Identifying patterns in blood test cancellations to improve patient care

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Introduction

Several factors influence the quality of a patient's experience within a clinical setting. Blood tests are a major diagnostic tool; therefore, it influences the patient's experience. Yet, there are times when these tests are cancelled for various reasons, such as miscommunication or improper handling of specimens. Limiting blood test cancellations is very important to patient care because it increases the efficiency of the treatment plan which then increases patient satisfaction. There are a number of reasons for cancellations including excessive hemolysis, clotted specimen, among others. A College of American Pathologist study surveyed a wide variety of hospitals to "determine the rate, causes, and circumstances surrounding laboratory test cancellations" (Darcy, Barasch, Souers, & Perrotta, 2016). Inspired by this study, this project set out to identify patterns within cancellations of blood tests in a particular laboratory to improve patient care by minimizing the possibility of cancellations.

Materials and Methods

Medical laboratory professionals documented details of blood test cancellations on pen and paper forms, for 2,680 patients, over a four-week period in August, 2016. Each patient's information was manually transferred to a Microsoft Excel® spreadsheet and grouped together based on diagnostic purpose. This data was analyzed for possible causes and circumstances surrounding laboratory test cancellations, including miscommunication, discrepancies in training of staff, or systemic inefficiencies. Unique identifiers, such as patient name and record number were omitted to eliminate patient confidentiality concerns.

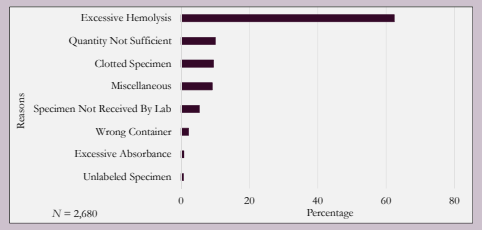
Results

It was determined that future analysis of age, date and time of collection, and date and time of cancellation were not necessary. Three main parameters contributed to understanding the cancellations: type of test, reason for cancellation, and location where the specimen was collected. The reasons for cancellations and their frequencies are depicted in Graph 1. The most frequent reason for cancellation, contributing to well over half of the cancellations, was excessive hemolysis.

Results (cont.)

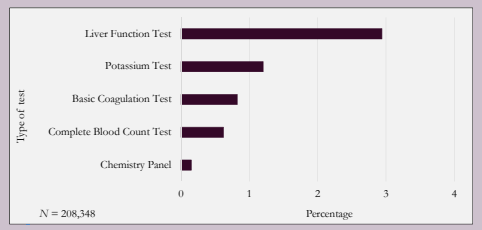
There are various factors that can cause excessive hemolysis and clotting to occur: the patient's condition, the draw technique implemented, and mishandling of specimen containers. The top five types of cancelled tests are displayed in Graph 2 along with their rates of cancellation.

Reasons for cancellations



Graph 1 (left): The percentages for *Quantity Not Sufficient*, *Clotted Specimen*, and *Miscellaneous* reasons were similar with about 250 cancelled tests.

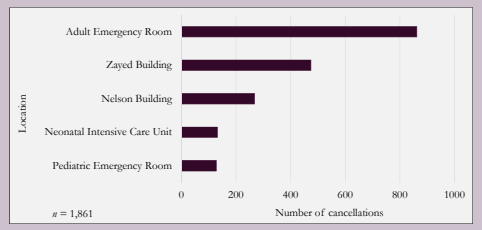
The five tests with the highest cancellation rate



Graph 2 (left): Out of 100% of the (N = 36,989) liver function tests ordered, 2.94% (n = 1,089) were cancelled. Other tests, not shown here, had cancellation rates lower than 0.15%.

There are many locations within Johns Hopkins Hospital that test cancellations occur. Graph 3 displays the five locations that had the majority of cancelled tests.

Top five locations where cancellations occurred



Graph 3 (left): The cancellation rates for each location could not be calculated due to the inability to obtain the total number of tests ordered for each location.

Discussion

The largest contributing reason for cancellation of each test was determined. Liver function and potassium tests were cancelled mainly due to hemolysis. Complete blood count tests were cancelled due to specimen clotting, and coagulation tests were canceled due to an insufficient amount of blood collected. The majority of chemistry panel tests were cancelled because the specimen never made it to the lab for testing. Although there was an extensive amount of data available within the hospital, a majority of it was not readily available to the laboratory staff. The form type on which cancellations were recorded was inconsistent; some were on paper while others were digital. The digital files were not easy to navigate, making it difficult to gather necessary data to perform statistical analyses.

From the inconsistent recording of data, two solutions were proposed to laboratory leadership. First, an improved database readily accessible to personnel should be implemented for more efficient monitoring of cancellations. The database should create a user friendly interface to gather additional data such as location and patient demographics. Second, information gathered should be used to inform continuing education and enhanced training programs for healthcare personnel who collect and handle blood specimens. This will allow for a uniform, accurate blood draw technique so that the patient will receive consistent care. The trends in data collected through this project will be used to inform additional research efforts at the hospital. Research will focus on improving the identified inefficiencies causing cancelled blood tests.

References

Darcy, T. P., Barasch, S. P., Souers, R. J., & Perrotta, P. L. (2016). Test cancellation: A College of American Pathologists Q-Probes study. *Archives of Pathology & Laboratory Medicine Journal, 140 (2)*, 125-129.

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