

Bellin Health: Living Quality Improvement Everyday

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Introduction

Bellin Health's stated mission 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 upon continual improvement of processes, systems, technology and relationships. Their commitment to quality improvement began in the late 1980's when the organization's leadership began learning about Dr. W. Edward Deming's approach to quality. In *The Business of Health Care*, Peter Knox describes these early days:

In the mid-80's, 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."ⁱ

As quality improvement initiatives expanded in health care, Bellin Health was an active participant. It was among the first 35 founding members of the Institute for Healthcare Improvement and a founding member of the Wisconsin Collaborative for Health Care Quality, a voluntary statewide consortium of quality-improvement driven health care organizations. In 1994, Bellin Health volunteered for a pilot assessment managed jointly by the Baldrige National Quality Program and the Joint Commission. This assessment helped Bellin to focus on developing an integrated measurement system aligned to the organization's strategic direction and accessible widely throughout the organization."ⁱⁱ

Background

Bellin Health System, an integrated health care delivery system based in Green Bay, Wisconsin, serves 450,000 people in northeastern Wisconsin and the Upper Peninsula of Michigan. Evolving from a 15-bed general hospital founded by Dr. Julius Bellin in 1907, it now comprises: Bellin Memorial Hospital, a 167-bed multi-specialty 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, raising funds to support initiatives of the system; and Lake Michigan Health Services, the parent corporation of several taxable entities that include retail pharmacies, MRI 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.

Bellin's model for competency improvement is based upon the belief that outcomes are the results of processes that can be improved through identification of success metrics, setting of goals and the Plan Do Study Act (PDSA) change process.ⁱⁱⁱ Statistical process control charts are used to track identified 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 our brands)
- Effectiveness (People will know that Bellin is the clinical benchmark in our brands)
- Efficiency (We will provide the best total cost solution for our patients, customers and employers)
- Engagement (Patients, families, customers, staff and physicians are connected and involved with Bellin in the pursuit of lifelong health)

A fifth component of the performance plan, Innovation, is also a measurement focus.

Leadership is committed to implementing this plan by making certain that all employees understand the organization's mission and can translate that into their daily work. Time must be dedicated to educating team leaders throughout the organization on Bellin's mission, vision and strategic plan and promoting the sharing of best practices and lessons learned across the system. It also requires that all employees have easy access to the most current measurement of 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. This department has ten employees (8.8 FTEs) including: eight registered nurses, one process engineer and one support staff. This group is responsible for all public reporting of performance measures, Joint Commission readiness, core measure abstraction and reporting, cardiac database management, data mining from state-wide administrative databases, infection control, peer review, and patient safety and privacy.

Problem Statement

In 2005, Bellin's measurement control system had over 250 system-level quality indicators. Many of these indicators also were reported at the department-level and on varying schedules (monthly, quarterly, annually, etc.). For example, compliance with the Centers for Disease Control guidelines on health care hand hygiene was measured across the entire system, the care center level (e.g., invasive clinical services, heart and vascular services) and 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 exists to do so. It was also clear to the Quality Resources team that the demand for quality and safety information from both accreditation and certification agencies, as well as the general public, would continue to grow.

Previous Options

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 was accessible to a variety of users. The paper reporting system in use was neither timely nor accessible. Indicators were housed in many different places on the organization's computer network and not all users had access. In the case of public reporting indicators, it was easier to find information about Bellin on public reporting sites than it was within internal systems. As there was no easily implemented enhancement of the existing information technology infrastructure to meet these needs, the Quality Resource team proposed a re-design of the indicator reporting process through adoption of performance improvement software. Requirements for an acceptable application included:

- Co-ordination 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
- Ability to drill down within the data to the appropriate level of analysis
- Efficient display of data over their corporate intranet to promote a paperless reporting system

The term "performance improvement software" has great diversity of meaning and application. Bellin Health's definition included the utilization of statistical process control technology as a method of monitoring processes through the use of control charts, providing feedback on processes "in and out" of control. Processes which are out-of-control by exhibiting "special cause variation" need to be detected early or they can, and will, adversely affect the quality of the service or output.

