Evidence-Based Assessment: Envisioning the Future

CDU School of Medicine

Miguel Paniagua, MD, FACP
Medical Advisor, Test Development Services
National Board of Medical Examiners
Adjunct Associate Professor of Medicine
University of Pennsylvania Perelman School of Medicine
Objectives

• By the end of the rounds the participant will:
  – Determine the role of innovations and limitations of assessment modalities
  – Discuss methods to improve education and assessment in diverse settings
  – Question the evolution of assessment of non-traditional competencies
    • Use of clinical decision making tools during an examination
    • Systems-based practice
    • Assessment of communication skills
    • Professionalism
How does assessment drive education?

“If we test it, they will teach it; If we test it, they will learn it…”

But how can we help teaching & assessment evolve to better approximate real-world practice?
The Committee to Evaluate the USMLE Program (2008)

• Support decisions about a physician’s readiness to provide patient care at each of two patient-centered points:
  – At the interface between undergraduate and graduate medical education (supervised practice)
  – At the beginning of independent (unsupervised) practice

• Affects many aspects of test development, including item writing and item review

• Item writers and reviewers must now focus on decision points
Decisions, Decisions!

Decision Point 1 (DP1)  Decision Point 2 (DP2)

<table>
<thead>
<tr>
<th>STEP 1</th>
<th>STEP 2</th>
<th>STEP 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical School Year 2</td>
<td>Medical School Year 4</td>
<td>Resident</td>
</tr>
</tbody>
</table>

Readiness for entry into supervised practice of medicine

Readiness for entry into unsupervised practice of medicine
Decisions, Decisions!

Decision Point 1
- Common
- Straight-forward
- Single Issue
- Typical
- Uncomplicated

Decision Point 2
- Less Common
- Nuanced
- Multiple Issues
- Atypical
- Complicated
Multiple Choice Questions

Advantages
- Broad content coverage
- Best for knowledge & cognitive skills
- Objective scoring
- Reproducible scores (test score reliability)
- Monitor exam difficulty

Disadvantages
- Cannot assess practical or interpersonal skills
- Professionalism? Teams?
- Involves other skills such as reading, memory
- MCQ study habits
- Recall vs. reasoning?
- The “test-wiseness” factor
Assessment of Foundational Science Throughout USMLE

- Changes to Step 1 questions
  - Increased clinical relevance, eliminated recall.
- Integration of appropriate foundational science questions into decision point 2
- Increased Biostatistics and Epidemiology content
Sample Patient Vignette

A 69-year-old woman comes to the physician because of weakness of her right leg since awakening 4 hours ago. Neurologic examination shows weakness of the extremity and Babinski sign on the right. Sensory testing shows decreased somatic sensation in the right foot and decreased position sense in the toes. An MRI of the brain shows an infarct in the cerebral cortex of the left hemisphere. Which of the following labeled arteries in the arteriogram is most likely to be involved?

<table>
<thead>
<tr>
<th></th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>74</td>
</tr>
<tr>
<td>Step 2 CK</td>
<td>60</td>
</tr>
<tr>
<td>Step 3</td>
<td>37</td>
</tr>
</tbody>
</table>
Basic Science Retention: 1975 to 2009

Total
Biochem
Micro
Anat
Phys
Pharm
Behav Sci
Path

1975-77
1981-82
1988-89
1991-92
2004-05
2008-09 Step 2
2009-10 Step 3
But how can we help teaching & assessment evolve to better approximate real-world practice?
What are the advantages of simulations for assessment and teaching?

- Learner-centered
- Exposure to situations not normally encountered
  - Controlled & reproducible (standardizable)
- Lifelike with immediate feedback
- Diverse topics difficult to teach & assess elsewhere
  - i.e. Team functioning
- “Crash in the simulator, not in the plane”

_Huang, 2007; Issenberg, 2005; Kneebone, 2005_
What are the limitations of simulations?

- Expensive and time-consuming to produce
  - High-fidelity simulators very costly
- Still requires trained facilitators
- For procedural skills, may only be helpful at beginning of learning curve
- Technology in its infancy as is supporting research

Kneebone, 2005; Cohen, 2006; Sedlack 2003
Use of Multimedia

• Steps 1, 2 CK and 3
  – Visualization of skin findings as well as other PE findings rather than descriptions
  – Heart sounds with associated clinical vignettes
  – Can the examinee differentiate normal from abnormal?
  – Visualization of neurologic findings to replace verbal descriptions
  – Brief video clips for communication MCQs
Assessment of Physical Exam Skills

• Heart sounds – original text version

A 6-year-old boy is brought to the physician by his mother for a well-child examination. He recently started practicing gymnastics in hopes of joining a gymnastics team, and his mother is concerned that his heart seems to be pounding after he exercises. The patient's growth and development are appropriate for age. Immunizations are up-to-date. His temperature is 37.5°C (99.5°F), pulse is 80/min, and respirations are 20/min. Breath sounds are normal bilaterally. There are no murmurs. $S_1$ is heard best at the apex. $S_2$ is loudest at the upper left sternal border; splitting of $S_2$ increases during inspiration. The remainder of the examination shows no abnormalities. Which of the following is the most appropriate next step in management?

