American Board of Family Medicine

2017 IN-TRAINING EXAMINATION

CRITIQUE BOOK

This book contains the answers to each question in the In-Training Examination, as well as a critique that provides a rationale for the correct answer. Bibliographic references are included at the end of each critique to facilitate any further study you may wish to do in a particular area.

Item 1

ANSWER: D

In a 3-year-old, red flags that would suggest the need for immediate speech-language evaluation include the inability to understand prepositions or action words or the child having a vocabulary that consists of less than 200 words (SOR C). A child should use 2-word phrases by 2½ years of age.

The evaluation should be performed through a local early developmental intervention program or a speech-language pathologist. The therapeutic response to parent-administered programs varies greatly, with programs lasting longer than 8 weeks having more success. Limiting screen time would not address this child's problem. Many family physicians would implement a parent-completed developmental survey such as Ages and Stages.

Ref: McLaughlin MR: Speech and language delay in children. *Am Fam Physician* 2011;83(10):1183-1188. 2) Mulrine C, Kollia B: Speech, language, hearing delays: Time for early intervention? *J Fam Pract* 2015;64(3):E1-E9. 3) Kliegman RM, Stanton BF, Geme JW III, et al (eds): *Nelson Textbook of Pediatrics*, ed 20. Elsevier Saunders, 2016, pp 207-214.

Item 2

ANSWER: C

Also known as erythema infectiosum or fifth disease, parvovirus B19 infection is a fairly common cause of an exanthematous rash and arthritis in younger women. This infection should be particularly suspected in health care workers who have frequent contact with children. By the age of 15 approximately 50% of children have detectable IgG antibodies to the virus, and this figure rises to 90% in the elderly. Within households and caregivers the secondary infection rate, especially among nonimmune children and young adults, approaches 50%. The specific characteristics of the rash, the pattern of joint involvement, and the place of employment in an otherwise healthy person all offer clues suggesting parvovirus B19 as the infecting agent. Measles virus, adenovirus, and HIV rarely cause arthritis, although HIV infection can cause a musculoskeletal syndrome later in the disease. Varicella-zoster virus may cause large-joint arthritis, but the rash is distinctively vesicular and pruritic.

Ref: Kasper DL, Fauci AS, Hauser SL, et al (eds): *Harrison's Principles of Internal Medicine*, ed 19. McGraw-Hill, 2015, pp 1194-1196.

Item 3

ANSWER: B

Cervical lymphadenopathy in children may be due to several causes, and the evaluation should focus on a complete history and physical examination to determine if observation or more urgent evaluation is indicated. When signs of infection are present it is appropriate to treat the patient with antibiotics, with evaluation for improvement in 2–3 days. If there are signs of malignancy (size >3 cm; a hard, firm, immobile mass; associated type B symptoms) the child should be referred urgently to an otolaryngologist. Fine-needle aspiration (FNA) of a lymph node can be helpful in some circumstances, but the initial evaluation should determine whether referral for excision may be needed, particularly if the history and examination suggest malignancy. In this patient, an infection is most likely and FNA would not be indicated at this time. If imaging is needed in children under the age of 14, the recommended initial study is ultrasonography. For those over 14 years of age, CT is recommended.

Ref: Meier JD, Grimmer JF: Evaluation and management of neck masses in children. *Am Fam Physician* 2014;89(5):353-358. 2) Gaddey HL, Riegel AM: Unexplained lymphadenopathy: Evaluation and differential diagnosis. *Am Fam Physician* 2016;94(11):896-903.

Item 4

ANSWER: C

The initial management of hypercalcemia of malignancy includes fluid replacement with normal saline to correct the volume depletion that is invariably present and to enhance renal calcium excretion. The use of loop diuretics such as furosemide should be restricted to patients in danger of fluid overload, since these drugs can aggravate volume depletion and are not very effective alone in promoting renal calcium excretion. Although intravenous pamidronate has become the mainstay of treatment for the hypercalcemia of malignancy, it should be considered only after the patient has been made euvolemic by saline repletion. The same is true for the other calcium-lowering agents listed.

Ref: Behl D, Hendrickson AW, Moynihan TJ: Oncologic emergencies. *Crit Care Clin* 2010;26(1):181-205. 2) Kasper DL, Fauci AS, Hauser SL, et al (eds): *Harrison's Principles of Internal Medicine*, ed 19. McGraw-Hill, 2015, pp 610, 2480-2481.

Item 5

ANSWER: E

Although this patient reports a history of gout, the diagnosis is not entirely clear. Gout can be diagnosed clinically if at least six of the following findings are present:

- asymmetric swelling within a joint on radiography
- an attack of monoarticular arthritis
- a joint fluid culture that is negative for microorganisms during an attack of joint inflammation
- development of maximal inflammation within 1 day
- hyperuricemia
- joint redness
- more than one attack of acute arthritis
- pain or redness in the first metatarsophalangeal joint
- a subcortical cyst without erosions on radiography
- a suspected tophus
- a unilateral attack involving the tarsal joint

In the absence of a diagnosis based on clinical criteria, the diagnosis can be confirmed by the presence of characteristic urate crystals in the joint fluid or the presence of a tophus proven to contain urate crystals by chemical means or polarized light microscopy. As this patient does not meet these clinical criteria, it would be appropriate to further evaluate whether his symptoms are truly from gout. It may also be reasonable to start treatment while studies are pending, but the diagnosis should be confirmed. Should gout be confirmed, dietary changes are recommended and allopurinol is a reasonable option for preventing future flares.

Ref: Hainer BL, Matheson E, Wilkes RT: Diagnosis, treatment, and prevention of gout. *Am Fam Physician* 2014;90(12):831-836. 2) Steinberg J: Clinical diagnosis of gout without joint aspirate. *Am Fam Physician* 2016;94(6):505-506.

Item 6

ANSWER: A

The test-and-treat strategy is appropriate for patients with dyspepsia who are younger than 55 years of age and have no alarm symptoms for gastric cancer. Testing for *Helicobacter pylori* in patients with GERD is not recommended.

Ref: Fashner J, Gitu AC: Diagnosis and treatment of peptic ulcer disease and *H. pylori* infection. *Am Fam Physician* 2015;91(4):236-242. 2) Anderson WD 3rd, Strayer SM, Mull SR: Common questions about the management of gastroesophageal reflux disease. *Am Fam Physician* 2015;91(10):692-697.

Item 7

ANSWER: A

Once an ST-elevation myocardial infarction is identified, a reperfusion strategy should be chosen as quickly as possible. In general, percutaneous coronary intervention (PCI) is preferred because it leads to improved outcomes compared to fibrinolysis when performed in high-volume medical facilities without treatment delays. If a patient's first medical contact is at a PCI-capable hospital or the time from first medical contact to device time is less than 120 minutes, PCI is the preferred intervention for patients presenting with symptoms for less than 12 hours. If the transfer time to a PCI-capable hospital is not short, such as the example of a patient with an onset of symptoms 6 hours ago and a transport time to the nearest PCI-capable hospital of more than 2 hours, then fibrinolysis is the preferred management strategy.

If there are absolute contraindications to fibrinolysis (such as a history of an ischemic stroke within the past 3 months), then PCI is preferred even if the transport time will not be short. In cases where the onset of symptoms was more than 12 hours ago but less than 24 hours ago and evidence of ongoing ischemia exists, it is still reasonable to pursue reperfusion therapy, and PCI would be the preferred strategy if it is available.

Ref: Switaj TL, Christensen SR, Brewer DM: Acute coronary syndrome: Current treatment. *Am Fam Physician* 2017;95(4):232-240.

Item 8

ANSWER: C

Metformin has been shown to reduce mortality rates in patients with type 2 diabetes mellitus (SOR A). Acarbose, an α-glucosidase inhibitor, reduces the risk of cardiovascular events, including myocardial infarction, in patients with impaired glucose tolerance or type 2 diabetes mellitus (SOR B). Rosiglitazone has been shown to be associated with an increased risk of myocardial infarction and death from cardiovascular causes (SOR A). To date, there is insufficient evidence to make any conclusions about the effect of sulfonylurea insulin secretagogues such as glipizide on cardiovascular morbidity and mortality (SOR B).

Ref: George CM, Brujin LL, Will K, Howard-Thompson A: Management of blood glucose with noninsulin therapies in type 2 diabetes. *Am Fam Physician* 2015;92(1):27-34. 2) Paneni F, Lüscher TF: Cardiovascular protection in the treatment of type 2 diabetes: A review of clinical trial results across drug classes. *Am J Med* 2017;130(6S):S18-S29.

Item 9

ANSWER: B

Procalcitonin is a biomarker that is elevated with bacterial infections but not with viral infections. The laboratory test for procalcitonin has a high sensitivity and can help exclude bacterial pneumonia in patients with acute heart failure, which can help expedite appropriate therapy with antibiotics. If the procalcitonin level is low a bacterial infection is less likely and antibiotics should not be given.

Ref: Wettersten N, Maisel AS: Biomarkers for heart failure: An update for practitioners of internal medicine. *Am J Med* 2016;129(6):560-567.

Item 10

ANSWER: A

Emtricitabine/tenofovir is the only currently approved regimen shown to be effective for HIV preexposure prophylaxis (PrEP) (SOR A). This patient has multiple sexual partners, including one at high risk for HIV infection due to intravenous drug use, and thus should be offered PrEP (SOR C). In patients without signs of acute HIV, PrEP may be initiated after documentation of negative fourth-generation HIV antibody/antigen testing, normal renal function, and hepatitis B infection and immunization status. Tenofovir can be toxic to the kidneys and is not recommended in patients with an estimated glomerular filtration rate < 60 mL/min/1.73 m^2.

Emtricitabine and tenofovir are both also active against hepatitis B virus (HBV) infection, so the use of PrEP in patients with active HBV must be carefully considered. If a patient with active HBV stops taking PrEP, reactivated HBV can cause liver damage. Patients susceptible to HBV infection should be immunized. Hepatitis C testing would be prudent in this case, but the results are not needed to begin therapy with emtricitabine/tenofovir.

Ref: Preexposure Prophylaxis for the Prevention of HIV Infection in the United States—2014: A clinical practice guideline. Centers for Disease Control and Prevention, 2014. 2) Conniff J, Evensen A: Preexposure prophylaxis (PrEP) for HIV prevention: The primary care perspective. *J Am Board Fam Med* 2016;29(1):143-151.

Item 11

ANSWER: B

This child has well controlled asthma, as evidenced by her normal daily activities, lack of nighttime symptoms, and limited use of her rescue inhaler. There is no reason that the diagnosis of asthma should limit her activities. Because her asthma is well controlled there is no need to add additional medications or increase the dosage of her current medications. Long-acting β-agonists are not recommended before the age of 12. Prophylactic pretreatment with a short-acting β-agonist has very little harm associated with it and may prevent the need for a rescue inhaler during an athletic event. Children should have ready access to their rescue inhalers at school and in other settings; this has been shown to reduce emergency department visits.

Ref: Casa DJ, Guskiewicz KM, Anderson SA, et al: National athletic trainers' association position statement: Preventing sudden death in sports. *J Athl Train* 2012;47(1):96-118. 2) Falk NP, Hughes SW, Rodgers BC: Medications for chronic asthma. *Am Fam Physician* 2016;94(6):454-462.

Item 12

ANSWER: E

Scaphoid fracture is the most common carpal bone injury. This injury tends to occur when the wrist is hyperextended and the hand is pronated and radially deviated. The presentation can range from disabling wrist pain to mild swelling and decreased range of motion. There is exquisite tenderness in the anatomic snuffbox with axial loading of the thumb or a pincer grasp.

Radiographs should include PA, lateral oblique, and ulnar deviated views. Nondisplaced fractures can be missed on radiographs, and if a fracture is suspected and the initial radiographs are negative for fracture, the management is the same as it would be for a fracture until a fracture can be ruled out by advanced imaging or by follow-up radiographs in 7 days. Treatment decisions depend upon fracture location and displacement. A thumb spica cast (a short arm cast with the thumb immobilized) for 6–10 weeks is appropriate for nondisplaced distal fractures. Surgical treatment should be considered for displaced or proximal fractures.

There is some controversy about the wrist position for immobilization, whether neutral, in extension, or in flexion, but the key treatment is cast immobilization. Follow-up evaluations should take place every 2–3 weeks, including out-of-cast radiographs, until union is confirmed. Nonunion occurs in approximately 10% of all scaphoid fractures. It is more common with proximal scaphoid fractures due to the precarious reverse blood supply. If union fails to occur the patient should be referred to an orthopedist.

Ref: Eiff MP, Hatch RL: *Fracture Management for Primary Care*, ed 3. Elsevier Saunders, 2012, pp 84-101. 2) Avery DM 3rd, Rodner CM, Edgar CM: Sports-related wrist and hand injuries: A review. *J Orthop Surg Res* 2016;11(1):99.

Item 13

ANSWER: C

These spirometry results indicate an irreversible obstructive pattern. Patients with a restrictive component to their lung disease have a decreased FVC. Reversible obstruction improves with bronchodilator therapy.

Ref: Johnson JD, Theurer WM: A stepwise approach to the interpretation of pulmonary function tests. *Am Fam Physician* 2014;89(5):359-366.

Item 14

ANSWER: B

Pharmacologic options for benign prostatic hyperplasia and lower urinary tract symptoms include an α-adrenergic blocker, a 5-α-reductase inhibitor (if there is evidence of prostatic enlargement or a PSA level >1.5 ng/mL), a phosphodiesterase-5 inhibitor, or antimuscarinic therapy. The first three have proven efficacy as monotherapies.

Ref: Sarma AV, Wei JT: Benign prostatic hyperplasia and lower urinary tract symptoms. *N Engl J Med* 2012;367(3):248-257.

Item 15

ANSWER: B

Gallstones are often asymptomatic and are found incidentally on imaging. However, they may become symptomatic, usually causing pain in the right upper quadrant or epigastrium. Most patients with symptomatic gallstones present with chronic cholecystitis, which causes recurrent attacks of pain. The pain is constant and increases in severity at the beginning, and lasts from 1 to 5 hours. It often starts during the night after a fatty meal and may be associated with nausea and vomiting. Abdominal ultrasonography is the initial imaging method.

Patients with acute cholecystitis may have a history of symptoms consistent with chronic cholecystitis. With acute cholecystitis, however, the pain does not remit and may last for days. The patient may also have a fever on examination, and may have tenderness to deep palpation of the right subcostal area, known as Murphy's sign. The WBC count may be somewhat elevated. Ultrasonography will show thickening of the bile duct wall (>4 mm).

Stones in the bile duct, or choledocholithiasis, typically lead to elevated transferase levels and bilirubin levels that are elevated but <15 mg/dL. The pain may be either mild or severe, and may be intermittent because of movement of the stones. Fever may be present. A bile duct >8 mm on ultrasonography in a patient with gallstones, jaundice, and biliary pain indicates that stones may be present in the duct.

The two main complications of choledochal stones are cholangitis and pancreatitis. Acute cholangitis is a bacterial infection. Bacterial growth is enhanced by obstruction of the duct. It may present as a mild self-limited disease but can also lead to sepsis. Cases typically present with fever, pain, and jaundice. Laboratory findings include an elevated WBC count, elevated bilirubin, and elevated transaminases and alkaline phosphatase. Ultrasonography will show a dilated bile duct in many cases, although it might not be dilated in acute obstruction.

Pancreatitis presents with pain, nausea, and vomiting. The pain is usually epigastric and radiates to the back. It reaches its maximum intensity within an hour and may last for days. The physical examination may reveal tachycardia, hypotension, tachypnea, and fever. The abdomen may be distended and is typically tender to palpation. The diagnosis requires two of three primary features: abdominal pain, elevation of serum amylase or lipase, and findings on imaging studies that are consistent with the diagnosis. Ultrasonography can show pancreatic enlargement or edema, and visualization of gallstones will suggest choledocholithiasis as the cause of the pancreatitis.

Ref: Brunicardi FC (ed): *Schwartz's Principles of Surgery*, ed 10. McGraw Hill Medical, 2015, pp 1317-1323. 2) Goldman L, Schafer AI (eds): *Goldman's Cecil Medicine*, ed 25. Elsevier Saunders, 2016, pp 961-962, 1038-1044.

Item 16

ANSWER: E

Dual antiplatelet therapy should extend beyond 1 year for patients with acute coronary syndrome who are not considered at high risk of bleeding, especially those with risk factors associated with high ischemic risk such as diabetes mellitus, peripheral artery disease, left main stenting, or a history of a cardiovascular event. For dual antiplatelet therapy that continues beyond a year, either ticagrelor, 60 mg twice daily, or clopidogrel, 75 mg daily, is recommended in addition to aspirin. The patient's bleeding and ischemic risk should be reevaluated at least annually.

Dual antiplatelet therapy should continue for at least 1 year in patients who are considered at high risk of bleeding. For patients who are at very high risk of bleeding or who experience significant bleeding while on dual antiplatelet therapy, a duration of less than 1 year is recommended.

Ref: Bagai A, Bhatt DL, Eikelboom JW, et al: Individualizing duration of dual antiplatelet therapy after acute coronary syndrome or percutaneous coronary intervention. *Circulation* 2016;133(21):2094-2098.

Item 17

ANSWER: A

For community-acquired pneumonia, an important decision point is the severity of illness that indicates the need for inpatient care. There are multiple tools for evaluation of pneumonia severity, including SMART-COP (predicts the likelihood of the need for invasive ventilation or vasopressor support), the Pneumonia Severity Index (predicts the risk of 30-day mortality and the need for admission to the intensive-care unit), and CURB-65 or CRB-65. In an outpatient setting, CURB-65 and CRB-65 are easy to use, although they have weaker predictive values for 30-day mortality. In addition, clinical judgment should always be used. In this scenario, the patient does not clinically appear markedly ill, and her vital signs and physical examination do not fit any criteria for increased risk in any of the scoring systems. Her only risk factor is age ≥65 years, and those with zero or one criteria for CURB-65 or CRB-65 can be managed as outpatients.

Ref: Kaysin A, Viera AJ: Community-acquired pneumonia in adults: Diagnosis and management. *Am Fam Physician* 2016;94(9):698-706.

Item 18

ANSWER: C

Tinnitus that is bilateral and not bothersome can be treated conservatively with cognitive-behavioral therapy, sound therapy, and, if appropriate, hearing aids. Antidepressants are not recommended. Pulsatile tinnitus, unilateral tinnitus, or tinnitus associated with asymmetric hearing loss is more likely to be associated with a pathologic cause. Symmetric, mild, high-frequency hearing loss is common in elderly patients. Imaging should not be part of the routine management of tinnitus that does not have warning signs, and patients should be counseled on conservative measures as described.

Ref: Walker DD, Cifu AS, Bluth MB: Tinnitus. *JAMA* 2016;315(20):2221-2222.

Item 19

ANSWER: C

Influenza vaccine is recommended for pregnant women regardless of trimester. This gives protection to the mother, and the infant may be protected up to 6 months. High-dose vaccines are recommended starting at age 65. An egg allergy is not a contraindication, but the vaccine should be given in a health care setting.

Ref: Grohskopf LA, Sokolow LZ, Broder KR, et al: Prevention and control of seasonal influenza with vaccines: Recommendations of the Advisory Committee on Immunization Practices—United States, 2017–18 influenza season. *MMWR Recomm Rep* 2017;66(2):1-20.

Item 20

ANSWER: C

Subluxation of the radial head, or nursemaid's elbow, is one of the most common injuries in children under 5 years of age. It occurs when the child's hand is suddenly jerked up, forcing the elbow into extension and causing the radial head to slip out from the annular ligament.

Ref: Kliegman RM, Stanton BF, Geme JW III, et al (eds): *Nelson Textbook of Pediatrics*, ed 20. Elsevier Saunders, 2016, p 3304.

Item 21

ANSWER: C

This patient has pulmonary hypertension that, based on her history, is most likely related to obstructive sleep apnea (OSA). Most patients with pulmonary hypertension have an underlying disease of the heart or lungs that leads to elevated pulmonary artery pressures. Common underlying conditions include chronic lung disease such as COPD, OSA, and left heart failure (with a reduced or preserved ejection fraction). Additional considerations include chronic thromboembolic disease and primary pulmonary arterial hypertension.

This patient's obesity and unrefreshing sleep make OSA the likely underlying cause of her pulmonary hypertension. She does not have clinical features of thromboembolic disease or a history of COPD. Her echocardiogram does not show heart failure, and she has no symptoms to suggest obstructive coronary disease. Ambulatory blood pressure monitoring can aid in the diagnosis and optimal treatment of hypertension, but this would be unlikely to relate directly to her pulmonary hypertension.

Ref: Dunlap B, Weyer G: Pulmonary hypertension: Diagnosis and treatment. *Am Fam Physician* 2016;94(6):463-469.

Item 22

ANSWER: D

The diagnosis of Duchenne muscular dystrophy, the most common neuromuscular disorder of childhood, is usually not made until the affected individual presents with an established gait abnormality at the age of 4–5 years. By then, parents unaware of the X-linked inheritance may have had additional children who would also be at risk.

The disease can be diagnosed earlier by testing for elevated creatine kinase in boys who are slow to walk. The mean age for walking in affected boys is 17.2 months, whereas over 75% of developmentally normal children in the United States walk by 13.5 months. Massive elevation of creatine kinase from 20 to 100 times normal occurs in every young infant with the disease. Early detection allows appropriate genetic counseling regarding future pregnancies.

Hypothyroidism and phenylketonuria could present as delayed walking. However, these diseases cause significant intellectual disability and would be associated with global developmental delay. Furthermore, these disorders are now diagnosed in the neonatal period by routine screening. Disorders of amino acid metabolism present in the newborn period with failure to thrive, poor feeding, and lethargy. Gross chromosomal abnormalities would usually be incompatible with a normal physical examination at 18 months of age.

Ref: Dooley J, Gordon KE, Dodds L, MacSween J: Duchenne muscular dystrophy: A 30-year population-based incidence study. *Clin Pediatr (Phila)* 2010;49(2):177-179. 2) Pegoraro E, Hoffman EP, Piva L, et al: Cooperative International Neuromuscular Research Group: SPP1 genotype is a determinant of disease severity in Duchenne muscular dystrophy. *Neurology* 2011;76(3):219-226.

Item 23

ANSWER: C

Bipolar disorders often present in late childhood or early adolescence. Outcomes can be improved by early recognition. Manic episodes that occur with bipolar I disorder are usually easy to identify. However, patients with bipolar II disorder may have a hypomanic episode that goes unrecognized, and the patient may present with persistent depression. There is usually a family history of bipolar disorder or multiple relatives having persistent depression, obsessive-compulsive disorder, attention-deficit disorder, or panic disorder. There may be multiple instances in the family of suicide, drug abuse, alcohol abuse, or incarceration. The patient has likely failed to respond to at least three antidepressant drugs and may have a history of multiple divorces.

There are options for the treatment of bipolar depression. Quetiapine usually leads to a response after 1 week of therapy but is associated with weight gain and extrapyramidal side effects. Olanzapine may also be used but should be combined with an SSRI. Lithium may also be effective for acute depression. Lamotrigine is effective but titration should be spread over at least 6 weeks in order to decrease the risk of Stevens-Johnson syndrome.

Ref: Price AL, Marzani-Nissen GR: Bipolar disorders: A review. *Am Fam Physician* 2012;85(5):483-493.

Item 24

ANSWER: A

The most common pathogen for nonpurulent cellulitis is β-hemolytic streptococci. Guidelines from the Infectious Diseases Society of America recommend treating moderate nonpurulent cellulitis with penicillin, ceftriaxone, cefazolin, or clindamycin alone. Vancomycin would be indicated if the patient had a history of illicit drug use, purulent drainage, concurrent evidence of MRSA infection elsewhere, nasal colonization with MRSA, or severe cellulitis.

Ref: Gunderson CG: Overtreatment of nonpurulent cellulitis. *J Hosp Med* 2016;11(8):587-590.

Item 25

ANSWER: C

This patient's EKG shows marked ST-T elevation in the inferior leads consistent with an acute inferior wall myocardial infarction. Pericarditis almost always presents with severe chest pain, and the ST segment elevation is more diffuse. With anteroseptal infarction, ST elevation is seen only on leads V_1–V_3.

Ref: Thygesen K, Alpert JS, Jaffe AS, et al; Joint ESC/ACCF/AHA/WHF Task Force for the Universal Definition of Myocardial Infarction: Third universal definition of myocardial infarction. *Circulation* 2012;126(16):2020-35.

Item 26

ANSWER: B

Most children will be evaluated for a febrile illness before 36 months of age, with the majority having a self-limited viral illness. Nontoxic-appearing febrile infants 29–90 days of age who have a negative screening laboratory workup, including a CBC with differential and a normal urinalysis, can be sent home and followed up in 24 hours (SOR B). A second option is to obtain blood cultures and stool studies, or a chest film if indicated by the history or examination, and spinal fluid studies if empiric antibiotics are to be given. This infant's clinical status did not indicate that any of these additional studies should be performed, and empiric antibiotic treatment is not planned.