In order to have an effective performance improvement software solution, certain capabilities must be evaluated:

- 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
- Real-time interaction of the analysis to make comments and corrective actions and monitor the statistical significance of a change to the process relative to the desired result
- Ability to drill down within the data to the appropriate level of analysis and create custom dashboards and scorecards specific to one's responsibilities
- Efficient display of data over their corporate intranet to promote a paperless reporting system

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

- "Reasonable" price
- User-friendly with an aesthetically pleasing user 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 Quality Resource team selected the Performance Indicator and Management Dashboard (Statit piMD™) from Statit Software, Inc. as the technology tool that would meet these needs and move their quality improvement efforts forward. The team selected Statit piMD because the application could be deployed on their intranet and provide simple, yet powerful dashboards, scorecards and trend outputs in real-time. The following exhibits provide a brief overview of this output using recent data from Bellin Health.

Exhibit 1: Statit piMD Dashboard

View = All Public










Group	Count	Status	
GROWTH	17		 ▼
Z INNOVATION	65		 ▼
EFFICIENCY	421		 ▼
ENGAGEMENT	144		 ▼
EFFECTIVENESS	590		 ▼

Exhibit 1 shows the Statit piMD dashboard, a summary of all indicators by group, providing both 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. Exhibit 2 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 updating of data has been validated by the assigned owner of the indicator.