- A. Reassurance
- B. Chest x-ray
- C. ECG
- D. Exercise stress test
- E. Echocardiography
Assessment of Physical Exam Skills

• Heart sounds
Breath Sounds

• 2015: Initial pre-test
  – 60 items
  • Examinees seem to have difficulty identifying normal breath sounds
  • Some text versions tested better than breath sound version
  • Step 1 breath sounds should be straightforward
  • Step 3 breath sounds should focus on management, not diagnosis
Assessment of Physical Exam Skills

• Lung sounds
Breath Sounds and Heart Sounds

- Breath sound items on Steps 1, 2 CK & 3
- Developing prototype avatar with anterior and lateral lung sounds
- Pilot work on response time and file size
- Heart sounds: variable heart rates?
- Heart and breath sounds: different ethnic backgrounds?, BMI?, age?
- Exposure of female breasts raised by avatar vendor
Assessment of Physical Exam Skills

• Neurologic Findings
Assessment of Physical Exam Skills

• Neurologic Findings
Assessment of Physical Exam Skills

• Neurologic Findings
Transforming patient vignettes

Patients don’t show up as nicely-constructed narrative paragraphs with A through E on their foreheads!”

- Anonymous student
Vignette to Chart Format

• Instead of the patient vignette in text (paragraph[s]), the information is presented as one would see in a patient chart (EHR)

• Pilot:
  – Step 1: 30 items
  – Step 3: 20 items
Vignette to Chart Format

• 10 items reformatted
  – Mean reduction of words: 63 (33-104)
  – Mean % reduction of words: 35% (25-54)
• How much of time spent answering a typical item is from reading versus the processing of the complex information?
A 3-year-old boy is admitted to the hospital because of a 5-day history of fever and cough. Since the age of 6 months, he has been treated for recurrent episodes of acute otitis media and has been hospitalized twice for treatment of pneumonia and once for treatment of viral meningitis. He was born at term following an uncomplicated pregnancy and delivery. His immunizations are up-to-date. He has no known drug allergies. He currently receives no medications or herbal or vitamin supplements. His maternal uncle died of sepsis at the age of 6 years. The patient has two healthy sisters and a 3-month-old brother who has no history of infection. The patient is at the 10th percentile for height, weight, and head circumference. His temperature is 39°C (102.2°F). Examination shows no lymphadenopathy and absence of tonsils. Crackles are heard over the left lung base. Laboratory studies show:

- Total B lymphocytes 1%
- Total T lymphocytes 91%

**Serum**

- IgA 8 mg/dL
- IgG 60 mg/dL
- IgM 10 mg/dL

A PPD skin test and HIV antibody test are negative. X-rays of the chest are shown. In addition to intravenous antibiotic therapy for treatment of this patient's current symptoms, which of the following is the most appropriate next step in management?

- (A) Subcutaneous granulocyte colony-stimulating factor therapy
- (B) Subcutaneous interferon gamma-1b therapy
- (C) Complement replacement therapy
- (D) Intravenous immune globulin therapy
- (E) Bone marrow transplant
Patient Information

<table>
<thead>
<tr>
<th>Age</th>
<th>3 years old</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>Male</td>
</tr>
<tr>
<td>Department</td>
<td>Hospital</td>
</tr>
<tr>
<td>Allergies</td>
<td>None</td>
</tr>
</tbody>
</table>

History

Chief Complaint 5-day history of fever and cough.

HPI
- Recurrent episodes of acute otitis media since age 6 mo
- Hospitalized x2 for treatment of pneumonia, viral meningitis x1
- Born at term; uncomplicated pregnancy and delivery

PMHx
- Medications - None
- Immunizations - Up to date

Family Hx
- Maternal uncle died of sepsis at 6 yo
- Two healthy sisters, 3 mo brother with no history of infection

Physical Exam
- 10th percentile for height, weight, and head circumference.
- No lymphadenopathy; tonsils absent
- Crackles over the left lung base

Labs

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total B lymphocytes</td>
<td>1%</td>
</tr>
<tr>
<td>Total T lymphocytes</td>
<td>91%</td>
</tr>
<tr>
<td>IgA</td>
<td>8 mg/dL</td>
</tr>
<tr>
<td>IgG</td>
<td>60 mg/dL</td>
</tr>
<tr>
<td>IgM</td>
<td>10 mg/dL</td>
</tr>
<tr>
<td>PPD</td>
<td>Negative</td>
</tr>
</tbody>
</table>

Question
In addition to intravenous antibiotic therapy for treatment of this patient's current symptoms, which of the following is the most appropriate next step in management?