Observation with no follow-up is an appropriate strategy in nontoxic children, but only if the child is 3–36 months of age and the temperature is under 39.0°C (102.2°F) (SOR B). Nontoxic children 3–36 months of age should be reevaluated in 24–48 hours if their temperature is ≥39.0°C. Although a positive response to antipyretics has been considered an indication of a lower risk of serious bacterial infection, there is no correlation between fever reduction and the likelihood of such an infection.

Any infant younger than 29 days, and any infant or child with a toxic appearance regardless of age, should undergo a complete sepsis workup and be admitted for observation until culture results are obtained or the source of the fever is found and treated (SOR A).

Ref: Hamilton JL, John SP: Evaluation of fever in infants and young children. *Am Fam Physician* 2013;87(4):254-260.

Item 27

ANSWER: C

The patient described has symptomatic arterial vascular disease manifested by intermittent claudication. He has already initiated the two most important changes: he has stopped smoking and started a walking program. His LDL-cholesterol is at target levels; further lowering is not likely to improve his symptoms. In the presence of diffuse disease, interventional treatments such as angioplasty or surgery may not be helpful; in addition, these interventions should be reserved as a last resort. Cilostazol has been shown to help with intermittent claudication, but additional antiplatelet agents are not likely to improve his symptoms. Fish oil and warfarin have not been found to be helpful in the management of this condition.

Ref: Hennion DR, Siano KA: Diagnosis and treatment of peripheral arterial disease. *Am Fam Physician* 2013;88(5):306-310.

Item 28

ANSWER: E

The Society of General Internal Medicine does not recommend cancer screening in adults with a life expectancy of less than 10 years. Other organizations have similar recommendations for specific cancers, usually based on a life expectancy of less than 10 years or an age greater than 65. For patients who have had negative screening results for cervical cancer in the past, this screening may be stopped at age 65. For patients who are 76–85 years of age, screening for colorectal cancer and breast cancer should be performed on an individual basis, taking into account the patient's overall health and screening history.

Ref: Salzman B, Beldowski K, de la Paz A: Cancer screening in older patients. *Am Fam Physician* 2016;93(8):659-667.

Item 29

ANSWER: B

The prepubescent male child with fragile X syndrome can be recognized by large ears, an elongated face, macrocephaly, or frontal bossing. This dysmorphic presentation can be subtle in young children, with an average age at diagnosis of 8 years. After puberty, a prominent jaw and macro-orchidism is characteristic. Although a child with Marfan syndrome has an elongated face, the frontal bossing and large ears are not characteristic of that condition. Prepubescent boys with Klinefelter syndrome do not have facial dysmorphic features. They appear similar to prepubescent boys with normal karyotypes. Facial dysmorphic features associated with Angelman syndrome include microbrachycephaly, maxillary hypoplasia, a large mouth, and prognathism. Facial dysmorphic features associated with Prader-Willi syndrome include a narrow distance between the temples, almond-shaped eyes, and a thin upper lip.

Ref: Wattendorf DJ, Muenke M: Diagnosis and management of fragile X syndrome. *Am Fam Physician* 2005;72(1):111-113.
2) Kliegman RM, Stanton BF, Geme JW III, et al (eds): *Nelson Textbook of Pediatrics*, ed 20. Elsevier Saunders, 2016, pp 620, 622-623, 3386-3387.

Item 30

ANSWER: E

This patient has herpes zoster oticus, which is also known as Ramsay Hunt syndrome when associated with a facial nerve palsy. It is caused by reactivation of the varicella-zoster virus (VZV) in the geniculate ganglion of the facial nerve. Typical symptoms include painful vesicles on one side of the palate and the ipsilateral ear. When the reactivation involves other branches of the facial nerve it can result in a unilateral facial herpetiform rash that may also involve the anterior two-thirds of the tongue, taste disturbance, and reduced lacrimation. If the nearby cochlear and vestibular nerves become involved, patients may also experience hearing loss, tinnitus, nausea, vomiting, and vertigo. The diagnosis is usually made clinically, but if confirmation is needed polymerase chain reaction testing of vesicular fluid or of a swab of the base of an ulcer may be done. Treatment includes antivirals (acyclovir, valacyclovir) and prednisone, and is more effective when started sooner in the course of illness.

Herpes simplex virus (HSV) can cause oral vesicles and ulcers, but the distribution of vesicles in the ear and the mouth of this patient is not typical for HSV. Epstein-Barr virus can cause leukoplakia of the mouth but not vesicles and is typically associated with systemic signs of illness. Group A *Streptococcus* causes throat pain and fever, not vesicles. Coxsackievirus causes oral vesicles and ulcers but is usually associated with fever and does not typically involve the ear.

Ref: Al-Hussaini A, Latif F, Berry S: Ear pain, vesicular rash, and facial palsy. *BMJ* 2014;349:g7572. 2) Moss DA, Crawford P: Sore throat and left ear pain. *J Fam Pract* 2015;64(2):117-119.

Item 31

ANSWER: C

This patient's condition is consistent with distal symmetric polyneuropathy (DSPN). It may be present in up to 10%–15% of newly diagnosed patients with type 2 diabetes mellitus and in up to 50% of patients within 10 years of diagnosis. Pregabalin or duloxetine is recommended as the initial approach in the symptomatic treatment of neuropathic pain in diabetes (SOR A). There is no significant evidence supporting glycemic control or lifestyle interventions as effective treatment for the condition. Narcotics, including tramadol, are not first- or second-line choices, and although tricyclic antidepressants such as amitriptyline are effective, they present a higher risk for serious side effects, especially in the elderly. There are no recommendations for the use of NSAIDs.

Ref: Pop-Busui R, Boulton AJ, Feldman EL, et al: Diabetic neuropathy: A position statement by the American Diabetes Association. *Diabetes Care* 2017;40(1):136-154.

Item 32

ANSWER: B

This patient has genitourinary syndrome of menopause (formerly termed vulvovaginal atrophy) based on her symptoms and examination. Estrogen therapy is highly effective for dyspareunia related to genitourinary syndrome of menopause, with the vaginal route preferred over systemic therapy if vaginal dryness is the primary concern. Bupropion and sildenafil may benefit women with sexual dysfunction induced by antidepressant medications. Data on the benefit of testosterone therapy is limited and inconsistent and lacks long-term information about safety. Cognitive-behavioral therapy has been shown to effectively treat low sexual desire, but does not affect the physiologic changes associated with genitourinary syndrome of menopause.

Ref: Faubion SS, Rullo JE: Sexual dysfunction in women: A practical approach. *Am Fam Physician* 2015;92(4):281-288.

Item 33

ANSWER: D

This patient has pulmonary hypertension due to left heart failure. The recommended treatment is to maximize treatment for her heart failure and any other comorbidities. Vasodilators are not recommended in the treatment of pulmonary hypertension due to left heart failure and may be harmful (SOR C). Oxygen therapy is recommended only for patients with hypoxia (SOR C). Lifelong anticoagulation is recommended if pulmonary hypertension is due to chronic thromboembolic disease but not if it is due to left heart failure (SOR C). Anticoagulation is not recommended in systolic left heart failure unless there is another indication.

Right heart catheterization is not recommended for pulmonary hypertension due to left heart disease because vasodilators are not a treatment option. Right heart catheterization is recommended in pulmonary hypertension prior to initiating vasodilator therapy in appropriate patients (SOR C).

Ref: Dunlap B, Weyer G: Pulmonary hypertension: Diagnosis and treatment. *Am Fam Physician* 2016;94(6):463-469.

Item 34

ANSWER: E

Calcaneal apophysitis, also called Sever's disease, is a common cause of heel pain in young athletes, especially those who participate in basketball, soccer, track, and other sports that involve running. Typically the heel apophysis closes by age 15. Treatment options include activity modification, the use of ice packs and/or moist heat, stretching, analgesics, and orthotic devices. The use of therapeutic ultrasound on the active bone growth plates in children is contraindicated.

Ref: Priscilla T, Bytomski JR: Diagnosis of heel pain. *Am Fam Physician* 2011;84(8):909-916. 2) Brukner P, Khan K: *Clinical Sports Medicine*, ed 4. McGraw Hill, 2012, p 183.

Item 35

ANSWER: D

The Ottawa ankle rules are 99% sensitive and 58% specific for identifying a fracture. They state that ankle radiography should be performed when a patient presents with pain in the malleolar region and has either point tenderness over the tip of the malleolus or the posterior edge of the affected bone (distal 6 cm), or is unable to bear weight at the time of injury and while being evaluated in the emergency department or office. Inability to bear weight is defined as the inability to take four steps. A limp when weight is transferred to the affected extremity still counts as being able to bear weight.

Ref: Stiell IG, Greenberg GH, McKnight RD, et al: Decision rules for the use of radiography in acute ankle injuries. Refinement and prospective validation. *JAMA* 1993;269(9):1127-1132. 2) Bica D, Sprouse RA, Armen J: Diagnosis and management of common foot fractures. *Am Fam Physician* 2016;93(3):183-191.

Item 36

ANSWER: B

While some workup may be indicated, it is also important to realize that depression may present with fatigue and vague symptoms, particularly in the geriatric population. The Geriatric Depression Scale and PHQ-9 are good screening tests for depression and would help to determine if more focus should be placed on a mood disorder. If further evaluation leads to a diagnosis of depression an SSRI may be indicated but paroxetine is not the first choice in the elderly because of its long half-life. In addition, its concentrations are increased 70%–80% in the elderly compared to younger adults, its clearance is decreased, and it has multiple side effects and drug interactions.

An EKG and stress testing are unlikely to be beneficial in a patient who has no significant symptoms and few risk factors for coronary artery disease. Pulmonary function testing may be helpful later in the evaluation if the initial workup does not reveal a diagnosis, but would not be indicated at this time given the lack of respiratory symptoms. A referral to Adult Protective Services is not warranted for suspected depression but would be an option if there were a reasonable suspicion of abuse in a patient and medical causes have been ruled out.

Ref: Maurer DM: Screening for depression. *Am Fam Physician* 2012;85(2):139-144.

Item 37

ANSWER: D

This patient most likely has preeclampsia, which is defined as an elevated blood pressure and proteinuria after 20 weeks gestation. The patient needs further evaluation, including a 24-hour urine for quantitative measurement of protein or a spot urine protein to creatinine ratio, blood pressure monitoring, and laboratory evaluation that includes hemoglobin, hematocrit, a platelet count, and serum levels of transaminase, creatinine, albumin, LDH, and uric acid. A peripheral smear and coagulation profiles also may be obtained. Antepartum fetal testing, such as a nonstress test to assess fetal well-being, would also be appropriate.

Ultrasonography should be performed to assess for fetal intrauterine growth restriction, but only after an initial laboratory and fetal evaluation. Delivery is the definitive treatment for preeclampsia. The timing of delivery is determined by the gestational age of the fetus and the severity of preeclampsia in the mother. Vaginal delivery is preferred over cesarean delivery, if possible, in patients with preeclampsia. It is not necessary to start this patient on antihypertensive therapy at this point. An obstetric consultation should be considered for patients with preeclampsia.

Ref: Leeman L, Dresang LT, Fontaine P: Hypertensive disorders of pregnancy. *Am Fam Physician* 2016;93(2):121-127.

Item 38

ANSWER: E

The U.S. Preventive Services Task Force (USPSTF) recommends that clinicians screen all adults for tobacco use, advise smoking cessation, and provide behavioral therapy and FDA-approved pharmacotherapy if appropriate (A recommendation). Varenicline is an FDA-approved pharmacotherapy that is an effective option for smoking cessation with or without behavioral therapy. Although clonidine has been used for smoking cessation it is considered a second-line agent and is not FDA approved for smoking cessation. The USPSTF concluded that there was not enough evidence on the effect on smoking cessation to recommend an electronic nicotine delivery system (I recommendation). Abrupt and complete ("cold-turkey") nicotine withdrawal is less effective than pharmacotherapy (nicotine replacement therapy, bupropion hydrochloride, and varenicline). There is a lack of evidence regarding the efficacy of hypnotherapy.

Ref: Larzelere MM, Williams DE: Promoting smoking cessation. *Am Fam Physician* 2012;85(6):591-598. 2) *Final Recommendation Statement: Tobacco Smoking Cessation in Adults, Including Pregnant Women: Behavioral and Pharmacotherapy Interventions*. US Preventive Services Task Force, 2015. 3) Hartmann-Boyce J, McRobbie H, Bullen C, et al: Electronic cigarettes for smoking cessation. *Cochrane Database Syst Rev* 2016;(9):CD010216.

Item 39

ANSWER: E

Motion sickness is a syndrome that includes nausea and other symptoms, including vague subtle symptoms of stomach awareness, malaise, fatigue, and irritability. The most effective medication is scopolamine; transdermal scopolamine is more effective than oral scopolamine.

Ref: Brainard A, Gresham C: Prevention and treatment of motion sickness. *Am Fam Physician* 2014;90(1):41-46.

Item 40

ANSWER: D

Antiandrogens such as spironolactone, along with oral contraceptives, are recommended for the treatment of hirsutism in premenopausal women (SOR C). Women should avoid becoming pregnant while on spironolactone because of the potential for teratogenic effects. In addition to having side effects, prednisone is only minimally helpful for reducing hirsutism by suppressing adrenal androgens. Leuprolide, although better than placebo, has many side effects and is expensive. Metformin can be used to treat patients with polycystic ovary syndrome, but this patient does not meet the criteria for this diagnosis.

Ref: Martin KA, Chang RJ, Ehrmann DA, et al: Evaluation and treatment of hirsutism in premenopausal women: An Endocrine Society clinical practice guideline. *J Clin Endocrinol Metab* 2008;93(4):1105-1120. 2) Bode D, Seehusen DA, Baird D: Hirsutism in women. *Am Fam Physician* 2012;85(4):373-380.

Item 41

ANSWER: A

This patient has a stage 2 pressure ulcer. It is recommended that pressure ulcers not be cleaned with povidone/iodine, Dakin's solution, hydrogen peroxide, wet-to-dry dressings, or any solutions that may impede granulation tissue formation. These sites should be cleaned with either saline or tap water and covered with hydrocolloid, foam, or another nonadherent dressing that promotes a moist environment.

Ref: Raetz JG, Wick KH: Common questions about pressure ulcers. *Am Fam Physician* 2015;92(10):888-894.

Item 42

ANSWER: A

Febrile seizures occur in 2%–5% of children ≤5 years of age. Simple febrile seizures are characterized as being general, tonic-clonic, and less than 15 minutes in duration, and occur in patients with no prior history of neurologic disease. Prospective cohort studies support reassurance after a simple febrile seizure. Retrospective cohort studies fail to show a benefit from neuroimaging or electroencephalography. Two large case review studies showed no risk or a very low risk for meningitis in the absence of altered mental status or meningeal signs, so a lumbar puncture is not indicated. Randomized, controlled trials failed to show benefit and did show a potential side-effect risk from starting antiepileptic medication.

Ref: Graves RC, Oehler K, Tingle LE: Febrile seizures: Risks, evaluation, and prognosis. *Am Fam Physician* 2012;85(2):149-153.

Item 43

ANSWER: D

Family physicians are often asked to provide primary care for organ transplant recipients. Pregnancy should be avoided during the 12 months following transplantation because of the increased risk of preterm delivery and graft rejection. Female fertility typically increases post transplant. The use of an IUD avoids interactions with medications, does not increase the risk of infection, and is not affected by typical immunosuppressive therapies.

The remaining options are incorrect because of their higher failure and discontinuation rates. The CDC cites failure rates with typical use of 9% for combined oral contraceptives and the etonogestrel/ethinyl estradiol vaginal ring, 6% for injectable progesterone, 0.2% for levonorgestrel IUDs, and 0.08% for the copper IUD. Barrier method failure rates exceed 18%. Combined oral contraceptives and the vaginal ring also have potential estrogen-related side effects, and injectable progesterone use increases the risk for osteoporosis.

Ref: Curtis KM, Tepper NK, Jatlaoui TC, et al: US medical eligibility criteria for contraceptive use, 2016. *MMWR Recommend Rep* 2016;65(3):1-103. 2) Cimino FM, Snyder KA: Primary care of the solid organ transplant recipient. *Am Fam Physician* 2016;93(3):203-210.

Item 44

ANSWER: C

There are several types of chronic headaches, and they often respond to different treatments. Migraine is very prevalent and is characterized by headaches that are periodic, often unilateral, and frequently pulsatile. Migraine is familial and typically starts in childhood, adolescence, or young adulthood, and the headaches decrease in frequency over time. Some are associated with aura, which causes visual disturbances. In mild cases, over-the-counter medications may control symptoms. For most patients, however, treatment to control the attack can include triptans such as sumatriptan, and/or ergot alkaloids such as ergotamine. Treatment to prevent attacks may also be appropriate, and could include a β-blocker, antiepileptic drugs, or amitriptyline.

Tension headaches are usually bilateral and are typically described as dull or aching, but patients often describe tightness or pressure. They are not associated with symptoms such as throbbing, nausea, or photophobia. Tension headaches are more frequent than migraine but patients often treat them at home without seeking medical treatment. Frequent or persistent tension headaches can be treated with several drugs used for anxiety or depression, including amitriptyline. Stronger analgesics and ergotamine are not helpful.

Cluster headache is another type of chronic headache. This occurs most frequently in adult males, and often occurs over a period which may extend over many weeks, with repeated episodes or clusters. It most often occurs at night, and may recur several times during the night. The headache is unilateral and is associated with orbital pain and vasomotor phenomenon such as blocked nasal passages, rhinorrhea, conjunctival injection, and miosis. The headache can be treated with inhalation of 100% oxygen, and the headache cycle can be terminated with verapamil. Ergotamine or sumatriptan can be used at night to prevent attacks.

There are also variants of cluster headaches, including chronic paroxysmal hemicrania, which resembles cluster headache but has some important differences. Like cluster headaches, these headaches are unilateral and accompanied by conjunctival hyperemia and rhinorrhea. However, these headaches are more frequent in women, and the paroxysms occur many times each day. This type of headache falls into a group of headaches that have been labeled indomethacin-responsive headaches because they respond dramatically to indomethacin.

Ref: Yancey JR, Sheridan R, Koren KG: Chronic daily headache: Diagnosis and management. *Am Fam Physician* 2014;89(8):642-648. 2) Ropper AH, Samuels MA, Klein JP: *Adams and Victor's Principles of Neurology*, ed 10. McGraw-Hill, 2014, pp 168-190.

Item 45

ANSWER: B

Cognitive-behavioral therapy for chronic insomnia is known to be superior to pharmacologic therapies (SOR A) and can be effectively administered by primary care physicians (SOR B). An important component of cognitive-behavioral therapy is sleep hygiene education to identify behaviors that can interfere with sleep, such as pets in the bedroom, caffeine consumption after 4 p.m., exercising within 2 hours of bedtime, and nicotine use. It is also important to identify factors that can facilitate sleep, such as maintaining an environment conducive to sleep, including a cool room and a comfortable bed. Addressing misunderstandings about normal sleep, reinforcing factual sleep-related information, and addressing stimulus control, such as limiting use of the bedroom to sleep and sex and delaying going to bed until sleepy, are among the other key components of a comprehensive cognitive-behavioral therapy program for chronic insomnia.

Ref: Ramar K, Olson EJ: Management of common sleep disorders. *Am Fam Physician* 2013;88(4):231-238.

Item 46

ANSWER: C

This patient has diarrhea-predominant irritable bowel syndrome (IBS). There are many treatments available, with varying degrees of evidence. SSRIs, along with tricyclic antidepressants, have been shown to decrease abdominal pain and improve global assessment scores in those with IBS. Polyethylene glycol is a treatment for constipation and would not help this patient. Acupuncture has not been shown to be superior to sham acupuncture in improving IBS symptoms. Neomycin has been shown to improve symptoms in constipation-predominant IBS but would not be helpful in diarrhea-predominant IBS. Soluble fiber such as psyllium improves symptoms and decreases abdominal pain scores in patients with IBS. Insoluble fiber has not been shown to improve any IBS outcomes.

Ref: Ruepert L, Quartero AO, de Wit NJ, et al: Bulking agents, antispasmodics and antidepressants for the treatment of irritable bowel syndrome. *Cochrane Database Syst Rev* 2011;(8):CD003460. 2) Manheimer E, Cheng K, Wieland LS, et al: Acupuncture for treatment of irritable bowel syndrome. *Cochrane Database Syst Rev* 2012;(5):CD005111. 3) Wilkins T, Pepitone C, Alex B, Schade RR: Diagnosis and management of IBS in adults. *Am Fam Physician* 2012;86(5):419-426. 4) Nagarajan N, Morden A, Bischof D, et al: The role of fiber supplementation in the treatment of irritable bowel syndrome: A systematic review and meta-analysis. *Eur J Gastroenterol Hepatol* 2015;27(9):1002-1010.

Item 47

ANSWER: B

Though symptoms of generalized anxiety disorder (GAD) overlap with other psychiatric and medical conditions, the case presented is most consistent with GAD. SSRIs are first-line therapy for GAD (SOR B). Benzodiazepines such as lorazepam can improve anxiety-related symptoms, but due to the side effects and addiction potential they are recommended for short-term use (SOR B). Bupropion is approved for the treatment of depression but is not used to treat GAD. Quetiapine may be considered as second-line therapy for GAD (SOR B). Methylphenidate is first-line therapy for attention-deficit/hyperactivity disorder but is not indicated to treat GAD. Psychotherapy, especially cognitive-behavioral therapy, is also first-line treatment for GAD (SOR A), and exercise can also improve symptoms (SOR B).

Ref: Locke AB, Kirst N, Shultz CG: Diagnosis and management of generalized anxiety disorder and panic disorder in adults. *Am Fam Physician* 2015;91(9):617-624.

Item 48

ANSWER: C

Low diffusing capacity of the lungs for carbon monoxide (DLCO) with normal spirometry indicates a disease process that disrupts gas transfer in the lungs without causing lung restriction or airflow obstruction. Common causes include chronic pulmonary emboli, heart failure, connective tissue disease with pulmonary involvement, and primary pulmonary hypertension. Asthma, bronchiectasis, COPD, and pulmonary fibrosis are associated with abnormalities on spirometry.

Ref: Johnson JD, Theurer WM: A stepwise approach to the interpretation of pulmonary function tests. *Am Fam Physician* 2014;89(5):359-366.

Item 49

ANSWER: B

Patients with an artificial heart valve should be given antibiotic prophylaxis prior to dental procedures to prevent infectious endocarditis. The organisms that most frequently cause infectious endocarditis include *Staphylococcus aureus* (31%), *Streptococcus viridans* (17%), coagulase-negative staphylococci (11%), *Enterococcus* (11%), *Streptococcus bovis* (7%), and other streptococci (5%). Amoxicillin is the preferred medication for prophylaxis. Clindamycin or azithromycin can be used in patients with a penicillin allergy. If the penicillin allergy is not associated with anaphylaxis, angioedema, or urticaria, then cephalexin would be an appropriate antibiotic choice. Ciprofloxacin, doxycycline, rifampin, and trimethoprim/sulfamethoxazole are not used for bacterial endocarditis prophylaxis.

Ref: Pierce D, Calkins BC, Thornton K: Infectious endocarditis: Diagnosis and treatment. *Am Fam Physician* 2012;85(10):981-986.

Item 50

ANSWER: D

Adult patients or their legally authorized representatives have the right to refuse any medical treatment, regardless of its likelihood of success; however, there is no legal right to receive any and all treatment demanded. When patients have explicit advance directives in writing, their wishes are clear. When no written document exists but the patient's desire is well known to his or her physician, the physician is ethically bound to honor these wishes. This responsibility must be balanced against the physician's ethical obligation not to perform futile treatments of no benefit to the patient. Family members acting as a medical decision-making proxy are obligated to represent what they believe to be the patient's wishes, even if this conflicts with their personal beliefs.

This case highlights two commonly encountered issues: honoring the patient's wishes when there is conflicting evidence of what their wishes may be, and withholding medically futile treatment. In this case, the futility of treating the patient's condition overrides any confusion as to her wishes, and the admission treatment plan is the most appropriate. Nevertheless, it would be best to discuss this with the nephew and attempt to arrive at a consensus, with the patient's best interest being the primary concern.

Ref: Talebreza S, Widera E: Advance directives: Navigating conflicts between expressed wishes and best interests. *Am Fam Physician* 2015;91(7):480-484.

Item 51

ANSWER: B

Prevention traditionally has been divided into three categories: primary, secondary, and tertiary. Primary prevention targets individuals who may be at risk to develop a medical condition and intervenes to prevent the onset of that condition. Examples include childhood vaccination programs, water fluoridation, antismoking programs, and education about safe sex. Secondary prevention targets individuals who have developed an asymptomatic disease and institutes treatment to prevent complications. Examples include routine Papanicolaou tests and screening for hypertension, diabetes mellitus, or hyperlipidemia. Tertiary prevention targets individuals with a known disease, with the goal of limiting or preventing future complications. Examples include screening patients with diabetes for microalbuminuria, rigorous treatment of diabetes mellitus, and post–myocardial infarction prophylaxis with β-blockers and aspirin.

