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SELF-ASSESSMENT AND BOARD REVIEW

哈里森内科学

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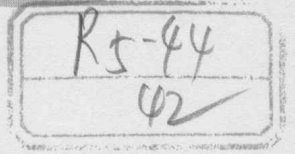
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Charles M. Wiener, Cynthia D. Brown, Anna R. Hemnes

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PREFACE

This is the third edition of *Harrison's Self-Assessment and Board Review* that we have had the honor of working on. We thank the editors of the 18th edition of *Harrison's Principles of Internal Medicine* for their continued confidence in our ability to produce a worthwhile companion to their exceptional textbook. It is truly inspirational to remind ourselves why we love medicine broadly, and internal medicine specifically.

The care of patients is a privilege. As physicians, we owe it to our patients to be intelligent, contemporary, and curious. Continuing education takes many forms; many of us enjoy the intellectual stimulation and active learning challenge of the question-answer format. It is in that spirit that we offer the 18th edition of the *Self-Assessment and Board Review* to students, housestaff, and practitioners. We hope that from it you will learn, read, investigate, and question. The questions and answers are particularly conducive to collaboration and discussion with colleagues. This edition

contains over 1100 questions that, whenever possible, utilize realistic patient scenarios including radiographic or pathologic images. Similarly, our answers attempt to explain the correct or best choice, often supported with figures from the 18th edition of *Harrison's Principles of Internal Medicine* to stimulate learning.

All of the authors have physically left the Osler Medical Service at Johns Hopkins Hospital. However, our experiences with colleagues and patients at Hopkins have defined our professional lives. In the words of William Osler, "We are here to add what we can to life, not to get what we can from life." We hope this addition to your life stimulates your mind, challenges your thinking, and translates to your patients.

Of course, none of this would be possible without the loving support of our families, for which we are truly thankful. They were patient and encouraging as we transformed (often not quietly) a mountain of page proofs into this book.

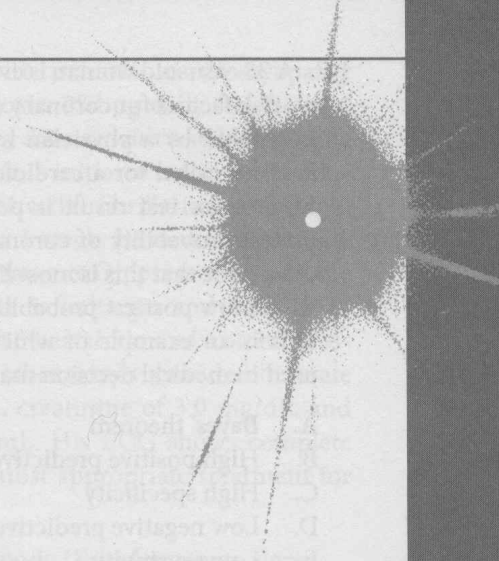
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SECTION I

Introduction to Clinical Medicine



QUESTIONS

DIRECTIONS: Choose the **one best** response to each question.

- I-1. Which of the following is the best definition of evidence-based medicine?
- A. A summary of existing data from existing clinical trials with a critical methodological review and statistical analysis of summative data
 - B. A type of research that compares the results of one approach to treating a disease with another approach to treating the same disease
 - C. Clinical decision making support tools developed by professional organizations that include expert opinions and data from clinical trials
 - D. Clinical decision making supported by data, preferably from randomized controlled clinical trials
 - E. One physician's clinical experience in caring for multiple patients with a specific disorder over many years
- I-2. All of the following are part of the informed consent process EXCEPT:
- A. Alternatives and likely consequences of the alternatives to the procedure
 - B. Ascertainment of understanding by the patient
 - C. Discussion of the details of the procedure
 - D. Outlining the patient's wishes if he or she becomes unable to make decisions
 - E. Risks and benefits of the procedure
- I-3. Which of the following is the standard measure for determining the impact of a health condition on a population?
- A. Disability-adjusted life years
 - B. Infant mortality
 - C. Life expectancy
 - D. Standardized mortality ratio
 - E. Years of life lost
- I-4. In high-income countries, what category of disease accounts for the greatest percentage of disability-adjusted life years lost?
- A. Alcohol abuse
 - B. Chronic obstructive pulmonary disease
 - C. Diabetes mellitus
 - D. Ischemic heart disease
 - E. Unipolar depressive disorders
- I-5. What is the leading cause of death in low-income countries?
- A. Diarrheal diseases
 - B. Human immunodeficiency virus
 - C. Ischemic heart disease
 - D. Lower respiratory disease
 - E. Malaria
- I-6. You are working with the public health minister of Malawi in a project to decrease malarial deaths in children younger than 5 years of age. All of the following strategies are part of the World Health Organization Roll Back Malaria plan EXCEPT:
- A. Artemisinin-based combination therapy
 - B. Early treatment with chloroquine alone
 - C. Indoor residual spraying
 - D. Insecticide-treated bed nets
 - E. Intermittent preventive treatment during pregnancy

