Lean Journey Helps Transform Nyack Hospital, Improving Quality, Efficiency & Patient Satisfaction

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Introduction

Nyack Hospital is a busy 375-bed acute care medical center with a Level II trauma center and several Centers of Excellence, including joint replacement, sleep medicine, maternity services, and cancer care. The hospital is a member of the New York Presbyterian Healthcare System and an affiliate of Columbia University College of Physicians and Surgeons. Like most hospitals, Nyack faced ongoing challenges of improving the quality and safety of patient care while juggling increased ED visits and patient admissions, rising costs, and lower reimbursement rates.

In late 2006, Nyack Hospital faced a new and daunting challenge—patient service levels in its busy ED had dropped considerably. More than 102 patients visited the ED each day, and it was not uncommon for patients to wait more than eight hours for treatment. In addition, an increasing number of patients—more than 3 percent in some months—were leaving the 36-bed ED without being seen.

These delays negatively affected the public’s perception of the entire hospital. The ED is the “front door” to the hospital, and its reputation in the community was slipping, with approval ratings dropping to record lows. According to patient satisfaction surveys conducted by Press Ganey Associates, Inc., which helps healthcare facilities assess patient needs and improve care, Nyack’s ED scores were in the bottom 17th percentile in New York State. In addition, employee morale hospital-wide was decreasing, leading to increased staff turnover.
The catalyst for the transformation at Nyack Hospital was the introduction of the BD Laboratory Consulting ServicesSM Lean team to hospital CEO David Freed in November 2006. Freed recognized the value and necessity of reducing all forms of waste (through the adoption of Lean principles) in order to achieve his goal of transforming the hospital into one that was both respected in the community and profitable. Since the ED is the first place many patients see when they come to a hospital, he started his re-engineering project there. The successes with the ED allowed Freed to expand his partnership with BD to include projects throughout the facility that continue to this day.

Lean & Six Sigma in Healthcare

Lean Sigma principles—used effectively in manufacturing for decades—are relatively new in healthcare but are being applied with successful results. Lean and Six Sigma go hand-in-hand in improving efficiency and quality. Derived from Japanese manufacturing processes, Lean strives to trim waste, saving time and money. By streamlining processes, Lean practices speed throughput, reduce costs, and enhance productivity.5

Agreement is growing among healthcare leaders that Lean Sigma principles can help reduce the waste that is pervasive in the U.S. healthcare system. Types of waste include:

- Overproduction/unnecessary testing, which can tie up capital and slow results to the doctor, nurse or patient;
- Transporting/moving things, which can increase testing time and create extra work;
- Unnecessary stock or inventory, which can tie up capital;
- Waiting, which can decrease productivity and waste personnel resources;
- Unnecessary motion, which can increase testing time; and
- Poorly designed processes or defects, such as repeat tests.

The Institute for Healthcare Improvement stated that Lean management strategies can help healthcare organizations improve processes and outcomes, reduce costs, and increase satisfaction among patients, providers, and staff.6 In addition, Lean can make an immediate impact, with results evident in as little as 8–14 weeks, depending on the scope of the process improvement.

Lean Transformation Begins in the Emergency Department

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A Solutions Approach
That Ensures Sustainability

Figure 1. An eight-step solutions approach helps ensure the sustainability of Lean programs.

Assessment and identifying problems were critical first steps, and after a thorough analysis, long wait times in the ED were attributed to eight major areas, including:

- **Work Processes**—Process and flow were not standardized, and staff assignments did not reflect actual work activities.
- **Staff Schedules**—Unpredictable patient volumes led to poor scheduling, further complicated by limited cross training.
- **Physical Layout**—The ED was not optimally configured, resulting in poor teamwork, delays in patient service, and ineffective communication.
• **Paperwork**—ED documentation was not centrally located or easily available to staff.
• **Communications**—Untimely exchange of information between bed control and nursing units caused delays in admitting and created ED bed backups.
• **Ancillary Departments**—Ultrasound, CT, and Laboratory often did not meet their turnaround time commitments.
• **Information Technology**—Printers, faxes, and computers were limited in number and inconveniently located, contributing to delays in the registration and tracking processes.
• **Supplies/Equipment**—Supplies and equipment were stored in locations that were inconvenient to the staff.