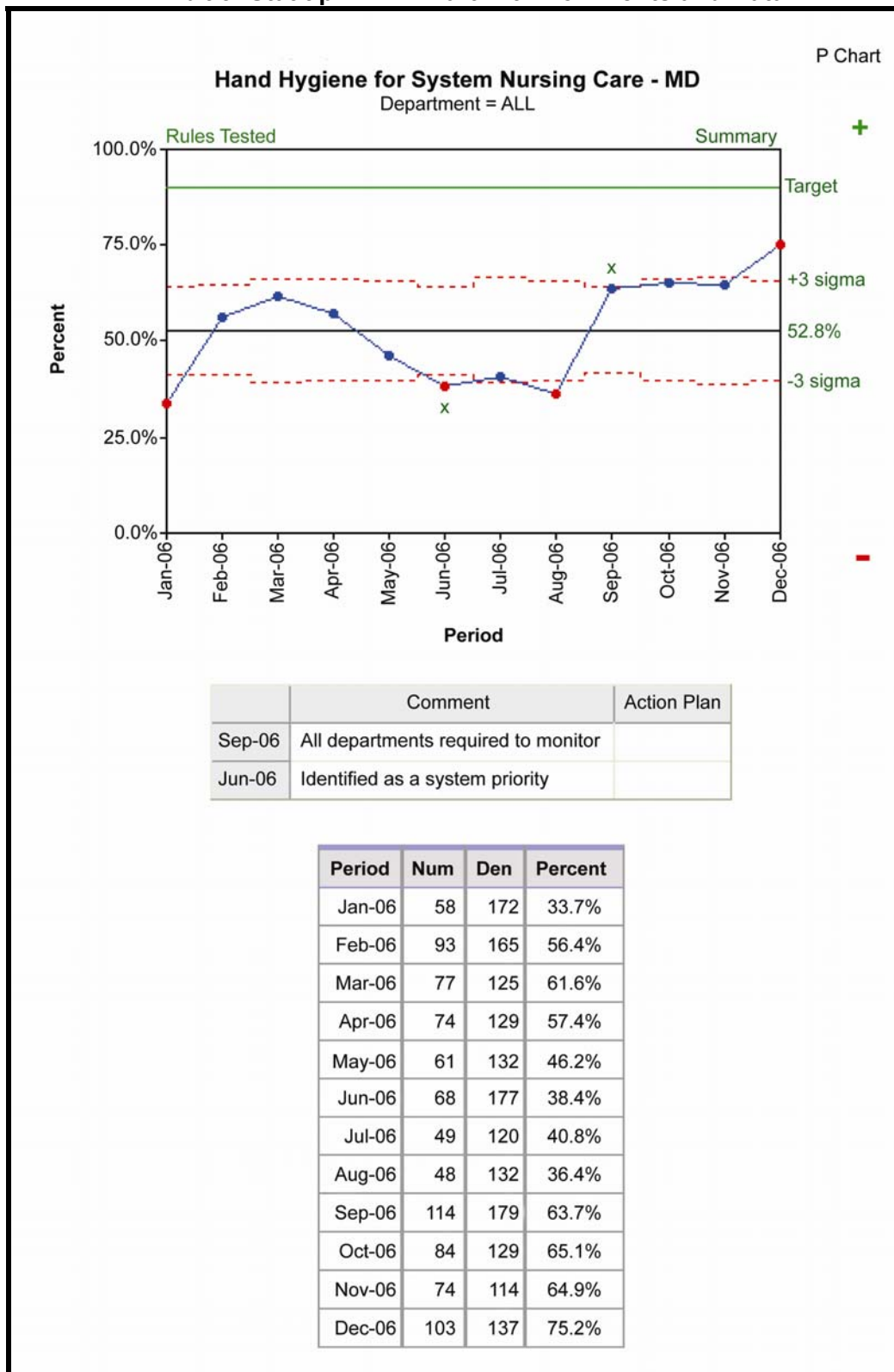
Exhibit 2: Statit piMD Scorecard

EFFECTIVENESS > Safety > Hand Hygiene MD View: All Public						
Status	Indicator	Current Value	Target	SPC Alarm	Updated	
	Hand Hygiene for BMG-MD	70.4%	90.0%		Dec-06	T
	Hand Hygiene for Heart and Vascular - MD	21.9%	90.0%		Dec-06	T
	Hand Hygiene for Invasive Clinical Services - MD	80.3%	90.0%		Dec-06	T
	Hand Hygiene for System Nursing Care - MD	75.2%	90.0%		Dec-06	T
	Hand Hygiene for Bond Center - MD	85.3%	90.0%		Dec-06	T
	Hand Hygiene MD: ACD	100.0%	90.0%		Dec-06	T
	Hand Hygiene for Business Health - MD	n/a	90.0%		Dec-06	T
	Hand Hygiene for Diagnostic Services - MD	n/a	90.0%		Dec-06	T
	Hand Hygiene for Family Programs - MD	n/a	90.0%		Dec-06	T

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According to the scorecard, Hand Hygiene for System Nursing Care – MD is below alarm levels with a score of 75.2% in comparison to the target level of 90%. Clicking on the name of this indicator allows the user to examine the trend in this indicator by drilling down to the P Chart that also includes comments on the indicator and the data from which the chart is drawn (Exhibit 3).

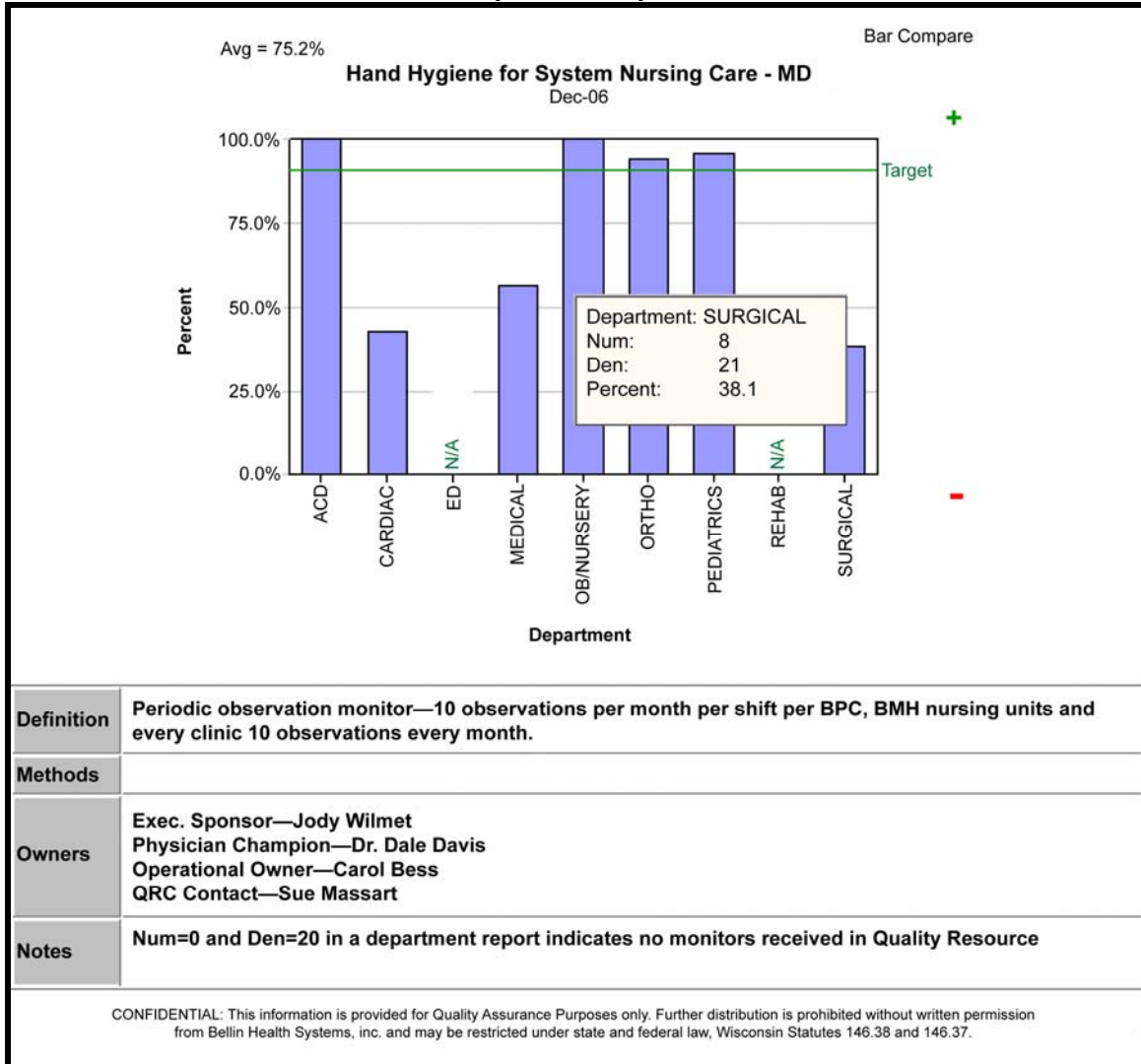
Exhibit 3: Statit piMD P Chart with Comments and Data



