

The Elements of a Great Multiple-Choice Test Question

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Learning Objectives

- At the conclusion of this presentation, participants should be better able to
 - Explain the purpose of testing
 - Describe the elements of good MCQs
 - List item flaws that diminish an MCQ's validity



Purpose of Testing

- To ensure participant understands the content
- To reveal knowledge/competence gaps and areas that need reinforcement
- To improve a clinician's practice habits
- To provide proof that clinician has participated in activity

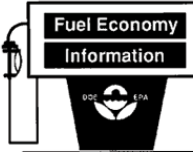
When you're taking a test and everyone starts using a ruler but you thought the answer was Abraham Lincoln



What to Test?

- Cover learning objectives
- Cover important points
- Cover medical certification exam topics

Compare this vehicle to others in the **FREE FUEL ECONOMY GUIDE** available at the dealer.

CITY MPG 23		HIGHWAY MPG 30
<small>Actual Mileage will vary with options, driving conditions, driving habits and vehicle's condition. Results reported to EPA indicate that the majority of vehicles with these estimates will achieve between 19 and 27 mpg in the city and between 26 and 35 mpg on the highway.</small>	1993 CANARY 2.0 LITER L4 ENGINE FUEL INJECTED AUTO 3 SPD TRANS CATALYST FEEDBACK FUEL SYSTEM Estimated Annual Fuel Cost: \$850	<small>For Comparison Shopping, all vehicles classified as COMPACT have been issued mileage ratings ranging from 11 to 31 mpg city and 16 to 41 mpg highway.</small>

"Dos" of Writing MCQs

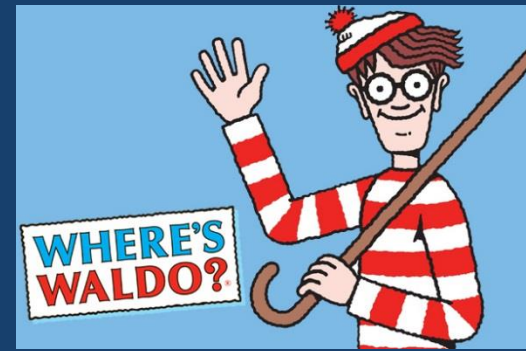
- Use the one-best-answer MCQ format
 - Clinical scenario/vignette (*optional*)
 - Lead-in question
 - 4 options (1 correct answer and 3 distractors)
- Add rationale (*optional*) to describe reason for correct/incorrect answers

Flaws to Avoid: Testwiseness

- Cueing: grammatical, logical, word repeats
- Absolute terms: always, never
- Long correct answer
- Convergence strategy



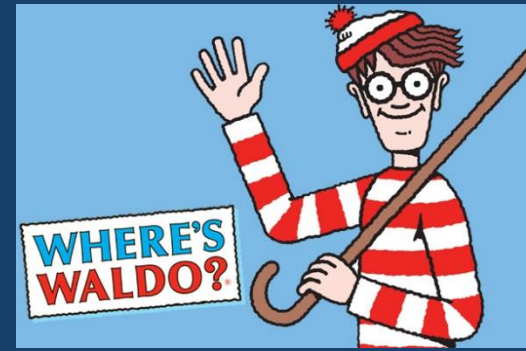
Find the Flaw!



Which of the following is NOT true regarding the EnRhythm MRI clinical study?

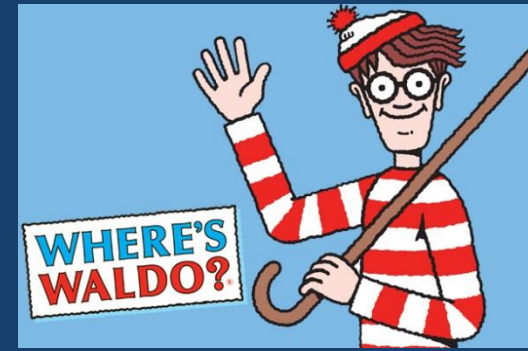
- A. It was a prospective, randomized controlled clinical trial to confirm the safety and efficacy of MRI in patients implanted with a specifically designed pacemaker and lead system
- B. Primary endpoint was safe and there was a successful completion of the MRI scan
- C. Pacemaker function was not normal during and/or after MRI
- D. Safety data showed no unexpected adverse events, MRI-related complications, or arrhythmias

Find the Flaw!