(A) Subcutaneous granulocyte colony-stimulating factor therapy
(B) Subcutaneous interferon gamma-1b therapy
(C) Complement replacement therapy
(D) Intravenous immune globulin therapy
(E) Bone marrow transplant
An 82-year-old woman comes to the emergency department because of frontal headaches that have increased in intensity during the past 3 weeks. Evaluation in the emergency department 3 weeks ago for headache showed sinusitis; mental status examination at that time showed no abnormalities. She was discharged with a prescription for a fluticasone nasal spray. She has a history of sinus headaches but continues to be concerned about having a stroke because an acquaintance in her Sunday school class at church had similar symptoms last month and died of a cerebral infarction. The patient also has hypertension and osteoporosis. Current medications include amlodipine, a daily multivitamin, and calcium carbonate. She lives alone and has few social contacts except through her church. Her temperature is 37°C (98.6°F), pulse is 82/min and regular, respirations are 22/min, and blood pressure is 130/80 mm Hg. Examination shows mild tenderness over the frontal sinuses and inflammation of the nasal membrane. There is 1+ pedal edema. On mental status examination, she says she has become increasingly anxious during the past month because she believes that there is something physically wrong with her but that no one is willing to tell her the truth. She has been feeling guilty that she may have caused her friend’s death. The patient has had a decreased appetite and difficulty sleeping because of her fear of having a stroke. She has been unable to concentrate or make decisions. She says she has not had a depressed mood or suicidal ideation but does think constantly about death. Her Mini-Mental State Examination score is 24/30; she recalls zero of three objects after 5 minutes and makes three errors when performing serial sevens. Which of the following is the most likely diagnosis?

- (A) Adverse effect of fluticasone
- (B) Bipolar disorder
- (C) Major depressive disorder
- (D) Pain disorder
- (E) Schizophrenia
Patient Information

Age 82 yrs
Sex Female
Department Emergency
Allergies None

History

Chief Complaint Headaches increasing in intensity during the past 3 weeks.

HPI
- Visit to ED 3 wks ago for headache due to sinusitis; mental status was normal. Discharged with fluticasone nasal spray.
- Increasingly anxious over last 1 mo. She believes to have physical illness but that no one is telling her the truth.
- History of sinus headaches; concerned about stroke because an acquaintance at church had similar symptoms and died of cerebral infarction. Feeling guilty that she may have caused friend's death.
- Decreased appetite and difficulty sleeping due to fear of stroke.
- Unable to concentrate or make decisions.
- Reports no depressed mood or suicidal ideation, but thinks constantly about death.

PMHx
- Medications: Amlodipine, Daily multivitamin, Calcium carbonate.
- Immunizations: Up to date
- Hypertension and osteoporosis.

Psychosocial Hx Lives alone and has few social contacts except through her church.

Physical Exam

Vital Signs

<table>
<thead>
<tr>
<th>BP</th>
<th>Pulse</th>
<th>Resp</th>
<th>O2 Sat</th>
<th>Temp</th>
<th>Wt</th>
<th>Ht</th>
<th>BMI</th>
<th>Pain</th>
</tr>
</thead>
<tbody>
<tr>
<td>130/88 mm Hg</td>
<td>82/min reg</td>
<td>22/min</td>
<td>-</td>
<td>39.5°C (103.1°F)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

- General Appearance: Appears anxious
- Mild tenderness over the frontal sinuses, inflammation of the nasal membrane.
- 1+ pedal edema
- Mini-Mental State Examination score is 24/30; recalls zero of three objects after 5 minutes and makes three errors when performing serial sevens.

Question

Which of the following is the most likely diagnosis?

- (A) Adverse effect of fluticasone
- (B) Bipolar disorder
- (C) Major depressive disorder
- (D) Pain disorder
- (E) Schizophrenia
## Vignette to Chart Format: Pilot Results

<table>
<thead>
<tr>
<th></th>
<th>% Correct (Old)</th>
<th>% Correct (New)</th>
<th>Seconds/item (Old)</th>
<th>Seconds/item (New)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1 (28 items)</strong></td>
<td>75.04</td>
<td>75.89</td>
<td>103.13</td>
<td>101.08</td>
</tr>
<tr>
<td><strong>Step 3 (17 items)</strong></td>
<td>67.41</td>
<td>68.06</td>
<td>85.25</td>
<td>82.31</td>
</tr>
</tbody>
</table>
Vignette to Chart Format: Future Research

Phase 1: Feasibility Small Pilot
Phase 2: Pilot
Phase 3: Large-scale test
Assess an examinee’s ability to obtain, interpret, and apply scientific & clinical information

• Testing application of biostatistics knowledge in real-life settings
• Faux pharmaceutical advertisements and scientific abstracts to serve as stimuli for MCQs
• NBME/Up-to-date pilot
Practice-based learning and improvement (EBM)

- Biostatistics and epidemiology MCQs
- Scientific abstracts
- Pharmaceutical advertisements
Six months of spironolactone improved left ventricular function in patients with mild to moderate heart failure

**Question**
In patients with mild to moderate heart failure (HF), what are the effects of spironolactone on left ventricular (LV) function and functional capacity?