- I-7. A 38-year-old woman is evaluated for chest pain. She has no risk factors for coronary artery disease, but a stress test is ordered by a physician in the emergency department. You are called for a cardiology consult when an exercise ECG stress test result is positive. You estimate that the pretest probability of coronary artery disease is 10% and determine that this is most likely a false-positive stress test with a low posttest probability of coronary artery disease. This is an example of which of the following principles used in medical decision making?
- Bayes' theorem
 - High positive predictive value
 - High specificity
 - Low negative predictive value
 - Low sensitivity
- I-8. A new diagnostic test for predicting latent tuberculosis is introduced into clinical practice. In clinical trials, it was determined to have a sensitivity of 90% and a specificity of 80%. A specific clinical population of 1000 individuals has a prevalence of tuberculosis of 10%. How many individuals with latent tuberculosis would be correctly identified in this population?
- 10
 - 80
 - 90
 - 100
 - 180
- I-9. In the above scenario, how many individuals would be erroneously told they have latent tuberculosis?
- 10
 - 90
 - 180
 - 720
 - 900
- I-10. A receiver operating characteristic (ROC) curve is constructed for a new test for disease X. All of the following statements regarding the ROC curve are true EXCEPT:
- One criticism of the ROC curve is that it is developed for testing only one test or clinical parameter with exclusion of other potentially relevant data.
 - The ROC curve allows the selection of a threshold value for a test that yields the best sensitivity with the fewest false-positive test results.
 - The axes of the ROC curve are sensitivity versus $1 - \text{specificity}$.
 - The ideal ROC curve would have a value of 0.5.
 - The value of the ROC curve is calculated as the area under the curve generated from the true-positive rate versus the false-positive rate.
- I-11. Which of the following values is affected by the disease prevalence in a population?
- Number needed to treat
 - Positive likelihood ratio
 - Positive predictive value
 - Sensitivity
 - Specificity
- I-12. Drug X is investigated in a meta-analysis for its effect on mortality after a myocardial infarction. It is found that mortality drops from 10 to 2% when this drug is administered. What is the absolute risk reduction conferred by drug X?
- 2%
 - 8%
 - 20%
 - 200%
 - None of the above
- I-13. How many patients will have to be treated with drug X to prevent one death?
- 2
 - 8
 - 12.5
 - 50
 - 93
- I-14. When considering a potential screening test, what endpoints should be considered to assess the potential gain from a proposed intervention?
- Absolute and relative impact of screening on the disease outcome
 - Cost per life year saved
 - Increase in the average life expectancy for the entire population
 - Number of subjects screened to alter the outcome in one individual
 - All of the above
- I-15. A 55-year-old man who smokes cigarettes is enrolled in a lung cancer screening trial based on performance of yearly CT scans over a period of 5 years. At year 2, he is found to have a 2-cm right lower lobe lung nodule that is a non-small cell lung cancer upon surgical removal. At that time, there were no positive lymph nodes. The cancer recurs, and the patient subsequently dies from lung cancer 6 years after his initial diagnosis. A person with a similar smoking history who is not participating in the trial is discovered to have a 3-cm lung nodule that is also non-small cell lung cancer. Upon surgical resection, one lymph node is positive. This person also dies from lung cancer after a period of 3 years. What conclusion can be made about the use of the CT screening for lung cancer in these patients?
- CT screening for lung cancer improves mortality in smokers.
 - It is unable to be determined if CT screening for lung cancer led to any difference in survival because one cannot determine if lag time bias is present.
 - It is unable to be determined if CT screening for lung cancer led to any difference in survival because one cannot determine if lead time bias is present.
 - Selection bias may cause apparent differences in survival in this trial, and one should be cautious in making conclusions with regards to CT screening for lung cancer.
 - The radiation received as part of the CT scan screening led to lung cancer in the initial patient and contributed to the first patient's overall mortality.

