Development and Validation of a New Tool to Assess Knowledge and Skills in Evidence-based Medicine

Nancy Adams§, Laura Willett*, Sarang Kim*, Kerry A. O'Rourke*, Eileen Moser§, Carol Whitfield§, and Diana Glendinning*

§Penn State College of Medicine; *Rutgers, Robert Wood Johnson Medical School

Acknowledgments: This project was supported by an NEGEA Collaborative Research Grant

Evidence-based medicine (EBM) refers to medical practice that uses the best, current evidence to inform decisions. Many medical schools currently have, or are developing, curricula in EBM. A validated and practical tool would provide these schools with a resource for evaluating students.

Although validated measurement tools have been described and used previously, none are both comprehensive and practical. The Fresnio test is a comprehensive assessment that is time-consuming to grade. The Berlin test is a multiple-choice question (MCQ) test but does not cover the complete breadth of undergraduate medical EBM content.

We aim to develop a new test of EBM knowledge and skills that is reliable, valid, efficient and appropriate for undergraduate medical students. We report on the progress of our project.

**Phase 1: Test Development**

**Defining Domains:**
We reviewed the EBM literature and textbooks and drew from our experience to
(i) Define 4 domains of EBM skills
(ii) Determine the best allocations of these domains in our test.

**Question Writing:**
Individuals wrote MCQ questions, and the group collectively reviewed and edited each question. Each question was classified as belonging to one of each of the domains. Twenty questions were entered into the REDCap (Research Electronic Data Capture) survey software.

**Expert Review:**
As part of the test development, the 20 questions were distributed to 3 faculty who were not in our group, but actively teaching EBM. Each expert “took” the test and answered specific questions about the difficulty, clarity and goodness of each question. They also answered several questions about the domain allocation.

**Quantification of Content Validity**
Content Validity will be quantified using the Content Validity Index (CVI). With 8 reviewers, items with a CVI of 0.88 will be considered valid.

\[
\text{Item CVI} = \frac{\text{# of reviewers choosing 3's and 4's on importance}}{\text{The total number of content reviewers}}
\]

\[
\text{Test CVI} = \frac{\text{# of test items deemed valid}}{\text{total # items}}
\]

**Future Validation Studies**
After Content Validation has been achieved, the following validation steps are planned:

- Content validity with EBM experts
- Pilot test with students and experts
- Discriminant validity and equivalence
- Responsiveness validity
- Retesting of novices

**References**
1. Shneyfelt et al., 2006
2. Ramos, Schafer & Traczy, 2003
3. Fritsche, Greenhalgh, et al., 2002
4. The Penn State Clinical & Translational Research Institute, Pennsylvania State University CTSA, NIH/NCATS Grant Number UL1 TR000127
5. Lynn, 1986