Ref: Roadmaps for clinical practice: A primer on population-based medicine. American Medical Association, 2002, pp 28-33. 2) Rakel RE, Rakel DP (eds): *Textbook of Family Medicine*, ed 9. Elsevier Saunders, 2016, p 82.

Item 52

ANSWER: D

Toe fractures are the most common fracture of the foot and they generally involve minimal displacement and are usually treated nonsurgically. Nondisplaced lesser toe fractures are generally treated with a rigid-sole shoe or buddy taping to an adjacent toe. The great toe has an increased role in weight bearing and balance, and fractures of this toe have a greater potential morbidity. Because of this, these fractures are generally treated with a short leg walking cast with a toe plate. The foot should be placed in a cast for 2–3 weeks, and if there are no significant symptoms at that time the patient can then use buddy taping or a rigid-sole shoe for the next 3–4 weeks. Because there was intra-articular involvement in this patient, he should also get a repeat radiograph after 1 week. Intra-articular fractures with 25% or greater involvement of the joint surface should be referred for surgical treatment.

Ref: Bica D, Sprouse RA, Armen J: Diagnosis and management of common foot fractures. *Am Fam Physician* 2016;93(3):183-191.

Item 53

ANSWER: C

Elderly patients, especially those taking hydrochlorothiazide, are at risk for developing hyponatremia while taking carbamazepine. Carbamazepine is one of the medications that can cause the syndrome of inappropriate antidiuretic hormone secretion, as it interferes with the ability to dilute the urine. It does not lead to the other derangements listed (SOR A).

Ref: Henry DA: In the clinic: Hyponatremia. *Ann Intern Med* 2015;163(3):ITC1-ITC19.

Item 54

ANSWER: C

Prazosin is an α-adrenergic receptor antagonist and is recommended for the treatment of nightmares in posttraumatic stress disorder (SOR A). It is thought to reduce sympathetic outflow in the brain. Although clonidine may be tried, evidence of its effectiveness is sparse (SOR C). Clonazepam, propranolol, and divalproex have not been recommended.

Ref: Aurora RN, Zak RS, Auerbach SH, et al: Best practice guide for the treatment of nightmare disorder in adults. *J Clin Sleep Med* 2010;6(4):389-401. 2) Kung S, Espinel Z, Lapid MI: Treatment of nightmares with prazosin: A systematic review. *Mayo Clin Proc* 2012;87(9):890-900.

Item 55

ANSWER: B

Oral corticosteroids are not indicated in the treatment of plaque psoriasis. All of the other options are indicated only if topical treatments fail. Of the options listed, the combination of a topical corticosteroid and topical calcipotriene is considered the most appropriate for this patient. Another option would be to add topical tazarotene to the topical corticosteroid. However, when tazarotene is used as monotherapy it often fails to clear plaques and increases the incidence of skin irritation.

Ref: Goldsmith LA, Katz SI, Gilchrest BA, et al: *Fitzpatrick's Dermatology in General Medicine*, ed 8. McGraw Hill Medical, 2012. 2) Hsu S, Papp KA, Lebwohl MG, et al: Consensus guidelines for the management of plaque psoriasis. *Arch Dermatol* 2012;148(1):95-102.

Item 56

ANSWER: D

This patient presents with signs and symptoms that suggest age-related macular degeneration. Smoking is a modifiable risk factor and smokers should be counseled to quit (SOR C). The patient should be referred to an ophthalmologist for further evaluation and management. Watchful waiting would not be appropriate. Vitamin supplements with Age-Related Eye Disease (AREDS) and AREDS2 formulations have been shown to delay visual loss in patients with age-related macular degeneration (SOR A). Age-related macular degeneration is not reversible but treatment can delay progression or stabilize the changes (SOR A).

Ref: Pelletier AL, Rojas-Roldan L, Coffin J: Vision loss in older adults. *Am Fam Physician* 2016;94(3):219-226.

Item 57

ANSWER: E

The American College of Gastroenterology recommends that patients with severe acute pancreatitis receive enteral nutrition. Enteral feedings help prevent infectious complications, such as infected necrosis, by maintaining the gut mucosal barrier and preventing translocation of bacteria that may seed pancreatic necrosis. Currently, continuous enteral feeding is preferred over bolus feeding. A meta-analysis has shown that continuous nasogastric enteral feeding started in the first 48 hours decreases mortality and the length of hospital stay.

Total parenteral nutrition is not recommended because of infectious and line-related complications. It should be avoided unless the enteral route cannot be used.

Ref: Tenner S, Baillie J, DeWitt J, et al: American College of Gastroenterology guideline: Management of acute pancreatitis. *Am J Gastroenterol* 2013;108(9):1400-1415.

Item 58

ANSWER: A

This child's presentation appears most consistent with bites from an insect. Having multiple exposures on skin often not covered by clothing would be typical of household fleas or bedbugs. Tick bites are typically identified by the presence of an actively feeding insect or a single papular lesion. Similarly, brown recluse spider bites would not be expected to be multiple or recurrent. A chigger is the larval form of a mite, which is an eight-legged arthropod. The larval form has only six legs, and tends to crawl into spaces near constricted clothing and cause welts from their bites along the neckline, waistline, sock line, or more rarely on the genitals. A scabies infestation often presents as an eczematous rash in semiprotected folds of skin such as the web spaces of fingers, the umbilicus, the axillae, or the genital region.

Ref: Bernardeschi C, Le Cleach L, Delaunay P, Chosidow O: Bed bug infestation. *BMJ* 2013;346:f138. 2) Juckett G: Arthropod bites. *Am Fam Physician* 2013;88(12):841-847. 3) Markova A, Kam SA, Miller DD, Lichtman MK: Common cutaneous parasites. *Ann Intern Med* 2014;161(5).

Item 59

ANSWER: B

Chronic kidney disease is defined as an estimated glomerular filtration rate (eGFR) < 60 mL/min/1.73 m^2 for at least 3 months, or other evidence of kidney damage such as albuminuria, abnormal imaging, or an abnormal biopsy. Current guidelines recommend referral to a nephrologist if a patient's renal disease is either of unknown etiology, is deteriorating quickly (eGFR decreasing by > 5 mL/min/1.73 m^2 per year), or is severe. Thresholds used to define severe chronic kidney disease include an eGFR < 30 mL/min/1.73 m^2, a urine albumin to creatinine ratio > 300 μg/mg, persistent acidosis or potassium imbalance, non–iron deficiency anemia with a hemoglobin level < 10 g/dL, and evidence of secondary hyperparathyroidism. The elevated phosphorus in this patient most likely indicates metabolically significant renal disease and warrants consultation.

Ref: Stevens PE, Levin A; Kidney Disease: Improving Global Outcomes Chronic Kidney Disease Guideline Development Work Group Members: Evaluation and management of chronic kidney disease: Synopsis of the kidney disease: Improving global outcomes 2012 clinical practice guideline. *Ann Intern Med* 2013;158(11):825-830. 2) Vassalotti JA, Centor R, Turner BJ, et al: Practical approach to detection and management of chronic kidney disease for the primary care clinician: *Am J Med* 2016;129(2):153-162.

Item 60

ANSWER: A

According to an international consensus statement, there are three criteria for diagnosing sarcoidosis: (1) a compatible clinical and radiologic presentation, (2) pathologic evidence of noncaseating granulomas, and (3) exclusion of other diseases with similar findings. The main exceptions to the need for histologic confirmation are the presence of bilateral hilar adenopathy in an asymptomatic patient (stage I) and the presentation of sarcoid-specific Lofgren syndrome—with fever, erythema nodosum, and bilateral hilar adenopathy that can be diagnosed based on clinical presentation alone. An asymptomatic patient with stage I sarcoidosis (bilateral hilar lymphadenopathy on chest radiography) without suspected infection or malignancy does not require an invasive tissue biopsy because the results would not affect the recommended management, which is monitoring only. Treatment is not indicated because spontaneous resolution of stage I sarcoidosis is common.

Reliable biomarkers for diagnosing sarcoidosis do not exist. Although the serum angiotensin converting enzyme level may be elevated in up to 75% of untreated patients, this lacks sufficient specificity, has large interindividual variability, and fails to consistently correlate with disease severity, all of which limit its clinical utility.

Pathologic evidence of noncaseating granulomas from the most accessible and safest biopsy site should be pursued only if there is an indication for treatment, such as significant symptomatic or progressive stage II or III pulmonary disease or serious extrapulmonary disease. If treatment is indicated, corticosteroids are the first-line treatment for sarcoidosis. Second- and third-line treatments include methotrexate, azathioprine, leflunomide, and biologic agents.

Ref: Statement on sarcoidosis. Joint statement of the American Thoracic Society (ATS), the European Respiratory Society (ERS) and the World Association of Sarcoidosis and Other Granulomatous Disorders (WASOG) adopted by the ATS Board of Directors and by the ERS Executive Committee, February 1999. *Am J Respir Crit Care Med* 1999;160(2):736-755. 2) Soto-Gomez N, Peters JI, Nambiar AM: Diagnosis and management of sarcoidosis. *Am Fam Physician* 2016;93(10):840-848.

Item 61

ANSWER: B

This patient has a peripheral neuropathy. A review of the patient's history and specific laboratory testing was performed to evaluate for the most common treatable causes of peripheral neuropathy, which include diabetes mellitus, hypothyroidism, and nutritional deficiencies. Additional causes of peripheral neuropathy include chronic liver disease and renal disease. It is important to consider medications as a possible cause, including amiodarone, digoxin, nitrofurantoin, and statins. Excessive alcohol use is another important consideration. In this patient, the mildly elevated total protein and erythrocyte sedimentation rate, which suggest a monoclonal gammopathy such as MGUS (monoclonal gammopathy of unknown significance) or multiple myeloma, should direct her workup. Serum protein electrophoresis is indicated to assess for this.

Other less common causes of peripheral neuropathy include carcinoma causing a paraneoplastic syndrome, lymphoma, sarcoidosis, AIDS, and genetic disorders such as Charcot-Marie-Tooth disease. Approximately 25% of patients with peripheral neuropathy have no clearly defined cause after a thorough evaluation and are diagnosed with idiopathic polyneuropathy.

MRI of the lumbar spine can identify central lesions causing spinal cord or nerve root compression but is not indicated in the evaluation of peripheral neuropathy. Serum angiotensin converting enzyme levels and a chest radiograph can assist in the diagnosis of sarcoidosis, which can cause peripheral neuropathy but is less likely in this patient. Cerebrospinal fluid analysis is important in assessing for chronic inflammatory demyelinating polyradiculoneuropathy, a more rare cause of peripheral neuropathy.

Ref: Hughes RA: Per Azhary H, Farooq MU, Bhanushali M, et al: Peripheral neuropathy: Differential diagnosis and management. *Am Fam Physician* 2010;81(7):887-892. 2) Goldman L, Schafer AI (eds): *Goldman's Cecil Medicine*, ed 25. Elsevier Saunders, 2016, pp 1274-1275, 2531-2532.

Item 62

ANSWER: C

The annual failure rate of combined oral contraceptive pills with typical use is 9%. Typical failure rates for other contraceptive methods are 0.2% for the levonorgestrel IUD, 6% for injectable progestin, 18% for male condoms, and 22% for the withdrawal method.

Ref: Division of Reproductive Health: Effectiveness of family planning methods. Centers for Disease Control and Prevention.

Item 63

ANSWER: C

Due to the disease prevalence and impact, effectiveness of screening instruments, and benefits of available treatment, the U.S. Preventive Services Task Force (USPSTF) recommends screening for major depressive disorder when adequate systems are in place to ensure accurate diagnosis, effective treatment, and appropriate follow-up. The USPSTF has made no recommendations regarding screening for bipolar disorder, generalized anxiety disorder, posttraumatic stress disorder, or schizophrenia.

Ref: Screening for depression in children and adolescents: Recommendation statement. *Am Fam Physician* 2016;93(6):506-508. 2) Screening for depression in adults: Recommendation statement. *Am Fam Physician* 2016;94(4):Online.

Item 64

ANSWER: E

This patient's cat is well more than 10 days after the bite, so rabies vaccine is not necessary. Azithromycin is indicated for cat scratch disease, but the presentation does not suggest this. Severe infections may require incision, drainage, and intravenous antibiotics. A surgery consultation is recommended to evaluate for tendon sheath or joint infection.

Ref: Ellis R, Ellis C: Dog and cat bites. *Am Fam Physician* 2014;90(4):239-243. 2) Worster B, Zawora MQ, Hsieh C: Common questions about wound care. *Am Fam Physician* 2015;91(2):86-92.

Item 65

ANSWER: A

The patient is experiencing an acute cognitive change from baseline, indicating possible delirium. The Confusion Assessment Method (CAM) is a delirium diagnosis tool useful for evaluating acute cognitive changes. The other tests listed, including the Mini-Mental State Examination, Mini-Cog, Montreal Cognitive Assessment, and Saint Louis Mental Status exam, test chronic baseline cognitive function and are not designed to test for acute changes.

Ref: Cordell CB, Borson S, Boustani M, et al: Alzheimer's Association recommendations for operationalizing the detection of cognitive impairment during the Medicare annual wellness visit in a primary care setting. *Alzheimers Dement* 2013;9(2):141-150. 2) American Geriatrics Society Expert Panel on Postoperative Delirium in Older Adults: Postoperative delirium in older adults: Best practice statement from the American Geriatrics Society. *J Am Coll Surg* 2015;220(2):136-148.

Item 66

ANSWER: C

In the treatment of active tuberculosis, direct observational therapy (DOT) involves providing the antituberculosis drugs directly to patients and watching them swallow the medication. It is the preferred care management strategy for all patients with tuberculosis. The use of DOT does not guarantee the ingestion of all doses of every medication, as patients may miss appointments, may not actually swallow the pills, or may regurgitate the medication, sometimes deliberately. Due to these limitations, the use of DOT does not remove the need to monitor patients for signs of treatment failure. DOT is effective in a wide variety of settings, including in the community with health nurses. It even shows benefit when the observation makes use of telehealth settings or mobile phones.

Among the important benefits of DOT are that it has been shown to decrease both the acquisition and transmission of drug-resistant tuberculosis and to increase treatment success in HIV-positive patients.

Ref: Nahid P, Dorman SE, Alipanah N, et al: Official American Thoracic Society/Centers for Disease Control and Prevention/Infectious Diseases Society of America clinical practice guidelines: Treatment of drug-susceptible tuberculosis. *Clin Infect Dis* 2016;63(7):e147-e195.

Item 67

ANSWER: E

Reported cure rates for trigger finger after corticosteroid injection range from 54% to 86%. Corticosteroid injection for the other conditions listed results in temporary pain relief, but the underlying conditions are not improved by the injection.

Ref: Foster ZJ, Voss TT, Hatch J, Frimodig A: Corticosteroid injections for common musculoskeletal conditions. *Am Fam Physician* 2015;92(8):694-699.

Item 68

ANSWER: C

Because of concerns about the growing epidemic of obesity in this population, the American Academy of Pediatrics now recommends screening for elevated serum cholesterol levels in children 9–11 years of age (SOR C). This patient should also be screened annually for depression beginning at 11 years of age and continuing through 21 years of age. Universal screening for iron deficiency anemia is recommended at 12 months of age and again at 15–30 months of age if the patient is determined to be high risk. HIV screening is recommended in adolescents 16–18 years of age, and age 21 is now the recommended starting age for screening for cervical dysplasia. Universal screening for diabetes mellitus is not recommended for children or adolescents.

Ref: Lambert M: AAP updates recommendations for routine preventive pediatric health care. *Am Fam Physician* 2016;94(4):324.

Item 69

ANSWER: C

Fibromyalgia is a chronic complex condition characterized by muscle pain, fatigue, muscle tenderness, and sleep disorders, often accompanied by mood disorders. SSRIs have been studied in the treatment of these symptoms, and while they have been shown to produce up to a 30% reduction in pain scores in patients with fibromyalgia, they have not been shown to affect fatigue or sleeping problems. They also have not been shown to be superior to tricyclics when treating pain. As with other patient populations, SSRIs have been shown to improve depression in those with fibromyalgia.

Ref: Walitt B, Urrútia G, Nishishinya MB, et al: Selective serotonin reuptake inhibitors for fibromyalgia syndrome. *Cochrane Database Syst Rev* 2015;(6):CD011735. 2) Yancey J, Hydrick EN: Selective serotonin reuptake inhibitors for fibromyalgia. *Am Fam Physician* 2016;94(7):548-549.

Item 70

ANSWER: B

This patient has hyperactive delirium. The first step in management is to determine and treat the underlying cause if possible. There are multiple causes of delirium such as medications, infections, metabolic abnormalities, and underlying diseases. The first step in treatment is behavioral management with strategies to orient the patient. Haloperidol or antipsychotics may be used if the patient is at risk of harm. Lorazepam and anticholinergics should both be avoided, as they can worsen delirium. Restraints can also worsen the agitation and should not be used. Mirtazapine is an antidepressant and is not used in the treatment of delirium.

Ref: Emanuel LL, Librach SL (eds): *Palliative Care: Core Skills and Clinical Competencies*, ed 2. Elsevier Saunders, 2011.

Item 71

ANSWER: C

Adenosine may be both diagnostic and therapeutic, and is a safe option in stable, regular, monomorphic wide-complex tachycardia (SOR B). A fluid bolus may also be appropriate, depending on the underlying disease state, but would not be the initial management for this patient. Defibrillation and chest compressions would be appropriate in this patient if he did not have a measurable pulse. If adenosine infusion is ineffective, antiarrhythmic medication would be recommended in this patient.

Ref: Helton MR: Diagnosis and management of common types of supraventricular tachycardia. *Am Fam Physician* 2015;92(9):793-800. 2) Neumar RW, Shuster M, Callaway CW, et al: Part 1: Executive Summary: 2015 American Heart Association guidelines update for cardiopulmonary resuscitation and emergency cardiovascular care. *Circulation* 2015;132(18 Suppl 2):S315-S367.

Item 72

ANSWER: C

Screening for hepatitis C virus (HCV) with an anti-HCV antibody test is recommended for all adults at high risk of infection, and one-time screening is recommended in adults born between 1945 and 1965. If the anti-HCV antibody test result is positive, current infection should be confirmed with a qualitative HCV RNA test.

Ref: Wilkins T, Akhtar M, Gititu E, et al: Diagnosis and management of hepatitis C. *Am Fam Physician* 2015;91(12):835-842.

Item 73

ANSWER: B

Diagnosing attention-deficit disorder in adults requires symptoms that interfere with social, academic, or occupational functioning and are present in more than one setting. *DSM-5* states that a history of symptoms before age 12 is required for the diagnosis. *DSM-IV* specified that symptoms must have been present before age 7.

Ref: American Psychiatric Association: *Diagnostic and Statistical Manual of Mental Disorders*, ed 5. American Psychiatric Association, 2013, p 59.

Item 74

ANSWER: B

Patients with a peanut allergy can have reactions to infinitesimal amounts of peanut protein, including residue on the lips of other people. This patient has successfully interrupted the course of anaphylaxis. Diphenhydramine can help reduce subsequent symptoms, and prednisone is generally given, although its value is unproven. However, the patient is at risk of a biphasic reaction and should go to an emergency department where additional epinephrine and resuscitation facilities are available. The American Academy of Pediatrics guideline recommends that all peanut-allergic patients who require a dose of adrenalin be observed in an emergency department.

Patients who have not already had a full allergy evaluation need to see an allergist, but this patient's peanut allergy has been established. Peanut-allergic patients tend to have accidental exposure about once every 5 years in spite of efforts at avoidance.

Ref: Cook VE, Chan ES: Anaphylaxis in the acute care setting. *CMAJ* 2014;186(9):694. 2) Sicherer SH, Simons FER; Section on Allergy and Immunology: Epinephrine for first-aid management of anaphylaxis. *Pediatrics* 2017;139(3):e20164006.

Item 75

ANSWER: A

In the first 3 to 4 days of illness, viral rhinosinusitis cannot be distinguished from early acute bacterial rhinosinusitis. If the patient seems to be improving and then symptoms start to worsen on days 5–10 of the illness (double sickening), acute bacterial rhinosinusitis should be suspected. The color of the nasal discharge should not be used as the sole indication for antibiotic therapy. One study showed that unilateral predominance with purulent rhinorrhea had an overall reliability of 85% for diagnosing sinusitis. After 10 days of upper respiratory symptoms, the probability of acute bacterial rhinosinusitis is 60%.

Antibiotic therapy should be considered if the patient does not improve after 7–10 days from the onset of symptoms or if the symptoms worsen at any time. According to most guidelines, the first-line antibiotic for treatment of adults with sinusitis is amoxicillin/clavulanate. Respiratory fluoroquinolones are not recommended as first-line medications, as they offer no additional benefits and have significant side effects. Second- and third-generation cephalosporins, trimethoprim/sulfamethoxazole, and macrolide antibiotics are no longer recommended for initial therapy. This is due to high rates of resistance in *Streptococcus pneumoniae* and *Haemophilus influenzae*.

Ref: Aring AM, Chan MM: Current concepts in adult acute rhinosinusitis. *Am Fam Physician* 2016;94(2):97-105.

Item 76

ANSWER: D

Gastroesophageal reflux accounts for a significant number of cases of failure to thrive, crib death, and recurrent pneumonia. Features of gastroesophageal reflux include a history of recurrent pneumonia, a low growth curve, a family history of sudden infant death syndrome, and normocytic anemia. A sweat chloride level of 20 mEq/L rules out cystic fibrosis. Normal serum calcium excludes DiGeorge's syndrome. The battered child generally presents with more than just a single recurring medical problem. β-Thalassemia would be indicated by a microcytic anemia.

Ref: Rudolph CD, Rudolph AM, Lister G, et al (eds): *Rudolph's Pediatrics*, ed 22. McGraw-Hill, 2011, pp 1405-1409. 2) Kliegman RM, Stanton BF, Geme JW III, et al (eds): *Nelson Textbook of Pediatrics*, ed 20. Elsevier Saunders, 2016, pp 1787-1791.

Item 77

ANSWER: A

Honey has been shown to decrease the frequency and severity of cough in children. Honey is safe in children 2 years of age or older, but should be avoided before then due to the risk of botulism. Safety and/or efficacy data is not available for the other agents listed in children under 2 years old. Codeine in particular has serious safety problems in young children and should be avoided.

Ref: Vernacchio L, Kelly JP, Kaufman DW, Mitchell AA: Cough and cold medication use by US children, 1999–2006: Results from the Slone survey. *Pediatrics* 2008;122(2):e323-e329. 2) Grogan SP, Egitto EA: Honey for acute cough in children. *Am Fam Physician* 2016;94(1):20-21. 3) Tobias JD, Green TP, Coté CJ, et al: Codeine: Time to say "no." *Pediatrics* 2016;138(4):e20162396.

Item 78

ANSWER: A

This patient has acute chest syndrome (ACS), a serious vaso-occlusive complication of sickle cell disease (SCD). Its cause may be multifactorial, but infections are common and antimicrobials are indicated. However, the clinical course of ACS is significantly different from infectious pneumonia in patients without SCD, due to the damaged microvasculature that occurs in ACS. Studies have shown that atypical pathogens predominate in ACS and it is therefore important to treat all patients with ACS with antibiotics that cover *Mycoplasma* and *Chlamydophila*. Viral infections are also common, especially in children with ACS. Other possible pathogens include *Staphylococcus aureus*, *Streptococcus pneumoniae*, and *Haemophilus influenzae*. Therefore, the use of a third-generation cephalosporin along with azithromycin is the recommended antibiotic coverage.

In addition to antimicrobials, treatment includes supportive care with supplemental oxygen, intravenous fluids, pain control, and incentive spirometry. Depending on the degree of anemia seen, a simple blood transfusion or exchange transfusion is often indicated as well. Consultation with a hematologist is recommended in the care of patients with ACS. Even with appropriate care, mortality rates in ACS are as high as 3%.

Ref: Yawn BP, Buchanan GR, Afenyi-Annan AN, et al: Management of sickle cell disease: Summary of the 2014 evidence-based report by expert panel members. *JAMA* 2014;312(10):1033-1048. 2) Howard J, Hart N, Roberts-Harewood M, et al: Guideline on the management of acute chest syndrome in sickle cell disease. *Br J Haematol* 2015;169(4):492-505.

Item 79

ANSWER: C

Recommendations to screen for vitamin D deficiency apply only to patients at risk and not to the general population. This patient's obesity and her clothing style, which limits sun exposure to the skin, puts her at increased risk. Additionally, this patient's muscle aches may be a symptom of vitamin D deficiency. The recommended test for this condition is a 25-hydroxyvitamin D level. A 1,25-dihydroxyvitamin D level is recommended to monitor, not diagnose, certain conditions. Parathyroid hormone, calcium, and alkaline phosphatase levels are poor indicators of vitamin D status.