- I-16. According to the U.S. Preventive Services Task Force, what is the recommended screening interval for thyroid disease in women older than the age of 30 years?
- Every 5 years beginning at age 30 years
 - Once at age 30 years
 - Once at age 30 years and again in 10 years if the test result is normal
 - Periodically
 - There is no recommended screening for thyroid disease recommended by the U.S. Preventive Services Task Force
- I-17. Which preventative intervention leads to the largest average increase in life expectancy for a target population?
- A regular exercise program for a 40-year-old man
 - Getting a 35-year-old smoker to quit smoking
 - Mammography in women age 50–70 years
 - Pap smears in women age 18–65 years
 - Prostate-specific antigen (PSA) and digital rectal examination for a man older than 50 years old
- I-18. All of the following patients should receive a lipid screening profile EXCEPT:
- A 16-year-old boy with type 1 diabetes
 - A 17-year-old female teen who recently began smoking
 - A 23-year-old healthy man who is starting his first job
 - A 48-year-old woman beginning menopause
 - A 62-year-old man with no past medical history
- I-19. A 43-year-old woman is diagnosed with pulmonary blastomycosis and is initiated on therapy with oral itraconazole therapy. All of the following could affect the bioavailability of this drug EXCEPT:
- Coadministration with a cola beverage
 - Coadministration with oral contraceptive pills
 - Formulation of the drug (liquid vs. capsule)
 - pH of the stomach
 - Presence of food in the stomach
- I-20. A 24-year-old woman with cystic fibrosis is admitted to the hospital with an exacerbation. She is known to be colonized with *Pseudomonas aeruginosa* and is started on intravenous therapy with cefepime 1 g IV every 8 hours and tobramycin 10 mg/kg IV once daily. You want to ensure that the risk of nephrotoxicity is low. When should the tobramycin level be checked?
- 30 minutes after the first dose
 - 2 hours after the first dose
 - 2 hours before second dose
 - Immediately before the fourth dose
 - There is no need to check drug levels if the patient has normal renal function
- I-21. A 68-year-old man with ischemic cardiomyopathy has been treated with digoxin 250 µg daily for the past year. He has chronic kidney disease with a stable baseline creatinine of 2.1 mg/dL. He is initiated on an oral amiodarone load for new-onset atrial fibrillation with rapid ventricular response. Over 1 week, he develops increasing nausea, vomiting, and fatigue. On presentation to the emergency department, he is lethargic and difficult to arouse with a heart rate of 45 beats/min and a blood pressure of 88/50 mmHg. His laboratory values demonstrate a potassium of 5.2 meq/L, creatinine of 3.0 mg/dL, and a digoxin level of 13 ng/mL. His ECG shows complete heart block. What is the most appropriate treatment for this patient?
- Digitalis-specific antibody (Fab) fragments alone
 - Digitalis-specific antibody fragments plus hemodialysis
 - Digitalis-specific antibody fragments plus hemoperfusion
 - Plasmapheresis alone
 - Volume resuscitation and observation
- I-22. A 48-year-old woman with a generalized seizure disorder has been taking phenytoin for the past 10 years with good control of her disease. She also has a history of hepatitis C virus infection acquired via a blood transfusion received after an automobile accident in her teens. She currently takes phenytoin 100 mg tid, lactulose 30 g tid, and spironolactone 25 mg daily. She is brought to the emergency department by her husband, who reports that she has had increasing lethargy for the past week. On examination, her blood pressure is 100/60 mmHg, heart rate is 88 beats/min, respiratory rate is 20 breaths/min, and oxygen saturation is 98% on room air. She is afebrile. She is minimally responsive to voice and follows no commands. There is no nuchal rigidity. Her abdomen is distended with a positive fluid wave but without tenderness. She has spider angiomas, caput medusae, and palmar erythema. She does not appear to have asterixis. She does have horizontal nystagmus on examination. Her laboratory values include Na, 134 meq/L; potassium, 3.9 meq/L; chloride, 104 meq/L; and bicarbonate, 20 meq/L. Creatinine is 1.0 mg/dL. The white blood cell count is 10,000/µL with a normal differential. Her liver function tests are unchanged from baseline with the exception of an albumin that is now 2.1 g/dL compared with 3 months ago when her level was 2.9 g/dL. Ammonia level is 15 µmol/L, and her phenytoin level is 17 mg/L. A paracentesis shows a white blood cell count of 100/µL that is 80% neutrophils. What test would be most likely to demonstrate the cause of the patient's change in mental status?
- CT scan of the head
 - Electroencephalogram (EEG)
 - Free phenytoin level
 - Gram stain of ascites fluid
 - Gram stain of cerebrospinal fluid (CSF)

- I-23. A 55-year-old Japanese woman is found to have a 3-cm mass in the right lower lobe of the lung. She is a lifelong nonsmoker. The mass is positive on positron emission tomography scan as are contralateral and ipsilateral lymph nodes in the mediastinum. A biopsy demonstrates the mass to be a moderately differentiated adenocarcinoma, and a left hilar lymph node also demonstrates adenocarcinoma. Clinically, this places the patient as a stage IIIB non-small cell lung cancer, and the patient and her oncologist decide to treat with chemotherapy. Molecular testing demonstrates an exon 19 deletion in the tyrosine kinase domain of the epidermal growth factor receptor and no mutation in k-ras. What is the best choice for initial chemotherapy in this patient?
- Carboplatin plus paclitaxel
 - Carboplatin and paclitaxel plus erlotinib
 - Docetaxel alone
 - Erlotinib alone
 - Gemcitabine plus docetaxel
- I-24. A 26-year-old woman received an allogeneic bone marrow transplant 9 months ago for acute myelogenous leukemia. Her transplant course is complicated by graft-versus-host disease with diarrhea, weight loss, and skin rash. She is immunosuppressed with tacrolimus 1 mg bid and prednisone 7.5 mg daily. She recently was admitted to the hospital with shortness of breath and fevers to 101.5°F. She has a chest CT showing nodular pneumonia, and fungal organisms are seen on a transbronchial lung biopsy. The culture demonstrates *Aspergillus fumigatus*, and a serum galactomannan level is elevated. She is initiated on therapy with voriconazole 6 mg/kg IV every 12 hours for 1 day, decreasing to 4 mg/kg IV every 12 hours beginning on day 2. Two days after starting voriconazole, she is no longer febrile but is complaining of headaches and tremors. Her blood pressure is 150/92 mmHg, up from 108/60 mmHg on admission. On examination, she has developed 1+ pitting edema in the lower extremities. Her creatinine has risen to 1.7 mg/dL from 0.8 mg/dL on admission. What is the most likely cause of the patient's current clinical picture?
- Aspergillus meningitis*
 - Congestive heart failure
 - Recurrent graft-versus-host disease
 - Tacrolimus toxicity
 - Thrombotic thrombocytopenic purpura caused by voriconazole
- I-25. A 45-year-old man is diagnosed with primary syphilis after development of a penile ulcer. Results of a rapid plasma reagin and fluorescent treponemal antibody absorption tests are both positive. He is treated with benzathine penicillin G 2.4 million units intramuscularly as a one-time dose. Ten days after the injection, the patient presents to the emergency department complaining of fevers, rash, and diffuse joint pains with muscle aches. On physical examination, the patient has a temperature of 38.3°F, heart rate of 110 beats/min, and blood pressure of 112/76 mmHg. His HEENT, chest, cardiovascular, and abdominal examination findings are normal. He has an urticarial rash on trunk, back, and extremities. There is swelling and warmth of the knees, wrists, and metacarpophalangeal joints bilaterally. In addition, there is pain with palpation of the tendinous insertions of the Achilles tendons and patellar tendons bilaterally. The penile ulcer has a dry base and has decreased in size compared with previously. Laboratory studies show a white cell count of 10,100/μL (80% neutrophils, 15% lymphocytes, 3% monocytes, and 2% eosinophils). The erythrocyte sedimentation rate is 55 seconds. Antinuclear antibodies and rheumatoid factor results are negative. A urethral swab is negative for *Chlamydia trachomatis* and *Neisseria gonorrhoea*. What is the most likely diagnosis?
- Disseminated gonococcal infection
 - Inadequate treatment of secondary syphilis
 - Jarisch-Herxheimer reaction
 - Seronegative rheumatoid arthritis
 - Serum sickness caused by benzathine penicillin
- I-26. Which of the following classes of medicines has been linked to the occurrence of hip fractures in elderly adults?
- Benzodiazepines
 - Opiates
 - Angiotensin-converting enzyme inhibitors
 - Beta-blockers
 - Atypical antipsychotics
- I-27. Patients taking which of the following drugs should be advised to avoid drinking grapefruit juice?
- Amoxicillin
 - Aspirin
 - Atorvastatin
 - Prevacid
 - Sildenafil
- I-28. Which of the following diseases is responsible for a greater percentage of deaths in women compared with men?
- Alzheimer's disease
 - Cerebrovascular disease
 - Chronic obstructive pulmonary disease
 - Sepsis
 - All of the above
- I-29. Which of the following statements regarding coronary heart disease (CHD) in women when compared with men is TRUE?
- Angina is a rare symptom in women with CHD.
 - At the time of diagnosis of CHD, women typically have fewer comorbidities compared with men.
 - Physicians are less likely to consider CHD in women and are also less likely to recommend both diagnostic and therapeutic procedures in women.
 - Women and men present with CHD at similar ages.
 - Women are more likely to present with ventricular tachycardia, but men more commonly have cardiac arrest or cardiogenic shock.

