Relative Frequencies of Mislabeled Laboratory Samples from the Emergency Department (ED) versus other Hospital Areas

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ABSTRACT

The receipt of mislabeled samples is a pre-analytical error experienced by many hospital laboratories. Error rates from the ED may be higher than from other clinical areas.

We compared the rate of mislabeled laboratory samples from the ED with that from other hospital locations. A secondary objective was to determine if laboratory personnel consistently followed laboratory policies for handling mislabeled samples.

The study took place in a metropolitan medical center with 77,000 ED patient visits yearly. Total laboratory orders received from July 1 to August 31, 2004 were obtained from the laboratory information system. An order consists of all samples from a patient submitted with one requisition. Laboratory initiated incident reports document each mislabeled sample.

There were 51 (0.36%) documented mislabeled orders from the ED compared to 37 (0.037%)documented labeling errors from all other hospital locations. For ED patients, these included blood (29), urine (14), urine and blood (4), culture swabs (3) and cerebral spinal fluid (1). Twenty-seven orders were relabeled and 14 were rejected, in accordance with laboratory policies. Nine (9) samples were relabeled that should have been rejected. Results were reported on the wrong patient in one instance due to a mislabeled order.

Laboratory samples drawn in the ED are about 10 times more likely to be mislabeled than samples drawn elsewhere in the hospital. Laboratory personnel do not consistently follow policies for sample rejection. Mislabeled samples pose a threat to patient safety due to delays in sample processing, re-draws, and the possibility that results may be reported on the wrong patients. Further study is needed to determine the causes of mislabeling errors and to design effective interventions to minimize labeling errors. A limitation of our study is that not all mislabeling incidents may be recognized or documented.

INTRODUCTION

Laboratory incident tracking has identified a higher incidence of pre-analytical errors attributable to sample collection from the Emergency Department (ED) than from other patient locations in the hospital. In our experience, the most frequent pre-analytical laboratory errors from the ED are sample identification errors and hemolyzed samples. Possible contributing factors include:

- •Phlebotomy performed by non-laboratory personnel
- •Too much flexibility in the process of drawing and labeling samples in the ED
- •Hand-offs of samples to a co-worker for labeling
- •Interruptions and multi-tasking in a busy work setting
- •Selecting the wrong patient from the patient care information system when there are multiple patients with similar names

Mislabeled samples pose a threat to patient safety because:

- •Clinical decisions might be based on another patient's lab results.
- •The correct laboratory results might be significantly delayed.

This study initially focused on two questions:

1. How does the rate of mislabeled samples from the ED compare to other patient locations?
2. Do laboratory staff consistently follow the policy regarding mislabeled samples?

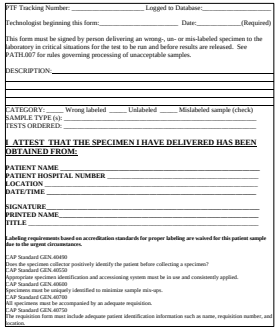
A third question was added after the initial data collection:

3. Are more acute patients at greater risk for mislabeled samples?

METHODS

- A critical sample patient identification form was completed for each mislabeling incident, according to existing laboratory policy (figure 1).
- For a 2 month period (July/Aug 2004), all mislabeling incidents from the ED were investigated retrospectively.
- For each error, the patient's chart was reviewed for:
  - Pediatric or Adult ED
  - Assigned triage code
  - Sample types and times sent to the laboratory
  - Disposition of the patient from the ED
  - Any documentation of the error in the patient's chart
- Total laboratory orders from the ED and other all other hospital patient locations were extracted from the LIS.

Figure 1:"Critical Specimen Patient Identification Form"



PTF Tracking Number: _____ Logged to Database:_____

Technologist beginning this form:_____ Date:_____(Required)

This form must be signed by person delivering an wrong-, un- or mis-labeled specimen to the laboratory in critical situations for the test to be run and before results are released. See FAUH.007 for rules governing processing of unacceptable samples.

DESCRIPTION:_____

CATEGORY: _____ Wrong labeled _____ Unlabeled _____Mislabeled sample (check)
SAMPLE TYPE (s): _____
TESTS ORDERED: _____

I, ATTEST THAT THE SPECIMEN I HAVE DELIVERED HAS BEEN OBTAINED FROM:

PATIENT NAME_____
PATIENT HOSPITAL NUMBER _____
LOCATION _____
DATE/TIME _____

SIGNATURE_____
PRINTED NAME_____
TITLE _____

Labeling requirements based on accreditation standards for proper labeling are waived for this patient sample due to the urgent circumstances.

CAP Standard GEN.40490
Does the specimen collector positively identify the patient before collecting a specimen?
CAP Standard GEN.40520
Appropriate specimen identification and accessioning system must be in use and consistently applied.
CAP Standard GEN.40680
Specimens must be uniquely identified to minimize sample mix-ups.
CAP Standard GEN.40780
All specimens must be accompanied by an adequate requisition.
CAP Standard GEN.40750
The requisition form must include adequate patient identification information such as name, requisition number, and location.

RESULTS

Figure 2: Comparison of Error Rates of ED &Non-ED Laboratory Samples

	Total Samples	Number Mislabeled	Percent Mislabeled
ED	13,855	51	0.36
Non-ED	99,166	37	0.037

Figure 3: Specimen Types

Adult	38
Pediatrics	19
Blood	29
Urine	14
Blood & Urine	4
Culture swab	3
CSF	1

Figure 4: Error Resolution

	Number
Relabeled	36*
Rejected	14
Results reported on wrong patient	1

*9 relabeled samples should have been rejected.

Figure 5: Shift Incident Occurred

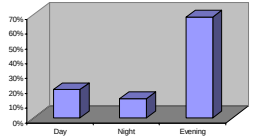


Figure 4: Day: 7AM-3PM, Evening: 3PM-11PM, Night: 11PM-7AM

Figure 6: Association of Triage Codes and Errors

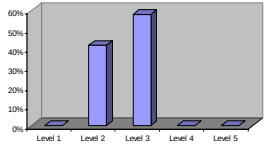


Figure 2: Triage codes in the ED are defined as follows:

- •Level 1: Patient intubated, apneic, pulse less or unresponsive
- •Level 2: High risk situation, immediately life threatening.
- •Level 3: Patients requiring many diagnostic tests or procedures
- •Level 4: Patients requiring 1 or 2 diagnostic tests or procedures
- •Level 5: Patients requiring no procedures or labs

CONCLUSIONS

- •The odds of an ED patient having a mislabeled specimen are about 10 times higher than for other hospitalized patients.
- •Most mislabeling incidents occur during the busiest shift in the ED.
- •Most mislabeled samples are from moderate to high acuity patients.
- •Mislabeling incidents and their effect on the ED visit are not documented in patients' charts
- •Mislabeling incidents cause delays in laboratory testing and availability of results.
- •Further study is needed to determine:
  - •Effects on patient care
  - •Root causes of these errors
  - •Effective interventions