

**The Remedy
for a
Data Dilemma**

Bellin finds a way to measure up

In 50 Words Or Less

- Bellin Health System had been committed to quality improvement for decades but felt its measurement process didn't reflect that.
- The paper reporting system was replaced by software that streamlined input and analysis of performance data.
- The new system helped Bellin handle the normally stressful accreditation process with ease.

by Colleen O'Brien
and Susan Jennings

emma

THE STATED MISSION of Bellin Health System, an integrated healthcare delivery organization in Green Bay, WI, is “to engage individuals, families, employers and communities in their lifelong journey toward optimal health and to provide easy-to-use, high quality affordable health products and services.”

Bellin understands that sustained success in this mission depends on continuous improvement of processes, systems, technology and relationships. Its commitment to quality improvement began in the late 1980s, when the organization's leadership began learning about W. Edward Deming's approach to quality.



In *The Business of Health Care*, Peter Knox described these early days:

In the mid-80s, Bellin Health System was an early health care entrant into quality management. At the time, very few health care organizations were interested in the concepts of quality improvement. Most, if not all, of the training materials were written for manufacturing businesses, requiring translation by service organizations such as health care. From these rudimentary beginnings, Bellin Health has concentrated on developing new approaches to achieving performance results in the complex world of health care."¹

As quality improvement initiatives expanded in healthcare, Bellin Health was an active participant. It was among the founding members of the Institute for Healthcare Improvement and the Wisconsin Collaborative for Healthcare Quality, a voluntary statewide consortium of quality improvement driven healthcare organizations.

In 1994, Bellin Health volunteered for a pilot assessment managed jointly by the Baldrige National Quality Program and the Joint Commission, which accredits and certifies healthcare organizations and programs in the United States. This assessment helped Bellin focus on developing an integrated measurement system that is aligned to the organization's strategic direction and is widely accessible throughout the organization.²

Tracking improvement

Bellin's model for competency improvement is based on the belief that outcomes are the results of processes and can be improved by identifying success metrics, setting goals and using the plan-do-check-act (PDCA) cycle.³ Statistical process control (SPC) charts track processes for stability and response to improvement efforts.

Measurement is focused on four areas as identified in the organization's strategic plan:

- **Growth:** Bellin will be the market leader in its brands.
- **Effectiveness:** People will know that Bellin is the clinical benchmark in its brands.
- **Efficiency:** Bellin will provide the best total cost solution for its patients, customers and employers.
- **Engagement:** Patients, families, customers, staff and physicians are connected and involved with Bellin in the pursuit of lifelong health.
- **Innovation.**

Leadership is committed to implementing this plan by making certain that all employees understand the organization's mission and can translate it into their daily work. Time must be dedicated to educating team leaders throughout the organization on Bellin's mission, vision and strategic plan, as well as the sharing of best practices and lessons learned across the system. Leadership also requires that all employees have easy access to the most current performance metrics and plans for improvement.

While quality control is an institutional focus, these efforts are the day-to-day responsibility of the quality resource department (QRD), which has 10 employees measuring 8.8 full-time positions: eight registered nurses, one process engineer and one support staff member.

The group is responsible for all public reporting of performance measures, Joint Commission readiness, core measure abstraction and reporting, cardiac database management, data mining from statewide administrative databases, infection control, peer review and patient safety and privacy.

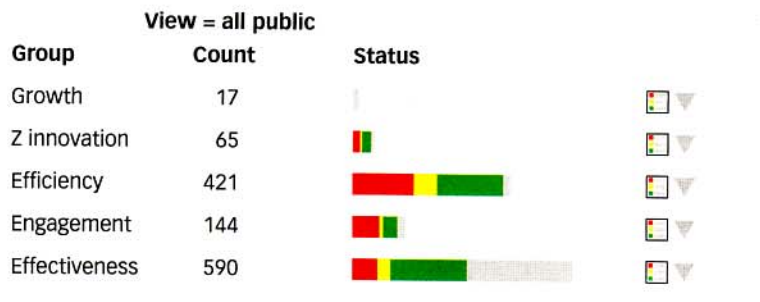
Scattered data

In 2005, Bellin's measurement control system had more than 250 system-level quality indicators. Many of these indicators were reported at the department level at varying times (monthly, quarterly or annually).