**Methods**

**Design:** Randomized placebo-controlled trial.

**Allocation:** Unclear allocation concealment.

**Blinding:** Patients blinded; clinicians unblinded.

**Follow-up period:** 6 months.

**Setting:** Not stated.

**Patients:** 158 patients (mean age 60 years, 84% men) with clinical evidence of HF (history of HF symptoms and signs or symptoms), LV systolic dysfunction (LV ejection fraction ≤40% within the past month), New York Heart Association class I to II severity of symptoms, and optimal medical treatment (including renin-angiotensin and diuretics, maintained at stable doses for ≥6 months). Exclusion criteria were an acute coronary syndrome or revascularization procedure in the previous 3 months, planned cardiac surgery in the next 3 months, chronic renal insufficiency, hyperkalemia, neoplasia, or life expectancy <1 year.

**Intervention:** Spironolactone, 25 mg/dL, uptitrated every 2 weeks to 50 or 100 mg/dL as tolerated (n=79), or placebo (n=79) for 6 months. If serum potassium remained >5.5 mEq/L or if creatinine was ≥3 mg/dL, the study medication was discontinued, and the patient was managed with conventional therapy only.

**Outcomes:** Included LV ejection fraction, LV end-diastolic and end-systolic volumes, and myocardial mass.

Item 1 of 2

A 62-year-old woman with mild heart failure comes to the physician for a follow-up examination. She recently read an article on the Internet about the benefits of spironolactone and asks if it should be added to her medication regimen. The physician conducts a search on the topic of the effects of spironolactone on left ventricular function and finds the abstract shown. Based on this abstract, the physician recommends against adding this drug to the patient’s medication regimen. Which of the following study characteristics provides the best rationale for the physician’s decision?

- A. Duration of follow-up was insufficient
- B. Exclusion criteria were too strict
- C. Funding source was not stated
- D. Measured outcomes were not important to patients
- E. Only 16% women were included in the study population
- F. Randomization allocation was not described
- G. Sample size was insufficient
Outcomes: Included LV ejection fraction, LV end-diastolic and end-systolic volumes, and myocardial mass.

Patient follow-up: 100%.

Main Results
At 6 months, patients who received spironolactone had greater increases in LVEF, and greater decreases in LV end-diastolic and end-systolic volumes than those who received placebo; groups did not differ for LV mass.

<table>
<thead>
<tr>
<th>Spironolactone vs placebo in patients with mild to moderate heart failure</th>
<th>Spironolactone</th>
<th>Placebo</th>
</tr>
</thead>
<tbody>
<tr>
<td>**Baseline</td>
<td>6 Months</td>
<td>Change</td>
</tr>
<tr>
<td>Change in LVEF (%)</td>
<td>35.2</td>
<td>39.1</td>
</tr>
<tr>
<td>Change in LV end-diastolic volume (mL)</td>
<td>195.8</td>
<td>169.0</td>
</tr>
<tr>
<td>Change in LV end-systolic volume (mL)</td>
<td>130.9</td>
<td>106.1</td>
</tr>
<tr>
<td>Left ventricular mass (g)</td>
<td>269.0</td>
<td>243.0</td>
</tr>
</tbody>
</table>

†P value (analysis of variance) for changes from baseline in spironolactone vs placebo group.

Conclusion
In patients with mild to moderate heart failure, 6 months of spironolactone increased left ventricular ejection fraction and reduced left ventricular end-diastolic and end-systolic volumes.

Source of funding: Not stated.


Item 2 of 2
Which of the following conclusions is most strongly supported by the results of this study?

- A. Because spironolactone significantly improves left ventricular ejection fraction, it should be prescribed for patients with mild to moderate heart failure to improve survival
- B. The 95% confidence interval for the difference in change in left ventricular mass between spironolactone and placebo does not include 0
- C. Left ventricular end-systolic volume decreases by a greater amount in patients treated with spironolactone than in patients treated with placebo
- D. Spironolactone improves quality of life in patients with mild to moderate heart failure
- E. Spironolactone should not be used in patients with hyperkalemia (K+>5.5)
The drug ad in the exhibit applies to the next 2 items.

Item 1 of 2

The information in this advertisement most strongly supports which of the following claims?

- A. Adverse events similar to vehicle
- B. Cosmetically elegant product
- C. Good symptom control with 6 weeks of treatment
- D. HPA axis suppression is rare
- E. Majority of patients respond to treatment

Item 2 of 2

The advertisement references "Psoriasis clearing with once-a-day treatment" with Essepro Crème. A study with which of the following designs would provide the most definitive information regarding this claim?