Ref: Holick MF, Binkley NC, Bischoff-Ferrari HA, et al: Evaluation, treatment, and prevention of vitamin D deficiency: An Endocrine Society clinical practice guideline. *J Clin Endocrinol Metab* 2011;96(7):1911-1930. 2) Kasper DL, Fauci AS, Hauser SL, et al (eds): *Harrison's Principles of Internal Medicine*, ed 19. McGraw-Hill, 2015, pp 2465-2466.

Item 80

ANSWER: D

Management of polycystic ovary syndrome is typically aimed at addressing patient symptoms, as well as irregular menses and the risk of endometrial hyperplasia. Infertility may become a therapeutic target for women who desire pregnancy at some point in their lives. In this patient, who needs contraception and hopes to address her hirsutism, combined oral contraceptives are most likely to address both concerns. In addition to suppressing ovulation they also suppress gonadotropin and ovarian androgen production. The estrogen component increases hepatic production of sex hormone binding globulin, thus decreasing androgen bioavailability.

Progestin-only pills and the levonorgestrel IUD protect against pregnancy but will not improve hirsutism. Cyclic progesterone every 1–3 months can be used to prevent endometrial hyperplasia but will not provide contraception or address hirsutism. Spironolactone is an androgen receptor antagonist that can decrease hair growth, but it will not provide contraception.

Ref: McCartney CR, Marshall JC: Polycystic ovary syndrome. *N Engl J Med* 2016;375(1):54-64.

Item 81

ANSWER: C

Absorption of levothyroxine is impaired by several gastrointestinal conditions, including atrophic gastritis, chronic proton pump inhibitor use, and *Helicobacter pylori* infection. Treatment of *H. pylori* infection reverses this effect, and following eradication of the infection a reduction of the levothyroxine dosage by 30% or more will often be required.

Ref: Jonklaas J, Bianco AC, Bauer AJ, et al: Guidelines for the treatment of hypothyroidism: Prepared by the American Thyroid Association task force on thyroid hormone replacement. *Thyroid* 2014;24(12):1670-1751. 2) Lahner E, Virili C, Santaguida MG, et al: *Helicobacter pylori* infection and drugs malabsorption. *World J Gastroenterol* 2014;20(30):10331-10337.

Item 82

ANSWER: B

Acute uncomplicated cystitis responds well to 3 days of trimethoprim/sulfamethoxazole, 160/800 mg twice daily. Increasing resistance to fluoroquinolones has been seen and they are therefore less likely to be successful. Because of the association with tendon rupture they are also not considered first-line treatment. β-Lactam agents have similar resistance issues. Azithromycin is not indicated for urinary tract infections.

Ibuprofen alone has produced good symptom relief, but antibiotics are frequently needed for a definitive cure. The presence of diabetes or prediabetes should not change treatment (SOR A, SOR C).

Ref: Grigoryan L, Trautner BW, Gupta K: Diagnosis and management of urinary tract infections in the outpatient setting: A review. *JAMA* 2014;312(16):1677-1684.

Item 83

ANSWER: D

Brain MRI would be useful in ruling out brain and pituitary tumors, but this patient has no brain tumor symptoms and normal prolactin and TSH levels. A trial of combined oral contraceptive pills may precipitate withdrawal bleeding, but this has poor sensitivity as a marker of ovarian function (SOR C) and will not lead to a diagnosis.

There are no signs or symptoms of hyperandrogenism, so a serum testosterone level would not be helpful. Pelvic ultrasonography to confirm the presence of a uterus is not indicated by the physical findings at this point.

Short stature and the lack of pubertal changes are characteristics of primary ovarian failure and Turner syndrome. A karyotype to rule out Turner syndrome and the presence of Y chromosome material is indicated at this point.

Ref: Klein DA, Poth MA: Amenorrhea: An approach to diagnosis and management. *Am Fam Physician* 2013;87(11):781-788.

Item 84

ANSWER: B

Most pregnant women with a positive tuberculin skin test are asymptomatic and have no evidence of active tuberculosis, and therefore have latent tuberculosis infection. The risk of reactivation of tuberculosis and progression to active disease is the highest in the first 2 years of conversion. In women with a known conversion to a positive PPD in the last 2 years, treatment with isoniazid (INH), 300 mg daily, is recommended starting after the first trimester. Treatment should last 6–9 months. Pregnant women are at an increased risk for peripheral neuropathy when treated with INH. Vitamin B_6 supplementation decreases the risk of developing peripheral neuropathy with the use of INH.

Ref: Gabbe SG, Niebyl JR, Simpson JL, et al (eds): *Obstetrics: Normal and Problem Pregnancies*, ed 7. Saunders Elsevier, 2017, pp 828-849.

Item 85

ANSWER: A

The European Society of Cardiology 2016 Guidelines for Atrial Fibrillation state that the benefits of oral anticoagulation outweigh the risks in the majority of patients with atrial fibrillation who meet CHA_2DS_2-VASc criteria for oral anticoagulation. This includes the elderly and patients with cognitive impairment, frailty, or frequent falling. Oral anticoagulation is superior to aspirin for the prevention of stroke, while the bleeding risk with aspirin is not different than that of oral anticoagulation.

Use of the CHA_2DS_2-VASc criteria significantly increases the number of patients eligible for anticoagulation therapy compared with the $CHADS_2$ scoring system. If there is concern about bleeding risk, particularly in patients older than 65 years of age, the HAS-BLED scoring system has been well validated, with a score of 3 or more indicating that a patient has a high likelihood of hemorrhage. This patient's HAS-BLED score is 1 (age) and her estimated risk of major bleeding with 1 year of anticoagulation is 1.88%–3.3%. Her adjusted stroke risk is high (4.8% per year), as she has a CHA_2DS_2-VASc score of 4 (age ≥75, female, history of hypertension).

Ref: Kirchhof P, Benussi S, Kolecha D, et al: 2016 ESC guidelines for the management of atrial fibrillation developed in collaboration with EACTS. *Europace* 2016;18(11):1609-1678. 2) Gutierrez C, Blanchard DG: Diagnosis and treatment of atrial fibrillation. *Am Fam Physician* 2016;94(6):442-452.

Item 86

ANSWER: A

In addition to aspirin, a high-intensity statin, and sublingual nitroglycerin as needed, patients with chronic stable angina may be treated with β-blockers, calcium channel blockers, and/or long-acting nitrates. β-Blockers and heart rate–lowering calcium channel blockers should be avoided in this patient who already has bradycardia. Ranolazine, which affects myocardial metabolism, is not used as a first-line agent. Ivabradine is not a first-line agent and is used only in patients with heart failure. A long-acting nitrate or a dihydropyridine calcium channel blocker would be appropriate for this patient.

Ref: Ohman EM: Chronic stable angina. *N Engl J Med* 2016;374(12):1167-1176.

Item 87

ANSWER: C

This patient has signs and symptoms of cubital tunnel syndrome, which is the second most common peripheral neuropathy. Symptoms develop because of ulnar nerve compression in the upper extremity, leading to sensory paresthesias in the ulnar digits and intrinsic muscular weakness. Vague motor problems, including poor coordination of the fingers and hand clumsiness, are frequent complaints. Provocative testing includes demonstration of Tinel's sign over the cubital tunnel, and the elbow flexion test with paresthesias elicited over the ulnar nerve.

Carpal tunnel syndrome causes paresthesias in the distal median nerve distribution. Wartenberg's syndrome reflects compression of the superficial radial nerve. Pronator syndrome is a proximal median nerve neuropathy, while anterior interosseous nerve syndrome, a rare clinical entity, causes paresis or paralysis of the flexor pollicis longus, and the flexor digitorum profundus of the index and long fingers.

Ref: MacGillis KJ, Mejia A, Siemionow MZ: Hand compression neuropathy: An assessment guide. *J Fam Pract* 2016;65(7):462-471.

Item 88

ANSWER: A

If atrial fibrillation is converted back to sinus rhythm, the likelihood of the patient staying in sinus rhythm is best predicted from the diameter of the left atrium on the patient's echocardiogram. Significant left atrium enlargement means the patient is unlikely to stay in sinus rhythm after successful conversion.

Other factors that predict a lack of success in maintaining sinus rhythm after cardioversion include a longer time in atrial fibrillation before cardioversion, or the presence of underlying heart disease, especially rheumatic heart disease.

Ref: Abu-El-Haija B, Giudici MC: Predictors of long-term maintenance of normal sinus rhythm after successful electrical cardioversion. *Clin Cardiol* 2014;37(6):381-385.

Item 89

ANSWER: B

Fractures of the clavicle are common in young individuals, usually from sports injuries or direct trauma. Eighty percent of these fractures occur in the midclavicle. Unless significantly displaced, these fractures do not require referral. They can be treated with just a sling for 2–6 weeks. A sling is more comfortable and less irritating than a figure-of-eight bandage. Passive range of motion of the shoulder is indicated as soon as the pain allows. Physical therapy may be started at 4 weeks after the injury.

Ref: Monica J, Vredenburgh Z, Korsh J, Gatt C: Acute shoulder injuries in adults. *Am Fam Physician* 2016;94(2):119-127.

Item 90

ANSWER: C

In a patient with cancer, deep vein thrombosis of the leg or a pulmonary embolus is considered to be cancer-associated thrombosis. Low molecular weight heparin (LMWH), such as enoxaparin, should be chosen over the other anticoagulant options listed. (LMWH over warfarin is a Grade 2B recommendation; LMWH over dabigatran is a Grade 2C recommendation; LMWH over rivaroxaban is a Grade 2C recommendation; and LMWH over apixaban or edoxaban is a Grade 2C recommendation).

Ref: Kearon C, Akl EA, Ornelas J, et al: Antithrombotic therapy for VTE disease: CHEST guideline and expert panel report. *Chest* 2016;149(2):315-352.

Item 91

ANSWER: B

Key diagnostic features of autism spectrum disorder include deficits in social communication and interaction across multiple contexts and restricted, repetitive patterns of behavior, interests, or activities. The *DSM-5*, which came out in 2013, created an umbrella diagnosis of autism spectrum disorder to consolidate four previously separate disorders: autistic disorder, Asperger's disorder, childhood disintegrative disorder, and pervasive developmental disorder not otherwise specified. Any individuals with a previous diagnosis of one of these disorders should now be given a diagnosis of autism spectrum disorder.

Ref: American Psychiatric Association: *Diagnostic and Statistical Manual of Mental Disorders*, ed 5. American Psychiatric Association, 2013, pp 50-51. 2) Sanchack KE, Thomas CA: Autism spectrum disorder: Primary care principles. *Am Fam Physician* 2016;94(12):972-979.

Item 92

ANSWER: D

This lesion is consistent with actinic keratosis, which is considered to be a premalignant lesion with the potential to progress to squamous cell carcinoma, so treatment is generally indicated. This can be accomplished with destruction or removal, including with topical medication therapies.

Ref: McIntyre WJ, Downs MR, Bedwell SA: Treatment options for actinic keratoses. *Am Fam Physician* 2007;76(5):667-671. 2) Habif TP: *Clinical Dermatology: A Color Guide to Diagnosis and Therapy*, ed 6. Elsevier, 2016, pp 819-826.

Item 93

ANSWER: A

This child has gastroesophageal reflux. This is a normal physiologic process that occurs in infants. Most reflux events are caused by transient lower esophageal sphincter relaxation that is triggered by postprandial gastric distention. This relaxation can continue into childhood, but with growth and an upright eating position it generally improves. Reflux in infants can be treated by implementing body position changes while awake, lower volume feedings if they are overfed, thickening agents, and antiregurgitant formula. It is recommended to avoid the use of medication in infants that have regurgitation that is effortless, painless, and not affecting growth. When the infant is not growing well or appears to be in pain, it would be appropriate to initiate pharmacotherapy with an acid-suppressing medication. Abdominal ultrasonography would be indicated if there were forceful vomiting and concerns about possible pyloric stenosis.

Ref: Baird DC, Harker DJ, Karmes AS: Diagnosis and treatment of gastroesophageal reflux in infants and children. *Am Fam Physician* 2015;92(8):705-714.

Item 94

ANSWER: B

Although the FDA has not approved the use of antipsychotics for aggressive behavior associated with dementia, they are often used to treat refractory behavioral and psychological symptoms of dementia. Their off-label use should be considered only when nonpharmacologic therapies are ineffective and the behaviors pose a risk of harm to the patient or others (SOR C), and the drug should be discontinued if there is no evidence of symptom improvement (SOR A). In a meta-analysis of three atypical antipsychotics, only aripiprazole showed small average reductions in behavioral and psychological symptoms of dementia. Olanzapine has demonstrated inconsistent results and ziprasidone is ineffective. Diphenhydramine is an anticholinergic agent and could exacerbate behaviors. Mirtazapine is indicated for depression. The American Geriatrics Society recommends against the use of benzodiazepines in older adults as a first choice for insomnia, agitation, or delirium.

Ref: Kalish VB, Gillham JE, Unwin BK: Delirium in older persons: Evaluation and management. *Am Fam Physician* 2014;90(3):150-158. 2) Reese TR, Thiel DJ, Cocker KE: Behavioral disorders in dementia: Appropriate nondrug interventions and antipsychotic use. *Am Fam Physician* 2016;94(4):276-282.

Item 95

ANSWER: E

This patient presents with the classic rash associated with varicella zoster (shingles). The rash is unilateral along a dermatome. Treatment of varicella zoster with antiviral therapy should be initiated if the patient can be treated within 72 hours of the onset of rash. This will decrease the severity of the outbreak and may decrease the risk of persistent neuropathic pain. Treatment can include topical corticosteroids and capsaicin cream, as well as oral pain medications and a corticosteroid.

This rash is not a contact dermatitis or a heat reaction, and topical corticosteroids are not indicated as the sole treatment. Oral corticosteroids alone should not be used to treat varicella zoster.

Varicella zoster can be complicated by a bacterial superinfection, in which case oral antistaphylococcal antibiotics are indicated. This rash is not impetigo and there is no role for topical antibiotics.

Ref: Fashner J, Bell AL: Herpes zoster and postherpetic neuralgia: Prevention and management. *Am Fam Physician* 2011;83(12):1432-1437. 2) Antiviral drugs. *Treat Guidel Med Lett* 2013;11(127):19-30.

Item 96

ANSWER: B

Lung cancer is the leading cause of cancer-related deaths in the United States and the third most common cause of death overall. Smoking causes approximately 85% of all U.S. lung cancer deaths. Thirty-seven percent of U.S. adults are current or former smokers. While nearly 90% of people diagnosed with lung cancer will die from the disease, early-stage non–small cell lung cancer has a better prognosis and can be treated with surgical resection. The largest randomized, controlled trial of low-dose CT (LDCT) for lung cancer detection, the National Lung Screening Trial, enrolled 50,000 people age 55–74 with at least a 30-pack-year smoking history and showed a reduction in lung cancer mortality of 16% and a reduction in all-cause mortality of 6.7%. Based on this study and several other randomized, controlled trials, the U.S. Preventive Services Task Force has concluded that LDCT has a high sensitivity and an acceptable specificity for the detection of lung cancer in high-risk persons. The other testing modalities listed have not been validated as acceptable screening strategies for lung cancer.

Ref: Moyer VA; US Preventive Services Task Force: Screening for lung cancer: US Preventive Services Task Force recommendation statement. *Ann Intern Med* 2014;160(5):330-338. 2) US Preventive Services Task Force: Screening for lung cancer: Recommendation statement. *Am Fam Physician* 2014;90(2):116A-116D.

Item 97

ANSWER: A

There are three situations when a breach of confidentiality is justified: abuse of a vulnerable person (child or elderly), a public health risk (communicable disease), or substantial danger to the patient or others. While *Chlamydia* is not usually considered life-threatening or dangerous, it is communicable. Contacting sexual partners to notify and treat them to stem the spread of disease is recommended.

Ref: Fleetwood J: STDs in patients with multiple partners: Confidentiality. *Am Fam Physician* 2006;74(11):1963-1964.

Item 98

ANSWER: B

The radiograph shows anterior glenohumeral (shoulder) dislocation. The glenohumeral articulation is the most common joint to be dislocated, with over 90% dislocating anteriorly. The injury typically occurs as a result of forced external rotation when the arm is abducted. On presentation there is a loss of normal contour of the shoulder and the arm is typically held in an abducted and externally rotated position. Associated findings may include injury to the axillary nerve (loss of sensation over the lateral shoulder), axillary artery (diminished radial pulse on the ipsilateral side), rotator cuff (tear), or humerus (Hill-Sachs deformities, Bankart lesions, other fractures). In posterior shoulder dislocations the arm is held adducted and internally rotated (SOR C).

Ref: Monica J, Vredenburgh Z, Korsh J, Gatt C: Acute shoulder injuries in adults. *Am Fam Physician* 2016;94(2):119-127.

Item 99

ANSWER: C

Sepsis is a severe life-threatening disorder that has a 25%–30% mortality rate. Early aggressive management has been shown to decrease the mortality rate. The initial step in the management of sepsis is respiratory stabilization. Fluid resuscitation should be started and followed by vasopressor therapy if there is an inadequate blood pressure response. Antibiotics should be initiated within 1 hour of presentation. Other interventions in early goal-directed therapy that have been shown to improve mortality rates include blood transfusions, low-dose corticosteroid therapy, and conventional (not intensive) glycemic control with a target glucose level of < 180 mg/dL. Intensive management of glucose in critically ill adult patients (a target glucose level of 80–110 mg/dL) has been shown to increase mortality.

Ref: Gauer RL: Early recognition and management of sepsis in adults: The first six hours. *Am Fam Physician* 2013;88(1):44-53.

Item 100

ANSWER: E

This child presents with oppositional defiant disorder (ODD). To meet the *DSM-5* criteria for ODD, the child must demonstrate at least four symptoms from any of the following categories: angry/irritable mood (often loses temper, is often touchy or easily annoyed, is often angry and resentful), argumentative/defiant behavior (often argues with authority figures or with adults, often actively defies or refuses to comply with requests from authority figures, often deliberately annoys others, often blames others for his/her mistakes or misbehavior), and vindictiveness (has been spiteful or vindictive at least twice within the past 6 months). These behaviors must be directed toward at least one person other than a sibling.

Behavioral problems associated with conduct disorder are more severe, including aggression toward animals or other persons, destruction of property, and a pattern of theft or deceit. The person's conduct frequently leads to conflict with authority figures.

Attention-deficit/hyperactivity disorder involves difficulty in following rules, struggles with authority figures, and possibly annoying others. In ODD, however, defiance of authority figures occurs in settings other than those where sustained attention or sitting quietly is required.

Bipolar disorder can include irritability and negative affect but the argumentative, defiant behavior or vindictiveness that occur in ODD do not routinely occur in mood disorders.

Intermittent explosive disorder involves repeated, sudden episodes of impulsive, aggressive, violent behavior or angry verbal outbursts in which the person reacts grossly out of proportion to the situation. Road rage, domestic abuse, throwing or breaking objects, or other temper tantrums may be signs of intermittent explosive disorder. Serious aggression toward others does not occur in ODD.

Ref: American Psychiatric Association: *Diagnostic and Statistical Manual of Mental Disorders*, ed 5. American Psychiatric Association, 2013, pp 462-463. 2) Riley M, Ahmed S, Locke A: Common questions about oppositional defiant disorder. *Am Fam Physician* 2016;93(7):586-591.

Item 101

ANSWER: C

This patient's history fits the diagnosis of functional dyspepsia. Two subtypes of this disorder have been described. The first, epigastric pain syndrome, is described as intermittent pain and burning in the epigastrium. The second, postprandial distress syndrome, is more typical of the symptoms this patient describes: postprandial fullness and early satiety. Although there is considerable benefit from reassurance and "naming" a patient's condition, empiric treatment is also warranted. Patients with epigastric pain syndrome are more likely to respond to proton pump inhibitors or H_2-blockers. Patients with predominantly postprandial distress symptoms are more likely to improve with a motility agent such as metoclopramide. Sucralfate, antacids, and selective antidepressants have not been shown to be more effective than placebo in functional dyspepsia, whereas tricyclic antidepressants and buspirone have shown some benefit and are reasonable next steps for this patient.

Ref: Loyd RA, McClellan DA: Update on the evaluation and management of functional dyspepsia. *Am Fam Physician* 2011;83(5):547-552. 2) Talley NJ, Ford AC: Functional dyspepsia. *N Engl J Med* 2015;373(19):1853-1863.

Item 102

ANSWER: B

Community-acquired pneumonia in children is treated based on age. The most likely etiologic agents in a school-age child are *Mycoplasma pneumoniae*, *Chlamydia pneumoniae*, and *Streptococcus pneumoniae*. Group A *Streptococcus* and *Haemophilus influenzae* are less common causes. *Staphylococcus aureus* that is methicillin-resistant has become increasingly common. The preferred treatment for community-acquired pneumonia is a macrolide antibiotic such as azithromycin.

In children ages 5–16, *Mycoplasma* pneumonia tends to have a gradual onset of symptoms and seldom causes respiratory distress. Signs and symptoms may vary. The patient may develop a rash, musculoskeletal symptoms, or gastrointestinal symptoms. Radiographs may reveal bronchopneumonia, nodular infiltrates, hilar adenopathy, pleural effusions, or plate-like atelectasis. Ear pain may be due to bullous myringitis, although this may be viral as well. Laboratory findings may not be helpful, as the WBC count may be normal or slightly elevated. There may be thrombocytosis, an elevated erythrocyte sedimentation rate, an elevation of cold agglutinins, or an elevated reticulocyte count. A Coombs test is seldom needed, although it might be helpful at times. The diagnosis is generally made on a clinical basis.

Ref: Stuckey-Schrock K, Hayes BL, George CM: Community-acquired pneumonia in children. *Am Fam Physician* 2012;86(7):661-667. 2) Kliegman RM, Stanton BF, Geme JW III, et al (eds): *Nelson Textbook of Pediatrics*, ed 20. Elsevier Saunders, 2016, pp 1487-1490.

Item 103

ANSWER: B

In young patients with hypertension it is important to consider secondary causes in addition to the more common essential hypertension. This patient's relatively young age and elevated home blood pressure readings despite drug therapy warrant further evaluation. The initial evaluation showed hypokalemia, which suggests an endocrine cause of hypertension, specifically hyperaldosteronism. Other potential causes of secondary hypertension include coarctation of the aorta, renal artery stenosis, thyroid disorders, obstructive sleep apnea, pheochromocytoma, and Cushing syndrome. Each of these presents with clinical findings that help to distinguish them from other potential causes, and the laboratory evaluation would depend on the suspected cause.

Ref: Viera AJ, Neutze DM: Diagnosis of secondary hypertension: An age-based approach. *Am Fam Physician* 2010;82(12):1471-1478. 2) Gyamlani G, Headley CM, Naseer A, et al: Primary aldosteronism: Diagnosis and management. *Am J Med Sci* 2016;352(4):391-398.

Item 104

ANSWER: C

Based on her clinical presentation and classic ophthalmopathy, this patient has Graves disease. Unlike radioactive iodine, methimazole has been shown to decrease the risk of development or progression of ophthalmopathy in Graves disease (SOR B). Atenolol is used for symptomatic control in hyperthyroidism. Cholestyramine can help lower thyroid hormone acutely but is not a long-term treatment. Prednisone is used for severe hyperthyroidism and not long-term treatment. Atenolol, cholestyramine, and prednisone do not have any effect on the long-term complications of Graves disease.

Ref: Ma C, Xie J, Wang H, et al: Radioiodine therapy versus antithyroid medications for Graves' disease. *Cochrane Database Syst Rev* 2016;(2):CD010094. 2) Kravets I: Hyperthyroidism: Diagnosis and treatment. *Am Fam Physician* 2016;93(5):363-370.

Item 105

ANSWER: A

Accepted mood stabilizers used for maintenance therapy in patients with bipolar disorder include lithium, valproate, lamotrigine, and some atypical antipsychotics such as olanzapine, quetiapine, and risperidone. The atypical antipsychotics are associated with weight gain and adverse metabolic changes. Annual testing for diabetes mellitus is recommended. Long-term maintenance therapy with a mood stabilizer is recommended in patients with bipolar I disorder due to the high risk of recurrent mania. Monotherapy with antidepressants is contraindicated. Although the typical antipsychotics may cause QT prolongation, atypical antipsychotics such as quetiapine do so much less frequently, and most SSRIs do not cause this. Coadministration with sertraline is not contraindicated.

Ref: Price AL, Marzani-Nissen GR: Bipolar disorders: A review. *Am Fam Physician* 2012;85(5):483-493.