For example, compliance with the Centers for Disease Control guidelines on healthcare hand hygiene was measured across the entire system, at the care center level—invasive clinical services, heart and vascular services—and at the department level, where actionable improvement plans could be developed to address the specific departmental environment.

Although none of the current indicators were measured at the shift level, the potential existed to do so. It was also clear to the QRD team that the demand for

Dashboard / FIGURE 1



quality and safety information from accreditation and certification agencies, as well as the general public, would continue to grow.

A measured response

Given the size and complexity of the measurement system, improvement would require that reports and feedback be timely, directed to the right audience, readily available and delivered in a format that is accessible to a variety of users.

The paper reporting system in use was neither timely nor accessible. Indicators were housed in several places on the organization's computer network and were not available to all users. In the case of public reporting indicators, it was easier to find information about Bellin on public reporting sites than through its own internal systems. As there was no easy fix for the existing IT infrastructure to meet these needs, the QRD team proposed a redesign of the indicator reporting process through adoption of performance improvement software.

Bellin Health's definition of performance improvement software included the use of SPC technology as a method of monitoring processes through the use of control charts and providing feedback on processes in and out of control. Processes that were out of control because they exhibited special cause variation needed to be detected early or they could adversely affect the quality of the service or output.

To have an effective performance improvement software solution, certain capabilities were required:

- Coordination of data from a variety of sources without requiring extensive changes to the current IT systems.
- Clear and timely alerts on processes that needed improvement.
- Convenient access to the analysis to make comments and corrective actions and monitor the statistical significance of a change to the process relative to the desired result.
- The ability to drill down in the data to the appropriate level of analysis and create custom dashboards and scorecards specific to an individual's responsibilities.

Scoreboard / TABLE 1

Effectiveness > safety > hand hygiene-MD View=all public

Status	Indicator	Current value	Target	SPC alarm	Updated
● ✓	Hand hygiene for BMG-MD	70.4%	90%		Dec. 06
● ☒	Hand hygiene for heart and vascular-MD	21.9%	90%	■	Dec. 06
● ✓	Hand hygiene for invasive clinical services-MD	80.3%	90%	■	Dec. 06
● ☒	Hand hygiene for system nursing care-MD	75.2%	90%	■	Dec. 06
● ☒	Hand hygiene for bond center-MD	85.3%	90%		Dec. 06
● ☒	Hand hygiene MD: ACD	100%	90%		Dec. 06
☒	Hand hygiene for business health-MD	n/a	90%		Dec. 06
☒	Hand hygiene for diagnostic services-MD	n/a	90%		Dec. 06
☒	Hand hygiene for family programs-MD	n/a	90%		Dec. 06

- Efficient display of data over the corporate intranet to promote a paperless reporting system.

Bellin's key criteria to choose a performance improvement solution also included the following specifications:

- Reasonable price.
- A user-friendly and aesthetically pleasing interface—end users should be able to easily find the information they need.
- Availability across the system—Bellin's initial plan looked at using the solution via the organization's intranet, covering a wide geographic area.
- Real-time display of data.
- Ability to manage solution with minimal involvement of information services department.

Bellin Health's solution

The QRD team selected a software solution as the answer to its data dilemma. Figure 1 and Tables 1 and 2 provide a brief overview of the output using recent data from Bellin Health.

Figure 1 shows the dashboard—a summary of all indicators by group—which provides the total number of indicators and the distribution of indicators by status. Status categories include: meeting or exceeding the user-defined target level (green); below the user-defined alarm level (red); between the alarm and target levels (yellow); and no target level defined (gray). Clicking on the chart icon allows the user to drill down to a scorecard listing individual indicators.

Table 1 displays the scorecard listing some of the indicators defined within the safety category—a subset of the effectiveness group listed on the dashboard. The scorecard lists the status of the indicator, the current

value, the target value, the presence of an SPC alarm and the date the indicator was last updated. The checkmark in the status section indicates whether the most recent data update has been validated by the assigned owner of the indicator.