Note: In Figure 3 above, 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.

Exhibit 4 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.

Exhibit 4: Statit piMD Comparison Bar Chart



Bellin Health also required that the data for this output be created easily from the organization’s existing databases, spreadsheets and ancillary information systems with minimal IT department’s intervention. This open approach to accessing data would allow use of data wherever it was located and in whatever format. The system provided a straightforward interface for creation and maintenance of indicators and, most importantly, multiple levels of reporting for different types of users including senior executives and boards, physicians, department heads, and dedicated quality staff. Bellin also knew that they could benefit from Statit’s staff of experienced, graduate-level statisticians to provide ongoing support for their quality initiatives.

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. Accordingly, Colleen O’Brien, Team Leader Quality Resource and Privacy and Safety Officer, presented a detailed business case proposal to senior leadership describing the costs and benefits for implementing Statit piMD along with a demonstration of the software. The recommendation was adopted in August 2005. Ms. O’Brien noted: “The senior leaders have

made this happen; they embraced it from the start and are the number one group clamoring for more indicators to be loaded. The need for easy and understandable information is a driving force.”

Implementation

In October 2005, the Statit piMD application was 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 of the staff responsible for indicator administration; orientation for content experts who would be responsible for maintaining and validating indicators; and demonstration for users of the system. In all, eight people were initially trained at the time of installation. This included 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 solution work throughout the entire system. Other trainees learned specifically about the solution itself, as they would be the primary administrators or users of the software solution.

“As with any new product in any organization,” Ms. O’Brien says, “the issues we faced centered around the ability to get our arms around the solution. 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, Ms. 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

Statit has built its service model on the belief that the customer’s real world experience in using the application is a powerful source of ideas for system improvements. Accordingly, they provide quick turn around on request for enhancements, incorporating them into the requestor’s system and evaluating the utility of deploying these enhancements across their customer base. For example, in early 2006, Bellin, a very early adopter of Statit piMD, requested a copy function that would facilitate entry of a large number of indicators. Within two days, Bellin had a revised copy function that allowed them to display an existing indicator and copy all non-unique parameters from this indicator to a new form. They could then add a new indicator ID and title and change only those parameters needed to define the new indication, reducing the entry time by more than half. Today, Bellin Health has over 1200 indicators.

Later in the year, Bellin requested a search utility to facilitate generation of lists of indicators by a variety of selection criteria, a particularly important function for organizations such as Bellin who manage large numbers of indicators. Within one day, Statit provided a flexible find function. See Exhibit 5.

Exhibit 5: Statit piMD Find Function

Find Indicators

Title Contains

Admin / Expert

Indicator Status

Validation

SPC Status Any Status Has Current SPC Alert

The Quality Resource team took responsibility for administration of Statit piMD. Ms. 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 Quality Resource team also distributed a needs assessment instrument to system users that listed features of the software and asked if the users wanted to learn more about how to use the feature. Ms. 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 a good opportunity to reinforce the importance of using Statit piMD as part of their daily work. In addition, the Quality Resource team developed naming conventions, rules for user set-up, submission criteria and definitions of roles and responsibilities to insure consistent use of Statit piMD across the over 150 staff with administrative responsibility for one or more indicators.