- A. Case-control study
- B. Case series
- C. Prospective cohort study
- D. Cross-sectional study
- E. Randomized controlled trial

End of Set
Access to References

- Pilot
- School based
- 1 hour 45 minutes
- 2 blocks of items, 105 minutes
- Retired Step 2 items
- UpToDate®
Access to References: Pilot Objectives

• Identify and remediate technical issues in incorporating electronic references into exam delivery
• Gain experience and identify exam administration issues (e.g. security)
• Effect on item difficulty and discrimination
• Determine implications of providing online references in a timed exam setting
• Inform next steps in research agenda, development and exam delivery
Access to References: Pilot

- 33 Examinees, 50 questions

- All examinees completed both sets of questions
# Access to References Pilot: Examinee Statistics

<table>
<thead>
<tr>
<th>Mean Examinee Measures</th>
<th>Block 1 (no Access to References)</th>
<th>Block 2 (with Access to References)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of items correct</td>
<td>15.4</td>
<td>16.5</td>
</tr>
<tr>
<td>Weighted Score*</td>
<td>5.2</td>
<td>4.7</td>
</tr>
<tr>
<td>Total Time Spent in Block**</td>
<td>34.9 minutes</td>
<td>36.4 minutes</td>
</tr>
<tr>
<td>Time Spent in A2R</td>
<td>-</td>
<td>4.4 minutes</td>
</tr>
<tr>
<td>Items used with A2R</td>
<td>-</td>
<td>4.5 items</td>
</tr>
</tbody>
</table>

*Weight used: percent of examinees who got the item incorrect
**Based on item duration values provided by ITS
Use of References Diminished Over Time

Total Minutes Spent in A2R by Item Sequence

- **X-axis**: Item Sequence
- **Y-axis**: Total Minutes Spent in A2R

THIS IS EXCLUSIVE, CONFIDENTIAL, and PROPRIETARY DATA BELONGING TO THE NBME
References and Item Categories

For which types of items was UpToDate particularly helpful? (Select all that apply.)

- Prevention
- Mechanisms of disease
- Most likely diagnosis
- Next step in workup
- Next step in treatment
Accessing Online References in a Timed Setting

Which of the following statements best summarizes your opinion about the time limit for the section of the examination in which access to UpToDate was available?

- I had sufficient time to complete each section
- I needed an additional 5 minutes to complete each section
- I needed an additional 10 minutes to complete each section
- I needed an additional 15 minutes to complete each section
- I needed more than an additional 15 minutes to complete each section
Examinee Comments from Pilot

- There isn't enough time to skim the information to answer a question with some confidence.
- I felt the same level of confidence/uncertainty when I used UptoDate as when I didn't have access to it.
- You either know the information or you don't.
- That is how we will be practicing medicine today and in the future; we will be presented a case and then have time to look up any questions.
- Adding this resource onto the test only seems to slow me down.
- Technical issues.
- Takes away time from questions, especially if you are not certain of what search to type in or have a vague idea of what you want answered.
- Makes me second guess my answers, which sometimes I already do.
Other Commonly Used References (or Tools)

- Cardiac risk calculators
- Other calculators
- Pharmacotherapeutic references
- Metabolic map
- Guidelines (CDC vaccination schedules)
Cardiac Risk: Aspirin? Statin?

A 62-year-old man comes to the office for a health maintenance evaluation. He is generally healthy. Medical history is unremarkable and he takes no medications. His father has hypertension and his mother was recently diagnosed with breast cancer. He exercises three to four times per week, an average of 1.5 hrs of aerobic exercise a week. He is 5 ft 8 in tall and weighs 150 lb; BMI is 22.8 kg/m². Pulse is 68/min, respirations are 12/min, and blood pressure is 116/76 mm Hg in both arms, sitting. The remainder of the physical examination discloses no abnormalities. The patient asks, "Should I be taking aspirin daily?" Laboratory studies are shown:

Serum: Creatinine 1.1 mg/dL; Urea nitrogen 14 mg/dL; Cholesterol Total 210 mg/dL; HDL 65 mg/dL; Triglycerides 150 mg/dL; Glucose 98 mg/dL; and

Blood: Hematocrit 45%; Hemoglobin 14.5 g/dL; WBC 10,400/mm³; Platelet count 208,000/mm³;

Which of the following is the most appropriate response to the patient?
Commonly Used Tools

- http://cvdrisk.nhlbi.nih.gov/
- http://www.ahrq.gov/professionals/clinicians-providers/resources/aspprovider.html
Metabolic Map: Origins

• American Biochemistry Course Directors meeting May 2013
  – Introduced to the topic of biochemical pathways provided to first-year medical students to avoid rote memorization

• American Biochemistry Course Directors meeting May 2015
  – During USMLE Update, discussed the potential use one day on high-stakes testing
Metabolic Map Task Force

- Architects of the map and experienced USMLE item writers

- Goals of meeting:
  - How will questions using the "map" will be different from current USMLE questions?
  - Articulate the rationale for including the map on USMLE.
  - Render the map for ease of use.
  - Outline a communication plan with the medical education community.
  - Identify all stakeholders.
  - Identify risks and strategies to mitigate risks.
What about the other competencies?

• Harder-to-measure competencies
  • Systems-based practice
  • Communication & Interpersonal Skills
  • Professionalism

• Replace text with multi-media

• Multimedia makes clinical presentations more authentic/realistic, but…. 
“If we taught concert pianists the way we teach medicine, we’d tell them to go in the concert hall, play a piece, then ask them to come out and tell us how it went”

-George Miller
System-based practice (patient safety)

- Simple textual A-type items
- A-type items with the use of video prompts
- Medication reconciliation using a grid format for option set
A 57-year-old man has been diagnosed with vitamin B12 (cyanocobalamin) deficiency. The physician decides to treat the patient with daily oral Vitamin B12. Which of the following is the most appropriate way of recording an order on this patient’s chart?

