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Reducing Specimen Identification Errors

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In 2006, the University of Wisconsin Hospital and Clinics identified that the number of specimen identification errors each month was much greater than desired and represented a significant patient safety issue. A collaborative performance improvement approach between nursing and the laboratory was undertaken for the inpatient, ambulatory, and surgical services areas, with the focus on creation of a just culture. Between 2007 and 2011, interventions were successful in significantly reducing the number of errors by 85%. **Key words:** *medical errors*, *patient safety*, *quality improvement*, *specimen handling*

IN 2000, the publication of *To Err Is Human: Building a Safer Health System* identified that health care in the United States is not as safe as it should and could be.[1] Since then, health care organizations have been striving to improve the safety of their practices to avoid errors. One type of error that can occur is a wrong-patient error. The Joint Commission 2003 National Patient Safety Goals identified the need to improve the accuracy of patient identification by using at least 2 patient identifiers whenever taking blood samples.[2] For 2012, there continues to be a National Patient Safety Goal from The Joint Commission on the need for 2 patient identifiers and also to "label containers used for blood and other specimens in the presence of the patient."[3] The College of American Pathologists has recognized patient identification as goal 1 of the College of American Pathologists' Laboratory and Patient Safety Goals.[4] Correctly identifying and labeling specimens must occur to prevent wrong-patient errors. Most wrong-patient errors related to specimen labeling often are not recognized until a negative patient outcome presents itself. Approximately 1 in every 18 identification errors results in an adverse event.[5] These adverse events consist of errors in diagnosis, surgeries on the wrong individual, inappropriate treatments, or death.

Implementing various technologies, such as computerized provider order entry or computer-assisted bar-coding systems, have resulted in a reduction of specimen labeling errors.[6-8] Other reported strategies to decrease specimen labeling errors are ongoing quality monitoring of specimen identification[9]; 24/7 phlebotomy service[9]; implementation of a zero-tolerance process[10]; and investigation of root causes, barriers, and associated interventions.[11] Although the various technologies are available at our organization, computerized provider order entry and bar-coding specimens did not decrease specimen labeling events. Despite implementation of a new policy that included rejecting specimens that were not properly labeled

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with 2 patient identifiers, the number of specimen identification errors each month had not shown a decline. In May 2007, the organization had 197 specimen identification events. Although the organization felt safer because all improperly labeled specimens were being rejected, the need for many specimens to be recollected remained a concern. The data prompted the organization to charter an interdisciplinary performance improvement team composed of laboratory, nursing, and quality department staff to address the issue.

PROBLEM IDENTIFICATION

At the University of Wisconsin Hospital and Clinics, when Papanicolaou test results became available for individuals with the first name of "Robert" and "William," it was known there was a problem with specimen identification. The risk for an adverse outcome from a specimen identification error was high. Laboratory personnel knew they received specimens with a variety of identification errors, but the exact volume and type of error was not known.

METHODS

The initial focus was on uncovering how the error occurred to decrease the chances of another error from occurring.[12] A team was formed consisting of staff from the laboratory and quality departments and nurses from the 5 areas with the largest number of specimen identification errors. This included the emergency department, 2 intensive care units, an intermediate care unit, and a general care unit. The team created a flowchart of the specimen identification process for each area. It became apparent quickly that workflow varied from area to area, particularly with the varying levels of care (intensive care unit, intermediate care unit, general care), as well as for specialty areas such as the emergency department. It was determined that the reason for the workflow variation was the difference between nurse and laboratory collected specimens. With the varying workflows, it was determined that the interventions would vary for each area.

Next the team reviewed 5 months of data on specimen identification errors to categorize the type of events that were occurring. The types included no label on the specimen, no patient identification on the request form, no request form, specimen labeled with 1 identifier only (patient name), and specimen and request form not matching (specimen labeled with wrong patient or request form labeled with wrong patient).

The team agreed to meet every 2 weeks and to use a rapid cycle change process. The goal was to determine strategies that were effective in reducing specimen identification errors and that were acceptable and sustainable to staff. It was critical to be able to discuss progress at each meeting, thus a way to track information on specimen identification errors was essential. Because all specimen identification errors were noted by the laboratory, there was agreement that those staff would enter the information into our event reporting system. In this manner, the manager was informed each time a specimen identification error occurred. It also allowed the improvement team to track progress as each strategy was implemented. Strategies that were attempted focused around 4 areas: establishing expectations, education, process (system), and feedback.