Statit piMD made it easier to update and distribute the data. As Ms O'Brien notes: "We would never have been able to produce over 1300 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 of Statit piMD, 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, statistical process control (SPC) charts represented less than 10 percent of the charts produced; now they represent over 90 percent. Christopher Watson MD, Chief Medical Officer, 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."

Since November 2005, reports from Statit piMD have become part of every quarterly leadership meeting, every patient safety steering committee, every leadership report, numerous committee and department meetings, and leadership updates. Ms. O'Brien summarized the acceptance of Statit piMD and the re-designed reporting process: "I can't begin to tell you how many meetings we use Statit 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 and/or the operational owner of the indicator defines the indicator and the reasons for its selection. Team members are identified along with the actions that they have taken to improve the process. The team then presents charts from Statit piMD to illustrate measurement on key issues and discusses both what the data are demonstrating and next steps for the work group.

One of the reasons for re-designing the quality reporting process was to prepare Bellin Health for increasing demands from accrediting and credentialing agencies, and in 2006 this prediction was validated with the change in the Joint Commission's policy for on-site surveys. Starting in January 2006, all non-initial, on-site surveys would be unannounced, i.e., the organization receives no advanced notice of dates of the survey. The Joint Commission's shift in survey strategy reflected a focus on continuous quality improvement efforts. As organizations have to be ready any time, quality improvement efforts have to be an integral part of organizational life.

In November, Bellin Health Psychiatric Center underwent a survey under the Joint Commission's unannounced procedure. At that time the Psychiatric Center had been using Statit piMD for less than a year but were well-prepared to use the tool in support of the survey. The three-day visit began with a quick overview of the Psychiatric Center operations providing information on the structure of the organization, the patient population served and the quality improvement framework under which the Psychiatric Center, as well as the larger organization, operated. After this brief introduction, Linda Roethle, President of Bellin Health Psychiatric Clinic, accessed Statit piMD on their corporate intranet and began showing the survey team the current status of their quality initiatives. They were able to show in real time how staff at the Center implemented the quality performance plan in their daily work. Ms. Roethle said: "This presentation grounded the whole survey process. The survey team made reference to the information in Statit piMD 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 the past, preparations for Joint Commission surveys, as well as daily support for quality initiatives, were more cumbersome. The clinical staff at the Center had little computer experience and had to struggle to keep up with the data entry and management activities needed to support the former reporting system. Using Statit piMD, one person is now able to enter all of the data needed and managers can then easily identify processes that are out of control, set priorities for improvement, and monitor performance in real time.

In January 2007, Bellin Hospital had a similar experience with their Joint Commission survey. Dr. Watson described the process: “We used Statit to show the surveyors how we track our data and performance improvement. 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 surveyors were able to see that indicator data were tracked, trended, analyzed and available.

Summary

Accountability with hard data, not fuzzy opinions, is being demanded. Existing processes must be examined and new ones discovered. The good news is that improved quality inherently lowers costs as it provides better service. Statistical process control provides accountability and is an essential ingredient in the quality effort.

SPC is not 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. Continuous quality improvement 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 all made by humans and based on wisdom and experience. Everyone should be involved in this effort.

Statit piMD has been in use at Bellin Health for just over one year and the uses of the system continue to grow in size and complexity, incorporating additional measures and increasing 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 in Statit according to the new strategic objectives. Dr. Watson is confident that Statit piMD will facilitate these changes: “Performance improvement is a continuing journey, and we are delighted to have Statit as a partner in this work.”

ⁱ Knox, P.J. (2000), *The Business of Health Care*. Appleton, Wisconsin: Print Source Plus, Inc. p. 4.

ⁱⁱ *Ibid.*, p. 41

ⁱⁱⁱ Langley GL, Nolan KM, Nolan TW, Provost LP (1996), *The Improvement Guide: A Practical Approach to Enhancing Organizational Performance*. San Francisco, California: Jossey-Bass Publishers.

Additional Reference: Hart, Marilyn K. and Hart, Robert F. (2002), *Statistical Process Control for Health Care*. Wadsworth Group.

For more information

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