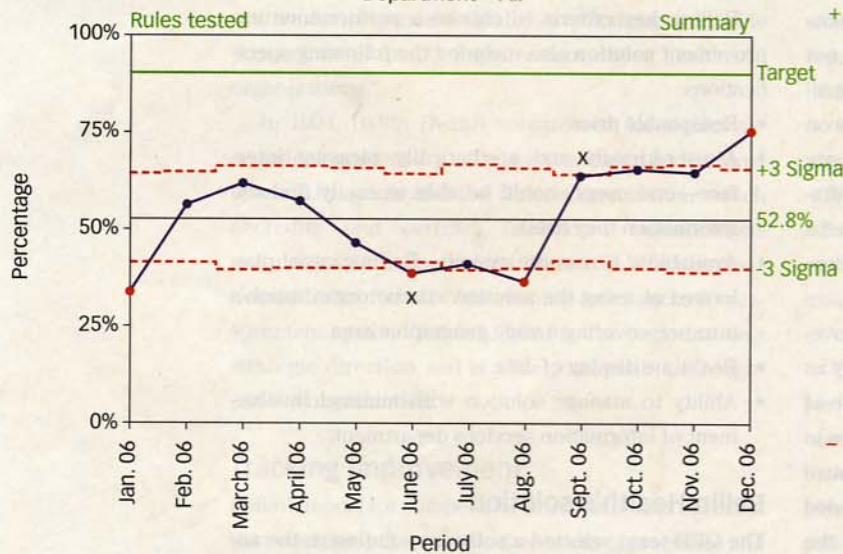
According to the scorecard, hand hygiene for system nursing care-MD is below alarm levels, with a score of 75.2% compared to the target level of 90%. Clicking on the name of this indicator allows the user to examine the trend by drilling down to the percent chart that includes user comments, as well as the data from which the chart is drawn (Figure 2).

Table 2 disaggregates the information about hand hygiene by department, allowing the reviewer to see that performance varied considerably. The application also allows the user to display administrative information about the indicator.

Bellin Health also required that the data for this output be created from the organization's existing databases, spreadsheets and ancillary information systems, with minimal intervention from the information services department. This open approach to accessing data allowed for use of that data in any location and in any format.

P chart with comments and data / FIGURE 2

Hand hygiene for system nursing care-MD
Department = All



	Comment	Action Plan
Sept. 06	All departments required to monitor.	
June 06	Identified as a system priority.	

Period	Num	Den	Percent
Jan. 06	58	172	33.7%
Feb. 06	93	165	56.4%
March 06	77	125	61.6%
April 06	74	129	57.4%
May 06	61	132	46.2%
June 06	68	177	38.4%
July 06	49	120	40.8%
Aug. 06	48	132	36.4%
Sept. 06	114	179	63.7%
Oct. 06	84	129	65.1%
Nov. 06	74	114	64.9%
Dec. 06	103	137	75.2%

Note: The numerator (num) is equal to the number of hand hygiene monitors that met criteria. The denominator (den) equals the number of opportunities to meet hand hygiene criteria.

The system provided a straightforward interface for the creation and maintenance of indicators and, most important, multiple levels of reporting for different users, including senior executives and boards, physicians, department heads and dedicated quality staff.

The support of senior management was necessary to approve the implementation of the new software and critical to the success of any redesign of the reporting process. Team leader Colleen O'Brien, who also serves as privacy and safety officer, presented a detailed business case proposal to senior leadership describing the costs and benefits of implementing the solution, as well as a demonstration of the software.

The recommendation was adopted in August 2005, after which O'Brien noted: "The senior leaders have made this happen; they embraced it from the start and are the No. 1 group clamoring for more indicators to be loaded. The need for easy and understandable information is a driving force."

Putting the program into play

In October 2005, the dashboard, scorecard and trend output solutions were installed on a Bellin web server, and key users were trained.

This was a three-day process that included installation of the software, training for system administrators and configuration of the system for the Bellin site on the first day.

The next two days involved training the staff responsible for indicator administration, orientation for content experts who would be responsible for maintaining and validating indicators, and demonstrating the system for users.

Eight people were trained at the time of installation, including two network specialists from the information services group who had a limited part in the training sessions but were focused on the server and making the program work throughout the entire system. Other trainees learned specifically about the program itself, as they would be the primary administrators or users of the software.

"As with any new product in any organization, the issues we faced centered around the ability to get our arms around the solution," O'Brien said. "The biggest obstacle we faced was how to create the tree structure, how to lay out the indicators. We needed to create an org chart for our indicators. We overcame this by weighing out samples of indicators from several different areas and making changes to the tree structure until we were happy with the final result."