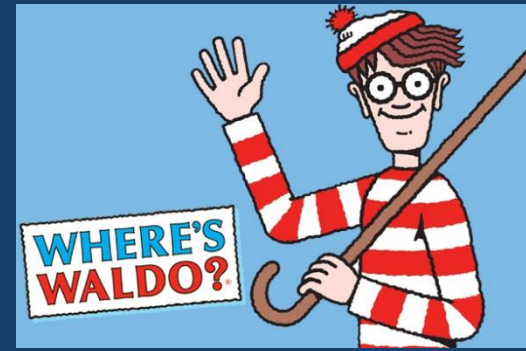
A 60-year-old man is brought to the emergency department by the police, who found him lying unconscious on the sidewalk. After ascertaining that the airway is open, the first step in management should be intravenous administration of

Find the Flaw!



- A. Examination of cerebrospinal fluid
- B. X-rays
- C. CT scan of the head
- D. Phenytoin
- E. Diazepam

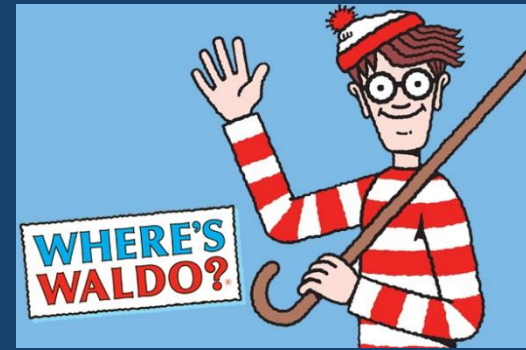
Find the Flaw!



Secondary gain is

- A. Synonymous with malingering
- B. A frequent problem in obsessive-compulsive disorder
- C. A complication of a variety of illnesses and tends to prolong many of them
- D. Never seen in organic brain damage

Find the Flaw!

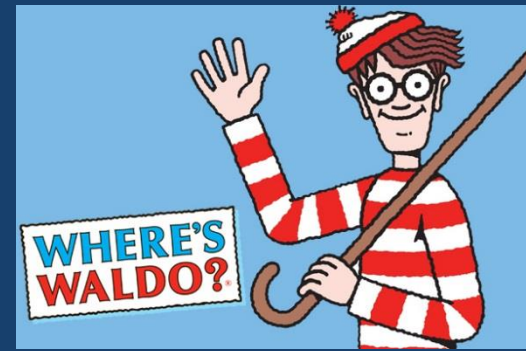


A 58-year-old man with a history of heavy alcohol use and previous psychiatric hospitalization is confused and agitated. He speaks of experiencing the world as unreal.

This symptom is called

- A. Depersonalization
- B. Derailment
- C. Derealization
- D. Focal memory deficit

Find the Flaw!



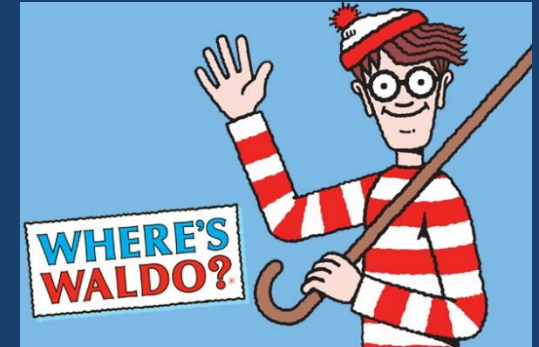
Local anesthetics are most effective in the

- A. Anionic form, acting from inside the nerve membrane
- B. Cationic form, acting from inside the nerve membrane
- C. Cationic form, acting from outside the nerve membrane
- D. Uncharged form, acting from inside the nerve membrane
- E. Uncharged form, acting from outside the nerve membrane

