

IMPROVED THROUGHPUT IN THE LABORATORY

ST. LUKE'S HOSPITAL

- ◆ Cedar Rapids, IA
- ◆ 560 beds
- ◆ www.crstlukes.org

St. Luke's Hospital serves the five-county area surrounding Cedar Rapids, Iowa. It offers a wide range of patient care services with strengths in cardiac care, obstetrics, neonatology, pediatrics, rehabilitation, behavioral health, general surgery, trauma care, and senior services. This project focused on its clinical laboratory services department.

STEEEP

Safe

One patient's specimen labels are issued at a time to reduce labeling errors.

Timely

All morning lab results posted by 7am with 90 percent reported within 45 minutes of collection.

Efficient

Improvements even with two less phlebotomists collecting specimens (total number of phlebotomists has dropped by one and one phlebotomist is now working solely as a swarm leader).

THE PROBLEM

The results of blood tests are crucial to physician decision making. At St. Luke's, physicians expect to have lab test results available for morning rounds as early as 6 am. However, the phlebotomy team was regularly challenged to complete the early morning collection of blood specimens in a timely manner.

THE SOLUTION

Led by the laboratory's Lean coordinators and supported by Dean Bliss, the members of the phlebotomy team applied Lean tools to analyze their current processes from the time the specimen is collected until the time the result is available. This provided the insight to develop more efficient processes that also improved patient safety. Rather than having eight phlebotomists working floors independently across 15 different patient care areas, six phlebotomists and a leader "swarm" one floor at a time to collect specimens as a team. For even greater efficiency and to eliminate labeling errors, phlebotomists now use "one-piece flow," with one patient's specimens collected, labeled, and sent to the lab at a time. This practice levels out the workflow of specimens to the lab and has helped reduce the bottlenecks that arose from batching the specimens.

RESULTS

- » Collect-to-receipt time: reduced from a high of 28 minutes to 10 minutes or less.
- » Receipt-to-report time: within 23 minutes, 97 percent of the time.
- » Collect-to-report time: within 45 minutes, 90 percent of the time.

BACKGROUND

Early morning specimen collections began at 4 am, with two of the lab's phlebotomists collecting independently for the intensive care, critical care and surgical units. Additional phlebotomists arrived at five and six, again collecting specimens independently. Each phlebotomist carried labels for seven to 15 patients at a time and sent specimens to the lab, via pneumatic tube, in batches following the blood collection from three to four patients. These batches created bottlenecks and back-ups within the receiving and testing areas, delaying the posting of results. It generally took two hours from specimen collection to result reporting. Missed, rejected, add-on and stat specimens were difficult to fit in, with results often arriving too late for the physicians to view on their morning rounds.

The lab team applied Lean tools to analyze the current processes from the time the specimen is collected until the time the result is available. This led to the development of a swarm approach using one-piece flow.

TEAM MEMBERS

- » **Julie Behr**
Quality Assurance Supervisor
- » **Carol Collingsworth**
Director, Laboratory Services
- » **Tammy Peterson**
Lean Coordinator
- » **Dean Bliss**
Director of Lean Improvements
- » **Elaine Kemmerer**
Lean Coordinator
- » **The St. Luke's phlebotomy team**

PRINCIPLES OF PERFORMANCE EXCELLENCE

Reduce Process Variation

The redesigned process uses six phlebotomists and a leader all swarming one unit at a time. Each phlebotomist carries a tray and the leader uses a cart that is equipped with additional collection supplies. After a patient's blood is drawn, the phlebotomist takes those specimens to the swarm leader. The swarm leader provides the phlebotomist with labels for the next patient and sends the specimens to the lab. The swarm team uses wireless communication technology to stay in touch with the main lab and each other.

Unexpected variations in the number of specimens to be collected from day to day were exacerbated by missed, rejected, add-on and stat specimens. With a team of phlebotomists on a single unit, the swarm leader can now easily deploy phlebotomists to handle recollection of rejected specimens, add-ons and stats that were once difficult to complete before rounds. Because the swarm works together as a team, a second phlebotomist is always available to collect a missed patient. And, with the swarm leader sending down a steady stream of specimens rather than batches, the lab is able to operate much more efficiently.

Removing Waste

The Lean team found that the time from collection to receipt in the lab was the longest in the overall collect-to-report process. By analyzing all the steps in the process, the team developed a new process to reduce this time, as well as a new staffing model. This model rotates phlebotomists to serve as the swarm leader. The swarm leader directs the work of the phlebotomists from the cart, which serves as a hub. This leaves one less phlebotomist collecting specimens, yet the new process overcomes this shortage with gains in efficiency.

Counter intuitively, having phlebotomists return to the swarm leader's cart after every draw—part of the one-piece flow process—has reduced the time from collect to receipt from 28 minutes to 10 minutes or less. The swarm leader now spends time managing labels, determining sequence and sending specimens to the lab. With this new approach, lab results are posted on patient charts in time for the physicians to review during morning rounds.

Eliminating Defects

The one-piece flow has eliminated the chance of mislabeling a patient's specimen. When phlebotomists carry labels with them for more than one patient, the opportunity for mislabeling specimens with the wrong patient labels is always there. The swarm leader dispenses one patient's labels at a time to each phlebotomist. Phlebotomists do not receive labels for the next patient until the specimens for the previous patient are out of their hands.

CONTINUAL IMPROVEMENT

The process redesign work began two years ago. The project team visited two outside labs to observe their application of Lean principles. The success of the new approach for collecting specimens for morning rounds has been well received by phlebotomists, nurses and physicians alike. Phlebotomists recognize a greater sense of fairness with the swarm leader dispensing labels rather than allowing a more pick-and-choose approach that often favored some with a less demanding workload.

This success has developed a strong sense of camaraderie within the lab and an eagerness to continue the work of improving processes. A team is now working on applying the one-piece flow to the rest of the day's work to see that results are available within 45 minutes of collection regardless of priority 24 hours a day. Additionally, St. Luke's is working on plans to implement additional wireless technology using hand-held computers with label printing at the bedside to further streamline specimen collection and receipt processes.