The Nyack Lean team, with guidance from BD, utilized a variety of Lean tools to identify solutions and implement changes, including:

• **Education**—BD conducted a three-day Lean training program for the ED staff, physicians, and others who regularly interacted with the department so that personnel were familiar with Lean principles and tools.
• **Observation & Value Stream Maps**—Data were gathered by observing all shifts, day and night, as well as conducting a video analysis of the walking/traffic patterns for staff members and specimens heading to the lab. “Value stream maps” were created to understand current processes and identify value and non-value steps.
• **Data Analysis**—Data were analyzed, looking at waste versus value-added steps. The ED also installed an ED charting system, and key metrics were monitored to track success.
• **Pilots**—Potential process changes were evaluated using pilots, which allowed staff to test new approaches. As part of the pilots, written descriptions of the workflow were distributed to staff members and included areas for comments. Some pilots failed, but many initiatives worked so well that they were quickly adopted as “standard work.”
• **Huddles**—“Huddles,” or brief meetings, were used to capture staff ideas and communicate changes, pilots, problems, and other information.
• **Decision Tools**—Staff facing a problem learned to evaluate the situation by asking a series of questions, and used the answers to identify the most appropriate solution. Recommendations then were presented to Lean team members for assessment, followed by the executive team, which had the final say.

The 30-Minute Service Standard

The foundation of the ED transformation was the creation of a “30-Minute Service Standard” to improve throughput, decrease walkouts, and improve patient satisfaction. The initiative called for all patients who arrive in the ED to have medical care initiated within 30 minutes of arrival.

As a first step, Oscar Marcilla, M.D., Director, Department of Emergency Medicine, met with all other departments to introduce the 30-Minute Service Standard. “We got the entire hospital engaged, which was critical and reflects the heart of Lean principles,” Dr. Marcilla said. “We promoted synergy between all departments, including Registration and Admitting, medical and nursing staff, hospitalist service, Housekeeping, Food Service, Transportation, Laboratory, and Radiology. The 30-Minute Service Standard was a unifying goal.”

The hospital worked closely with Emergency Medical Associates, its ED management partner, to redesign clinical, business, and information technology services. An essential part of the redesign plan included adoption of an electronic medical record (EMR) system that provided computerized provider order entry, real-time charge capture, and the ability to fully document ED patient encounters. The Lean transformation in the ED also included:

• Redesigning the physical layout of the ED to be more conducive to teamwork;
• Cross-training nursing staff to provide more flexibility in scheduling and allow easy hand-off of patients;
• Funding more computers, printers, fax machines, and other needed equipment;
• Instituting a mobile registration cart and wireless technology to expedite registration and enable quick access to a patient’s medical history; and
• Establishing service guarantees of 30–90 minutes for a variety of frequently ordered laboratory tests and radiologic studies.

The Lean team also evaluated bed control processes and the feasibility of bedside triage using data generated by observations made in the waiting room.
and tracked by the EMR. Data showed there was a bottleneck at triage and registration. “We were able to see that we needed to add more triage nurses, which we did,” Dr. Marcilla said. “We also saw that as soon as we got busy, there would be a queue of people waiting to be registered, which would get longer and longer. By instituting a ‘Meeter-Greeter,’ as well as the novel idea of bedside triage in conjunction with bedside registration, we were able to trim our patient input process from 13 to seven steps.”

According to Alice Cronin, Chief Systems and Transformation Officer at Nyack Hospital, the Lean process engaged staff throughout the hospital and allowed large and small problems to be addressed. One of the simplest involved the wastebaskets in the ED. “We met with the staff and had them identify simple things,” she said. “We found that something as basic as understanding that our small trash cans were frequently overflowing and needed to be emptied constantly made such a big difference. We were able to get them changed.”