- I-30. Which of the following is an independent risk factor for coronary heart disease in women but not men?
- A. Elevated total triglyceride levels
 - B. Hypertension
 - C. Low high-density lipoprotein cholesterol
 - D. Obesity
 - E. Smoking
- I-31. All of the following diseases are more common in women than men EXCEPT:
- A. Depression
 - B. Hypertension
 - C. Obesity
 - D. Rheumatoid arthritis
 - E. Type 1 diabetes mellitus
- I-32. Which of the following statements regarding Alzheimer's disease and gender are true?
- A. Alzheimer's disease affects men and women at equal rates.
 - B. Alzheimer's disease affects men two times more commonly than women.
 - C. In a recent placebo-controlled trial, postmenopausal hormone therapy did not show improvement in disease progression in women with Alzheimer's disease.
 - D. The difference in deaths from Alzheimer's disease between men and women can be entirely accounted for by the difference in life expectancy between men and women.
 - E. Women with Alzheimer's disease have higher levels of circulating estrogen than women without Alzheimer's disease.
- I-33. All of the following are changes in the cardiovascular system seen in pregnancy EXCEPT:
- A. Decreased blood pressure
 - B. Increased cardiac output
 - C. Increased heart rate
 - D. Increased plasma volume
 - E. Increased systemic vascular resistance
- I-34. A 36-year-old woman has a history of hypertension and is planning on starting a family. She is currently taking lisinopril 10 mg daily for control of her blood pressure. She wants to stop taking her oral contraceptive medications. Her current blood pressure is 128/83 mmHg. What do you advise her about ongoing treatment with antihypertensive medications?
- A. Because the cardiovascular changes that occur during pregnancy lead to a fall in blood pressure, she can safely discontinue her lisinopril when she stops her oral contraceptives.
 - B. She should continue lisinopril and start hydrochlorothiazide.
 - C. She should discontinue lisinopril and start irbesartan.
 - D. She should discontinue lisinopril and start labetalol.
 - E. She should not get pregnant because she is high risk of complications.
- I-35. Which of the following cardiovascular conditions is a contraindication to pregnancy?
- A. Atrial septal defect without Eisenmenger syndrome
 - B. Idiopathic pulmonary arterial hypertension
 - C. Marfan syndrome
 - D. Mitral regurgitation
 - E. Prior peripartum cardiomyopathy with a current ejection fraction of 65%
- I-36. A 33-year-old woman with diabetes mellitus and hypertension presents to the hospital with seizures during week 37 of her pregnancy. Her blood pressure is 156/92 mmHg. She has 4+ proteinuria. Management should include all of the following EXCEPT:
- A. Emergent delivery
 - B. Intravenous labetalol
 - C. Intravenous magnesium sulfate
 - D. Intravenous phenytoin
- I-37. A 27-year-old woman develops left leg swelling during week 20 of her pregnancy. Left lower extremity ultrasonogram reveals a left iliac vein deep venous thrombosis (DVT). Proper management includes:
- A. Bedrest
 - B. Catheter-directed thrombolysis
 - C. Enoxaparin
 - D. Inferior vena cava filter placement
 - E. Warfarin
- I-38. In which of the following categories should women undergo routine screening for gestational diabetes?
- A. Age greater than 25 years
 - B. Body mass index greater than 25 kg/m²
 - C. Family history of diabetes mellitus in a first-degree relative
 - D. African American
 - E. All of the above
- I-39. Which of the following surgeries would be considered at the greatest risk for postsurgical complications?
- A. Carotid endarterectomy
 - B. Non-emergent repair of a thoracic aortic aneurysm
 - C. Resection of a 5-cm lung cancer
 - D. Total colectomy for colon cancer
 - E. Total hip replacement

I-40. A 64-year-old man is contemplating undergoing elective cholecystectomy for biliary colic and cholelithiasis. He has a history of coronary artery disease with coronary artery bypass surgery performed at the age of 51 after an anterior wall myocardial infarction. His most recent ejection fraction 2 years previously was 35%. He also has a 45 pack-year history of tobacco, quitting after his surgery 13 years previously. Since his bypass surgery, he reports failure to return to full functional capacity. You ask him about his current exercise capacity. Which of the following would be considered poor exercise tolerance and increase his risk of perioperative complications?

