Developing a Validated Tool to Assess Internal Medicine and Infectious Disease Trainees’ Ability to Obtain and Interpret TB Diagnostics

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Background

- In order for TB incidence to continue to decline in the US, health systems and health care providers must remain vigilant in recognizing and diagnosing TB
- As TB diagnostics have evolved and improved, providers need to be aware of current recommendations for TB diagnosis
- Given that one untreated patient with active pulmonary TB infects an average of 10-15 people per year, missed cases have important consequences
- Up to 45% of TB patients in the US are diagnosed while hospitalized. Unfortunately, delays in diagnosis and treatment of TB among hospitalized patients have been reported
- Prior work has shown that in some urban areas the majority of internal medicine (IM) residents at least one TB case annually, infectious disease (ID) fellows likely see many more. In addition, IM and ID providers are often first to suspect TB disease
- As care patterns learned during training are reflected in future practice, training IM residents and ID fellows in TB diagnostics may have long-term benefits for TB control
- Assessing what IM and ID trainees know about diagnosing TB is important, but there are no validated instruments to assess IM and ID trainees’ knowledge of TB diagnostics

Objectives

- To develop and validate an instrument to assess trainees’ knowledge of available TB diagnostic tests, indications for the different tests, and interpretation of test results

Methods

- We created an instrument with 10 multiple-choice items based upon CDC’s Core Curriculum on TB
- Ten ID attending physicians reviewed the items for content and accuracy
- Using Qualtrics’® software, the instrument was emailed as an online survey to 86 IM residents at Johns Hopkins (JH) Hospital and JH Bayview Medical Center, and 43 ID fellows at JH, Emory University, and Vanderbilt University
- Resident responders were offered a $10 gift card as a token of appreciation for their time
- We used the American Association for Public Opinion Research’s response rate by institution or year of training
- The overall response rate was 57%; 53% of residents and 65% of fellows responded
- There was no difference in the response rate by institution or year of training
- The mean time to instrument completion was 15 minutes (SD=2)
- There was no difference in fellows’ scores by institution
- There was no difference in residents’ scores by institution

Figure 1: Examples of Questions from Instrument

Figure 2: Delivery of Instrument Using Qualtrics® Software

Figure 3: Validation Process

Table 1: Validation Results

<table>
<thead>
<tr>
<th>Type of validity</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content validity</td>
<td>No questions adjusted</td>
</tr>
<tr>
<td>Test validity: item analysis</td>
<td>One item with a correct response proportion of 0.14 adjusted</td>
</tr>
<tr>
<td>Test validity: point-biserial index</td>
<td>One item with a point-biserial index of 0.01 adjusted</td>
</tr>
<tr>
<td>Criterion validity: resident vs. fellow scores</td>
<td>3.8/10 [SD 1.7] vs. 7.10 [SD 1.8]; p&lt;.001</td>
</tr>
<tr>
<td>Reliability: KR-20</td>
<td>0.72</td>
</tr>
</tbody>
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Conclusions

- We developed and validated a 10-item instrument for use by IM and ID trainees to assess their knowledge regarding the ordering and interpretation of TB diagnostic tests
- Employing the instrument to identify trainee knowledge gaps will allow for the creation of educational interventions on TB diagnostics
- This validation process can also be applied to educational projects focused on other infectious diseases or populations

References