Item 106

ANSWER: A

Conservative treatment is the recommended initial management for olecranon bursitis when there is no history of trauma or signs of septic bursitis. Aspiration of the bursal fluid is not recommended initially due to the risk of iatrogenic infection, but can be considered for symptomatic relief if there is significant enlargement or symptoms, or for diagnosis and culture if septic bursitis is suspected. Antibiotics are not recommended for aseptic bursitis and should be delayed in septic bursitis until after aspiration for culture. MRSA coverage may be indicated if the patient is at high risk for MRSA infection. An intrabursal corticosteroid injection is not routinely recommended for bursitis unless an underlying inflammatory condition is suspected, such as gout or rheumatoid arthritis. An intrabursal hyaluronic acid injection is not a recommended treatment for bursitis.

Ref: Kane SF, Lynch JH, Taylor JC: Evaluation of elbow pain in adults. *Am Fam Physician* 2014;89(8):649-657. 2) Khodaee M: Common superficial bursitis. *Am Fam Physician* 2017;95(4):224-231.

Item 107

ANSWER: A

Generally, the goal for patients with vertebral compression fractures is early mobilization when tolerated. Bed rest is ordered only if movement is not tolerated. The evidence for back bracing is limited but it can be used after weighing the risks and benefits. Current evidence supports initial conservative treatment before considering vertebroplasty or kyphoplasty (SOR C). Neurosurgical consultation is not required in this case.

Ref: *ACR-ASNR-ASSR-SIR-SNIS Practice Parameter for the Performance of Vertebral Augmentation*. American College of Radiology, amended 2014. 2) McCarthy J, Davis A: Diagnosis and management of vertebral compression fractures. *Am Fam Physician* 2016;94(1):44-50.

Item 108

ANSWER: A

There has been a large increase in the number of diagnostic tests available over the past 20 years. Although tests may aid in supporting or excluding a diagnosis, they are associated with expense and the potential for harm. In addition, the characteristics of a particular test and how the results will affect management and outcomes must be considered. Clinically useful statistics for evaluating diagnostic tests include the positive predictive value, negative predictive value, and likelihood ratio.

The likelihood ratio indicates how a positive or negative test correlates with the likelihood of disease. Ratios greater than 5–10 greatly increase the likelihood of disease, and those less than 0.1–0.2 greatly decrease it. In the example given, if the patient's endometrial stripe is >25 mm, the likelihood ratio is 15.2 and her post-test probability of endometrial cancer is 63%. However, if it is ≤ 4 mm, the likelihood ratio is 0.02 and her post-test probability of endometrial cancer is 0.2%.

The number needed to treat is useful for evaluating data regarding treatments, not diagnosis. Prevalence is the existence of a disease in the current population, and incidence describes the occurrence of new cases of disease in a population over a defined time period. The relative risk is the risk of an event in the experimental group versus the control group in a clinical trial.

Ref: Ebell MH: Diagnosis: Making the best use of medical data. *Am Fam Physician* 2009;79(6):478-480. 2) Kasper DL, Fauci AS, Hauser SL, et al (eds): *Harrison's Principles of Internal Medicine*, ed 19. McGraw-Hill, 2015, pp 21-24.

Item 109

ANSWER: C

A patient with alcohol withdrawal delirium (delirium tremens) is best treated as an inpatient, usually in an intensive-care unit. Evaluation of these patients consists of a workup to identify comorbid medical conditions, and treatment includes supportive care, intravenous thiamine, and medications to control agitation, promote sleep, and raise the seizure threshold. The first-line pharmacologic agent for the treatment of alcohol withdrawal delirium is a benzodiazepine, such as lorazepam. The other medications listed are used as adjunctive treatment for severe symptoms or for patients who do not have an adequate response to high doses of benzodiazepines. They all may have significant side effects and offer few advantages for most patients compared to benzodiazepines.

Ref: Schuckit MA: Recognition and management of withdrawal delirium (delirium tremens). *N Engl J Med* 2014;371(22):2109-2113.

Item 110

ANSWER: B

Difficult patient encounters involve many factors including both patient and clinician characteristics, behaviors, feelings, and attitudes. Motivational interviewing has been shown to improve the therapeutic alliance and result in positive behavior change. Clinicians may need to adjust schedules to allow appropriate time with such patients, but judgmental or dismissive remarks are not productive.

Ref: Cannarella Lorenzetti R, Jacques CH, Donovan C, et al: Managing difficult encounters: Understanding physician, patient, and situational factors. *Am Fam Physician* 2013;87(6):419-425.

Item 111

ANSWER: C

The 2013 American College of Cardiology/American Heart Association cholesterol guideline suggests statin therapy for individuals with an estimated 10-year risk of atherosclerotic cardiovascular disease of 7.5% or greater. The U.S. Preventive Services Task Force and the National Institute for Health and Care Excellence recommend statin therapy when the patient's 10-year risk of cardiovascular disease is 10% or greater. While international guidelines differ somewhat, other major guidelines would support similar recommendations.

Ref: Cardiovascular disease: Risk assessment and reduction, including lipid modification. National Institute for Health and Care Excellence, updated 2016. 2) Nayor M, Vasan RS: Recent update to the US cholesterol treatment guidelines: A comparison with international guidelines. *Circulation* 2016;133(18):1795-1806. 3) US Preventive Services Task Force, Bibbins-Domingo K, Grossman DC, et al: Statin use for the primary prevention of cardiovascular disease in adults: US Preventive Services Task Force Recommendation Statement. *JAMA* 2016;316(19):1997-2007.

Item 112

ANSWER: D

Constitutional growth delay, defined as delayed but eventually normal growth in an adolescent, is usually genetic. If evaluation of the short adolescent male reveals no evidence of chronic disease, if his sexual maturity rating is 2 or 3, and if his height is appropriate for his skeletal age he can be told without endocrinologic testing that he will begin to grow taller within a year or so. His adult height may be below average but cannot be predicted reliably. Average sexual maturity ratings for a male of 14.3 years are 4 for genitalia and 3–4 for pubic hair. The history and physical examination would have given clues to any illnesses or nutritional problems.

Ref: Barstow C, Rerucha C: Evaluation of short and tall stature in children. *Am Fam Physician* 2015;92(1):43-50. 2) Kliegman RM, Stanton BF, Geme JW III, et al (eds): *Nelson Textbook of Pediatrics*, ed 20. Elsevier Saunders, 2016, pp 87-89, 2643.

Item 113

ANSWER: A

Family physicians should know about health risks associated with adverse childhood experiences (ACEs). Many risk factors are associated with cumulative ACEs. As ACEs increase so do the risks for alcoholism, drug abuse, depression, suicide attempts, smoking, poor self-rated health, ≥50 sex partners, sexually transmitted disease, physical inactivity, severe obesity, and several chronic medical conditions that are leading causes of death in adults. Of the options listed, this child is at greatest risk for alcoholism.

Ref: Shonkoff JP, Garner AS; Committee on Psychosocial Aspects of Child and Family Health, et al: The lifelong effects of early childhood adversity and toxic stress. *Pediatrics* 2012;129(1):e232-e246. 2) Injury prevention & control: Division of Violence Prevention: VetoViolence. Centers for Disease Control and Prevention, reviewed 2017.

Item 114

ANSWER: A

α_1-Blockers such as doxazosin, prazosin, and tamsulosin have been shown to hasten the passage of ureteral stones (level 2 evidence). They are probably more effective than calcium channel blockers (level 2 evidence). β-Blockers, phosphodiesterase inhibitors such as sildenafil, 5-α-reductase inhibitors such as finasteride, and thiazide diuretics have not been shown to hasten stone passage. However, thiazide diuretics have been shown to decrease stone formation in patients with hypercalciuria.

Ref: Stevermer JJ, Ewigman B: Drugs help pass more ureteral stones. *J Fam Pract* 2008;57(4):224-227. 2) Hollingsworth JM, Canales BK, Rogers MA, et al: α-Blockers for treatment of ureteric stones: Systematic review and meta-analysis. *BMJ* 2016;355:i6112.

Item 115

ANSWER: A

In 2013 nearly 180,000 bariatric surgery procedures were performed in the United States. Bariatric surgery does result in reduced all-cause mortality and more weight loss. National Institutes of Health Consensus Development Conference eligibility criteria include comprehension of risks, benefits, expected outcomes, alternatives, and required lifestyle changes, including required postoperative lifelong supplements, diet changes, and follow-up appointments.

Ref: Moyer VA; US Preventive Services Task Force: Screening for and management of obesity in adults: US Preventive Services Task Force recommendation statement. *Ann Intern Med* 2012:157(5):373-378. 2) Schroeder R, Harrison TD, McGraw SL: Treatment of adult obesity with bariatric surgery. *Am Fam Physician* 2016;93(1):31-37.

Item 116

ANSWER: B

Posterior midline fissures cause pain during and after defecation. Most are caused by the passage of hard stool and when stretched cause bleeding. Conservative therapy consisting of bulk agents and stool softeners usually allows these to heal.

Internal hemorrhoids can cause bleeding with the passage of stool but are typically painless. External hemorrhoids can bleed with trauma but typically cause pain with thrombosis, independent of bowel movements. Anal fistulas and perirectal abscesses may intermittently drain purulent material. Abscesses can cause continuous pain, and a perianal mass may be noted on examination.

Ref: Klein JW: Common anal problems. *Med Clin North Am* 2014;98(3):609-923.

Item 117

ANSWER: D

This patient's MRSA bacteremia is considered uncomplicated due to the effectiveness of the antibiotic therapy and the lack of endocarditis or implanted prostheses such as heart valves. Therefore, the Infectious Diseases Society of America recommends that follow-up cultures of blood samples be obtained 2–4 days after the initial cultures and as needed thereafter to document clearance of bacteremia (SOR A; Quality of Evidence II).

Ref: Liu C, Bayer A, Cosgrove SE, et al: Clinical practice guidelines by the Infectious Diseases Society of America for the treatment of methicillin-resistant *Staphylococcus aureus* infections in adults and children. *Clin Infect Dis* 2011;52(3):e18-e55. 2) Bennett JE, Dolin R, Blaser MJ (eds): *Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases*, ed 8. Elsevier Saunders, 2015, p 2263.

Item 118

ANSWER: B

GLP-1 agonists are contraindicated in patients with medullary thyroid cancer or multiple endocrine neoplasm syndrome, or with a family history of these conditions. They are not associated with heart failure, coronary artery disease, or hypothyroidism. They have been associated with pancreatitis in rare cases, but this is not a contraindication to prescribing them.

Ref: Two new GLP-1 receptor agonists for diabetes. *Med Lett Drugs Ther* 2014;56(1455):109-111.

Item 119

ANSWER: B

Coin rubbing is a traditional healing custom practiced primarily in east Asian countries such as Cambodia, Korea, China, and Vietnam. The belief is that one's illness must be drawn out of the body, and the red marks produced by rubbing the skin with a coin are evidence of the body's "release" of the illness. These marks may be confused with abuse, trauma from some other source, or an unusual manifestation of the illness itself.

Ref: Galanti G: *Caring for Patients from Different Cultures*, ed 3. University of Pennsylvania Press, 2004, pp 167-169. 2) Juckett G: Cross-cultural medicine. *Am Fam Physician* 2005;72(11):2267-2274. 3) Swerdlin A, Berkowitz C, Craft N: Cutaneous signs of child abuse. *J Am Acad Dermatol* 2007;57(3):371-392. 4) Lilly E, Kundu RV: Dermatoses secondary to Asian cultural practices. *Int J Dermatol* 2012;51(4):372-379. 5) Kliegman RM, Stanton BF, Geme JW III, et al (eds): *Nelson Textbook of Pediatrics*, ed 20. Elsevier Saunders, 2016, pp 35-37.

Item 120

ANSWER: B

Recent guidelines have suggested that hypotension (a systolic blood pressure <90 mm Hg or a diastolic blood pressure <60 mm Hg, for 15 minutes or longer) should be treated with thrombolysis in patients who are not at high risk for bleeding. Patients who have other indicators of cardiopulmonary impairment without signs of hypotension should be given anticoagulation therapy and aggressive supportive care, but should not be treated with thrombolytic therapy. If the patient's condition continues to deteriorate as evidenced by the development of hypotension or other clinical indicators of cardiopulmonary compromise, thrombolysis may be considered.

Ref: Kearon C, Akl EA, Ornelas J, et al: Antithrombotic therapy for VTE disease: CHEST guideline and expert panel report. *Chest* 2016;149(2):315-352.

Item 121

ANSWER: B

The U.S. Preventive Services Task Force (USPSTF) recommends screening for abnormal blood glucose levels as part of a cardiovascular disease risk assessment for adults who are 40–70 years of age and who are overweight (BMI 25.0–29.9 kg/m^2) or obese (BMI $\geq$30.0 kg/m^2). Since his fasting blood glucose result was in the range consistent with impaired fasting glucose (100–125 mg/dL), the USPSTF recommends confirming the diagnosis of the abnormal glucose level soon by performing the same test on a different day. Appropriate treatment should begin once the diagnosis is confirmed.

Ref: Siu AL; US Preventive Services Task Force: Screening for abnormal blood glucose and type 2 diabetes mellitus: US Preventive Services Task Force recommendation statement. *Ann Intern Med* 2015;163(11):861-868. 2) Ngo-Metzger Q, Owings J: Screening for abnormal blood glucose and type 2 diabetes mellitus. *Am Fam Physician* 2016;93(12):1025-1026.

Item 122

ANSWER: B

According to the guidelines of the American Academy of Pediatrics, elemental iron supplementation (2 mg/kg per day) should begin at 1 month of age for exclusively breastfed infants born before 37 weeks gestation and should continue until 12 months of age, unless the infant had multiple blood transfusions.

Ref: Wang M: Iron deficiency and other types of anemia in infants and children. *Am Fam Physician* 2016;93(4):270-278.

Item 123

ANSWER: D

All staff, visitors, and nursing home residents should observe strict handwashing practices when a resident has a MRSA infection. Barrier precautions for wounds and medical devices should also be initiated. Surveillance cultures are not warranted. Aggressive housekeeping practices play little, if any, role in preventing the spread of MRSA. Isolating the patient is not practical or cost effective.

Ref: Unwin BK, Porvaznik M, Spoelhof GD: Nursing home care: Part I. Principles and pitfalls of practice. *Am Fam Physician* 2010;81(10):1219-1227.

Item 124

ANSWER: B

Achilles tendinopathy is among the most common injuries in middle-aged distance runners. Oral NSAIDs may be helpful for temporary pain relief, but they contribute little to recovery from this injury. Corticosteroid injection is contraindicated due to the risk of tendon rupture. Surgical debridement and fixation in a walking boot may be considered as a last resort for difficult cases, but the most effective treatment overall is eccentric calf-strengthening exercises.

Ref: Cosca DD, Navazio F: Common problems in endurance athletes. *Am Fam Physician* 2007;76(2):237-244. 2) Childress MA, Beutler A: Management of chronic tendon injuries. *Am Fam Physician* 2013;87(7):486-499.

Item 125

ANSWER: D

In 2013 the members of the Eighth Joint National Committee (JNC 8) updated guidelines for the management of hypertension, recommending treatment of systolic blood pressure to <150 mm Hg in patients >60 years of age without comorbid conditions, based on evidence that a systolic blood pressure <150 mm Hg reduces rates of cardiovascular disease, stroke, and death (SOR A). While this was a recent recommendation, the evidence supporting the beneficial effects of lowering blood pressure is decades old. The JNC 8 panel concluded that there is insufficient evidence to support a specific systolic blood pressure goal in adults <60 years of age. A Cochrane review concluded that treatment of patients with mild hypertension (systolic blood pressure of 140–159 mm Hg and/or diastolic blood pressure of 90–99 mm Hg) did not reduce morbidity or mortality compared with placebo (SOR A).

Ref: Musini VM, Tejani AM, Bassett K, Wright JM: Pharmacotherapy for hypertension in the elderly. *Cochrane Database Syst Rev* 2009;(4):CD000028. 2) Diao D, Wright JM, Cundiff DK, Gueyffier F: Pharmacotherapy for mild hypertension. *Cochrane Database Syst Rev* 2012;(8):CD006742. 3) Langan R, Jones K: Common questions about the initial management of hypertension. *Am Fam Physician* 2015;91(3):172-177.

Item 126

ANSWER: D

Infantile hemangiomas usually appear by 4 weeks of age and stop growing by 5 months of age. As many as 70% leave residual skin changes, including telangiectasia, fibrofatty tissue, redundant skin, atrophy, dyspigmentation, and scarring. Systemic corticosteroids were the mainstay of treatment for hemangiomas during infancy until 2008, when the FDA approved oral propranolol for this indication. Intralesional corticosteroids can be effective for small, bulky, well localized lesions in infants. Laser therapy can also be used to treat early lesions or residual telangiectasia. Once involution is complete, however, as is the case with this child, elective surgical excision is the treatment of choice, producing better outcomes.

Ref: Darrow DH, Greene AK, Mancini AJ, et al: Diagnosis and management of infantile hemangioma: Executive summary. *Pediatrics* 2015;136(4):786-791. 2) Randel A: American Academy of Pediatrics releases report on infantile hemangiomas. *Am Fam Physician* 2016;93(6):526-527.

Item 127

ANSWER: B

First-line agents for hypertension include ACE inhibitors, angiotensin receptor blockers, thiazide diuretics, and calcium channel blockers. Hydrochlorothiazide would be relatively contraindicated due to the patient's gout. Losartan, an angiotensin receptor blocker, should not be added because the patient is taking an ACE inhibitor. Metoprolol succinate, a β-blocker, is not a first-line agent for blood pressure unless there is another indication such as systolic heart failure or migraine prophylaxis.

Ref: James PA, Oparil S, Carter BL, et al: 2014 Evidence-based guideline for the management of high blood pressure in adults: Report from the panel members appointed to the Eighth Joint National Committee (JNC 8). *JAMA* 2014;311(5):507-520.

Item 128

ANSWER: C

The specificity of a test for a disease is the proportion or percentage of those without the disease who have a negative test. In this case, option A is the sensitivity, which is the proportion of those with the disease who have a positive test. Option B is the false-negative rate and option D is the false-positive rate. Option E is the ratio of false-negative tests to false-positive tests, a meaningless ratio.

The predictive values of positive and negative tests are extremely important characteristics of a screening test. Determination of these values requires knowledge of the prevalence of the disease in the population screened, as well as the sensitivity, specificity, and false-positive and false-negative rates. Since the prevalence of most diseases is low, the percentage of those with a positive test (the predictive value of a positive test) is relatively low, even when sensitivity and specificity are high. When prevalence is low, however, the predictive value of a negative test is very high and may approach 100%.

Ref: Kasper DL, Fauci AS, Hauser SL, et al (eds): *Harrison's Principles of Internal Medicine*, ed 19. McGraw-Hill, 2015, p 479.

Item 129

ANSWER: C

According to the American College of Rheumatology criteria, this patient has systemic lupus erythematosus, with photosensitivity, arthritis, a positive antinuclear antibody test, and a positive anti–double-stranded DNA test. She has a mild form of the disease. Hydroxychloroquine reduces arthritis pain in lupus patients (SOR A) and is the preferred initial treatment for lupus arthritis. Cyclosporine and azathioprine are indicated for severe lupus or lupus nephritis. Mycophenolate is indicated for refractory lupus or lupus nephritis. Rituximab is indicated for severe refractory lupus.

Ref: Lam NC, Ghetu MV, Bieniek ML: Systemic lupus erythematosus: Primary care approach to diagnosis and management. *Am Fam Physician* 2016;94(4):284-294.

Item 130

ANSWER: B

In otherwise healthy stable patients with upper gastrointestinal bleeding, a transfusion of red cells is recommended when the hemoglobin level falls below 7.0 g/dL. In hypotensive patients with severe bleeding, a blood transfusion before the hemoglobin level reaches 7.0 g/dL is needed to prevent significant decreases below this level that would occur with just fluid resuscitation. In hemodynamically stable patients with known cardiovascular disease and significant upper gastrointestinal bleeding, 8.0 g/dL should be the threshold for a blood transfusion.

Ref: Laine L: Upper gastrointestinal bleeding due to a peptic ulcer. *N Engl J Med* 2016;374(24):2367-2376.

Item 131

ANSWER: D

Elevated levels of NT-proBNP are known to indicate an increased likelihood of heart failure, and lower levels can rule out heart failure. However, certain patient characteristics can lead to higher levels of NT-proBNP even in healthy individuals. The use of one normal cutoff level for elevated NT-proBNP may not be appropriate. Even healthy female patients and those >65 years of age will have higher levels of NT-proBNP than younger male patients (SOR A).

NT-proBNP is negatively correlated with kidney function as measured by the estimated glomerular filtration rate (GFR) and albumin levels. Patients with a low GFR or a low level of albumin have higher NT-proBNP levels (SOR A). Interestingly, grip strength is negatively correlated with NT-proBNP as well.

A higher BMI is associated with a lower NT-proBNP. Thus, the utility of NT-proBNP to rule out heart failure in obese patients is decreased (SOR A).

Ref: Booth RA, Hill SA, Don-Wauchope A, et al: Performance of BNP and NT-proBNP for diagnosis of heart failure in primary care patients: A systematic review. *Heart Fail Rev* 2014;19(4):439-451. 2) Redfield MM: Heart failure with preserved ejection fraction. *N Engl J Med* 2016;375(19):1868-1877. 3) Chen SF, Li YJ, Song HM, et al: Impact of protein nutritional status on plasma BNP in elderly patients. *J Nutr Health Aging* 2016;20(9):937-943. 4) Hamada M, Shigematsu Y, Takezaki M, et al: Plasma levels of atrial and brain natriuretic peptides in apparently healthy subjects: Effects of sex, age, and hemoglobin concentration. *Int J Cardiol* 2017;228:599-604.

Item 132

ANSWER: D

While it is possible that this patient has baby blues, given the short duration of symptoms proximate to delivery, more evaluation is needed to differentiate between baby blues, which are very common and unlikely to contribute to the development of postpartum depression, and an episode of postpartum depression that has much more significant implications. There is more than one screening tool for postpartum depression, including the Edinburgh Postnatal Depression Scale, the PHQ-9 questionnaire, and the Postpartum Depression Screening Scale. An SSRI is the appropriate treatment for confirmed moderate to severe postpartum depression along with psychotherapy, while mild to moderate postpartum depression can be treated with psychotherapy or an SSRI. Referral to psychotherapy may be appropriate, but further evaluation should be pursued in order to determine the best treatment plan. Due to the risks associated with postpartum depression, an evaluation should be performed at this visit rather than asking the patient to monitor symptoms.

Ref: Langan R, Goodbred AJ: Identification and management of peripartum depression. *Am Fam Physician* 2016;93(10):852-858.

Item 133

ANSWER: A

Randomized, controlled studies yield stronger evidence than other types of studies, especially case-control or cohort studies, because randomization provides the greatest safeguard against unanticipated study bias. Evidence obtained from randomized, controlled studies is considered level 1 (strongest) by the U.S. Preventive Services Task Force. Evidence obtained from nonrandomized, controlled studies is considered level 2a, well-designed case-control and cohort studies are considered level 2b, and reports of expert committees or respected authorities are considered level 3 (weakest).

Ref: Paulman PM, Taylor RB (eds): *Family Medicine: Principles and Practice*, ed 7. Springer, 2017, pp 51-52.

Item 134

ANSWER: E

Legionella should be considered as a pathogen for community-acquired pneumonia when the patient has a history of a hotel stay or cruise ship travel within the past couple of weeks. Travel to or residence in Southeast Asia or East Asia is a risk factor for avian influenza, exposure to farm animals or parturient cats is a risk factor for *Coxiella burnetii* infection, exposure to bird or bat droppings is a risk factor for *Histoplasma capsulatum* infection, and travel to or residence in desert Southwest states with deer mouse exposure is a risk factor for *Hantavirus* infection.

Ref: Kaysin A, Viera AJ: Community-acquired pneumonia in adults: Diagnosis and management. *Am Fam Physician* 2016;94(9):698-706.

Item 135

ANSWER: B

In 2016 the CDC changed the recommendation for the number of HPV vaccine doses for children ages 11–14. Children in this age group need only two doses of HPV vaccine 6–12 months apart. However, if they received two doses of HPV vaccine less than 5 months apart, they still need to have the third dose. Children and young adults over the age of 14 and those with certain immunocompromising conditions still require three doses of HPV vaccine. There is no indication for a booster dose at a later date, nor is there clinical data to support using titers to gauge immunogenicity to HPV.

Ref: HPV vaccines: Vaccinating your preteen or teen. Centers for Disease Control and Prevention, 2016.

Item 136

ANSWER: C

A fractured hip is possible and must be ruled out since there is difficulty bearing weight and the leg is externally rotated. Examination of a patient with severe dementia can be extremely difficult. Other findings with a fractured hip would include pain elicited on rotation and groin pain when applying an axial load. If the hip radiograph is negative, MRI of the knee may be considered.

Ref: LeBlanc KE, Muncie HL Jr, LeBlanc LL: Hip fracture: Diagnosis, treatment, and secondary prevention. *Am Fam Physician* 2014;89(12):945-951.

Item 137

ANSWER: E

Informed consent to treat is considered an important ethical and legal part of caring for children and adolescents. Some situations can become confusing when trying to balance the need for treatment, a child's consent, and a parent or guardian's permission. In most states, 18 is the age when legal decisions can be made; however, in some states 21 years old is the age of legal consent.