- A. Inability to achieve 4 metabolic equivalents during an exercise test
- B. Inability to carry 15–20 lb
- C. Inability to climb two flights of stairs at a normal pace
- D. Inability to walk four blocks at a normal pace
- E. All of the above

I-41. A 74-year-old man is scheduled to undergo total colectomy for recurrent life-threatening diverticular bleeding. He denies any chest pain with exertion but is limited in his physical activity because of degenerative arthritis of his knees. He has no history of coronary artery disease or congestive heart failure but does have diabetes mellitus and hypertension. His current medications include aspirin 81 mg daily, atorvastatin 10 mg daily, enalapril 20 mg daily, and insulin glargine 25 units daily in combination with insulin lispro on a sliding scale. His blood pressure is 128/86 mmHg. His physical examination findings are normal. His most recent hemoglobin A1C is 6.3%, and his creatinine is 1.5 mg/dL. You elect to perform an electrocardiogram preoperatively, and it demonstrates Q waves in leads II, III, and aVF. Based on this information, what is his expected his postoperative risk of a major cardiac event?

- A. 0.5%
- B. 1%
- C. 5%
- D. 10%
- E. 20%

I-42. All of the following are risk factors for postoperative pulmonary complications EXCEPT:

- A. Age greater than 60 years
- B. Asthma with a peak expiratory flow rate of 220 L/min
- C. Chronic obstructive pulmonary disease
- D. Congestive heart failure
- E. Forced expiratory volume in 1 second of 1.5 L

I-43. You are caring for a 56-year-old woman who was admitted to the hospital with a change in mental status. She underwent a right-sided mastectomy and axillary lymph node dissection 3 years previously for stage IIIB ductal carcinoma. Serum calcium is elevated at 15.3 mg/dL. A chest radiograph demonstrates innumerable pulmonary nodules, and a head CT shows a brain mass in the right frontal lobe with surrounding edema. Despite correcting her calcium and treating cerebral edema, the patient remains confused. You approach the family to discuss the diagnosis of widely metastatic disease and the patient's poor prognosis. Which

of the following is NOT a component of the seven elements for communicating bad news (P-SPIKES approach)?

- A. Assess the family's perception of her current illness and the status of her underlying cancer diagnosis.
- B. Empathize with the family's feelings and provide emotional support.
- C. Prepare mentally for the discussion.
- D. Provide an appropriate setting for discussion.
- E. Schedule a follow-up meeting in 1 day to reassess whether there are additional informational and emotional needs.

I-44. Which of the following is not a component of a living will?

- A. Delineation of specific interventions that would be acceptable to the patient under certain conditions
- B. Description of values that should guide discussions regarding terminal care
- C. Designation of a health care proxy
- D. General statements regarding whether the patient desires receipt of life-sustaining interventions such as mechanical ventilation

I-45. A 72-year-old woman has stage IV ovarian cancer with diffuse peritoneal studding. She is developing increasing pain in her abdomen and is admitted to the hospital for pain control. She previously was treated with oxycodone 10 mg orally every 6 hours as needed. Upon admission, she is initiated on morphine intravenously via patient-controlled analgesia. During the first 48 hours of her hospitalization, she received an average daily dose of morphine 90 mg and reports adequate pain control unless she is walking. What is the most appropriate opioid regimen for transitioning this patient to oral pain medication?

	Sustained-Release Morphine	Immediate-Release Morphine
A.	None	15 mg every 4 hours as needed
B.	45 mg twice daily	5 mg every 4 hours as needed
C.	45 mg twice daily	15 mg every 4 hours as needed
D.	90 mg twice daily	15 mg every 4 hours as needed
E.	90 mg three time daily	15 mg every 4 hours as needed

I-46. You are asked to consult on 62-year-old man who was recently found to have newly metastatic disease. He was originally diagnosed with cancer of the prostate 5 years previously and presented to the hospital with back pain and weakness. Magnetic resonance imaging (MRI) demonstrated bony metastases to his L2 and L5 vertebrae with spinal cord compression at the L2 level only. On bone scan images, there was evidence of widespread bony metastases. He has been started on radiation and hormonal therapy, and his disease has shown some response. However, he has become quite depressed since the metastatic disease was found. His family reports that he is sleeping for 18 or more hours daily and has stopped eating. His weight is down 12 lb over 4 weeks. He expresses profound fatigue, hopelessness, and a feeling of sadness. He claims to have no interest in his usual activities and no longer interacts

with his grandchildren. What is the best approach to treating this patient's depression?

- A. Do not initiate pharmacologic therapy because the patient is experiencing an appropriate reaction to his newly diagnosed metastatic disease.
- B. Initiate therapy with doxepin 75 mg nightly.
- C. Initiate therapy with fluoxetine 10 mg daily.
- D. Initiate therapy with fluoxetine 10 mg daily and methylphenidate 2.5 mg twice daily in the morning and at noon.
- E. Initiate therapy with methylphenidate 2.5 mg twice daily in the morning and at noon.