Expectations

Establishing clear expectations for staff was accomplished through a review and update of all existing policies related to specimen identification. Into each policy was added the same verbiage:

"Safe patient care and accurate test result reporting depend on correct patient identification throughout the specimen collection and labeling process. It is the responsibility of all persons who collect laboratory specimens to:

1. Positively identify the patient prior to specimen collection using at least 2 forms of patient specific identification.
2. Confirm that each specimen label has at least 2 patient specific identifiers that

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match the identified patient. The identifiers must be accurate, complete, and legible and agree with the test order.
3. Label patient specimens immediately after collection and in the presence of the identified patient." (University of Wisconsin Hospital and Clinics, December 16, 2011)

This verbiage was consistent with best practice as well as with regulatory standards. It also was shared with staff that they were expected to identify each specimen being sent with the name of the collector. This made it possible for individual staff follow-up.

Education

It was essential for all staff to receive education on the expectations rather than to assume that staff knew how to perform the process of specimen identification properly, particularly labeling at the bedside in the presence of the patient. Education was provided to all patient care areas. An educational meeting was held for each unit/area manager, clinical nurse specialist, and an identified unit champion(s). These educational meetings focused on the problem, findings from the 5 pilot units, and a "toolbox" of strategies that could be used to decrease specimen identification errors in their own area. Because the education was needed for many staff and areas, the decision was made to provide a variety of educational strategies that could be used. Strategies in the "toolbox" included:

- An education flyer to post in the break room that was titled "Did You Know . . . " and shared important information such as the number of errors for all units, the number of errors for that specific unit, and expectations for specimen identification.
- A commitment memo that staff could sign stating their understanding of the specimen identification expectations and desire to meet them.
- A flyer posted by all blood tubes and urine specimen containers reminding staff to take labels into the patient room with them and label each specimen in the presence of the patient.
- A flyer by the pneumatic tube system where staff sends the specimens to the laboratory, asking them to assure that the specimen(s) and requisition form(s) are labeled and match.

Those attending the educational session were asked to take the tools back to their units and develop a unit specific implementation and improvement plan. In addition to unit specific educational efforts, centralized education began in orientation for new registered nurses and nursing assistants and in the annual safety training that is mandatory for all employees.

Individual staff feedback

In December 2009, although the number of specimen identification events had declined to 36, this still remained above the desired number of 0. The team determined that education alone was not sufficient to change practice and began a feedback process for every specimen identification error noted by the laboratory in the event reporting system. When the error was entered into the event reporting system, an e-mail was generated to a Quality and Safety clinical nurse specialist (CNS). The clinical nurse specialist reviewed the entry and forwarded it to the appropriate manager and director asking for feedback on the event. It was expected that the manager would follow up with each employee involved in the event, discussing the specific event, and identifying ways to prevent future occurrences.

Providing feedback to front-line workers was essential to improving safety.[13] Therefore, the labeling error information was recorded, and the data were reported monthly to managers and directors. The type of data reported were the total number of events, number of events in each unit or department, type of worker who made the error, and that manager follow-up was completed with the staff member who made the labeling error. This strategy of central feedback ensured that

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every error was followed up in a consistent manner.

Process

Once the managers were required to follow up on each event, they learned the "story" of what happened related to the specimen collection. One type of error occurred repeatedly: Staff would obtain patient labels for specimens from the label printer located in the department. Occasionally, a staff member would mistakenly retrieve 1 or 2 labels from the previous patient batch that was printed. The label printers had been programmed to leave a blank label between different patient names, but this was not enough of a deterrent to prevent staff from retrieving the wrong labels. Specimens with incorrect patient labels were sent to the laboratory because of this error and highlighted the fact that staff was not checking the label at the bedside.

After seeking staff input from the Nursing Practice Council and Nursing Quality Council, it was decided to print 3 large Xs (XXX) on the blank label between patient names for a larger visual cue to identify different labels. A pilot study was conducted on 2 inpatient units with positive feedback received from staff; therefore, the change was made on all inpatient units. Shortly thereafter this label printer change was made in the surgical services and ambulatory settings.

RESULTS

Specimen identification events are placed into the organization's error reporting system by staff from the laboratory. The database records the type of error, type of specimen, location of error, and person responsible for the error. In May 2007, there were 197 specimen identification events. The 5 pilot units made up 55 of those events. Interventions on the pilot units began to show immediate positive results and decreased to 18 events by April 2008. The house-wide rollout began in February/March 2008, with the goal of reducing the frequency of specimen identification events by 50% by July 1, 2008; that goal was achieved. Through June 30, 2011, the number of overall specimen identification events has continued to decline (the Figure) with individual staff feedback provided for each specimen identification event.

