Accessing External Resources During a High-Stakes Secure Exam

Rebecca S. Lipner, PhD
American Board of Internal Medicine (ABIM)
Goal of Talk

• Discuss issues with open-book (OBE) vs closed-book exams (CBE)
  • Define construct to be tested with OBE
  • Review literature on OBE vs CBE

• Describe two uses of external resources in a secure exam
  • Clinical calculator tool
  • Web resources pilot test

• Discuss future research that could inform this novel area
Background

• Certification is high-stakes
  • Not being certified has consequences for employment
  • The public may rely on certification to choose a physician

• ABIM exams currently are
  • Closed book
  • Mostly selected response
  • Patient vignettes: Test clinical judgment and purposefully not rote-memorization
  • Administered at secure testing centers
Background
Technology Changes in Medicine

Decision Support Systems

Mobile Devices

2014 Epocrates Mobile Trends Report
41% of clinicians are “digital omnivores” - use the triad of tablet, smartphone, and computer routinely in a professional capacity
The Debate: Open-Book

• PROs
  • Physicians use external resources regularly (?) in patient care
  • “Look-up” should be allowed so exam is more true to practice

• CONs
  • People (physicians too) don’t always know what they don’t know
  • To provide quality patient care, physicians must have a rich and well-organized knowledge base (“core”) - without “look-up”
If Open-Book: What Construct is Being Tested?

• If assess clinical judgment but allow external resources for look-up
  • Construct is thought to have same purpose as closed-book exam but does the construct change when allow look-up?

• If assess information retrieval skills – use of external resources is the object
  • Construct has different purpose than the closed-book exam, so definitely a different construct
Academic Medicine, *in press* (Durning, 2015)
Systematic Review of Literature: Methods

• OBE (e.g., note cards, “cheat sheet”, book, internet)
• MEDLINE, ERIC, PsychInfo, Google Scholar
  • Variety of search terms (OBE, CBE, OBT, CBT, exam resources, exam format...)
• 4,192 citations (reduced to 37)
• Grouped by six emergent themes/categories
• Most resources were not web resources
Six Themes: Results

1) Exam preparation
   • Students prepare differently and at greater length for CBE

2) Test anxiety
   • Students overestimate the impact that OBEs have on reducing anxiety

3) Exam performance
   • Students do better on CBE
Six Themes: Results (2)

4) Psychometrics and logistics
   • OBEs take longer and reliability lower

5) Learning effect
   • No difference

6) Public perception
   • OBEs seen as more difficult by examinees
Examples Accessing External Resources

• Clinical Calculator
  • Smaller step
  • Risk calculators and diagnostic calculator tools are used in daily practice so no need to memorize complex formulas

• Web resources – “Open-book”
  • Larger step
  • Pilot study using a resource known as “Isabel”
Clinical Calculator Example

• Designed to provide secure in-exam access to common diagnostic calculators available on the internet (e.g., MDCalc, MedCalc)

• Accessible via the upper toolbar on the exam where candidates now access a traditional calculator

• Application launches in an interface designed to closely resemble online calculators available in daily practice
Clinical Calculator Functionality

CHADS<sub>2</sub> Score for Atrial Fibrillation Stroke Risk

- Congestive Heart Failure history? Yes
- Hypertension history? Yes
- Patient age is 75 years or older? Yes
- Diabetes Mellitus history? Yes
- Stroke symptoms previously or TIA? Yes

Score: 3
Risk of Thromboembolic Event per Year: 5.9%
Risk Category: High
Pilot OBE Example

• Question: Is an OBE exam feasible in a secure setting?

• Collaboration among
  • Testing organization (ABIM)
  • Testing vendor (Pearson VUE)
  • Web resource provider (Isabel Healthcare)
Things to Consider in OBE

• External resources
  • Are there common ones for the specific field of testing?
  • Are they available for use?
  • How many external resources should be used?
  • Are tutorials needed to familiarize examinee with resources before event?