I-47. You are treating a 76-year-old woman with Alzheimer's disease admitted to the intensive care unit for aspiration pneumonia. After 7 days of mechanical ventilation, her family requests that care be withdrawn. The patient is palliated with fentanyl intravenously at a rate of 25 $\mu\text{g/hr}$ and midazolam intravenously at 2 mg/hr. You are urgently called to the bedside 15 minutes after the patient is extubated because the patient's daughter is distraught. She states that you are "drowning" her mother and is upset because her mother appears to be struggling to breathe. When you enter the room, you hear a gurgling noise that is coming from accumulated secretions in the oropharynx. You suction the patient for liberal amounts of thin salivary secretions and reassure the daughter that you will make her mother as comfortable as possible. Which of the following interventions may help with the treatment of the patient's oral secretions?

- A. Increased infusion rate of fentanyl
- B. N-acetylcysteine nebulized
- C. Pilocarpine drops
- D. Placement of a nasal trumpet and oral airway to allow easier access for aggressive suctioning
- E. Scopolamine patches

I-48. Which of the following is the most common type of preventable adverse event in hospitalized patients?

- A. Adverse drug events
- B. Diagnostic failures
- C. Falls
- D. Technical complications of procedures
- E. Wound infections

I-49. All of the following statements regarding the use of complementary and alternative medicine (CAM) in the US are true EXCEPT:

- A. Acupuncture is the most frequently used CAM approach in the US
- B. CAM approaches represent approximately 10% of out-of-pocket medical expenses in the US
- C. Control of back or musculoskeletal pain is a common reason for US patients to utilize CAM approaches
- D. Recent estimates suggest 30-40% of Americans use CAM approaches
- E. The most common reasons US patients seek CAM approaches is for management of symptoms poorly controlled by conventional approaches

I-50. Independent of insurance status, income, age, and comorbid conditions, African American patients are less likely to receive equivalent levels of care compared with white patients for the following scenarios:

- A. Prescription of analgesic for pain control
- B. Referral to renal transplantation
- C. Surgical treatment for lung cancer
- D. Utilization of cardiac diagnostic and therapeutic procedures
- E. All of the above

I-51. All of the following statements regarding the difference between breast cancer in pregnant versus nonpregnant women are true EXCEPT:

- A. Estrogen-positive tumors are more common in pregnant women.
- B. Her-2 positivity is more common in pregnant women.
- C. A higher stage is more common in pregnant women.
- D. Positive lymph nodes are more common in pregnant women.
- E. Tumor size at diagnosis is larger in pregnant women.

I-52. A 32-year-old woman seeks evaluation for cough that has been present for 4 months. She reports that the cough is present day and night. It does awaken her from sleep and is worse in the early morning hours. She also notes the cough to be worse in cold weather and after exercise. She describes the cough as dry and has no associated shortness of breath or wheezing. She gives no antecedent history of an upper respiratory tract infection that preceded the onset of cough. She has a medical history of pulmonary embolus occurring in the postpartum period 6 years previously. Her only medication is norgestimate/ethinyl estradiol. She works as an elementary school teacher. On review of systems, she reports intermittent itchy eyes and runny nose that is worse in the spring and fall. She denies postnasal drip and heartburn. Her physical examination findings are normal with the exception of coughing when breathing through an open mouth. A chest radiograph is also normal. Spirometry demonstrates a forced expiratory volume in 1 second (FEV_1) of 3.0 L (85% predicted), forced vital capacity (FVC) of 3.75 L (88% predicted), and FEV_1/FVC ratio of 80%. After administration of a bronchodilator, the FEV_1 increases to 3.3 L (10% change). What would you recommend next in the evaluation and treatment of this patient?

- A. Initiate a nasal corticosteroid.
- B. Initiate a proton pump inhibitor.
- C. Perform a methacholine challenge test.
- D. Perform a nasopharyngeal culture for *Bordetella pertussis*.
- E. Reassure the patient that there are no pulmonary abnormalities and continue supportive care.