Cronin cited other examples of change, such as the acquisition of additional IV poles and EKGs. “Nurses were hanging IVs over lights because they didn’t have mobile poles in the ED,” she said. “When they brought it to our attention, they got an immediate response. In turn, the nurses became engaged with the process and started looking at other problems and coming up with solutions. For example, they also were having a problem providing an EKG within 10 minutes of arrival to any patient with chest pain. We purchased additional equipment and also eventually acquired wireless EKG so that results would be automatically transmitted and stored.”

**Dramatic Results**

The 30-Minute Service Standard was launched in early 2008. If care did not begin within 30 minutes, patients received a letter of apology and a $25 gift certificate to a local supermarket. The hospital also embarked upon a marketing campaign to raise awareness in the community about the initiative. The “ER 30” campaign included radio, newspaper, billboard, and public bus advertisements.

Results of the program were almost immediate. The rate of patient walkouts dropped from 1.6 percent in January 2007 to 0.0 percent in December 2009, and Nyack Hospital has been able to sustain results with only 0.08 percent walkouts at the end of 2010. Length of stay—a direct reflection of the level of service—dropped from more than five hours in November 2006 to less than four hours.

![Figure 2. In November 2007, Nyack Hospital’s ED met its 30-minute service standard in just 37% of cases. By June 2008, after the initiation of its Lean transformation, the service standard was being met in 97% of cases. Continued use of LEAN has allowed the hospital to sustain these results.](image)

Patient satisfaction increased from the bottom 17th percentile in the second quarter of 2006 to the 91st percentile in the last quarter of 2010 (with levels reaching as high as the 99th percentile in early 2009). (See Figure 3) In 2008, the hospital received the prestigious Press Ganey Compass Award for outstanding improvement in ED patient satisfaction.

This optimized performance has been accompanied by a steady growth in the number of patients seen in and admitted via the ED. According to Dr. Marcilla, admissions have increased 20 percent a year for the past two years, with annual ED patient visits in 2009 totaling nearly 53,000, up from 38,600 in 2006. He said the increase in ED volume has favorably impacted the hospital’s bottom line. In three years, increased ED volume and inpatient admissions have helped the hospital generate more revenue, with income increasing from a loss of nearly $4 million in 2006 to a profit of almost $4.8 million in 2009. (See Figure 4)

Dr. Marcilla noted that the hospital’s revenue and income grew despite the fact that the ED hired...
additional nurses to accommodate the increase in patient volume—an important factor since staffing costs are a significant portion of a hospital’s budget.

**Taking Lean Hospital-Wide**

For Nyack Hospital, Lean Sigma has provided an opportunity to change its performance and culture—in the ED and beyond. While the hospital’s initial focus was fixing the problems in the ED, it soon became clear that a hospital-wide approach was needed. “Everybody thought, ‘the ED is broken—we need to fix it’,” Maul said. “The ‘burning platform’ was the ED, but no one initially realized that the platform was supported by all of these other departments, or ‘legs.’ In order to fix the burning platform, we needed to shore up all the legs.”

As a result, the hospital expanded Lean to other areas. For example, Lean processes completed in the lab also had impressive results, with benefits in the ED and throughout the hospital. Previously, about 5 percent of lab results were delivered late (outside time targets). Lean analysis showed that some process changes were required. After the changes were implemented, outliers dropped to less than 1 percent—without adding staff.

Transport also was evaluated. Transportation “pilots” addressed decentralization and better utilization of transport personnel, and an automated transport dispatch process replaced a manual system. Results were immediately apparent throughout the hospital. For example, CT turnaround times were reduced by one hour. Importantly, these performance levels have been sustained, with average dispatch times of two minutes and transport times of eight minutes.