Children below the age of majority must have proof of permission to treat from a parent or guardian for non-emergent care. This does not apply to emergency situations in which a delay in care could result in serious harm. Another exception to parental consent is when a child is considered emancipated under state law. This can happen with a court order, or (in some states) if the child is married, is a parent, is in the military, or is living independently. Either biologic parent can consent to treatment unless one of them is explicitly denied guardianship. If a child presents with a non-emergent condition and does not have evidence of permission from a parent or guardian, permission should be sought before the physician interaction takes place.

Ref: Zawistowski CA, Frader JE: Ethical problems in pediatric critical care: Consent. *Crit Care Med* 2003;31(5 Suppl):S407-S410.

Item 138

ANSWER: A

By definition, a pulmonary nodule is a circumscribed, round lesion that may measure up to 3 cm in size and is surrounded by aerated lung. Management is based on the size of the nodule and the probability of malignancy. Risk factors for lung cancer include a previous malignancy, a positive smoking history, and age ≥65. Only 1% of nodules between 2 mm and 5 mm in size are malignant.

Nodules <8 mm are difficult to biopsy, and a PET scan is not reliable. The risk of surgery outweighs the benefits in nodules of this size. For a low-risk patient with a nodule 4 mm to <6 mm in size, a repeat noncontrast CT at 12 months is recommended. If it is unchanged, no further follow-up is needed.

Ref: Kikano GE, Fabien A, Schilz R: Evaluation of the solitary pulmonary nodule. *Am Fam Physician* 2015;92(12):1084-1091.

Item 139

ANSWER: D

Female pattern hair loss is categorized as diffuse and nonscarring. It presents with parietal hair thinning with preservation of the frontal hairline. Minoxidil 2% produces regrowth of hair in female pattern hair loss (SOR B). Oral finasteride is appropriate only for men with male pattern hair loss (SOR A). Hydroxychloroquine is used for inflammatory hair loss associated with discoid lupus erythematosus, which is focal and scarring. Topical corticosteroids are appropriate for alopecia areata (SOR B) but not for female pattern hair loss. Griseofulvin is used to treat tinea capitis, which presents as focal scale with erythema.

Ref: Thiedke CC: Alopecia in women. *Am Fam Physician* 2003;67(5):1007-1014. 2) Mounsey AL, Reed SW: Diagnosing and treating hair loss. *Am Fam Physician* 2009;80(4):356-362. 3) Goldman L, Schafer AI (eds): *Goldman's Cecil Medicine*, ed 25. Elsevier Saunders, 2016, p 2704.

Item 140

ANSWER: C

Childhood bullying has potentially serious implications for bullies and their targets. The target children are typically quiet and sensitive, and may be perceived to be weak and different. Children who say they are being bullied must be believed and reassured that they have done the right thing in acknowledging the problem. Parents should be advised to discuss the situation with school personnel.

Bullying is extremely difficult to resolve. Confronting bullies and expecting victims to conform are not successful approaches. The presenting symptoms are not temporary, and in fact can progress to more serious problems such as suicide, substance abuse, and victim-to-bully transformation. The signs and symptoms in the patient described here are consistent with bullying and not thyroid disease.

The Olweus Bullying Prevention Program developed in Norway is a well documented, effective program for reducing bullying among elementary and middle-school students by altering social norms and by changing school responses to bullying incidents, including efforts to protect and support victims. Students who have been bullied regularly are more likely to carry weapons to school, be in frequent fights, and eventually be injured.

Ref: Gini G, Pozzoli T: Bullied children and psychosomatic problems: A meta-analysis. *Pediatrics* 2013;132(4):720-729. 2) McClowry RJ, Miller MN, Mills GD: What family physicians can do to combat bullying. *J Fam Pract* 2017;66(2):82-89.

Item 141

ANSWER: B

The Joint Commission for Hospital Accreditation now requires a patient spiritual assessment upon hospital admission. Using the FICA Spiritual History Tool or HOPE questions for making the spiritual assessment is appropriate for the physician. HOPE is a mnemonic for sources of Hope, Organized religion, Personal spirituality and practices, and Effects on medical care and end-of-life issues. The FICA tool includes questions in the categories of Faith and beliefs, Importance, Community, and how to Address these issues when providing care. It is very appropriate for a physician to conduct a spiritual assessment in older, hospitalized patients with critical or terminal illnesses. Some patients may consider themselves spiritual but not necessarily religious.

Ref: Saguil A, Phelps K: The spiritual assessment. *Am Fam Physician* 2012;86(6):546-550.

Item 142

ANSWER: D

To decrease the patient's frequent use of a short-acting bronchodilator, the addition of a long-acting anticholinergic inhaler for maintenance is most reasonable. Such medications have been demonstrated to improve quality of life and reduce hospitalizations. Evidence has demonstrated that a β-agonist combined with an inhaled corticosteroid would not be as preferable in this case, as they can increase the incidence of pneumonia. Long-acting theophylline and roflumilast may be added to the regimen of patients still symptomatic on triple therapy with long-acting β_2-agonists, inhaled corticosteroids, and anticholinergic bronchodilators.

Ref: Lee H, Kim J, Tagmazyan K: Treatment of stable chronic obstructive pulmonary disease: The GOLD guidelines. *Am Fam Physician* 2013;88(10):655-663.

Item 143

ANSWER: B

This patient has physical findings and a history consistent with impetigo, a skin infection caused by *Staphylococcus aureus* and/or *Streptococcus pyogenes*. Since she has only one lesion, systemic antibiotics are not required as they would be for a patient with extensive disease or multiple lesions. Although bacitracin and neomycin are commonly used, they are much less effective for impetigo than mupirocin, despite some reports of resistance to mupirocin (level A-1 evidence).

Ref: Stevens DL, Bisno AL, Chambers HF, et al: Practice guidelines for the diagnosis and management of skin and soft-tissue infections: 2014 update by the Infectious Diseases Society of America. *Clin Infect Dis* 2014;59(2):e10-e52.

Item 144

ANSWER: A

Patellofemoral pain syndrome is one of the most common causes of knee pain in children, particularly adolescent girls. Pain beneath the patella is the most common symptom. Squatting, running, and other vigorous activities exacerbate the pain. Walking up and down stairs is a classic cause of the pain, and pain with sitting for an extended period is also common. The physical examination reveals isolated tenderness with palpation at the medial and lateral aspects of the knee, and the grind test is also positive.

Osgood-Schlatter disease is seen in skeletally immature patients. Rapid growth of the femur can cause tight musculature in the quadriceps across the knee joint. It typically appears between the ages of 10 and 15, during periods of rapid growth. Pain and tenderness over the tibial tubercle and the distal patellar tendon is the most common presentation. The pain is aggravated by sports participation, but also occurs with normal daily activities and even at rest.

Growing pains most often affect the thigh and quadriceps and occur during late afternoon or evening, or wake the patient at night. The joints are not affected. The pain typically goes away by morning, and may sometimes occur the day after vigorous or unusual activity.

Patellar tendinopathy is an overuse injury often seen in those who participate in jumping sports such as volleyball, and is also related to frequent stops and starts in football players. It typically causes infrapatellar pain, and findings include extensor mechanism malalignment, weakness of ankle flexors, and tightness of the hamstring, heel cord, and/or quadriceps.

Sever's disease is an overuse syndrome most often seen between the ages of 9 and 14, and is related to osteochondrosis at the insertion of the Achilles tendon on the calcaneal tuberosity. It occurs during periods of rapid growth, causes heel pain during and after activity, and is relieved with rest. It is often related to beginning a new sport or the start of a season.

Ref: Madden CC, Putukian M, Young CC, McCarty EC: *Netter's Sports Medicine*. Elsevier Saunders, 2010, pp 425-426, 442-443, 466-467. 2) Kliegman RM, Stanton BF, Geme JW III, et al (eds): *Nelson Textbook of Pediatrics*, ed 20. Elsevier Saunders, 2016, pp 1226-1227, 3271-3273, 3346-3347.

Item 145

ANSWER: B

This funduscopic picture shows a 70% "cupping" or abnormal enlargement of the light-colored area around the central vascular area in the disc, which is a phenomenon that highly suggests increased intraocular pressure or glaucoma. Primary care physicians, especially family physicians, who often examine the eyes for other symptoms must be aware of these early changes in order to allow patients to obtain treatment to reverse or ameliorate the disease process.

Ref: Kasper DL, Fauci AS, Hauser SL, et al (eds): *Harrison's Principles of Internal Medicine*, ed 19. McGraw-Hill, 2015, pp 204-205.

Item 146

ANSWER: B

Urinary tract infection (UTI) is the most common bacterial infection in women. The annual incidence of UTI in women is 12%. Women who have had a UTI in the past are usually quite adept at diagnosing their own subsequent UTIs. Prospective studies have shown that women who suspect they have a UTI are more than 85% accurate based on culture results (SOR B). This is more accurate than dipstick testing, which has a sensitivity of 75% and a specificity of 82%. Nonpregnant female patients who have typical UTI symptoms without signs of pyelonephritis (i.e., fever and nausea) or vaginitis can be treated safely and effectively by phone.

Urine culture testing is not indicated for uncomplicated UTIs. It has been found that the traditional criterion for infection (100,000 colony-forming units/mL) is not sensitive for women with a UTI. Urine testing should be reserved for patients suspected of having pyelonephritis.

There are three first-line antibiotics for uncomplicated UTI. These include nitrofurantoin for 5 days, trimethoprim/sulfamethoxazole for 3 days, and fosfomycin as a single dose (SOR A). Fluoroquinolones are second-line agents and are best reserved for more serious infections such as pyelonephritis.

Urinary analgesics can be helpful with UTI symptoms but are not the preferred method of treatment, as antibiotics rapidly reduce the symptoms of infection.

Ref: Hooton TM: Uncomplicated urinary tract infection. *N Engl J Med* 2012;366(11):1028-1037. 2) Arnold JJ, Hehn LE, Klein DA: Common questions about recurrent urinary tract infections in women. *Am Fam Physician* 2016;93(7):560-569.

Item 147

ANSWER: E

Exercise-based therapy is the foundation for treating knee osteoarthritis. Foot orthoses can be helpful for anterior knee pain but this patient's pain is located medially. The benefit of hyaluronic acid injections is controversial, and recommendations vary; recent systematic reviews do not support a clinically significant benefit. Weight loss is recommended for patients with a BMI >25.0 kg/m^2. Wearing a knee brace has shown little or no benefit for reducing pain or improving knee function.

Ref: Jones BQ, Covey CJ, Sineath MH Jr: Nonsurgical management of knee pain in adults. *Am Fam Physician* 2015;92(10):875-883.

Item 148

ANSWER: A

This patient is suffering from acute urinary retention, likely due to mild benign prostatic hyperplasia exacerbated by pain medication and a lack of activity. Acute urinary retention could also possibly be due to irritation of sympathetic and/or parasympathetic nerves near the spine. Placing an indwelling bladder catheter is appropriate. It would also be reasonable, although impractical in the short term, to teach the patient or his caretakers to intermittently catheterize him.

The likelihood of a successful return to voiding spontaneously will increase over time. However, the risk of catheter-associated urinary tract infection is estimated to be about 5% per day. Therefore, catheter removal and a trial of spontaneous voiding should be attempted after 48–72 hours. There is good evidence that starting an α-blocking medication such as tamsulosin during the time the catheter is in place will nearly double the success of the trial of spontaneous voiding. Finasteride in isolation is not recommended and oxybutynin would be contraindicated.

Ref: Selius BA, Subedi R: Urinary retention in adults: Diagnosis and initial management. *Am Fam Physician* 2008;77(5):643-650. 2) Kowalik U, Plante MK: Urinary retention in surgical patients. *Surg Clin North Am* 2016;96(3):453-467.

Item 149

ANSWER: C

Patients 65 years of age and older should be vaccinated against *Pneumococcus*. The recommended sequence for a previously unvaccinated person is to give the 13-valent pneumococcal conjugate vaccine (PCV13) first, followed by the 23-valent pneumococcal polysaccharide vaccine (PPSV23) in 12 months. The interval was increased from 6 months in 2015. This patient has already received a Tdap booster so she requires only a Td booster. She does not need an MMR booster, as anyone born prior to 1957 is considered immune. Influenza vaccine should be delayed until fall. She is also due for herpes zoster vaccine if that was not offered when she turned 60.

Ref: Tomczyk S, Bennett NM, Stoecker C, et al: Use of 13-valent pneumococcal conjugate vaccine and 23-valent pneumococcal polysaccharide vaccine among adults aged ≥65 years: Recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR Morb Mortal Wkly Rep* 2014;63(37):822-825. 2) Kobayashi M, Bennett NM, Gierke R, et al: Intervals between PCV13 and PPSV23 vaccines: Recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR Morb Mortal Wkly Rep* 2015;64(34):944-947. 3) Adult immunization schedule. Centers for Disease Control and Prevention, 2016.

Item 150

ANSWER: D

A wealth of evidence-based research has established the benefits of probiotics, especially in children. Probiotics, particularly *Saccharomyces boulardii*, have been shown to prevent the antibiotic-associated diarrhea that occurs in 5%–30% of children who receive antibiotics (SOR A). The number needed to treat to prevent one case of diarrhea is 10.

Probiotics reduce the pain associated with irritable bowel syndrome (IBS) but have not been shown to be helpful in reducing diarrhea or constipation in pediatric IBS patients (SOR A).

In breastfed infants, probiotics reduce daily crying time by up to an hour. Similar benefits have not been found in formula-fed infants or infants who are combining breastfeeding and formula. Probiotics have not been shown to prevent colic in any infants.

Other benefits of probiotics include the prevention of eczema and upper respiratory infections (SOR A). However, their use has not been shown to prevent allergies and asthma.

Ref: Johnston BC, Goldenberg JZ, Parkin PC: Probiotics and the prevention of antibiotic-associated diarrhea in infants and children. *JAMA* 2016;316(14):1484-1485. 2) Islam SU: Clinical uses of probiotics. *Medicine (Baltimore)* 2016;95(5):e2658. 3) Dassow P, Fox S: When can infants and children benefit from probiotics? *J Fam Pract* 2016;65(11):789-794.

Item 151

ANSWER: C

Acute mountain sickness (AMS) occurs in at least 25% of persons traveling to destinations over 8000 feet above sea level. Risk factors include rapid ascent, living at low altitudes (<2000 ft), a prior history of altitude illness, and strenuous physical exertion during the ascent. AMS is most often manifested by headache, fatigue, lightheadedness, and/or nausea. The best way to prevent AMS is gradual ascent, but medications may also be effective in prophylaxis, especially if a rapid ascent such as in motorcycling, driving, or flying to altitude is planned.

The drug of first choice in preventing AMS is acetazolamide, a carbonic anhydrase inhibitor, starting the day before ascent. It is, however, contraindicated in patients with sulfa allergy. The second-line drug for prevention is dexamethasone, which should be used for prophylaxis in sulfa-allergic patients. It is also used in the treatment of AMS and high-altitude cerebral or pulmonary edema, but immediate descent of at least 2000 feet is imperative if either of those more serious complications develop. While advocated as a prophylactic and treatment option for AMS, the results for ginkgo are mixed and it is therefore not recommended for use in this situation. Smoking cessation and physical conditioning are both good ideas for this patient, but neither will reduce his risk for developing AMS.

Ref: Fiore DC, Hall S, Shoja P: Altitude illness: Risk factors, prevention, presentation, and treatment. *Am Fam Physician* 2010;82(9):1103-1110. 2) Nieto Estrada VH, Molano Franco D, Medina RD, et al: Interventions for preventing high altitude illness: Part 1. Commonly-used classes of drugs. *Cochrane Database Syst Rev* 2017;(6):CD009761.

Item 152

ANSWER: B

Family physicians should be familiar with age-appropriate cancer screening recommendations. Deaths from cervical cancer have been significantly reduced through screening. HPV testing is not recommended for screening in average-risk women younger than 30 years old. Cytology without HPV testing is recommended for screening every 3 years for an average-risk 21-year-old female.

Ref: Sawaya GF, Kulasingam S, Denberg TD, et al: Cervical cancer screening in average-risk women: Best practice advice from the clinical guidelines committee of the American College of Physicians. *Ann Intern Med* 2015;162(12):851-859. 2) Lambert M: ACP releases best practice advice on screening for cervical cancer. *Am Fam Physician* 2015;92(12):1107-1110.

Item 153

ANSWER: C

Patients with systemic sclerosis (SS) in its final stages often develop a restrictive lung disease (SOR C). Interstitial lung disease and pulmonary artery hypertension are common. While the restrictive pattern is similar to idiopathic pulmonary fibrosis, this condition is characteristic of SS and is not idiopathic. Emphysema presents with an obstructive pattern on pulmonary function tests. Pulmonary edema can develop from cardiac malfunction and heart failure, but it is not present in this patient. Sarcoidosis is not related to SS. There is a 10-year mortality of 42% in patients with SS who have an FVC $<50\%$. Cyclophosphamide may be helpful in some cases to improve lung function, decrease dyspnea, and improve the patient's quality of life (SOR B).

Ref: Hinchcliff M, Varga J: Systemic sclerosis/scleroderma: A treatable multisystem disease. *Am Fam Physician* 2008;78(8):961-968. 2) Herzog EL, Mathur A, Tager AM, et al: Review: Interstitial lung disease associated with systemic sclerosis and idiopathic pulmonary fibrosis: How similar and distinct? *Arthritis Rheumatol* 2014;66(8):1967-1978.

Item 154

ANSWER: D

The appearance of this lesion strongly suggests malignant melanoma. Although any of the options listed can provide tissue adequate for pathologic confirmation, the American Academy of Dermatology recommends an excision with narrow margins (1–3 mm) that includes the entire gross lesion with clinically negative margins to a depth that ensures the lesion is not transected (SOR B, level of evidence 2). For smaller lesions punch excision with sutures or shave removal to an adequate depth are acceptable alternatives if the recommended excision objectives can be met. Once the tissue diagnosis is obtained, appropriate staging and definitive surgery should be undertaken.

Ref: Bichakjian CK, Halpern AC, Johnson TM, et al: Guidelines of care for the management of primary cutaneous melanoma. American Academy of Dermatology. *J Am Acad Dermatol* 2011;65(5):1032-1047.

Item 155

ANSWER: D

Domestic violence can affect children, intimate partners, and older adults. It is a serious medical problem that should be considered in the care of patients and families. There is great variation in the profiles of patients affected by domestic violence. Neither demographic factors nor psychological problems have been found to be consistent predictors of victimization or violence. Domestic violence cuts across all racial, socioeconomic, religious, and ethnic lines. The only consistent risk factor for being a victim of domestic violence is female gender.

Ref: Neufeld B: SAFE questions: Overcoming barriers to the detection of domestic violence. *Am Fam Physician* 1996;53(8):2575-2580. 2) *Final Recommendation Statement: Intimate Partner Violence and Abuse of Elderly and Vulnerable Adults: Screening*. US Preventive Services Task Force, 2013.

Item 156

ANSWER: E

Colon cancer arises from adenomatous polyps, and generally requires at least 5 years of growth before malignant transformation. Villous adenomas carry a threefold increased risk for becoming malignant compared with other adenomatous types such as tubular or tubulovillous adenomas. The larger the polyp the greater the chance of malignancy, although malignant polyps < 1.5 cm are rare. Hamartomas (juvenile polyps) and inflammatory polyps (often associated with inflammatory bowel disease) are benign. Hyperplastic polyps are the most common histologic type by far, but only rarely become cancerous.

Ref: Kasper DL, Fauci AS, Hauser SL, et al (eds): *Harrison's Principles of Internal Medicine*, ed 19. McGraw-Hill, 2015, pp 537-538.

Item 157

ANSWER: A

The American Diabetes Association recommends screening for all asymptomatic adults with a BMI > 25.0 kg/m^2 who have one or more additional risk factors for diabetes mellitus, and screening for all adults with no risk factors every 3 years beginning at age 45. Current criteria for the diagnosis of diabetes mellitus include a hemoglobin A_{1c} $\geq 6.5\%$, a fasting plasma glucose level ≥ 126 mg/dL, a 2-hour plasma glucose level ≥ 200 mg/dL, or, in a symptomatic patient, a random blood glucose level ≥ 200 mg/dL. In the absence of unequivocal hyperglycemia, results require confirmation by repeat testing.

Ref: Patel P, Macerollo A: Diabetes mellitus: Diagnosis and screening. *Am Fam Physician* 2010;81(7):863-870. 2) American Diabetes Association: Standards of medical care in diabetes—2017. *Diabetes Care* 2017;40(Suppl 1):S11-S24.

Item 158

ANSWER: B

Dietary counseling is key in the management of cirrhosis. Patients with ascites should be limited to 2000 mg of sodium daily (SOR A). Fluid restriction is not recommended unless the serum sodium level is < 120 mEq/L, and it is extremely difficult to achieve. Patients would need to limit fluid intake to less than their urinary output, which is often reduced.

Up to 60% of patients with cirrhosis suffer from malnutrition, so a high-protein diet is recommended (1.0–1.5 g/kg dry body weight). High-protein diets are tolerated well and result in improved mental status (SOR B). Protein restriction does not benefit those with hepatic encephalopathy.

β-Blockers should be stopped when the patient's mean arterial pressure is < 82 mm Hg (blood pressure 100/73 mm Hg) (SOR B). β-Blockers are used in early cirrhosis for hypertension, reducing portal pressures, and prevention of varices. They are no longer effective when the patient becomes hypotensive or has refractory ascites, spontaneous bacterial peritonitis, or other conditions associated with significant changes in hemodynamic status. This patient is normotensive on his current dosage of metoprolol. As his cirrhosis progresses the metoprolol will likely need to be discontinued.

Statins can be safely used in patients with cirrhosis. Their cardiovascular benefits are well established and the risk of associated liver failure is extremely low (SOR A).

Ref: Ge PS, Runyon BA: Treatment of patients with cirrhosis. *N Engl J Med* 2016;375(8):767-777.

Item 159

ANSWER: B

This patient has signs and symptoms consistent with primary adrenal insufficiency (PAI). In Western countries autoimmunity is responsible for 90% of these cases. Because the corticotropin (ACTH) stimulation test has a higher degree of sensitivity and specificity than morning cortisol and ACTH concentrations, it is the preferred test in all patients with possible primary adrenal insufficiency. Serum aldosterone paired with plasma renin activity is used to screen for adrenal hyperplasia in hypertensive patients and also for establishing the existence of mineralocorticoid insufficiency in patients with PAI. Once the diagnosis is established, 21-hydroxylase antibodies and 17-hydroxylase progesterone levels are used to determine the etiology of PAI.

Ref: Bornstein SR, Allolio B, Arlt W, et al: Diagnosis and treatment of primary adrenal insufficiency: An Endocrine Society clinical practice guideline. *J Clin Endocrinol Metab* 2016;101(2):364-389.

Item 160

ANSWER: A

Validated clinical prediction rules can be used to estimate the pretest probability of deep vein thrombosis (DVT) and pulmonary embolism in a patient with dyspnea and chest pain, and to guide further evaluation (SOR C). Factors used for calculating the pretest probability include elevated heart rate without hemoptysis, a diagnosis of cancer, recent surgery/immobilization, previous thromboembolism, and signs and symptoms of DVT. Based on these rules the patient described in the scenario has a low score and therefore a low probability of pulmonary embolism.

A D-dimer level is the next most appropriate test for this low-probability scenario. Compression ultrasonography would be the next test for a patient with an intermediate or high pretest probability for DVT. CT angiography would be the next test for a clinically stable patient with an intermediate or high pretest probability of pulmonary embolism. A ventilation-perfusion scan would be the next test if a CT angiogram were indicated in a patient with a contraindication such as contrast allergy, renal disease, or pregnancy. Echocardiography would be the next test for a critically ill patient with a high pretest probability of pulmonary embolism.

Ref: Wilbur J, Shian B: Diagnosis of deep venous thrombosis and pulmonary embolism. *Am Fam Physician* 2012;86(10):913-919.

Item 161

ANSWER: E

NSAIDs, acetaminophen, and muscle relaxants are effective for the treatment of acute low back pain (SOR A). There is moderate-quality evidence that nonbenzodiazepine muscle relaxants are beneficial in the treatment of acute low back pain. There is also moderate-quality evidence that NSAIDs combined with nonbenzodiazepine muscle relaxants may have additive benefit for decreasing pain. Bed rest is not helpful in the treatment of acute back pain and is not recommended (SOR A). There is no evidence that lumbar support is helpful. Oral corticosteroids have not been found to be beneficial for isolated low back pain, but there is questionable benefit when there are associated radicular symptoms. There are several low-quality trials that show acupuncture has minimal or no benefit over sham treatment in acute back pain.

Ref: Casazza BA: Diagnosis and treatment of acute low back pain. *Am Fam Physician* 2012;85(4):343-350.

