

## **INNOVATIONS: ESTABLISHING A POINT-OF-CARE SATELLITE LABORATORY IN THE EMERGENCY DEPARTMENT AT MASSACHUSETTS GENERAL HOSPITAL**

While looking for ways to ease crowding and reduce patient length of stay in their emergency department, Massachusetts General Hospital decided to focus on improving the turnaround time for laboratory tests. A team made up of hospital administrators, laboratory staff, ED physicians and nurses explored how to start providing point-of-care testing in the ED. Ultimately, they opted to create a new satellite laboratory within the ED that offers a limited menu of rapid point-of-care tests.

The ED lab kiosk, which opened in 2002, is located near the patient care area in the ED and is managed and staffed by the hospital's central core laboratory. Initially, the test menu included whole-blood cardiac markers (troponin I and creatine kinase-MB isoenzyme), urine dipstick testing, urine pregnancy testing, and whole-blood glucose testing. These tests were all chosen specifically for their potential impact on ED length of stay.

"We only select tests [for the satellite lab] that can potentially improve ED efficiency," explains Kent Lewandrowski, MD, associate chief of pathology and director of Laboratory and Molecular Medicine at Massachusetts General Hospital. "We often ask the ED physicians and nurses if they think it would help them if we added a particular test."

Several new tests have been added to the menu over the years, including rapid influenza testing, rapid RSV, rapid Strep A, rapid urine drugs-of-abuse, and rapid whole-blood D-dimer testing. Lewandrowski says the team is now considering adding rapid creatinine testing for patients in need of a CT scan and will be receiving a contrast agent. Whole-blood glucose testing is no longer provided by the satellite lab because the nursing staff now performs bedside glucose testing.

At the request of the ED physicians and the hospital administration, the satellite lab also expanded its hours of operation. In the beginning, the lab was open only during the day shift, Monday through Friday. Currently it's open 24 hours a day, 7 days a week.

### **Changing the Workflow in the ED**

Before the satellite lab was established, the nurses in the ED had to put lab samples in a pneumatic tube. The samples were then transported via the pneumatic tube system to the hospital's central core laboratory. Now the ED nurses and physicians can either bring the samples directly to the nearby satellite lab or drop them in the plastic bins that are located in each work area in the ED. Every fifteen minutes, satellite lab staff members collect the samples from these bins.

"As a result of these changes, the specimens are brought into the testing area much more quickly," says Elizabeth Lee-Lewandrowski, PhD, MPH, co-director of the Clinical Laboratory Research Core at Massachusetts General Hospital. "Also, since the satellite lab is so close by, the nurses and physicians can walk to the kiosk to ask if a test result – that hasn't been entered into the computer yet – is available. The lab testing has become much more integrated into patient care."

### **Monitoring the Impact**

In 2003, Lee-Lewandrowski and Lewandrowski co-authored a study that found that implementing the initial menu of rapid point-of-care tests resulted in an 87 percent decrease in test turnaround time. In addition, ED patient length of stay decreased by an average of 41 minutes for each patient tested and there was a significant improvement in physician and nurse satisfaction with laboratory services.

Lee-Lewandrowski says the laboratory staff continues to monitor test turnaround times using their dashboard system. And whenever a new rapid test is added to the satellite lab's menu, they assess its impact on patient length of stay. They found, for instance, that implementing rapid urine drugs-of-abuse testing in the satellite lab resulted in a decrease in median ED length of stay of one hour for patients who received testing.

In order to estimate the total impact of the satellite lab's test menu on ED length of stay, Lewandrowski, Lee-Lewandrowski, and their colleagues multiplied the reduction in length of stay for each test by the annual volume. Using data from 2009, they calculated that the total approximate impact of the test menu on ED length of stay is a reduction of 46,042 ED patient bed-hours per year. This number is equivalent to adding five extra beds to the ED capacity.

### **Sharing Lessons Learned**

In recent years, Lewandrowski and Lee-Lewandrowski have helped several other hospitals develop point-of-care testing programs. They've found that an increasing number of large hospitals are looking at how to reduce bottlenecks in the ED by offering point-of-care tests.

Since establishing a satellite lab is very expensive, Lewandrowski says it's an option that may be better suited to a hospital with a large emergency department. "You need to be performing a high volume of tests to justify the cost of having technologists working in that lab 24 hours a day," he notes. Hospitals with smaller emergency departments may be able to implement a point-of-care testing program at a lower cost if their nurses and physicians perform the tests.

If a hospital is aiming to reduce ED length of stay, Lewandrowski and Lee-Lewandrowski recommend choosing point-of-care tests that impact a clinical decision point where the result is needed to begin the next step in the clinical care process. Two examples are cardiac marker tests and D-dimer tests.

In addition, they note that hospitals should be aware that they might end up using rapid point-of-care tests that are also performed using different methods in their central laboratory. In these situations, reporting strategies must be developed so that clinicians are not confused when trying to interpret test results.

Lee-Lewandrowski and Lewandrowski feel that one of the biggest benefits of establishing the satellite lab is that it fostered closer collaboration between the ED staff and the lab staff. "We work together very cordially, without finger-pointing or blame," says Lee-Lewandrowski. "They view us as a department that wants to help get the job done in caring for patients," adds Lewandrowski.

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