Flaws to Avoid: Irrelevant Difficulty

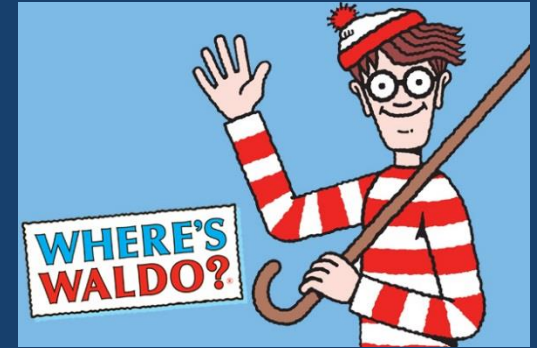
- Options or lead-ins are long, complicated
- Terms are vague (rarely, usually)
- Language in options isn't parallel
- Options aren't in logical order
- All of the above, none of the above – almost always the answer!
- Answer is hinged to an answer of a previous question

Find the Flaw!



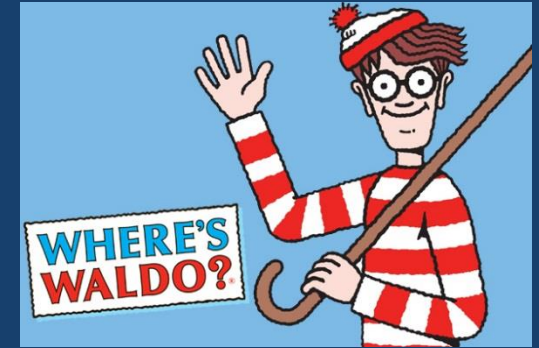
Which of the following statements regarding the role of echocardiography and right heart catheterization in the evaluation of pulmonary hypertension is most correct?

Find the Flaw!



- A. The sensitivity of echocardiography is similar to right heart catheterization for estimating pulmonary arterial pressures
- B. The specificity of echocardiography is similar to right heart catheterization for estimating pulmonary arterial pressures
- C. Right heart catheterization should be performed on all patients with pulmonary hypertension to confirm the diagnosis and determine the initial course of therapy
- D. The complication rate of right heart catheterization significantly limits its usefulness and non-invasive echocardiography is sufficient in most patients

Find the Flaw!

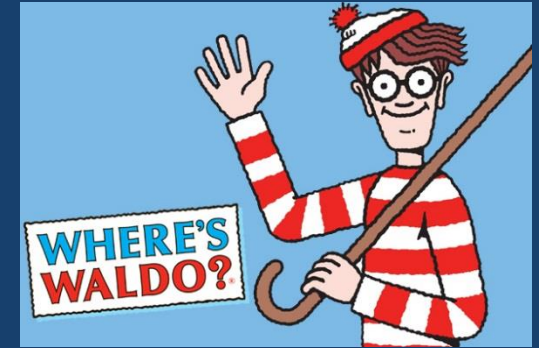


The patient's symptoms are most suggestive of

- A. Corneal ulcer
- B. Iritis
- C. Keratitis
- D. All of the above

Find the Flaw!

Revised



The patient's symptoms are most suggestive of

- A. Conjunctivitis
- B. Detached retina
- C. Hyphema
- D. Ruptured lens

MCQ: The Clinical Scenario

- Clinical scenarios should be brief and precise; avoid superfluous information
- Do not personalize or use names (eg, John came to the office...)
 - Only personalize if the social, ethnic, or religious information is crucial to answering the question(s)

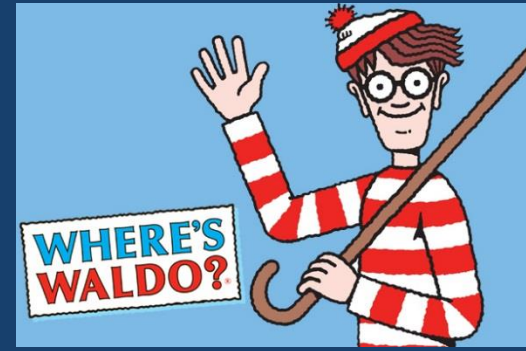
MCQ: The Clinical Scenario

A 52-year-old woman comes to the office because of generalized pruritis for the past 6 months and yellowing of her complexion for the past 2 weeks. Past medical history is negative. Physical examination reveals jaundice and hepatomegaly. Laboratory tests reveal a serum alkaline phosphatase level 5 times that of normal and a positive antimitochondrial antibody test.