A. Vitamin B12 1000 μg PO qd
B. Vitamin B12 1000 μg PO daily
C. Vitamin B12 .125 mg PO daily
D. Vitamin B12 125 mcg PO qd
E. Vitamin B12 125.0 mcg PO daily
F. Vitamin B12 0.125 mcg PO daily
A 25-year-old man is being prepared for discharge 4 days after admission to the hospital for treatment of sickle cell pain crisis. On admission, the patient reported diffuse muscle and bone pain. His temperature was 38°C (100.5°F). Treatment with intravenous fluids, oxygen, and intravenous morphine was begun. Examination and results of laboratory studies showed no evidence of bacterial infection; he was diagnosed with a viral respiratory infection. Today, the patient reports that his pain has improved and intravenous morphine is discontinued; he is transitioning to oral hydrocodone-acetaminophen therapy. He is able to eat and drink and has been ambulating without difficulty. His temperature is 37°C (98.6°F), pulse is 80/min, and blood pressure is 124/76 mm Hg. He is scheduled to see his primary care physician in 10 days.

Based on this information, complete the discharge medication reconciliation form below.

For each medication listed, please select from the choices below the most appropriate order for the setting (eg, home) to which the transfer is to be made:

- the dose/route used in the initial setting (eg, Home Dose/Route)
- the dose/route used in the subsequent setting (eg, Hospital Dose/Route)
- Do Not Take

Before proceeding to the next question, verify that there is a response for each medication listed.

### Discharge Dose/Route

<table>
<thead>
<tr>
<th>Drug</th>
<th>Home Dose/Route</th>
<th>Hospital Dose/Route</th>
<th>Home Dose/Route</th>
<th>Hospital Dose/Route</th>
<th>Do Not Take</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydroxyurea</td>
<td>500 mg po daily</td>
<td>500 mg po daily</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydrocodone-acetaminophen</td>
<td>5 mg/500 mg</td>
<td>1 tab po q4 hr prn</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multivitamin</td>
<td>1 tab po daily</td>
<td>1 tab po daily</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Codeine-acetaminophen</td>
<td>1-2 tab po q6 hr prn pain</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
For each row in the response grid below, rate the quality of the related performance in the video as "Satisfactory" or "Not Satisfactory." Before proceeding to the next question, verify that there is a response for each row and that the number of responses in each column is consistent with the instructions for that column.

<table>
<thead>
<tr>
<th>Environment used for error disclosure</th>
<th>Satisfactory</th>
<th>Not Satisfactory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acknowledgment of responsibility for the error</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Use of nonverbal communication to establish and maintain rapport</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>
Communication and Interpersonal Skills
Using Video Vignettes in MCQ items - Pilot

- Video-based items and text-based MCQ items
- Conducting think aloud qualitative data gathering
  - Capture thought processes and responses to the items

All items:
- Item difficulty
- Timing
- Accessibility
- Testing point of the item
  - What the item is intended to assess?
  - Confidence in answering correctly

Video items:
- Was there anything about the video or item that seemed confusing?
- Would this item be challenging if you could play the video only one time, or only a very limited number of times?
A 46-year-old Pakistani woman comes to the office with her husband to receive the results of diagnostic testing that reveal a serious new illness. When questioned, she insists that her husband stay in the room while discussing the results. Just prior to disclosing the results, the husband states, “Wait, doctor, please. If this is serious, I want you to talk to me first, and then I will decide.” When confirming this request with the wife directly, she states, “Yes, you may talk to him. He takes care of me.” Which of the following is the most appropriate next step by the physician?
A. Ask a nurse to serve as a witness while the physician shares the test results with the patient and her husband
B. Clarify the patient’s wishes after briefly separating her from her husband
C. Inform the patient that she has the right to ask her husband to leave the room
D. Inform the patient’s husband that the test results must be shared directly with the patient
E. Tell the husband that his wife must sign a HIPAA release form indicating it is OK to release medical information to only him
A 46-year-old woman comes to the office with her husband to receive the results of diagnostic testing. Play the video to view the interaction between the physician, the patient, and her husband. Which of the following is the most appropriate next step by the physician?
A. Ask a nurse to serve as a witness while the physician shares the test results with the patient and her husband
B. Clarify the patient’s wishes after briefly separating her from her husband
C. Inform the patient that she has the right to ask her husband to leave the room
D. Inform the patient’s husband that the test results must be shared directly with the patient
E. Tell the husband that his wife must sign a HIPAA release form indicating it is OK to release medical information to only him
Three days after being admitted to the hospital for treatment of an asthma exacerbation, a 12-year-old boy is prepared for discharge. He has no other history of serious illness. His medications after discharge are daily oral montelukast, inhaled fluticasone, and inhaled albuterol as needed, and the use of each is explained to the mother. The physician reviews the discharge instructions at the bedside with the mother, stating, “He has a pill, a yellow inhaler and a white inhaler. Can you repeat back to me how to use each of these just as I have explained them?” The mother does so with little difficulty. Before discharge, which of the following additional strategies is the most effective strategy for promoting adherence to the patient’s medication regimen?
A. Arrange for a home health nurse to visit after discharge
B. Ask the patient’s mother to repeat back the medication schedules in 10 minutes to ensure she understands
C. Include the patient in the instruction and write down the medication schedules
D. Schedule a follow-up telephone call with the family 72 hours after discharge
E. Use visual aids to assist the patient’s mother with the different inhalers
Three days after being admitted to the hospital for treatment of an asthma exacerbation, a 12-year-old boy is prepared for discharge. He has no other history of serious illness. His medications after discharge are daily oral montelukast, inhaled fluticasone, and inhaled albuterol as needed. The physician reviews the discharge instructions, as shown in the video.

