Eliminating Radiology Specimen Labeling Errors Using a 2-Person Check

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Purpose

Improper specimen labeling of biopsy samples is a serious problem that may be improved through quality improvement methods. Misidentification of samples can cause substantial harm to patients through diagnostic delays, administration of inappropriate treatments, and can result in a loss of trust in healthcare. Labeling errors of specimens occur at a rate of 1 to 50 per 1000 labels and laboratories with ongoing quality monitors for specimen identification are associated with lower labeling error rates. 2-Step verification has been used effectively to prevent medication errors and can be translated into the practice of radiology specimen labeling.

Methods

Quality improvement meetings in the radiology department identified a reduced rate of labeling errors specifically in breast imaging, which utilized a process consisting of a 2-person verification of samples before being sent to pathology. In the fourth quarter of 2017, the radiology department implemented a 2-person verification pause in the specimen collection procedure workflow throughout all care teams obtaining biopsies in the radiology department.

This study attempts to identify the effectiveness of the 2-person verification on the labeling error rate overall and among care teams. Data on radiology specimen labeling errors were collected from the Radiology department's Statit Scorecard and the Safety Even Report From database from Q1 of 2015 through Q1 of 2018. Information on specimen labeling error rates were determined by looking at the number of errors for all modalities as well as individual areas such as ultrasound, general imaging, CT, and breast imaging. Labeling errors were classified and weighted based on severity using a scale for both patient identification and specimen information as follows respectively: Misidentification, Mismatch, Illegible, and No Label. The number of errors per quarter and severity were assessed from before and after the 2-person verification was implemented in Q4 2017.

Specimen Labeling Workflow

The specimen labeling workflow is as follows with the addition at Step 11:

Pre- Procedure

1) Verify orders
2) Gather supplies, including generating labels and forms

Procedural Room

3) Clean Sweep (staff & room)
4) Prepare for procedure, including setting up specimen containers, labels and requisitions
5) Identify patient - escort/transport to room as needed
6) Pause and review labels and requisition before calling Radiologist
7) Procedural pause when all staff present, to include verification of correct labels
8) Procedure complete/specimen collected
9) Complete labeling process, ensuring requisitions are complete and correct Radiologist signs requisition as appropriate
10) Discharge patient from area
11) Final verification with 2nd staff member
12) Package specimen appropriately and deliver to pathology

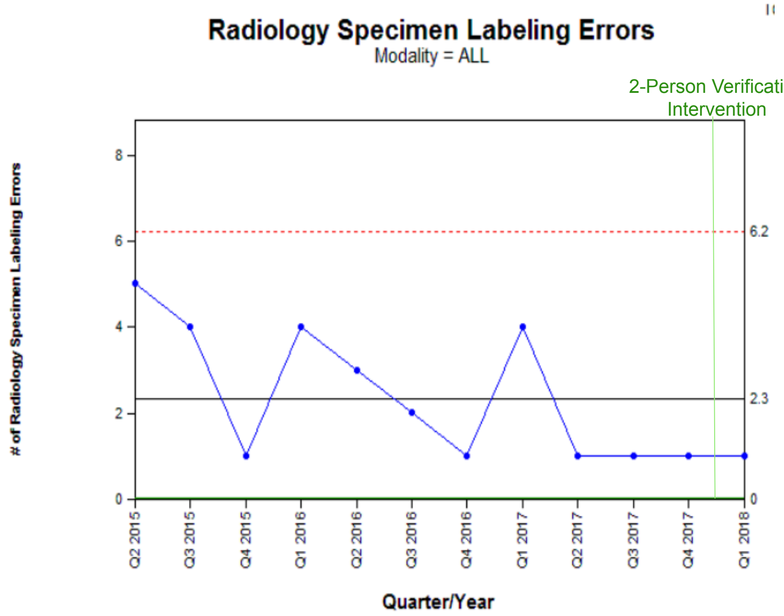
Acknowledgements

Thank you to Radiological Society of North America (RSNA) for supporting medical student education though travel grants and opportunities to get involved in the field of radiology.

References

1. Elizabeth A. Wagar, Ana K. Stankovic, Stephen Raab, Raouf E. Nakhleh, and Molly K. Walsh (2008) Specimen Labeling Errors: A Q-Probes Analysis of 147 Clinical Laboratories. Archives of Pathology & Laboratory Medicine: October 2008, Vol. 132, No. 10, pp. 1617-1622.
2. Schwappach DLB, Pfeiffer Y, Taxis K. Medication double-checking procedures in clinical practice: a cross-sectional survey of oncology nurses' experiences. BMJ Open. 2016;6(6):e011394. doi:10.1136/bmjopen-2016-011394.
3. Aileen P. Morrison, Milenko J. Tanasijevic, Ellen M. Goonan, Margaret M. Lobo, Michael M. Bates, Stuart R. Lipsitz, David W. Bates, Stacy E.F. Melanson; Reduction in Specimen Labeling Errors After Implementation of a Positive Patient Identification System in Phlebotomy, American Journal of Clinical Pathology, Volume 133, Issue 6, 1 June 2010, Pages 870–877

Radiology Specimen Labeling



	Q2 2015	Q3 2015	Q4 2015	Q1 2016	Q2 2016	Q3 2016	Q4 2016	Q1 2017	Q2 2017	Q3 2017	Q4 2017	Q1 2018
# of Radiology Specimen Labeling Errors	5	4	1	4	3	2	1	4	1	1	1	1

Figure 1: Line Chart of Radiology Specimen Labeling Errors

This figure displays the relationship between number of radiology specimen labeling errors on the y-axis and time (quarters) on the x-axis. The data is displayed over the period of Q2 2015 until Q1 2018. The solid black line displays the average number of errors over a 3 year period. Data from Q1 2015 is reported to be 3 errors.

Results

31 specimen labeling errors were self-reported by the procedural staff over a period of 12 quarters (3 years) resulting in an error rate of 2.6 errors per quarter with an average severity rating of 4.4. Mismatch of specimen labels accounted for 48.4%(15/31) of the labeling errors. The next highest error was for specimens sent without patient ID labels, occurring at a rate of 35.5% (11/31). The ultrasound modality had the most frequent labeling errors detected, occurring in 54.8%(17/31) of the samples studied. Since the intervention was implemented, one mismatch patient identification labeling error occurred in ultrasound in Q1 of 2018, representing a severity rating of 5. Ultrasound had the highest frequency of specimen labeling errors with one occurring even after numerous interventions. Constraints on time and feelings of production pressure may contribute to process deviation, resulting in workflow shortcuts that increase the risk of errors. Mismatching specimen labels as well as samples not containing a patient identification label indicate a need for greater adherence for the 2-person verification process. More time is needed to assess the effectiveness of the modified workflow procedure as Poisson's test was not significant (x=1,λ=2.583,P(X<=1)=.271).

Conclusion

Quality improvement analysis as well as refinement of workflow procedures can help reduce labeling error rates and improve reliability of processes. Finding outliers within one's institution can provide an excellent option for identifying best practices and disseminating those practices across service lines. As institutions continue to grow and merge, this will be both a challenge and opportunity for improvement. It is important to work with staff and other stakeholders to come up with innovative solutions that can be effectively implemented in the workplace. Additional interventions such as the application of bar code-based patient identification may be applied to radiology samples, as it has shown effectiveness in other areas of medicine. Understanding process constraints, empowering medical staff, and educating providers on the dangers of labeling errors will benefit patients and improve quality of care.