MCQ: The Lead-in

- The lead-in (question)
 - Use language that clearly asks for one best answer
 - Avoid “Except,” “Least,” “Not”
 - Avoid True/False questions
 - Avoid interrelated options (eg, “All of the above,” “None of the above,” “Both A and B”)
 - Avoid True/False “Which of the following statements is correct?”

Find the Flaw!



Patients with all of the following, regardless of symptoms, are at significant risk and should be routinely screened for the development of pulmonary hypertension with Doppler echocardiography EXCEPT for patients with

- A. Cirrhosis and portal hypertension being considered for liver transplantation
- B. Family history of PAH
- C. If she has scleroderma
- D. HIV infection

MCQ: The Lead-In

- ▶ The most likely test result is
- ▶ The most appropriate management is
- ▶ Which of the following is the most appropriate next step?
- ▶ The most likely diagnosis is
- ▶ Which of the following is the most likely cause of her symptoms?

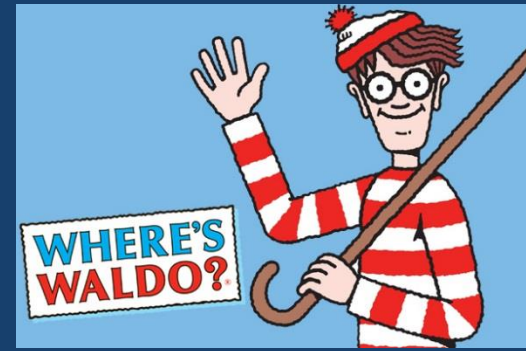
MCQ: The Options

- ▶ 3 distractors, 1 correct answer
- ▶ Arrange alphabetically or numerically
- ▶ Each option should grammatically follow the lead-in
- ▶ Options must not be
 - ▶ Opposites (eg, hyperthyroidism and hypothyroidism)
 - ▶ Too closely related (eg, MRI with contrast and MRI without contrast)

Evaluating the MCQ

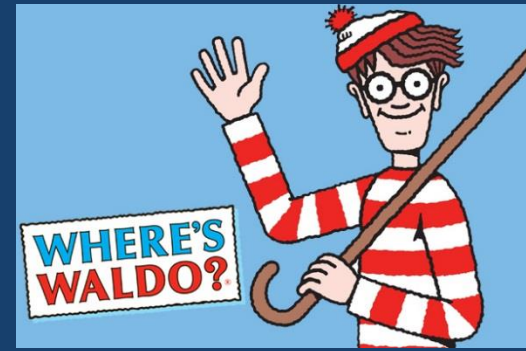
- Ask yourself the following questions:
 - Is the clinical scenario necessary to answer the question(s)?
 - Are all of the options plausible?
 - Are the options homogeneous?
 - Is the correct answer the best choice given?

Find the Flaw!



Larry, a 55-year-old Jewish man, presents to the office with progressive photophobia, blurred vision, and pain in the right eye for the past 6 hours. He is here with his wife, and he took the day off from work. He denies any trauma to the eye, or previous eye problems. Physical examination reveals a reddened and painful eye with the pupil constricted and direct and consensual photophobia apparent on penlight examination. There is evidence of a ciliary flush and diffuse reddening of the sclera at the limbus. Visual acuity and intraocular pressure are decreased in the affected eye.

Find the Flaw!



Which of the following is the most clinically relevant rationale for your choice?

- A. The patient will enjoy the camaraderie of the chemotherapy suite
- B. The patient lives near the office and will not have a problem with the amount of time chemotherapy administration will take
- C. You will have greater control over infusional drug administration vs the oral route and the opportunity for face-to-face assessment
- D. You will be able to determine whether a vascular access device is necessary for this patient



Questions/Discussion