With guidance from BD, Lean has expanded into other areas such as Accounts Payable, Information Technology, Dietary, Housekeeping, Pharmacy, Registration and Scheduling, Surgery, and Telemetry. “No one expected the depth and breadth of the work that had to be done throughout the hospital to increase our efficiency and improve our ability to serve patients,” said John Volanto, Vice President & CIO of Nyack Hospital. “We took the Lean training and chose some techniques that worked really well for...
Lean Certification—Creating Experts to Drive Positive Change

Part of the Lean journey for Nyack Hospital was a Lean training program conducted by experts from BD’s Lean consulting group. Fifteen hospital staff members initially were trained, representing a cross section of the organization—from Admitting, Finance, Accounts Payable, Accounts Receivable, Nursing, Lab, Radiology, and other areas. From this group, five people continued work toward their Lean certification, which would empower them to lead Lean efforts not just in their areas of responsibility, but throughout the hospital. As part of the certification process, candidates completed at least three Lean projects, one of which was outside their domain. They worked with BD consultants to identify potential projects, and submitted a list to an executive steering committee made up of the CEO and senior management team, and most department managers. The committee selected specific projects that would lend value to the overall organization. The first projects were closely mentored by the BD Lean consultants. By the third project, the individuals worked independently, relying on BD only as needed to keep the projects on track.

For example, one project led by a candidate from Dietary and Housekeeping involved making sure that case carts for surgical procedures were complete, since missing instruments or items that were not properly sterilized often disrupted surgical schedules. This represented a key tenet of Lean—to minimize or eliminate the possibility that medical staff members begin a procedure only to find that items are missing from the case cart. Another project, led by a staff member from the Quality Assurance Department, involved revising pre-admission testing practices to help ensure that the first procedures of the day start on time, as delayed first cases will always disrupt the entire day’s schedule.

Certification candidates presented the results of their projects to the Lean team and Executive Committee, as well as to the hospital’s Board of Trustees. To date, three Nyack staff members have achieved certification as Lean Leaders, which takes approximately six months.

This hands-on approach to learning Lean methodologies allows newly certified Lean Leaders to carry on the work of transforming the hospital long after the departure of the BD Lean consultants. For Nyack Hospital, it also helped insert Lean thinking and methodologies into the “DNA” of the organization, preventing staff from reverting to old habits once an initial Lean project has been completed.

“These certified staff members become part of the Lean Leadership Team, and they are deployed any time there is a project that requires interdepartmental cooperation to get rid of waste that is hindering the efficient flow of patients and effective patient care,” Maul said. “It isn’t individuals working independently within their own silos, but rather the Lean team working in concert with senior leadership in order to accomplish key goals for the organization. This is an important part of the structure that was put in place at Nyack Hospital to sustain its Lean transformation.”

Keys to Success

The Lean transformation at Nyack Hospital works for a number of reasons, including the fact that Lean:

• Addresses staff needs and interests, motivating them to fully participate in the process;
• Examines the root causes of problems;
• Uses data to monitor and drive success;
• Leverages champions to “own” the processes and lead others;
• Facilitates meaningful communication;
• Aligns goals and incentives;
• Provides a way to manage change; and
• Provides relevant results (better care is less costly), especially important in this era of cost constraints.
One key Lean tool for keeping staff informed and energized at Nyack Hospital is the use of “dashboards” posted in many departments—typically white boards or bulletin boards—containing information about ongoing Lean initiatives such as the objectives, the progress being made, charts showing patient satisfaction rates, and success stories. The dashboards also provide a place to post ideas and suggestions so good ideas don’t get lost in the bustle of a busy hospital environment.

In addition, the Lean process requires that data be used to solve problems. “Everybody has gotten better at collecting and using data to make decisions,” Cronin said. “As a result, staff members are not making off-the-cuff decisions—we use data to validate our solutions and measure results.”

Also critical to the process has been the unwavering support of the hospital’s administration. “We have been successful because we have the right leadership and got the entire hospital engaged,” Dr. Marcilla said. “Our employees know they have support from the executive leadership and, in turn, we get support from the staff for our Lean programs.”