DISCUSSION

Key to the improvements at the University of Wisconsin Hospital and Clinics was the willingness of the laboratory staff to continue to take the time to enter each specimen identification event into the event reporting system. These data highlighted the issue and created the sense of urgency needed for change. Ongoing collection of data allowed individual staff follow-up, which was critical to continued improvements. Keeping track of all events centrally assured that every event was followed up and there was consistent individual accountability. Examining each event to determine potential causes led to the simple technology change with the label printers that assisted clinicians in doing their work in a safer manner. Similar analysis of specimen labeling errors, root cause analysis, workflow analysis, and implementing strategies to address barriers were reported by the Pennsylvania Patient Safety Authority in 6 different facilities,[10] which enhances the ability to generalize this quality improvement initiative.

Even to this date, the University of Wisconsin Hospital and Clinics continues to track all specimen labeling errors and provides individual staff follow-up to strive for zero events. Managers receive notification of

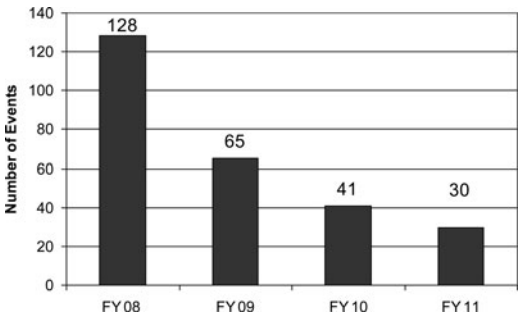

Figure. Average monthly specimen identification events by fiscal year.

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events through the event reporting system. Nursing quality tracks all events and receives notification from the manager that the appropriate individual feedback has occurred. Unfortunately, the desired number of 0 has not been attained, and the number of errors has remained at approximately 20 to 30 per month. We will continue to analyze events to identify contributing factors with the goal of eliminating specimen labeling events.

REFERENCES

1. Institute of Medicine. *To Err Is Human: Building a Safer Health System*. Washington, DC: National Academies Press; 2000.
2. Erickson D. JCAHO announces six patient safety goals for 2003. MeetingsNet Web site. Published July 25, 2002. http://meetingsnet.com/news/meetings_jcaho_announces_six/. Accessed December 4, 2012.
3. The Joint Commission. National Patient Safety Goals effective January 1, 2012: hospital accreditation program. http://www.jointcommission.org/assets/1/6/NPSG_Chapter_Jan2012_HAP.pdf. Accessed December 28, 2012.
4. College of American Pathologists. When a rose is not a rose. http://www.cap.org/apps/cap.portal?_nfpb=true&cntvwrPtlt_actionOverride=%2Fportlets%2FcontentViewer%2Fshow&_windowLabel=cntvwrPtlt&cntvwrPtlt%7BactionForm.contentReference%7D=practice_management%2Fdirectips%2Fmislabeled_specimens.html&_state=maximized&_pageLabel=cntvwr. Updated February 23, 2010. Accessed December 4, 2011.
5. Valenstein PN, Raab SS, Walsh MK. Identification errors involving clinical laboratories. *Arch Pathol Lab Med*. 2006;130(8):1106-1113.
6. Hill PM, Mareiniss D, Murphy P, et al. Significant reduction of laboratory specimen labeling error by implementation of an electronic ordering system paired with a bar-code specimen labeling process. *Ann Emerg Med.* 2010;56(6):630-636.
7. Hayden RT, Patterson DJ, Jay DW, et al. Computer-assisted barcoding system significantly reduces clinical laboratory specimen identification errors in a pediatric oncology hospital. *J Pediatr*. 2008;152(2):219-224.
8. Brown JE, Smith N, Sherfy BR. Decreasing mislabeled laboratory specimens using barcode technology and bedside printers. *J Nurs Care Qual.* 2011;26(1):13-21.
9. Wagar EA, Stankovic AK, Raab S, Nakhleh RE, Walsh MK. Specimen labeling errors: a Q-probes analysis of 147 clinical laboratories. *Arch Pathol Lab Med*. 2008;132(10):1617-1622.
10. Dock B. Improving the accuracy of specimen labeling. *Clin Lab Sci*. 2005;18(4):210-212.
11. Reducing errors in blood specimen labeling: a multihospital initiative. *Pa Patient Saf Advis*. 2011;8(2):47-52.
12. Position statement: just culture. American Nurses Association Website. http://www.nursingworld.org/psjustculture. Published January 28, 2010, Retrieved September 17, 2011.
13. Institute for Healthcare Improvement Web site. Patient Safety. http://www.ihi.org/IHI/Topics/PatientSafety/SafetyGeneral/Changes/IndividualChanges/Provide+Feedback+to+Front-Line+Staff.htm. Accessed September 17, 2011.

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