• Environment
  • Ensure content viewed in locked-down environment (HTML-based or PDFs)
  • All content available under one domain (No links to external sites)
  • No login required to access content
Isabel Healthcare Web Resource

• Main Purpose: Reduce diagnostic errors in healthcare
• Web-based diagnosis checklist system
• Integrates knowledge resources from leading publishers (e.g., Best Practice)
Technical Solutions

• Pearson VUE
  • Modification of web link (out to hosted content), eliminate scripting errors
  • Block users from unauthorized websites

• Isabel Healthcare
  • Authentication for access to resource
  • Log file to follow look-up activity
  • Block users from unauthorized websites

• ABIM
  • Transmission of registration information
Proof of Concept Pilot Study

• 6-month project that assumes not all features perfected
• 60-item test
  • Three 20-question modules plus survey
• 23 pilot testers
  • Physicians and non-physician staff
• Tutorial done ahead of the event
• Pilot testers encouraged to
  • Use links to assess ease of use
  • Attempt to “break out” of web resource
Using a Link to Access Website

A 43-year-old man who has recurrent calcium oxalate nephrolithiasis has had right flank pain radiating to the scrotum for two days. He has not had nausea or vomiting. The pain is consistent with that of previous episodes of renal colic. The patient rates the pain as 7 of 10 (on a scale from 0, no pain, to 10, most severe pain); naproxen and hydrocodone have provided minimal relief. He has increased his fluid intake.

Computed tomography of the pelvis reveals a 4-mm stone at the right ureteropelvic junction. No hydronephrosis is noted.

Which of the following is the most appropriate recommendation?

- A. Continue supportive care; initiate a low-sodium diet
- B. Begin hydrochlorothiazide
- C. Begin tamsulosin
- D. Refer for shock-wave lithotripsy
- E. Admit for possible ureteroscopy
Isabel’s Website Search Feature
Isabel’s Diagnoses’ Web Results Page
<table>
<thead>
<tr>
<th>Component</th>
<th>Date</th>
<th>Query Text</th>
</tr>
</thead>
<tbody>
<tr>
<td>BP Search via Widget</td>
<td>2013-05-31 12:43:46</td>
<td>tobacco cessation</td>
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<td>2013-05-31 12:42:08</td>
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<td>atrial fibrillation treatment</td>
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<td>Don’t miss diagnoses</td>
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## Survey Results from Pilot Testers

<table>
<thead>
<tr>
<th>Question</th>
<th>N (Agree)</th>
</tr>
</thead>
<tbody>
<tr>
<td>It was easy to access to the web resource when available during exam</td>
<td>17</td>
</tr>
<tr>
<td>I never encountered any technical errors when I was using the web resource</td>
<td>4</td>
</tr>
<tr>
<td>I would have liked to be able to access additional web resources during the exam</td>
<td>9</td>
</tr>
<tr>
<td>I was able to find my information on the web resource in a reasonable amount of time</td>
<td>10</td>
</tr>
</tbody>
</table>

### Common Comments

<table>
<thead>
<tr>
<th>Comment</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Was able to send email, get into Facebook, blogs, Twitter</td>
<td>7</td>
</tr>
<tr>
<td>Cannot cut, copy, paste text</td>
<td>5</td>
</tr>
<tr>
<td>Too much promotional information in resource</td>
<td>3</td>
</tr>
</tbody>
</table>
Conclusions

• Feasibility promising
• Log file informative
• Technical issues remain
  • Scripting errors
  • Navigation issues
  • Ability to copy and paste
  • Build out the security process
  • Build out the credential verification process
• Web resource(s) should support the construct being tested
Future Research: Structured Designs

• To assess clinical judgment - with a resource available
  • Type and number of resources
  • Amount of testing time
  • Age of examinee
  • Question type
  • Others?

• To assess information retrieval skills
  • Need to develop new exam questions where testing point is retrieval skills
  • Track time, path, and resources used