Before discharge, which of the following is the most effective strategy for promoting adherence to the patient’s medication regimen?
Case 3 - video
Case 3 – options

A. Arrange for a home health nurse to visit after discharge
B. Ask the patient’s mother to repeat back the medication schedules in 10 minutes to ensure she understands
C. Include the patient in the instruction and write down the medication schedules
D. Schedule a follow-up telephone call with the family 72 hours after discharge
E. Use visual aids to assist the patient’s mother with the different inhalers
**Survey Results from Interviews**

Very Uncomfortable (1) to Very Comfortable (5) with communication tasks

<table>
<thead>
<tr>
<th>Activity</th>
<th>Average Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explaining treatment options to a patient</td>
<td>4.2</td>
</tr>
<tr>
<td>Making statements to help a patient cope with their health worries</td>
<td>4</td>
</tr>
<tr>
<td>Explaining risks and benefits of recommended interventions (procedures,</td>
<td>4.8</td>
</tr>
<tr>
<td>treatments, medications)</td>
<td></td>
</tr>
<tr>
<td>Offering patient-specific advice to resolve a common health problem</td>
<td>4.8</td>
</tr>
<tr>
<td>Conveying empathy to a patient</td>
<td>4.8</td>
</tr>
<tr>
<td>Identifying and pursuing verbal cues from a patient</td>
<td>4.4</td>
</tr>
<tr>
<td>Identifying and pursuing non-verbal cues from a patient</td>
<td>4.4</td>
</tr>
<tr>
<td>Communicating effectively with a patient even if I find the patient to</td>
<td>4</td>
</tr>
<tr>
<td>be difficult</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Activity</th>
<th>Average Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>A downloadable mini-test or set of practice items</td>
<td>4.8</td>
</tr>
<tr>
<td>Sample video items on the tutorial immediately preceding the test</td>
<td>4.4</td>
</tr>
<tr>
<td>A downloadable text description of the potential scenarios to be shown in</td>
<td>4.2</td>
</tr>
<tr>
<td>the videos, but not the actual videos</td>
<td></td>
</tr>
<tr>
<td>A web-based application to practice the items, including video examples</td>
<td>5</td>
</tr>
<tr>
<td>A web-based set of videos that could be viewed as examples, but no</td>
<td>3.6</td>
</tr>
<tr>
<td>practice items</td>
<td></td>
</tr>
</tbody>
</table>
Survey Results from Interviews

Very Uncomfortable (1) to Very Comfortable (5) with communication tasks

<table>
<thead>
<tr>
<th>Activity</th>
<th>Average rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taking a classroom test on a computer</td>
<td>4.8</td>
</tr>
<tr>
<td>Taking a classroom test that has static media images (e.g., radiographs, pictures)</td>
<td>4.4</td>
</tr>
<tr>
<td>Taking a classroom test that has video images, with no audio</td>
<td>4.75</td>
</tr>
<tr>
<td>Taking a classroom test that has video images, with audio</td>
<td>3.8</td>
</tr>
<tr>
<td>Taking a classroom test that has interactive items (e.g., drag and drop, hotspots)</td>
<td>4</td>
</tr>
<tr>
<td>Taking a licensure test or NBME exam on the computer</td>
<td>4.6</td>
</tr>
<tr>
<td>Taking a licensure or NBME exam that has static media images (e.g., radiographs, pictures)</td>
<td>4.6</td>
</tr>
<tr>
<td>Taking a licensure or NBME exam that has video images, with no audio</td>
<td>3.8</td>
</tr>
<tr>
<td>Taking a licensure or NBME exam that has video images, with audio</td>
<td>3.8</td>
</tr>
<tr>
<td>Taking a licensure or NBME exam that has interactive items (e.g., drag and drop, hotspots)</td>
<td>4</td>
</tr>
</tbody>
</table>
Video Vignette Pilot Study: Themes