Item 162

ANSWER: C

In patients ≥65 years of age treated with medication for type 2 diabetes mellitus, hemoglobin A_{1c} values of 7%–8% have shown the greatest reduction in mortality in multiple studies. It is suggested that frequent hypoglycemia is associated with lower hemoglobin A_{1c} values, and that presents a greater risk. Values over 9% are associated with greater mortality (SOR B). Thus, while the risk of complications increases linearly with hemoglobin A_{1c}, mortality has a V-shaped curve.

Ref: Huang ES, Davis AM: Glycemic control in older adults with diabetes mellitus. *JAMA* 2015;314(14):1509-1510.

Item 163

ANSWER: C

Radiographs confirm the clinical diagnosis of small-bowel obstruction in most patients and more accurately define the site of obstruction. Small-bowel obstruction typically occupies the more central portions of the abdomen. Patients with mechanical small-bowel obstruction usually have minimal or no colonic gas. Films taken in the upright or lateral decubitus position in patients with small-bowel obstruction usually show multiple gas-filled levels, with the distended bowel resembling an inverted U.

Patients with small-bowel obstruction are likely to be depleted of fluids and electrolytes, and require intravenous fluids, electrolyte management, and surgical evaluation.

Ref: Townsend CM Jr, Beauchamp RD, Evers BM, et al: *Sabiston Textbook of Surgery: The Biological Basis of Modern Surgical Practice*, ed 19. Saunders, 2012, pp 1236-1243. 2) Walls RM, Hockberger RS, Gausche-Hill M, et al (eds): *Rosen's Emergency Medicine: Concepts and Clinical Practice*, ed 9. Elsevier Inc, 2018, pp 1112-1116.

Item 164

ANSWER: D

Medication and/or a walking program have been shown to improve functional capacity in patients with symptomatic peripheral artery disease (PAD). However, this patient has critical limb ischemia and needs urgent revascularization. Endovascular therapy of isolated disease below the knee is not recommended. These patients should undergo femoral-tibial bypass. Warfarin is not recommended for the treatment of PAD.

Ref: Kullo IJ, Rooke TW: Peripheral artery disease. *N Engl J Med* 2016;374(9):861-871.

Item 165

ANSWER: A

When an otherwise healthy patient's alkaline phosphatase level is elevated, it is helpful to determine whether the source of elevated isoenzymes is the liver or bone. One method is fractionation of the alkaline phosphatase by electrophoresis. A gamma-glutamyl transferase or 5′-nucleotidase level can also indicate whether the elevation of the alkaline phosphatase is from the liver. These enzymes are rarely elevated in conditions other than liver disease. Severe vitamin D deficiency can lead to osteomalacia with an elevated alkaline phosphatase.

Ref: Basha B, Rao DS, Han ZH, Parfitt AM: Osteomalacia due to vitamin D depletion: A neglected consequence of intestinal malabsorption. *Am J Med* 2000;108(4):296-300. 2) Kasper DL, Fauci AS, Hauser SL, et al (eds): *Harrison's Principles of Internal Medicine*, ed 19. McGraw-Hill, 2015, pp 1993-1997.

Item 166

ANSWER: D

The U.S. Preventive Services Task Force does not recommend routine physical examinations but recommends blood pressure screenings every 3–5 years for adults 18–39 years of age who are at low risk for hypertension. Mammograms are not recommended until age 40. Lead screening is recommended for at-risk individuals between 6 months and 6 years of age. Colorectal cancer screening for average-risk individuals is recommended at age 50. Counseling on tobacco use and other substance abuse is recommended as part of all routine preventive care.

Ref: US Preventive Services Task Force: *Published recommendations*. USPSTF website.

Item 167

ANSWER: D

Medications shown to improve mortality in patients with heart failure with a reduced ejection fraction include ACE inhibitors, angiotensin receptor blockers, β-blockers, aldosterone antagonists, and in African-American patients, direct-acting vasodilators. Among the β-blockers, carvedilol, bisoprolol, and metoprolol succinate have this indication. Diuretics, along with digoxin, may improve symptoms but do not alter disease mortality.

Ref: Goldman L, Schafer AI (eds): *Goldman's Cecil Medicine*, ed 25. Elsevier Saunders, 2016, pp 309-315. 2) Chavey WE, Hogikyan RV, Van Harrison R, Nicklas JM: Heart failure due to reduced ejection fraction: Medical management. *Am Fam Physician* 2017;95(1):13-20.

Item 168

ANSWER: D

In a patient with sepsis, vasopressors are indicated when fluid resuscitation does not restore organ perfusion and blood pressure. Norepinephrine and dopamine are the preferred pressor agents; however, norepinephrine appears to be more effective and has a lower mortality rate. Norepinephrine is the preferred drug for shock due to sepsis. Its relative safety suggests that it be used as an initial vasopressor. It is a potent vasoconstrictor and inotropic stimulant and is useful for shock. As a first-line therapy norepinephrine is associated with fewer adverse events, including arrhythmia, compared to dopamine. Phenylephrine, epinephrine, or vasopressin should not be used as first-line therapy. Vasopressin is employed after high-dose conventional vasopressors have failed. The use of low-dose dopamine is no longer recommended based on a clinical trial showing no benefit in critically ill patients at risk for renal failure. If an agent is needed to increase cardiac output, dobutamine is the agent of choice.

Ref: Kasper DL, Fauci AS, Hauser SL, et al (eds): *Harrison's Principles of Internal Medicine*, ed 19. McGraw-Hill, 2015, pp 1760-1761. 2) Rhodes A, Evans LE, Alhazzani W, et al: Surviving Sepsis Campaign: International guidelines for management of sepsis and septic shock: 2016. *Crit Care Med* 2017;45(3):486-552.

Item 169

ANSWER: B

Even though they are the most common fracture in this age group, radial fractures can be missed by clinicians. The bend in the cortex of the distal radius indicates the fracture. Sometimes referred to as a buckle or torus fracture, it will heal with almost any choice of treatment. Most clinicians opt for casting to reduce the chance of reinjury during the first few weeks of healing, but parent preference in this regard is important. Some pediatric long-bone fractures involve growth plates, and the results can be indeterminate, requiring either more advanced imaging or comparison views of the opposite limb.

Ref: Browner BD, Levine AM, Jupiter JB, et al: *Skeletal Trauma: Basic Science, Management, and Reconstruction*, ed 4. Saunders, 2008, chap 40. 2) Marx JA, Hockberger RS, Walls RM (eds): *Rosen's Emergency Medicine: Concepts and Clinical Practice*, ed 8. Elsevier Saunders, 2013, pp 587-588.

Item 170

ANSWER: A

Long-acting reversible contraception (LARC) includes the copper IUD, levonorgestrel IUDs, and subdermal implants. LARCs can be placed at any point in the patient's menstrual cycle (SOR A). There should be evidence that the patient is not pregnant prior to placement.

Ref: Division of Reproductive Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention (CDC): US selected practice recommendations for contraceptive use, 2013: Adapted from the World Health Organization selected practice recommendations for contraceptive use, 2nd edition. *MMWR Recomm Rep* 2013;62(RR-05):1-60. 2) Kolman KB, Hadley SK, Jordahl-Iafrato MA: Long-acting reversible contraception: Who, what, when, and how. *J Fam Pract* 2015;64(8):479-484.

Item 171

ANSWER: A

Gout is definitively diagnosed by aspiration of synovial fluid that is examined under polarized light microscopy to identify negatively birefringent uric acid crystals. In primary care settings the diagnosis of gout is often made clinically, and a clinical diagnostic rule has been developed that increases the accuracy of the diagnosis. Points are scored as follows:

- acute onset with maximum symptoms within 1 day 0.5
- joint erythema 1.0
- cardiovascular disease or hypertension 1.5
- male sex 2.0
- previous attack of joint pain or arthritis 2.0
- first metatarsophalangeal joint involved 2.5
- serum uric acid >5.88 mg/dL 3.5

The maximum score is 13.0 points. A score ≥8.0 would mean a clinical diagnosis of gout. Nongout diagnoses should be considered if the score is ≤4 points. An intermediate point total of 4.5–7.5 calls for either joint aspiration for polarized light microscopy or referral to a rheumatologist.

Ref: Steinberg J: Clinical diagnosis of gout without joint aspirate. *Am Fam Physician* 2016;94(6):505-506.

Item 172

ANSWER: C

The 2014 evidence-based guideline from the panel members appointed to the Eighth Joint National Committee (JNC 8) makes few suggestions regarding preferred initial agents for the treatment of hypertension. Of the options listed, only hydrochlorothiazide is a reasonable option for first-line treatment. Verapamil is rarely used for blood pressure control.

Ref: James PA, Oparil S, Carter BL, et al: 2014 evidence-based guideline for the management of high blood pressure in adults: Report from the panel members appointed to the Eighth Joint National Committee (JNC 8). *JAMA* 2014;311(5):507-520.

Item 173

ANSWER: D

The patient described has polymyalgia rheumatica (PMR). The hallmark of this condition is the rapid and often dramatic response, typically within a few days, to low-dose corticosteroids. In fact, the lack of response to low-dose prednisone in such a case should prompt the physician to consider another diagnosis.

A related condition, giant cell arteritis, is associated with transient or even permanent vision loss, typically unilateral but sometimes bilateral. This condition usually presents with headache and tenderness of the affected artery, most commonly the temporal artery. Prompt recognition and the initiation of high-dose corticosteroids are keys to preventing blindness.

The other options listed are not pertinent to the management of PMR. While prompt response to low-dose corticosteroids confirms the diagnosis, they are usually continued for 1–2 years, with gradual tapering beginning several months after initiation of treatment (SOR C).

Ref: Caylor TL, Perkins A: Recognition and management of polymyalgia rheumatica and giant cell arteritis. *Am Fam Physician* 2013;88(10):676-684.

Item 174

ANSWER: D

Postexposure prophylaxis after exposure to invasive meningococcal disease is indicated for any close contact regardless of immunization status. Close contacts include those exposed in households, dormitories, or day care centers, and those who have direct contact with oral secretions. There are several options for prophylaxis, including ciprofloxacin, 500 mg orally one time; azithromycin, 500 mg orally one time; ceftriaxone, 250 mg intramuscularly one time; or rifampin, 600 mg orally twice daily for 2 days. Treatment should begin as soon as possible after exposure but no later than 14 days. While rifampin can be used for postexposure prophylaxis, a one-time dose is not adequate. This patient is at risk of infection due to his close contact with the source patient. Postexposure prophylaxis is indicated even for vaccinated patients.

Ref: Bader MS, McKinsey DS: Postexposure prophylaxis for common infectious diseases. *Am Fam Physician* 2013;88(1):25-32.

Item 175

ANSWER: B

This patient's symptoms and findings suggest dermatomyositis. This disease is distinguished from autoimmune myopathies and polymyositis by distinct dermatologic findings, including Gottron's sign (nonpalpable macules over the extensor surface of joints). Patients may also have dilated nail-fold capillaries and ragged, thickened cuticles. Distal onycholysis is most commonly associated with onychomycosis, while hyperkeratotic plaques are not a feature of dermatomyositis. Polygonal papules on the wrist flexor surfaces are seen in lichen planus.

Ref: MacFarlane L, Osman N, Ritter S, et al: Eye of the beholder. *N Engl J Med* 2016;374(18):1774-1779.

Item 176

ANSWER: D

The clinical picture of diverticulitis can be confused with urinary tract infections because bladder symptoms can accompany the gastrointestinal symptoms. The sigmoid colon lies close enough to the bladder that the bladder can be irritated by sigmoid diverticulitis. Conversely, urinary infections do not cause painful defecation. Tenderness in the left lower quadrant and above the rectum is typical for sigmoid diverticulitis. No single test is routinely diagnostic for diverticulitis, but a CT scan that shows edema in the sigmoid mesentery has the best positive predictive value.

Appendicitis is usually diagnosed clinically, but like diverticulitis is increasingly confirmed by CT. The tenderness is generally in the right lower quadrant. CT findings are noted around the cecum, rather than adjacent to the sigmoid. Colon cancer is usually asymptomatic when discovered, but when symptoms are present they usually include a change in bowel habits, hematochezia, anemia, or symptoms of obstruction. Pericolic abscess is a rare presentation of colon cancer.

Ref: Wilkins T, Embry K, George R: Diagnosis and management of acute diverticulitis. *Am Fam Physician* 2013;87(9):612-620.

Item 177

ANSWER: E

This patient has the classic presentation for roseola infantum, which is caused by human herpesvirus 6. The typical history includes a high fever in a child with either mild upper respiratory symptoms or no other symptoms. After the fever subsides, a rash will appear. The rash is self-limited and no treatment is required.

Pityriasis rosea typically presents with a single herald patch that is oval-shaped and scaly with central clearing, followed by a symmetric rash on the trunk in a typical distribution along the Langer lines. The rash may last up to 12 weeks and no treatment is required.

Erythema infectiosum is caused by parvovirus B19 and is also known as fifth disease. The child will typically have mild symptoms then an erythematous facial rash that has a “slapped cheek” appearance. This is sometimes followed by pink patches and macules in a reticular pattern. Once the rash appears the child is no longer contagious.

Molluscum contagiosum is caused by a poxvirus and is characterized by scattered flesh-colored papules with umbilicated centers. Atopic dermatitis typically presents as scaly, erythematous plaques, commonly on the flexor surfaces of the extremities.

Ref: Allmon A, Deane K, Martin KL: Common skin rashes in children. *Am Fam Physician* 2015;92(3):211-216. 2) Habif TP: *Clinical Dermatology: A Color Guide to Diagnosis and Therapy*, ed 6. Elsevier, 2016, p 547.

Item 178

ANSWER: C

Abnormal uterine bleeding can be a sign of endometrial cancer in premenopausal women, who account for 20% of cases of endometrial cancer. The American College of Obstetricians and Gynecologists recommends that women with abnormal uterine bleeding should be evaluated for endometrial cancer if they are older than 45 years or if they have a history of unopposed estrogen exposure (SOR C). Most guidelines recommend either transvaginal ultrasonography or endometrial biopsy as the initial study in the evaluation of endometrial cancer. Transvaginal ultrasonography is often preferred as the initial study because of its availability, cost-effectiveness, and high sensitivity. If bleeding persists despite normal transvaginal ultrasonography a tissue biopsy should be performed. The listed hormonal treatment options may be appropriate once cancer is ruled out. An FSH level can help determine whether someone is menopausal or approaching menopause, in which case they will likely be missing periods. Continued observation would only delay the diagnosis.

Ref: Braun MM, Overbeek-Wager EA, Grumbo RJ: Diagnosis and management of endometrial cancer. *Am Fam Physician* 2016;93(6):468-474.

Item 179

ANSWER: E

Pulmonary rehabilitation has multidimensional benefits in COPD management, including improved exercise tolerance, quality of life, and mood. Aerobic exercise improves muscle mass, with high-intensity exercise proving more efficacious than low-intensity exercise. According to Global Initiative for Obstructive Lung Disease (GOLD) guidelines, an inhaled corticosteroid should be added for frequent exacerbations and an FEV_1 $<50\%$. Although it is possible that a combined long-acting β-agonist (LABA)/corticosteroid would improve dyspnea more than a LABA alone, the benefit would not likely be more than a pulmonary rehabilitation program. Switching from formoterol to tiotropium would not be expected to provide a significant benefit, and the benefits of adding a LABA to tiotropium have not been studied. Third-party payers restrict payment for oxygen therapy to those with an SaO_2 $<89\%$, a PaO_2 <55 mm Hg, a hematocrit $>55\%$, or documented cor pulmonale.

Ref: Niewoehner DE: Outpatient management of severe COPD. *N Engl J Med* 2010;362(15):1407-1416. 2) Yawn BP: Optimizing chronic obstructive pulmonary disease management in primary care. *South Med J* 2011;104(2):121-127. 3) Global Strategy for the Diagnosis, Management, and Prevention of Chronic Obstructive Pulmonary Disease. Global Initiative for Chronic Obstructive Lung Disease, 2017.

Item 180

ANSWER: D

This patient has a Jones fracture. The treatment plan for this type of fracture needs to account for the activity level of the patient. It has been shown that active patients have shorter healing times and return to activity sooner with surgical management. A competitive dancer would be best managed with surgery. If the nonsurgical option is chosen the patient is given an initial posterior splint and followed up in 3–5 days, then placed in a short non–weight-bearing cast for 6 weeks, at which time a repeat radiograph is taken. If the radiograph shows healing, the patient can return to gradual weight bearing. If the radiograph does not show proper healing, then the period of non–weight bearing is extended.

Ref: Bica D, Sprouse RA, Armen J: Diagnosis and management of common foot fractures. *Am Fam Physician* 2016;93(3):183-191.

Item 181

ANSWER: B

Functional ovarian cysts are estimated to be present in approximately 15% of menstruating women and are often found incidentally on a pelvic examination or on diagnostic imaging performed for other reasons. The majority of these lesions resolve spontaneously within two or three menstrual cycles and management should consist of follow-up ultrasonography 8–12 weeks after the cyst is identified. Cysts that are particularly symptomatic, have less than simple features, are >10 cm in size, or that persist longer than 12 weeks should be referred for consideration of diagnostic removal (cystectomy or oophorectomy depending on patient characteristics). Patients who carry a *BRCA* gene or who have a family history of ovarian cancer should also be considered for invasive testing sooner. Serum CA-125 testing is difficult to interpret in premenopausal patients, who frequently have elevated levels without evidence of a malignancy. In postmenopausal women with an ovarian cyst a CA-125 level >35 U/mL should prompt referral for removal.

Ref: Biggs WS, Marks ST: Diagnosis and management of adnexal masses. *Am Fam Physician* 2016;93(8):676-681. 2) Lobo RA, Gershenson DM, Lentz GM, Valea FA: *Comprehensive Gynecology*, ed 7. Elsevier, 2017, pp 370-422.

Item 182

ANSWER: C

In patients who present with an ear discharge and have ventilation tubes in place, antibiotic eardrops (with or without corticosteroids) can resolve the discharge and improve the illness-related quality of life more quickly than oral antibiotics, corticosteroid eardrops, or saline rinses. The antibiotic eardrops of choice are fluoroquinolones, which are not ototoxic.

Ref: Venekamp RP, Javed F, van Dongen TM, et al: Interventions for children with ear discharge occurring at least two weeks following grommet (ventilation tube) insertion. *Cochrane Database Syst Rev* 2016;(11):CD011684.

Item 183

ANSWER: C

Sex education programs have been associated with a reduction in the rates of sexually transmitted infections in adolescents. Clinicians should meet with adolescents privately to provide confidentiality. Adolescents should be screened for obesity and provided appropriate behavioral counseling. Cervical cancer screening should begin at age 21.

Ref: Ham P, Allen C: Adolescent health screening and counseling. *Am Fam Physician* 2012;86(12):1109-1116.

Item 184

ANSWER: B

The U.S. Preventive Services Task Force (USPSTF) recommends screening for asymptomatic bacteriuria with a urine culture for pregnant women at 12–16 weeks gestation or at the first prenatal visit if it occurs later (A recommendation). The USPSTF recommends against screening for asymptomatic bacteriuria in men and nonpregnant women (D recommendation).

The Infectious Diseases Society of America (IDSA) guidelines for asymptomatic bacteriuria recommend that pregnant women should be screened for bacteriuria by urine culture at least once in early pregnancy, and they should be treated if the results are positive (A-I recommendation). The IDSA also recommends screening for and treatment of asymptomatic bacteriuria before transurethral resection of the prostate (A-I recommendation) and also before other urologic procedures for which mucosal bleeding is anticipated (A-III recommendation).

The IDSA's recommendation for the Choosing Wisely campaign is to not treat asymptomatic bacteriuria with antibiotics. The only exceptions to this recommendation include pregnant women, patients undergoing prostate surgery or other invasive urologic surgery, and kidney or kidney pancreas organ transplant patients within the first year of receiving the transplant.

Screening for asymptomatic bacteriuria is not recommended for long-term care residents or patients with indwelling bladder catheters without symptoms of a UTI (catheter-associated asymptomatic bacteriuria).

Ref: Nicolle LE, Bradley S, Colgan R, et al: Infectious Diseases Society of America guidelines for the diagnosis and treatment of asymptomatic bacteriuria in adults. *Clin Infect Dis* 2005;40(5):643-654. 2) US Preventive Services Task Force: Screening for asymptomatic bacteriuria in adults: US Preventive Services Task Force reaffirmation recommendation statement. *Ann Intern Med* 2008;149(1):43-47. 3) Infectious Diseases Society of America: Five things physicians and patients should question. ABIM Foundation Choosing Wisely campaign, 2015.

Item 185

ANSWER: D

Gradually worsening anterolateral hip joint pain that is sharply accentuated when pivoting laterally on the affected hip or moving from a seated to a standing position is consistent with femoroacetabular impingement. The most sensitive finding is reproduction of the pain on a range-of-motion examination by manipulating the hip into a position of flexion, adduction, and internal rotation (FADIR test). Special radiographic imaging of the flexed and adducted hip can emphasize the anatomic abnormalities associated with impingement that may go unnoticed on standard radiographic series views.

Although the pain associated with avascular necrosis is similarly insidious and heightened when bearing weight, tenderness is usually evident with hip motion in any direction. Osteoarthritis of the hip generally occurs in individuals of more advanced age than this patient, and the pain produced is typically localized to the groin area and can be elicited by flexion, abduction, and external rotation (FABER test) of the affected hip. Bursitis manifests as soreness after exercise and tenderness over the affected bursa.

Ref: Kuhlman GS, Domb BG: Hip impingement: Identifying and treating a common cause of hip pain. *Am Fam Physician* 2009;80(12):1429-1434. 2) Brukner P, Khan K: *Clinical Sports Medicine*, ed 4. McGraw Hill, 2012, pp 516-518.

Item 186

ANSWER: B

The U.S. Preventive Services Task Force (USPSTF) recommends screening for abdominal aortic aneurysm in men between the ages of 65 and 75 who have ever smoked (B recommendation). This should be performed one time, using abdominal duplex ultrasonography. There may be a small benefit for screening men who have never smoked, and the USPSTF recommends selectively offering screening to this group (C recommendation). The evidence is insufficient to assess the benefits and harms in women who have ever smoked (I recommendation), and the USPSTF recommends against screening for women who have never smoked (D recommendation).

Ref: *Final Recommendation Statement: Abdominal Aortic Aneurysm Screening.* US Preventive Services Task Force, 2014.

Item 187

ANSWER: B

Evaluation of the pleural fluid is important to assist in determining the cause of the effusion. Protein, glucose, LDH, and cell counts should be measured in the pleural fluid. This can help determine if the effusion is exudative or transudative. A pleural protein to serum protein ratio >0.5 or a pleural fluid LDH to serum LDH ratio >0.6 suggests an exudative effusion. Lower ratios suggest a transudative process. With transudates, the pleural fluid pH is typically between 7.40 and 7.55, with fewer than 1000 WBCs, and the glucose level is similar to the serum glucose level. Cirrhosis with ascites is a cause of transudative effusion. Pleural effusions associated with malignancy, pneumonia, viral illness, and asbestosis tend to be exudative.

Ref: Papadakis MA, McPhee SJ (eds): *Current Medical Diagnosis & Treatment 2017*. McGraw-Hill Education, 2017, chapter 9 (Pulmonary Disorders, by Chesnutt MS & Prendergast TJ).

Item 188

ANSWER: E

Concerns about addiction and respiratory depression often limit the use of opioids or lead to inadequate dosages in patients with a terminal illness who are experiencing pain at the end of life (SOR C). Sedation (ranging from full consciousness to complete loss of consciousness) usually precedes respiratory depression. Opioid use and dosages can therefore be effectively managed with close monitoring for sedation, allowing patients to receive adequate medication to control pain. Close monitoring allows clinicians to identify advancing sedation before it is compounded by continued opioid administration that could lead to clinically significant respiratory depression (SOR C).

Ref: Jacobsen R, Sjøgren P, Møldrup C, Christrup L: Physician-related barriers to cancer pain management with opioid analgesics: A systematic review. *J Opioid Manag* 2007;3(4):207-214. 2) Groninger H, Vijayan J: Pharmacologic management of pain at the end of life. *Am Fam Physician* 2014;90(1):26-32.

Item 189

ANSWER: C

Amoxicillin, levofloxacin, and moxifloxacin should be taken by asplenic patients with a new onset of fever if they cannot get to a medical facility within 2 hours for evaluation. Fever should be reported immediately due to the lifelong significant risk of sepsis. Unless otherwise contraindicated, asplenic patients should receive annual influenza immunization. Pneumococcal polysaccharide vaccine (PPSV23) should be given twice, with the second dose given 5 years after the first.

Ref: Rubin LG, Schaffner W: Care of the asplenic patient. *N Engl J Med* 2014;371(4):349-356.