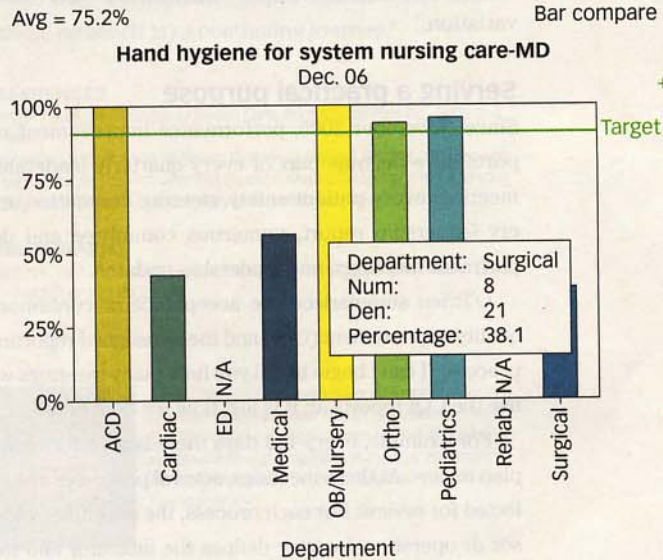
Within three weeks of training, O'Brien was demonstrating the system at the quarterly leadership meeting, and within three months, all initial system-level indicators (approximately 350) were entered into the system.

The QRD team took responsibility for administration of the software solution. O'Brien conducted 30-minute, one-on-one meetings with all mid-level clinical managers, directors, senior leaders and the president of the corporation.

The QRD team also distributed a needs assessment instrument to system users that listed features of the software and asked them whether they wanted to learn more about how to use the feature. O'Brien or members of her staff followed up with each respondent who requested more information and provided them with one-on-one training on easier ways to use the system. These meetings also provided an opportunity to reinforce the importance of using performance improvement analysis as part of everyone's daily work.

In addition, the QRD team developed naming conventions, rules for user setup, submission criteria and definitions of roles and responsibilities to ensure consistent use by the 150-plus staff members with administrative responsibility for one or more indicators. The

Comparison bar chart / TABLE 2



Definition	Periodic observation monitor—10 observations per month per shift per Bellin Psychiatric Center, Bellin Memorial Hospital nursing units and every clinic 10 observations every month.
Methods	
Owners	Executive sponsor—Jody Wilment Physician champion—Dr. Dale Davis Operational owner—Carol Bess QRC contact—Sue Massart
Notes	Num = 0 and Den = 20 in a department report indicates no monitors received in quality resource.

web solution made it easier to update and distribute the data.

As O'Brien noted: "We would never have been able to produce more than 1,300 indicators if we were still in the Excel graph-making business. Because the software allows for automation, as soon as a data source is updated, the corresponding indicators are also updated.

"Also, using the validation component, we can see that the party accountable for a particular indicator is verifying the validity of incoming data."

It was also easier to create more complex presentations of information. In the past, SPC charts represented less than 10% of the charts produced; they now represent over 90%. Christopher Watson, M.D., chief medical officer at Bellin Health, highlighted the benefit of this capability: "The display of data in SPC

chart format is particularly helpful to us in quickly distinguishing between normal and special cause variation.”

Serving a practical purpose

Since November 2005, performance improvement reports have become part of every quarterly leadership meeting, every patient safety steering committee, every leadership report, numerous committee and department meetings, and leadership updates.

O'Brien summarized the acceptance of continuous quality improvement (CQI) and the redesigned reporting process: “I can't begin to tell you how many meetings we use the CQI reports at; it is just how we do it here.”

For example, every 120 days there is a performance plan review. At these meetings, several processes are selected for review. For each process, the executive sponsor or operational owner defines the indicator and the reasons for its selection. Team members are identified, as well as the actions they took to improve the process. The team then presents charts to illustrate measurement on key issues and discusses what the data are demonstrating and the next steps for the workgroup.

One of the reasons for redesigning the quality report-

ing process was to prepare Bellin Health for increasing demands from accrediting and credentialing agencies. In 2006, that foresight was validated with the change in the Joint Commission's policy for on-site surveys. Starting in January 2006, organizations no longer received advanced notice of on-site surveys. Organizations had to be ready at any time, so quality improvement efforts needed to be an integral part of organizational life.

In November, the Joint Commission conducted an unannounced survey of Bellin Health Psychiatric Center. At that time, the center had been using CQI reporting for less than a year but was prepared to use the tool in support of the survey. The three-day visit began with an overview of the center's operations and provided information on the structure of the organization, the patient population served and the quality improvement framework under which the center operated.