• Positive remarks about the interface and the item type
• Some items were equally easy in both formats
  – E.g., excessive use of jargon was detectable as an communication deficit regardless of presentation
• Difficult to tell the tone of the interaction from the text alone
  – If tone was important, perceived difficulty of the item varied by format
• They quickly learned to apply test-taking strategies
  – E.g., read the stem and then options; some guessed the item from the video thumbnail alone
• “What’s the communication deficit?” was seen as easy; “What’s the next step for the physician?” was harder
Clinical Skills Enhancements

- Step 2 Clinical Skills Examination
  - Enhancement of communication skills assessment
    - Increase realism of SP questions and responses
    - Implementation of new grading rubric
    - Piloting more advanced communication challenges.
  - Enhanced assessment of clinical reasoning
    - Modifications to Patient Note
      - SOAP to SOAP format)
  - Distant future: advanced clinical skills (simulators)
Clinical Skills Exam Enhancements

• Our construct: The Six Function Model
  1. Fostering the Relationship
  2. Gathering Information
  3. Providing Information
  4. Helping the Patient Make Decisions
  5. Supporting Emotion
Clinical Skills Exam Enhancements

• New cases are based on a communication problem or challenge dealing with:
  – Decision Making
  – Supporting Emotions
  – Promote and Support Patient Self-Management
Professionalism

“...I know it when I see it...”

- Justice Potter Stewart, Jacobellis v. Ohio, 1964
Professionalism

• Two different (but linked) components:
  – A set of observable behaviors
  – The “humanistic” attitudes and traits that underlie them

Cohen, Acad Med. 2007
Assessments of Professionalism

• Physicianship forms
• Standardized Patient encounters (SP)
• Objective Structured Clinical Encounters (OSCE)
• 360 degree evaluations
• Mini-CEX’s and P-MEX [professionalism mini evaluation exercise]
• Portfolios, self-reflection and journals
Performance Assessments in Professionalism

Rating scales
- Capturing one person’s subjective judgment concerning another person on a quantifiable scale for purposes of evaluation

• Limitations
  - Poor inter-rater reliability
  - Limited generalizability
  - Resource-intensive design and execution
  - Done retrospectively

Gray, JD. Global Rating Scales in Residency Education. Acad Med 1996
Performance Assessments:

Raters

• Attendings
  – Most reliable raters
  – Product of their experience, the scoring tools used, and number of observations

• Resident peer evaluations
  – Less “halo effect” and lower scores

• Nurses
  – Consistent and reliable raters of humanistic qualities

• Patient ratings
  – Dependent on patient characteristics

• Self-ratings are used infrequently due to generosity error

Gray, JD Acad Med 1996
Professionalism

• Few if any validated tools to teach or assess professionalism
  – Using multiple methods and sources of information accumulated over time with multiple observations may be the best assessment strategy
  – Consensus about how to define and evaluate professionalism lacking
  – Balance between cost of development and cost of lapses in professionalism to stakeholders
Critical Synthesis Package: Assessment of Professional Behaviors (APB)

Publication ID
9902

Published
September 29, 2014

Version
1

Description

This Critical Synthesis Package contains (1) a Critical Analysis of the psychometric properties and application to health sciences education for the Assessment of Professional Behaviors Instrument (APB); (2) a copy of the Assessment of Professional Behaviors Instrument developed by the National Board of Medical Examiners and (3) two sample reports from the NBME based on instrument data.

The Assessment of Professional Behaviors program is a multisource feedback program designed to evaluate the observable behaviors of residents/fellows during their clinical training. The core component of the program is a multisource feedback instrument, Assessment of Professional Behaviors, which is the focus of this critical analysis.
ASSESSMENT OF TEAMWORK
Core Competencies for Interprofessional Collaborative Practice

Sponsored by the Interprofessional Education Collaborative*

Report of an Expert Panel
May 2011
Interprofessional team-based care

• Care delivered by intentionally created, usually relatively small work groups in health care, who are recognized by others as well as by themselves as having a collective identity and shared responsibility for a patient or group of patients, e.g., rapid response team, palliative care team, primary care team, operating room team
Skill / Behaviour
- Work collaboratively with others, as appropriate, to assess, plan, provide care/intervention and make decisions to optimize client/patient/family health outcomes and improve quality of care.
- Demonstrate leadership in advancing effective IP team function through a variety of strategies including, but not limited to:
  - Reflection,
  - Promotion of effective decision-making,
  - Identification of factors that contribute to or hinder team collaboration, including power and hierarchy,
  - Flexibility and adaptability,
  - Able to assume diverse roles in their IP group and support others in their roles,
  - Establish and maintain effective IP working relationship partnerships with clients/patients/families and other team members, teams and/or organizations to support achievement of common goals.

Attitude
- Based on client/patient/family needs, consider that preferred practice is IP collaboration and willingly collaborate.
Objectives: Revisited

• By the end of the rounds the participant will:
  – Appreciate the role of innovations in medical education and their application
  – Discuss methods to improve educational activities in diverse settings
  – Understand the evolution of assessment of other competencies
    • Use of clinical decision making tools during an examination
    • Systems-based practice
    • Assessment of communication skills
    • Professionalism
Questions and Discussion?