The hospital’s CEO and medical director attend Lean meetings and have helped facilitate the process to make sure the mission is supported. “I am a facilitator, working to make sure that projects come to fruition,” said Michael Rader, M.D., Nyack’s Medical Director. “This support is important because of the nature of hospital environments, where you typically have different departments working independently and doing things for their own reasons. We needed to bring everyone together.”

Dr. Marcilla said that BD has been invaluable, providing the Lean expertise needed throughout the process. “BD taught us Lean philosophy, pointed us in the right direction, and then we grabbed the ball and ran with it,” he said.

The New Nyack

According to Dr. Rader, Lean has become the new philosophy at Nyack. “I often use the phrase ‘old Nyack versus new Nyack,’” he said. “Old Nyack was everybody shrugging their shoulders and saying there was nothing they could do to solve problems. With the new Nyack, no one uses the word ‘never.’”

Cronin and Volanto agreed: “Lean has been embraced by staff throughout the hospital,” Cronin said. “It helped put structure around a skill set they already had and made the implementation of changes easier. They appreciate being asked about what is working and what is not, as well as the opportunity to offer solutions.”

“We wound up with a team that wants to work together toward a common goal,” Volanto said. “There have been vast improvements in terms of the attitude of the entire hospital. It has become a collaborative effort, and everybody has started working together instead of working in opposite directions.”

David Freed, Nyack’s President and CEO, said there has been tremendous value in using Lean Sigma to solve problems in the ED and throughout the hospital. “If you close your eyes and imagine a patient on his or her back, they actually have to go through a series of well-defined steps as part of their care, not dissimilar to a manufacturing environment,” Freed said. “We were doing a poor job of that, and the BD tools helped us immensely with how we arrange and sequence those steps, as well as how we execute those steps in a very rigorous, disciplined, organized, and efficient way.”

According to Freed, the result is an organization more focused on patient care. “This process provides real value to us,” he said. “Today, value in a hospital setting is no longer just theory or strategic planning. There needs to be a practical application with real results because hospitals are challenged to survive these days. BD gave us techniques, information, and
ways to creatively think about things that we could use immediately. They are a valued partner and an organization that we’ll work with much more over time.”

Freed added that Nyack’s transformation using Lean principles has caught the attention of other hospitals. “We surprised a lot of people and have received a number of inquiries from facilities around the country asking how we made these changes,” he said. “They want to know how we looked at things differently and organized the changes, and how we brought together hundreds of steps toward a single goal. Every area of the hospital can benefit from this approach.”

**Conclusion**

More than four years after beginning its Lean transformation, Nyack Hospital continues to focus on patient-centered care and Lean process improvements. Its Lean transformation also is a public relations success for the hospital, resulting in an enhanced reputation in the community and increased patient loyalty. And, while increased quality and efficiency have impacted patient satisfaction, they also have allowed the hospital to lower costs and increase market share, positively impacting the financial health of the organization.

The lessons learned by Nyack Hospital are important for other healthcare leaders, who must balance an increased focus on patient safety, quality of care, and patient satisfaction with shrinking budgets and increased regulation. In addition, hospitals face uncertainties in connection with healthcare reform and whether it will add to the ED and hospital congestion already experienced by hospitals across the country and further squeeze budgets. To remain successful, hospitals are going to have to learn to be more efficient and better satisfy patients, and Lean methods provide critical tools to meet those goals.

For Nyack Hospital, Lean has helped refocus the organization on patient care, and it continues its commitment to Lean process improvements. “Lean teaches you about the concept of standard work,” Freed said. “If you want to guarantee safety and efficiency, you should think about doing things in a very standard way, because simplicity and high quality travel together. What we accomplished together with BD didn’t involve one or two swings of the bat. It involved a rigorous, well-disciplined process for bringing together the hundreds of things that make our hospital work.”

**References**