- I-53. A 56-year-old man presents to his primary care physician complaining of coughing up blood. He has felt ill for the past 4 days with a low-grade fever and cough. The cough was initially productive of yellow-green sputum, but it now is sputum mixed with red blood. He estimates that he has produced about 1–2 tsp (5–10 mL) of blood in the past day. He smokes 1 pack of cigarettes daily and has done so since the 15 years of age. He is known to have moderate chronic obstructive pulmonary disease and coronary artery disease. He takes aspirin, metoprolol, lisinopril, tiotropium, and albuterol as needed. His physical examination is notable for a temperature of 37.8°C (100.0°F). Bilateral expiratory wheezing and coarse rhonchi are heard on examination. Chest radiograph is normal. What is the most likely cause of hemoptysis in this individual?
- Acute bronchitis
 - Infection with tuberculosis
 - Lung abscess
 - Lung cancer
 - Medications
- I-54. A 65-year-old man with a known squamous cell carcinoma near the right upper lobe bronchus is admitted to intensive care after coughing up more than 100 mL of bright red blood. He appears in significant respiratory distress with an oxygen saturation of 78% on room air. He continues to have violent coughing with ongoing hemoptysis. He had a prior pulmonary embolus and is being treated with warfarin. His last INR was therapeutic at 2.5 three days previously. All of the following would be useful in the immediate management of this patient EXCEPT:
- Consultation with anesthesia for placement of a dual-lumen endotracheal tube.
 - Consultation with interventional radiology for embolization.
 - Consultation with thoracic surgery for urgent surgical intervention if conservative management fails.
 - Correction of the patient's coagulopathy.
 - Positioning of the patient in the left lateral decubitus position.
- I-55. Microbial agents have been used as bioweapons since ancient times. All of the following are key features of microbial agents that are used as bioweapons EXCEPT:
- Environmental stability
 - High morbidity and mortality rates
 - Lack of rapid diagnostic capability
 - Lack of readily available antibiotic treatment
 - Lack of universally available and effective vaccine
- I-56. Ten individuals in Arizona are hospitalized over a 4-week period with fever and rapidly enlarging and painful lymph nodes. Seven of these individuals experience severe sepsis, and three die. While reviewing the epidemiologic characteristics of these individuals, you note that they are all illegal immigrants and have recently stayed in the same immigrant camp. Blood cultures are growing gram-negative rods that are identified as *Yersinia pestis*. You notify local public health officials and the Centers for Disease Control and Prevention. Which of the following factors indicate that this is NOT likely to be an act of bioterrorism?
- The area affected was limited to a small immigrant camp.
 - The individuals presented with symptoms of bubonic plague rather than pneumonic plague.
 - The individuals were in close contact with one another, suggesting possible person-to-person transmission.
 - The mortality rate was less than 50%.
 - Yersinia pestis* is not environmentally stable for longer than 1 hour.
- I-57. Which of the following routes of dispersal are likely for botulinum toxin used as a bioweapon?
- Aerosol
 - Contamination of the food supply
 - Contamination of the water supply
 - A and B
 - All of the above
- I-58. Anthrax spores can remain dormant in the respiratory tract for how long?
- 1 week
 - 6 weeks
 - 6 months
 - 1 year
 - 3 years
- I-59. Twenty recent attendees at a National Football League game arrive at the emergency department complaining of shortness of breath, fever, and malaise. Chest radiographs show mediastinal widening on several of these patients, prompting a concern for inhalational anthrax as a result of a bioterror attack. Antibiotics are initiated, and the Centers for Disease Control and Prevention is notified. What form of isolation should be instituted for these patients in the hospital?
- Airborne
 - Contact
 - Droplet
 - None
- I-60. The Centers for Disease Control and Prevention (CDC) has designated several biologic agents as category A in their ability to be used as bioweapons. Category A agents include agents that can be easily disseminated or transmitted, result in high mortality, can cause public panic, and require special action for public health preparedness. All of the following agents are considered category A EXCEPT:
- Bacillus anthracis*
 - Francisella tularensis*
 - Ricin toxin from *Ricinus communis*
 - Smallpox
 - Yersinia pestis*

I-61. All of the following chemical agents of bioterrorism are correctly identified by their mechanism of injury EXCEPT:

- A. Arsine—asphyxiant
- B. Chlorine gas—pulmonary damage
- C. Cyanogen chloride—nerve agent
- D. Mustard gas—vesicant
- E. Sarin—nerve agent

I-62. Over the course of 12 hours, 24 individuals present to a single emergency department complaining of a sunburn-like reaction with development of large blisters. Most of these individuals are also experiencing irritation of the eyes, nose, and pharynx. Two individuals developed progressive dyspnea, severe cough, and stridor requiring endotracheal intubation. On physical examination, all of the patients exhibited conjunctivitis and nasal congestion. Erythema of the skin was greatest in the axillae, neck, and antecubital fossae. Many of the affected had large, thin-walled bullae on the extremities that were filled with a clear or straw-colored fluid. On further questioning, all of the affected individuals had been shopping at a local mall within the past 24 hours and ate at the food court. Many commented on a strong odor of burning garlic in the food court at that time. You suspect a bioterrorism act. Which of the following is TRUE with regard to the likely agent causing the patients' symptoms?

- A. 2-Pralidoxime should be administered to all affected individuals.
- B. The associated mortality rate of this agent is more than 50%.
- C. The cause of respiratory distress in affected individuals is related to direct alveolar injury and adult respiratory distress syndrome.
- D. The erythema that occurs can be delayed as long as 2 days after exposure and depends on several factors, including ambient temperature and humidity.
- E. The fluid within the bullae should be treated as a hazardous substance that can lead to local reactions and blistering with exposure.

I-63. A 24-year-old man is evaluated immediately after exposure to chlorine gas as an act of chemical terrorism. He currently denies dyspnea. His respiratory rate is 16 breaths/min and oxygen saturation is 97% on room air. All of the following should be included in the immediate treatment of this individual EXCEPT:

- A. Aggressive bathing of all exposed skin areas
- B. Flushing of the eyes with water or normal saline
- C. Forced rest and fresh air
- D. Immediate removal of clothing if no frostbite
- E. Maintenance of a semiupright position

I-64. You are a physician working in an urban emergency department when several patients are brought in after the release of an unknown gas at the performance of a symphony. You are evaluating a 52-year-old woman who is not able to talk clearly because of excessive salivation and rhinorrhea, although she is able to tell you that she feels as if she lost her sight immediately upon exposure. At present, she also has

nausea, vomiting, diarrhea, and muscle twitching. On physical examination, the patient has a blood pressure of 156/92 mmHg, a heart rate of 92, a respiratory rate of 30 breaths/min, and a temperature of 37.4°C (99.3°F). She has pinpoint pupils with profuse rhinorrhea and salivation. She also is coughing profusely, with production of copious amounts of clear secretions. A lung examination reveals wheezing on expiration in bilateral lung fields. The patient has a regular rate and rhythm with normal heart sounds. Bowel sounds are hyperactive, but the abdomen is not tender. She is having diffuse fasciculations. At the end of your examination, the patient abruptly develops tonic-clonic seizures. Which of the following agents is most likely to cause this patient's symptoms?

