Clinical lab quality assurance project: the value of send-out tests
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Introduction
In a hospital clinical laboratory environment, there are three reasons for testing a specimen taken by a physician: diagnosing, monitoring health, and deciding on treatment. At Johns Hopkins Hospital, there are two menus of tests; in-house and send-outs. This clinical laboratory quality assurance project allows management to evaluate the efficiency of their laboratory services. Intentionally observing the process of a send-out testing will benefit the doctors, patients, and clinical lab. The purpose of this study is to establish the tests that are worth continuing to send out, tests that are repeated enough to bring in house, and tests that are not valuable enough, based on cost versus the benefit to the patient, to have repeated in a specific amount of time. Determining whether a test for diagnosis requested by a physician is beneficial to the patient for the time and stage of their disease will ultimately decide whether the test result is beneficial to the course of the disease (Hanson, 2012).

This capstone project involved evaluating send-out tests in clinical laboratories in order to maintain sufficient patient care and appropriate budgeting. When a test is completed in-house, the hospital’s database creates a code as a short cut for that test. When a test is not completed in-house, it is listed in a separate menu. This menu indicates the test must be sent out to be tested in another laboratory, hence the name send-out test. A request, made by a physician, is sent using a Pathology Customer Service Esoteric Test Request Worksheet, otherwise known as the green sheet. This green sheet requires a physician to specify the type of specimen that is being used, the test being requested, the price of the test, and special instructions on specimen handling request for the test. The American Society for Clinical Pathology is currently completing a campaign named Choose Wisely (Brown, 2013) which had originated from the American Board of International Medicine and acted as inspiration for this project. This study can be applied to any other clinical lab across the country.

Materials and Methods

The latest research of disease and treatment for diagnosis was found in order to keep up with the physicians’ strategies. Five physicians were studied by looking at their area of practice and number of tests he/she requested in the six month period. The next step and most important for analysis was price. Knowing the cost of each test determined whether or not to continue to study this diagnostic test. Tests not covered by insurance consume a large part of the clinical laboratory’s budget. All of this information was found on the green sheet, which was filled out by the physician. If a specific test created a high cost for the clinical laboratory, an investigation of bringing this test in-house was made. If the diagnostic test must be continued to send out, there must be a lab qualified.

Materials and Methods (cont.)

The five tests, shown in Graph 1 above, had the largest number of requests over the six months and were chosen for further study. The graph shows the small number of tests requested per month for these send-out tests. The graph is meant to provide evidence, trends over the six months. According to the graph, there are no specific trends but the distribution has a standard deviation of 0.33.

The average cost of these five tests, shown in Table 1, over the six month period was three hundred and twenty-nine dollars. This cost represents the total amount paid by the clinical laboratory in order to have these tests completed. This cost is only minor when comparing the cost of supporting the entire clinical laboratory.

Results (cont.)

A chi-squared goodness of fit test was completed comparing the expected number of requests for bringing in-house and the actual number of tests and resulted in p-values of 0.000. This value shows a lack of significance for the number of tests completed compared to the 200 tests needed to bring in-house (Wisecarver & Williams, 2012).

Conclusions
The purpose of this project was to establish send-out tests that are worth continuing to send-out, tests that are repeated enough to bring in house, and tests that are not valuable enough to keep. After the analysis of five specific send-out tests, it was found the number of requests was not significant enough to bring any tests in-house. With each component of send-out tests taken into account, such as machinery and labor, it was concluded that the number of repeats for each test does not have a significant enough p-value to bring any in house, thus none of the send-out tests would be beneficial to the clinical laboratory at the hospital to bring in-house. If this investigation were to be completed over a longer period of time, a possible trend for each test may become apparent. Many factors can be taken into account to look for a trend such as season, fiscal years, and health insurance renewal. The analysis of this data may bring to light how tests for diagnosis, treatment, and care are being used. Because each test has its own cost, hospitals are looking to find an efficient and effective way to bring costs down for all persons involved. By finding trends in the tests requested relating to their costs and uses, it may create an impact on other hospitals nationwide to begin their own research. Many of the decisions that physicians make in treatment are based on laboratory data (Brown, 2013). With further research done on the types of test they are requesting, they too will acquire more knowledge on their strategies of testing. A continuation of this project could include an analysis of in-house tests and whether or not these tests should be turned into send-out tests. A similar method could be used but there would be many more tests to analyze.

Materials and Methods

The beginning of the project consisted of following the process and people that it takes to complete a send-out test, including the tests themselves. The data collection took place in the core lab at Johns Hopkins Hospital in the Homewood Campus. The first step of the process was to name the test. Figuring out the quantity of requests for the tests and the number of times it was repeated for each patient is a crucial variable for analysis. The second step was to select or recognize the diseases to research. Because there are so many different diseases and treatments, a more narrow approach was necessary to establish guidelines (Procop, 2013).

<table>
<thead>
<tr>
<th>Name of Test</th>
<th>Mycobacteria PCR</th>
<th>SMAD3, TGFβ2</th>
<th>Paraneoplastic CSF</th>
<th>NMDA-Receptor Ab</th>
<th>Synthetic Glucocorticoid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost (Dollars)</td>
<td>200-300</td>
<td>1000-2000</td>
<td>500-600</td>
<td>300-400</td>
<td>100-200</td>
</tr>
</tbody>
</table>

Table 1: The five most requested tests and the cost range to complete each

References