schwartz, the new measures caught the hospital “off guard.” Now, when a new measure is announced, usually six to 12 months



in advance of data collection, the hospital immediately begins to track their performance, giving clinicians an opportunity to make improvements before reporting data to CMS. The hospital strives to be proactive in improving performance, paying attention to the activities of the National Quality Forum and the Agency for Healthcare Research and Quality. It also reviews the proposed and final Inpatient Prospective Payment System rules issued by CMS to identify clinical areas, such as stroke care, that the agency might focus on in future public reporting efforts.

CHALLENGES AND LESSONS LEARNED

Hospitals looking to achieve high performance in the pneumonia care core measures might take the following lessons from Holland's experience:

- Support from upper management is key.
- Flagging core measure patients and performing concurrent review greatly reduces the likelihood of a case falling out of compliance.
- A core measures leadership team can be used to monitor performance and maintain the momentum for performance improvement efforts.

- Interdisciplinary workgroups can focus on opportunities to improve care systems—rather than blame individuals for problems.
- A goal-sharing program linked to core measure performance helps motivate employees and establishes a culture focused on quality improvement.

Holland Hospital is now consistently performing at a high level in the pneumonia care core measures. Leaders no longer look for “silver bullets” to solve problems, such as shifting the responsibility for taking blood cultures or reprogramming its electronic nursing record. Instead, they carefully examine the few cases that fall out of compliance and find opportunities to eliminate the causes. Schwartz refers to the Swiss cheese model of quality improvement in explaining the need to “plug holes.”²² “Our OFIs are all latent problems that manifest themselves when certain holes line up,” he says. “We continually expect to have more OFIs, usually caused by a unique set of circumstances, but we continue to try to engineer these circumstances out of our processes. Upon analysis we often find that the circumstances that produced the OFI are unlikely to happen again, but we still try to prevent the reoccurrence.”

Holland Hospital staff note the challenge of keeping energy levels high. By having monthly meetings of the core measures leadership team, the organization maintains its focus on quality improvement.

Holland Hospital faces some challenges that are beyond their control. For example, the recommended antibiotics are at times difficult to obtain from the manufacturer, an issue that could result in cases unnecessarily falling out of compliance with the pneumonia care core measures. Also, Holland Hospital uses internal data to assess the community's pneumococcal resistance to antibiotics, which at times results in the need for an antibiotic regimen that contradicts the core measure recommendations. In these cases, Holland Hospital has reached out to their state Medicare Quality Improvement Organization and asked it to raise their concerns with CMS.

FOR MORE INFORMATION

For further information, contact Rob Schwartz, M.B.A., M.H.A., M.S./M.I.T., director of quality and risk, at Rschwartz@hollandhospital.org.

NOTES

- ¹ The MIDAS system is an integrated medical information management system for hospitals that enables comparative data analysis and clinical benchmarking using a large concurrent database with over 3,000 clinical metrics. See <http://www.midasplus.com/index.asp>.
- ² James Reason developed the model to illustrate how smaller systems failures combine to create an error. In the model, individual slices of cheese represent protections against error. The holes in the cheese, which vary in size and position, represent individual mistakes. When the holes align, an error occurs, such as a case falling out of compliance.

Appendix. 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 seven 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 pneumonia care.

Pneumonia Care Process-of-Care Measures

1. Percent of pneumonia patients given oxygenation assessment
2. Percent of pneumonia patients assessed and given pneumococcal vaccination
3. Percent of pneumonia patients whose initial emergency room blood culture was performed prior to the administration of the first hospital dose of antibiotics
4. Percent of pneumonia patients given smoking cessation advice/counseling
5. Percent of pneumonia patients given initial antibiotic(s) within six hours after arrival
6. Percent of pneumonia patients given the most appropriate initial antibiotic(s)
7. Percent of pneumonia patients assessed and given influenza vaccination

The analysis uses all-payer data from July 2007 through June 2008. To be included, a hospital must have submitted data for all seven measures (even if data submitted were based on zero cases), with a minimum of 30 cases for at least one measure, over four quarters. The top 3 percent among 2,887 hospitals eligible for the analysis and with 50 or more beds were considered high performers.

In calculating a composite score, 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 a high score on a composite of surgical care improvement process-of-care measures was the primary criterion for selection in this series, the hospitals also had to meet the following criteria: at least 50 beds, not a government-owned hospital, 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 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

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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.