- A. Arsine
- B. Cyanogen chloride
- C. Nitrogen mustard
- D. Sarin
- E. VX

I-65. All the following should be used in the treatment of this patient EXCEPT:

- A. Atropine
- B. Decontamination
- C. Diazepam
- D. Phenytoin
- E. 2-Pralidoxime chloride

I-66. All of the following statements are true regarding the results of detonation of a low-yield nuclear device by a terrorist group EXCEPT:

- A. After recovery of initial exposure symptoms, the patient remains at risk of systemic illness for up to 6 weeks.
- B. Appropriate medical therapy can change the LD50 from approximately 4–8 gray (Gy).
- C. Initial mortality is mostly caused by shock blast and thermal damage.
- D. Most of the total mortality is related to release of alpha and beta particles.
- E. The hematopoietic, gastrointestinal, and neurologic systems are most likely involved in acute radiation syndrome.

- I-67. A "dirty" bomb is detonated in downtown Boston. The bomb was composed of cesium-137 with trinitrotoluene. In the immediate aftermath, an estimated 30 people were killed because of the power of the blast. The fallout area was about 0.5 mile, with radiation exposure of about 1.8 Gy. An estimated 5000 people have been potentially exposed to beta and gamma radiation. Most of these individuals show no sign of any injury, but about 60 people have evidence of thermal injury. What is the most appropriate approach to treating the injured victims?
- All individuals who have been exposed should be treated with potassium iodide.
 - All individuals who have been exposed should be treated with Prussian blue.
 - All individuals should be decontaminated before transportation to the nearest medical center for emergency care to prevent exposure of health care workers.
 - Severely injured individuals should be transported to the hospital for emergency care after removing the victims' clothes because the risk of exposure to health care workers is low.
 - With this degree of radiation exposure, no further testing and treatment are needed.
- I-68. A 37-year-old woman is brought to the ICU after her elective laparoscopic cholecystectomy is complicated by a temperature of 105°F, tachycardia, and systemic hypotension. Examination is notable for diffuse muscular rigidity. Which of the following drugs should be administered immediately?
- Acetaminophen
 - Dantrolene
 - Haloperidol
 - Hydrocortisone
 - Ibuprofen
- I-69. Hyperthermia is defined as:
- A core temperature greater than 40.0°C
 - A core temperature greater than 41.5°C
 - An uncontrolled increase in body temperature despite a normal hypothalamic temperature setting
 - An elevated temperature that normalizes with antipyretic therapy
 - Temperature greater than 40.0°C, rigidity, and autonomic dysregulation
- I-70. Which of the following conditions is associated with increased susceptibility to heat stroke in elderly adults?
- A heat wave
 - Antiparkinsonian therapy
 - Bedridden status
 - Diuretic therapy
 - All of the above
- I-71. A recent 18-year-old immigrant from Kenya presents to a university clinic with fever, nasal congestion, severe fatigue, and a rash. The rash started with discrete lesions at the hairline that coalesced as the rash spread caudally. There is sparing of the palms and soles. Small white spots with a surrounding red halo are noted on examination of the palate. The patient is at risk for developing which of the following in the future?
- Encephalitis
 - Epiglottitis
 - Opportunistic infections
 - Postherpetic neuralgia
 - Splenic rupture
- I-72. A 23-year-old woman with a chronic lower extremity ulcer related to prior trauma presents with rash, hypotension, and fever. She has had no recent travel or outdoor exposure and is up to date on all of her vaccinations. She does not use IV drugs. On examination, the ulcer looks clean with a well-granulated base and no erythema, warmth, or pustular discharge. However, the patient does have diffuse erythema that is most prominent on her palms, conjunctiva, and oral mucosa. Other than profound hypotension and tachycardia, the remainder of the examination is nonfocal. Laboratory results are notable for a creatinine of 2.8 mg/dL, aspartate aminotransferase of 250 U/L, alanine aminotransferase of 328 U/L, total bilirubin of 3.2 mg/dL, direct bilirubin of 0.5 mg/dL, INR of 1.5, activated partial thromboplastin time of 1.6 × control, and platelets at 94,000/μL. Ferritin is 1300 μg/mL. The patient is started on broad-spectrum antibiotics after appropriate blood cultures are drawn and is resuscitated with IV fluid and vasopressors. Her blood cultures are negative at 72 hours; at this point, her fingertips start to desquamate. What is the most likely diagnosis?
- Juvenile rheumatoid arthritis (JRA)
 - Leptospirosis
 - Staphylococcal toxic shock syndrome
 - Streptococcal toxic shock syndrome
 - Typhoid fever
- I-73. A 75-year-old man with chronic systolic heart failure requiring high-dose diuretics and lisinopril is seen by his primary care physician for acute onset of right great toe pain with redness and swelling. He is unable to bear weight on this foot. On examination, he is afebrile and has normal vital signs. His complaints in his right great toe are verified. No other joints are involved, and he appears otherwise to be in well-compensated heart failure. Prednisone and allopurinol are prescribed. Five days later, the patient is seen in the emergency department with a temperature of 101°F and a rash throughout his body and mouth. On examination, he has diffuse erythema, areas of skin exfoliation, and oral and orbital edema. Mucous membranes are not involved. Laboratory studies show mild transaminitis and peripheral eosinophilia. Which of the following syndromes describes this condition?
- Acute bacterial endocarditis
 - Angioedema caused by lisinopril
 - Drug-induced hypersensitivity syndrome caused by allopurinol
 - MRSA cellulitis
 - Staphylococcal toxic shock syndrome caused by septic arthritis