After this brief introduction, Linda Roethle, president of Bellin Health Psychiatric Center, accessed the software solution through Bellin's corporate intranet and began showing the survey team the current status of the center's quality initiatives. She was able to show in real time how staff at the center implemented quality performance plans in its daily work.

“This presentation grounded the whole survey process,” Roethle said. “The survey team made reference to the information every day of the three-day visit. It was clear that our quality improvement activities were how we did things here and not just a dog-and-pony show prepared for their benefit.”

In January 2007, Bellin Hospital had a similar experience with its Joint Commission survey. “We used our CQI solution to show the surveyors how we track our data and performance improvement,” Watson recalled. “Because we continually update and validate our data, we could show the Joint Commission our work and be confident that the correct, most current version was being used. It was clear that we make our performance data widely and openly available.”

The benefits of accountability

There is a great demand for accountability via hard data, not fuzzy opinions. Existing processes must be examined and new ones discovered. The good news is that improved quality inherently lowers costs as it provides better service.

BELLIN HEALTH AT A GLANCE

Bellin Health System based in Green Bay, WI, serves 450,000 people in northeastern Wisconsin and the Upper Peninsula of Michigan. Evolving from a 15-bed general hospital founded by Julius Bellin, M.D., in 1907, it is now comprised of:

- Bellin Memorial Hospital, a 167-bed multispecialty hospital.
- Bellin Psychiatric Center, a 54-bed hospital providing inpatient and outpatient mental health services.
- The Bellin Medical Group of primary care, internal medicine and pediatric physicians and mid-level providers practicing at 20 clinics throughout the region.
- Bellin College of Nursing.
- The Bellin Foundation, the fundraising arm that supports initiatives of the system.
- Lake Michigan Health Services, the parent corporation of several taxable entities that include retail pharmacies, magnetic resonance imaging, the rental and sale of durable medical equipment and managed care contracting. In addition, independent specialty physicians provide coordinated care through Physicians Partners Ltd., a physician-hospital organization.

SPC provides accountability and is an essential ingredient in the quality effort, not just an abstract theoretical exercise for mathematicians. It is a hands-on endeavor by people who care about their work and strive to improve themselves and their productivity every day.

CQI charts are a tool to assist in the management of this endeavor. The decisions about what needs to be improved, the possible methods to improve it and the steps to take after getting results from the charts are made by all members of the organization and are based on wisdom and experience.

Bellin Health continues to grow in size and complexity, including the incorporation of additional measures and an increase in the automation of data collection through greater use of organizational databases. Bellin Health is revising performance measures to reflect updated mission, vision and strategic objective statements that will require reorganization of the data to align to the new strategic objectives.

As Watson, Bellin Health's chief medical officer, points out, "Performance improvement is not a destination; rather (it is) a continuing journey."

REFERENCES

1. Peter Knox, *The Business of Health Care*, Print Source Plus Inc., 2000, p. 4.
2. Ibid.
3. Gerald J. Langley, Kevin M. Nolan, Thomas W. Nolan, Clifford L. Norman and Lloyd P. Provost, *The Improvement Guide: A Practical Approach to Enhancing Organizational Performance*, Jossey-Bass Publishers, 1996.

BIBLIOGRAPHY

Marilyn K. Hart and Robert F. Hart, *Statistical Process Control for Health Care*, Wadsworth Group, 2002.



COLLEEN O'BRIEN is a team leader in the quality resource center of Bellin Health. She received her master's degree in nursing from Marquette University in Milwaukee and a master's in medical informatics from the Milwaukee School of Engineering. She is a member of ASQ.

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Do you stay awake wondering when the Joint Commission will arrive? Take one **Statit piMD** and rest easy!

With the demands from accrediting and credentialing agencies and unannounced visits, it's important your continuous quality improvement initiatives support:

- * Integration of data from a variety of sources including Excel, Access, Oracle, Sequel Server, text files and more
- * Clear and timely alerts on processes that need improvement
- * Ability to drill down within the data to the appropriate level of analysis and root cause
- * Efficient display of data over your corporate intranet to promote a paperless reporting system

"We have done the head-to-head comparisons. Statit far exceeds all contenders when it comes to building the tools and applications necessary to support a full Quality Improvement roll-out."

*Dr. Brent C. James, M.D., M.Stat., Executive Director,
Institute for Health Care Delivery Research, Intermountain Health Care*

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