Item 190

ANSWER: A

Oral antibiotics are recommended for acne that is resistant to topical treatments. Oral isotretinoin is indicated for severe nodular acne or moderate acne resistant to other treatments. Since this patient has not tried any therapies, these two options would not yet be appropriate. Topical antibiotics are recommended only in combination with benzoyl peroxide. Appropriate treatments would be topical benzoyl peroxide, a topical retinoid, and oral contraceptives. Antiandrogen therapies such as spironolactone are not indicated solely for acne vulgaris, although they may be appropriate for concomitant conditions such as polycystic ovary syndrome.

Ref: Roman CJ, Cifu AS, Stein SL: Management of acne vulgaris. *JAMA* 2016;316(13):1402-1403. 2) Zaenglein AL, Pathy AL, Schlosser BJ, et al: Guidelines of care for the management of acne vulgaris. *J Am Acad Dermatol* 2016;74(5):945-973.

Item 191

ANSWER: E

Treatment of adult obesity with bariatric surgery is becoming more common. In addition to counseling patients about surgical options and the risks and benefits of surgery, the family physician is in a position to provide both long-term support and postsurgical medical management. Bariatric surgery does result in greater weight loss than nonsurgical interventions and is highly effective in treating comorbidities of obesity, particularly diabetes mellitus. Bariatric surgery also reduces obesity-related mortality.

After bariatric surgery the patient's postoperative medications may require adjustments and NSAIDs should be avoided. Patients should be encouraged to eat three meals and one or two snacks daily. Very dry foods, bread, and fibrous vegetables are most likely to cause problems. Fluids should be avoided during meals and for 15–30 minutes before and after meals.

Those desiring pregnancy should wait 12–18 months after surgery. Recommended laboratory studies include a CBC, a metabolic profile, a folic acid level, iron studies, a parathyroid hormone level, a lipid profile, vitamin B_{12} levels, 24-hour urinary calcium excretion, and 25-hydroxyvitamin D levels. It is recommended that bone density measurements be done every 2 years.

Ref: Schroeder R, Harrison TD, McGraw SL: Treatment of adult obesity with bariatric surgery. *Am Fam Physician* 2016;93(1):31-37.

Item 192

ANSWER: E

Plasma sodium concentration measurements can be unreliable in patients with severe hyperlipidemia or hyperproteinemia (pseudohyponatremia). The other electrolyte abnormalities do not cause hyponatremia.

Ref: Cohen DM, Ellison DH: Evaluating hyponatremia. *JAMA* 2015;313(12):1260-1261.

Item 193

ANSWER: B

In patients ≥12 years of age, asthma is classified as intermittent if symptoms are present ≤2 days per week, nighttime awakenings occur ≤2 times per month, an inhaler is required ≤2 days per week, and the FEV_1 is >80% of predicted. Intermittent asthma does not interfere with normal activities and inhaled short-acting β_2-agonists during symptomatic periods are usually sufficient treatment.

Mild persistent asthma is defined as symptoms present >2 days per week but not daily, nighttime awakenings 3–4 times per month, and inhaler use >2 days per week but not daily and not more than once on any day. The FEV_1 is >80% of predicted. Mild persistent asthma can cause minor limitations during normal activities and should be treated with low-dose inhaled corticosteroids (ICs).

With moderate persistent asthma, symptoms are present daily, nighttime awakenings occur >1 time per week but not nightly, and an inhaler is required daily. A patient with moderate persistent asthma has an FEV_1 that is 60%–80% of predicted and can experience some limitations during normal activities. Moderate persistent asthma is treated with a combination of low-dose ICs and long-acting β_2-agonists (LABA) or medium-dose ICs as monotherapy.

Severe asthma is defined as symptoms present throughout the day, nighttime awakenings up to 7 times per week, inhaler use several times per day, and an FEV_1 <60% of predicted. Normal activities are extremely limited by severe asthma. Treatment includes medium- to high-dose ICs with a LABA, and consultation with an asthma specialist is recommended. Omalizumab is also indicated for patients who have allergies.

Ref: *Asthma Care Quick Reference: Diagnosing and Managing Asthma*. National Heart, Lung, and Blood Institute, 2012.

Item 194

ANSWER: E

Cigarette smoking, increasing age, and exogenous estrogen, particularly at the supraphysiologic doses used in contraceptives, all increase risk for vascular events such as venous thromboembolism and stroke. The use of estrogen-containing contraception in smokers ≥35 years is contraindicated because of this risk. All of the contraceptive options listed contain estrogen except for the etonogestrel implant. Other progestin-only contraceptive options that could be considered include depot medroxyprogesterone acetate, the levonorgestrel-releasing IUD, and progestin-only oral contraceptive pills.

Ref: Curtis KM, Jatlaoui TC, Tepper NK, et al: US selected practice recommendations for contraceptive use, 2016. *MMWR Recomm Rep* 2016;65(4):1-66.

Item 195

ANSWER: C

Because many radiologic options are available for detecting suspected urolithiasis, and many contexts might affect their use, the American College of Radiology established appropriateness criteria to aid the selection process. These guidelines rate the appropriateness of CT, ultrasonography, radiography, and MRI for three categories of patients: (1) those presenting with a suspected stone, (2) those with recurrent stone symptoms, and (3) those with abdominal pain in pregnancy. Each modality is rated on a scale from 9 (most appropriate) to 1 (least appropriate).

For suspected stone disease in the case presented, the most appropriate imaging modality is helical (spiral) noncontrast CT of the abdomen and pelvis with a rating of 8 (usually appropriate). Standard CT of the abdomen and pelvis with intravenous contrast has an appropriateness rating of 2 (usually not appropriate). Abdominal radiography (KUB) has an appropriateness rating of 3 (usually not appropriate). MRI of the abdomen and pelvis without contrast has a rating of 4 (may be appropriate). Ultrasonography of the kidneys and bladder is appropriate in pregnancy, but in the case presented it is given an appropriateness rating of 6 (may be appropriate).

Ref: ACR Appropriateness Criteria: Clinical condition: Acute onset of flank pain—Suspicion of stone disease (urolithiasis). American College of Radiology, 2015. 2) Bredemeyer M: ACR appropriateness criteria for acute onset of flank pain with suspicion of stone disease. *Am Fam Physician* 2016;94(7):575-576.

Item 196

ANSWER: B

This patient has symptomatic iron deficiency anemia. Because she has had a gastric bypass, she is not able to absorb iron adequately and therefore needs intravenous iron replacement. A blood transfusion may help temporarily but will not restore her iron stores, so it is not indicated. She will not absorb oral iron adequately. If she does not respond to intravenous iron, consultation with a hematologist may be indicated.

Ref: Short MW, Domagalski JE: Iron deficiency anemia: Evaluation and management. *Am Fam Physician* 2013;87(2):98-104.

Item 197

ANSWER: B

Oxycodone often is not detected by an immunoassay test and unexpected results require follow-up with a more accurate test such as gas chromatography/mass spectrometry or high-performance liquid chromatography. Codeine can be detected more accurately, but substituting codeine for oxycodone would be inappropriate. Pain management is reasonable if the patient is requiring large amounts of opiates, has failed treatment, or has a history of drug abuse. A pain management agreement should be initiated at the beginning of treatment with an opiate.

Ref: Standridge JB, Adams SM, Zotos AP: Urine drug screening: A valuable office procedure. *Am Fam Physician* 2010;81(5):635-640. 2) Jamison RN, Mao J: Opioid analgesics. *Mayo Clin Proc* 2015;90(7):957-968.

Item 198

ANSWER: D

Because of their favorable side-effect profile and low cost, SSRIs are the first-line agents for late-life depression. SNRIs may be used as second-line agents when remission is not obtained with an SSRI. Tricyclic antidepressants work as well as SSRIs and may be considered in recalcitrant cases, but side effects may be troublesome, especially in this age group. The use of stimulants in depressed older adults has not been well studied. Second-generation antipsychotic agents may be used as an add-on to an SSRI or SNRI medication when the depression is resistant. Side effects and long-term safety may be issues with this approach.

Ref: Taylor WD: Depression in the elderly. *N Engl J Med* 2014;371(13):1228-1236.

Item 199

ANSWER: A

Supraventricular tachycardia (SVT) can be mistaken for panic disorder, particularly in women. Atrioventricular nodal reentrant tachycardia is more common in women than men. For hemodynamically stable SVT, Valsalva maneuvers are indicated as the first treatment because the maneuver is simple and may resolve the episode. If this is ineffective, medications can be used. For hemodynamically unstable SVT, synchronized cardioversion should be performed. In this case the patient is hemodynamically stable and minimally symptomatic, so a Valsalva maneuver should be attempted. If this is unsuccessful she may need medication.

Cardiology referral should be considered for SVT when the diagnosis is unclear, underlying cardiac disease is suspected, the patient has syncope or works in or participates in high-risk activities, SVT is not controlled with medications, a wide QRS complex is noted, or the patient desires ablation. Anxiety treatment may be needed in this patient, but that should be evaluated further. At this time her most urgent issue is her supraventricular tachycardia.

Ref: Helton MR: Diagnosis and management of common types of supraventricular tachycardia. *Am Fam Physician* 2015;92(9):793-800.

Item 200

ANSWER: B

Given the obesity epidemic in the United States, an awareness of therapies that affect weight is imperative for family physicians. This patient is taking medications that help with weight loss (metformin) and medications that are weight neutral (lisinopril, simvastatin, and fluoxetine). Glipizide, however, causes weight gain, and switching to an SLGT2 inhibitor such as canagliflozin can help promote weight loss. Likewise, the patient could use a GLP-1 receptor agonist such as exenatide or an amylin mimetic (pramlintide) for weight loss benefits. Sulfonylureas, thiazolidinediones, and insulins all promote weight gain (SOR A).

Fluoxetine and sertraline are weight neutral, whereas paroxetine can cause weight gain (SOR B). The statins are weight neutral in general, and switching to atorvastatin should not affect weight. ACE inhibitors, angiotensin receptor blockers, calcium channel blockers, thiazides, and β-adrenergic blockers are all weight neutral. In this patient with diabetes mellitus, an ACE inhibitor would be preferable to carvedilol in terms of renal protection (SOR A).

Ref: Saunders KH, Igel LI, Shukla AP, Aronne LJ: Drug-induced weight gain: Rethinking our choices. *J Fam Pract* 2016;65(11):780-788. 2) American Diabetes Association: 7. Approaches to glycemic treatment. *Diabetes Care* 2016;39(Suppl 1):S52-S59.

Item 201

ANSWER: A

Thrombocytopenia is a relatively common dyscrasia often discovered through routine laboratory studies. There are many causes of thrombocytopenia but medication-induced thrombocytopenia should always be considered. In this case the patient is taking an H_2-blocker that may cause blood dyscrasias. The offending agent should be stopped and a repeat level should be obtained in 2–4 weeks for patients with mild asymptomatic thrombocytopenia (platelet count 100,000–150,000/mm^3) and in 1–2 weeks for moderate thrombocytopenia (platelet count 50,000–100,000/mm^3) (SOR C). Prednisone is the first-line treatment for immune thrombocytopenic purpura (SOR C); however in this situation, it is reasonable to look for other causes first. If the thrombocytopenia is worse on repeat testing ($<$100,000/mm^3) it is reasonable to consider consultation for further evaluation and to consider a bone marrow biopsy. If the platelet count improves, continued monitoring is indicated until it returns to normal. Platelet transfusions are not indicated in stable, nonbleeding patients unless the platelet count drops below 10,000/mm^3.

Ref: Sharma S, Sharma P, Tyler LN: Transfusion of blood and blood products: Indications and complications. *Am Fam Physician* 2011;83(6):719-724. 2) Gauer RL, Braun MM: Thrombocytopenia. *Am Fam Physician* 2012;85(6):612-622.

Item 202

ANSWER: C

Amyloidosis is defined as the extracellular deposition of the fibrous protein amyloid at one or more sites. It may remain undiagnosed for years. Features that should alert the clinician to the diagnosis of primary amyloidosis include unexplained proteinuria, peripheral neuropathy, enlargement of the tongue, cardiomegaly, intestinal malabsorption, bilateral carpal tunnel syndrome, and orthostatic hypotension. Amyloidosis occurs both as a primary idiopathic disorder and in association with other diseases such as multiple myeloma.

Ref: Kasper DL, Fauci AS, Hauser SL, et al (eds): *Harrison's Principles of Internal Medicine*, ed 19. McGraw-Hill, 2015, pp 719-722. 2) Goldman L, Schafer AI (eds): *Goldman's Cecil Medicine*, ed 25. Elsevier Saunders, 2016, pp 1284-1287.

Item 203

ANSWER: E

This patient has severe asthma that is not responding to a moderate dose of an inhaled corticosteroid, a leukotriene inhibitor, and a long-acting β-agonist. The next appropriate step is to add a stronger dose of inhaled corticosteroid. Methotrexate and azithromycin are considered inappropriate therapies. Theophylline and low-dose oral prednisone are considered appropriate steps if the patient does not respond to high doses of an inhaled corticosteroid. Other reasonable options for the treatment of severe asthma would be a muscarinic antagonist such as tiotropium, or assessing for the presence of IgE-dependent allergic asthma that may respond to omalizumab.

Ref: Chung KF, Wenzel SE, Brozek JL, et al: International ERS/ATS guidelines on definition, evaluation and treatment of severe asthma. *Eur Respir J* 2014;43(2):343-373. 2) Falk NP, Hughes SW, Rodgers BC: Medications for chronic asthma. *Am Fam Physician* 2016;94(6):454-462.

Item 204

ANSWER: A

The U.S. Preventive Services Task Force (USPSTF) recommends that all women planning or capable of pregnancy take a daily folic acid supplement containing 0.4–0.8 mg (400–800 μg) (A recommendation). A manual breast examination by the clinician or patient is not recommended by the USPSTF. Cervical cytology (a Papanicolaou test) is recommended every 5 years if results are normal and it is combined with negative high-risk HPV testing (A recommendation). *Chlamydia* screening is recommended yearly for all sexually active females under age 25 and older individuals at higher risk. For women who are over 25 and not at increased risk the USPSTF makes no recommendation for or against screening (C recommendation). This patient was screened for lipid disorders 3 years ago. While the best screening interval for lipids is not clearly defined, there is no clear recommendation to repeat screening lipids at this time. The USPSTF makes no recommendation for or against screening for lipid disorders in women who are not at increased risk for coronary heart disease (C recommendation).

Ref: US Preventive Services Task Force: *The Guide to Clinical Preventive Services 2014: Recommendations of the US Preventive Services Task Force*. Agency for Healthcare Research and Quality, 2014. 2) *Final Recommendation Statement: Folic Acid for the Prevention of Neural Tube Defects: Preventive Medication.* US Preventive Services Task Force, 2017.

Item 205

ANSWER: D

CT angiography (CTA) is the recommended imaging modality for the diagnosis of visceral ischemic syndromes because of its 95%–100% accuracy. Images of the origins and length of the vessels can be obtained rapidly, characterize the extent of stenosis or occlusion and the relationship to branch vessels, and aid in the assessment of options for revascularization. Endoscopy is most useful for diagnosing conditions other than mesenteric ischemia. The value of ultrasonography is extremely dependent on the skills of the technologist. In addition, adequate imaging can be difficult to obtain in patients with obesity, bowel gas, and heavy calcification in the vessels. Angiography with selective catheterization of mesenteric vessels is now used after a plan for revascularization has been chosen. MR angiography takes longer to perform than CTA, lacks the necessary resolution, and can overestimate the degree of stenosis.

Ref: Clair DG, Beach JM: Mesenteric ischemia. *N Engl J Med* 2016;374(10):959-968.

Item 206

ANSWER: B

After a shoulder dislocation, normal activity can resume when motion and strength in both arms is equal. Immobilization of the shoulder after a dislocation is recommended for at least 1 week. Recurrent shoulder dislocations are more common in younger patients and should be immobilized for 3 weeks in patients under 30 years of age. In patients over 30 years of age, 1 week of immobilization will limit the amount of joint stiffness. Prolonged immobilization is a risk factor for developing adhesive capsulitis (frozen shoulder). Gentle range-of-motion exercises should be performed during the immobilization period to limit the risk of adhesive capsulitis. Recurrent dislocations, rotator cuff injuries, shoulder impingement syndrome, and acromioclavicular joint injuries are not reduced by gentle range-of-motion exercises.

Ref: Manske RC, Prohaska D: Diagnosis and management of adhesive capsulitis. *Curr Rev Musculoskelet Med* 2008;1(3-4):180-189. 2) Monica J, Vredenburgh Z, Korsh J, Gatt C: Acute shoulder injuries in adults. *Am Fam Physician* 2016;94(2):119-127.

Item 207

ANSWER: B

Expert panel guideline recommendations suggest fluoxetine should be the first-line pharmacotherapy option for adolescents after a trial of psychotherapy. The patient should be monitored weekly for side effects for a month after starting fluoxetine. If fluoxetine is ineffective, sertraline and citalopram are recommended as alternatives. Venlafaxine should be avoided in adolescents because it is associated with a statistically increased risk of suicidal behavior or ideation.

Ref: Delucia V, Kelsberg G, Safranek S: Which SSRIs most effectively treat depression in adolescents? *J Fam Pract* 2016;65(9):632-634.

Item 208

ANSWER: C

Most pericarditis is presumed to be viral in origin. Enteroviruses, herpesviruses, adenovirus, and parvovirus B19 are common agents. Tuberculosis infection is also possible in this patient, considering the high prevalence of tuberculosis in sub-Saharan Africa. *Candida* infection is much less common, especially in an HIV-negative patient. Post–myocardial infarction syndrome, secondary metastatic tumor, and drug reaction are infrequent causes, especially in a previously healthy patient. Ibuprofen may be used to treat pericarditis.

Ref: Imazio M, Gaita F, LeWinter M: Evaluation and treatment of pericarditis: A systematic review. *JAMA* 2015;314(14):1498-1506.

Item 209

ANSWER: D

Atrial fibrillation is the most common cardiac arrhythmia and can be a source of morbidity and mortality. If this is suspected, a 12-lead EKG should be obtained to confirm the diagnosis. Patients need evaluation for possible cardioversion, rate versus rhythm control, and anticoagulation. The first-line agent to achieve a target heart rate of <80 beats/min would be either a β-blocker or a nondihydropyridine calcium channel blocker. This patient has significant COPD, which eliminates the use of a nonselective β-blocker such as propranolol. A nondihydropyridine calcium channel blocker such as verapamil or diltiazem would be a better choice. Adding digoxin could be considered if the initial therapy is unsuccessful in controlling the heart rate. Amiodarone has significant toxicity and is usually not recommended unless the first-line options fail.

Ref: Gutierrez C, Blanchard DG: Diagnosis and treatment of atrial fibrillation. *Am Fam Physician* 2016;94(6):442-452.

Item 210

ANSWER: D

A history of gestational diabetes mellitus (GDM) is the greatest risk factor for future development of diabetes mellitus. It is thought that GDM unmasks an underlying propensity to diabetes. While a healthy pregnancy is a diabetogenic state, it is not thought to lead to future diabetes. This patient's age is not a risk factor. Obesity and family history are risk factors for the development of diabetes, but having GDM leads to a fourfold greater risk of developing diabetes, independent of other risk factors (SOR C). It is thought that 5%–10% of women who have GDM will be diagnosed with type 2 diabetes within 6 months of delivery. About 50% of women with a history of GDM will develop type 2 diabetes within 10 years of the affected pregnancy.

Ref: Gunderson EP, Lewis CE, Tsai AL, et al: A 20-year prospective study of childbearing and incidence of diabetes in young women, controlling for glycemia before conception. *Diabetes* 2007;56(12):2990-2996. 2) Serlin DC, Lash RW: Diagnosis and management of gestational diabetes mellitus. *Am Fam Physician* 2009;80(1):57-62. 3) Garrison A: Screening, diagnosis, and management of gestational diabetes mellitus. *Am Fam Physician* 2015;91(7):460-467.

Item 211

ANSWER: D

Value is often defined as quality divided by cost. As such, the value that a health care system provides increases as the quality of that care increases, the costs of the care decrease, or both. Value-based reimbursement is a system of health care reimbursement that seeks to motivate health care systems and/or providers to increase the value of their services rather than just seeking to increase the quantity of their services. An example of this type of payment incentive is the Center for Medicare and Medicaid Services's move to establish a program called value-based purchasing. This program increases reimbursement rates for high-value hospitals and decreases reimbursement rates for hospitals that provide lower-value services.

Ref: Porter ME: What is value in health care? *N Engl J Med* 2010;363(26):2477-2481. 2) Chee TT, Ryan AM, Wasfy JH, Borden WB: Current state of value-based purchasing programs. *Circulation* 2016;133(22):2197-2205.

Item 212

ANSWER: A

Spinal extension that increases lumbar lordosis decreases the cross-sectional area of the spinal canal, thereby compressing the spinal cord further. Walking downhill can cause this. Spinal flexion that decreases lordosis has the opposite effect and will usually improve the pain, as will sitting.

Pain with internal hip rotation is characteristic of hip arthritis and is often felt in the groin. Pain in the lateral hip is more typical of trochanteric bursitis.

Ref: Katz JN, Harris MB: Clinical practice: Lumbar spinal stenosis. *N Engl J Med* 2008;358(8):818-825. 2) Yuan PS, Albert TJ: Managing degenerative lumbar spinal stenosis. *J Musculoskel Med* 2009;26(6):222-231. 3) Halter JB, Ouslander JG, Tinetti ME, et al (eds): *Hazzard's Geriatric Medicine and Gerontology*, ed 6. McGraw-Hill Medical, 2009, pp 1471-1477.

Item 213

ANSWER: D

Dysphagia alone or with unintentional weight loss is the most common presenting symptom of esophageal cancer. Adenocarcinoma is the most common esophageal cancer in developed nations, and risk factors include GERD, obesity, and tobacco abuse. Upper endoscopy is the recommended diagnostic tool (SOR B). If cancer is confirmed, CT and PET scanning are useful for staging.

Ref: Short MW, Burgers KG, Fry VT: Esophageal cancer. *Am Fam Physician* 2017;95(1):22-28.

Item 214

ANSWER: D

When evaluating bilateral lower extremity edema, one should first look for systemic etiologies that would result in edema, such as hepatic, renal, or cardiac failure. In patients with obesity or a history of loud snoring, daytime drowsiness, or unrestful sleep, obstructive sleep apnea is likely. These patients can be diagnosed through polysomnography. Echocardiography is also recommended to detect pulmonary hypertension.

Chronic venous insufficiency would be associated with skin changes such as hemosiderin deposits or venous ulcerations. If these findings are present, duplex ultrasonography should be ordered. If there is suspected arterial insufficiency an ankle-brachial index can be determined. For those with a low likelihood of deep vein thrombosis (DVT), a D-dimer assay can be ordered, but duplex ultrasonography is a more definitive test. For those with negative ultrasonography, magnetic resonance venography may be needed to rule out a pelvic or thigh DVT. Patients with suspected lymphedema can usually be diagnosed clinically, although lymphoscintigraphy may be required.

Ref: Trayes KP, Studdiford JS, Pickle S, Tully AS: Edema: Diagnosis and management. *Am Fam Physician* 2013;88(2):102-110.

Item 215

ANSWER: B

Adult patients with acute bronchitis rarely require a chest radiograph to rule out pneumonia. Indications for a chest radiograph include dyspnea, tachypnea, tachycardia, temperature $>100.0°F$, bloody sputum, or signs of focal consolidation on lung auscultation. In patients with bronchitis the cough lasts an average of 18 days, so a chest radiograph would not be indicated after only 14 days. Smoking does not influence the need for a chest radiograph, and wheezing is common in uncomplicated acute bronchitis.

Ref: Kinkade S, Long NA: Acute bronchitis. *Am Fam Physician* 2016;94(7):560-565.

Item 216

ANSWER: A

This patient has subclinical hypothyroidism and should have a TSH level repeated in 1–3 months, as TSH may fluctuate in patients without thyroid disease and return to normal on subsequent testing. In a patient with a normal free T_4 the TSH level must be >10 μU/mL for a diagnosis of hypothyroidism. Mild TSH elevations may be a normal manifestation of aging.

Ref: Papaleontiou M, Cappola AR: Thyroid-stimulating hormone in the evaluation of subclinical hypothyroidism. *JAMA* 2016;316(15):1592-1593.

Item 217

ANSWER: E

This patient should have his aortic valve replaced. He meets criteria for severe aortic stenosis with a transthoracic velocity ≥4.0 m/sec and an aortic valve area < 1.0 cm^2. Symptomatic patients with severe aortic stenosis have 2-year mortality rates of more than 50%. After valve replacement the 10-year survival rate is almost identical to that of patients without aortic stenosis. Watchful waiting with monitoring for symptoms and periodic echocardiograms is indicated for asymptomatic patients with moderate to severe aortic stenosis who have a normal ejection fraction. There is no medical treatment that delays the progression of aortic valve disease or improves survival. Measures to reduce cardiovascular risk, including treatment of hypertension, are indicated. Rate-slowing calcium channel blockers and β-blockers that depress left ventricular function should be avoided if possible. ACE inhibitors may improve symptoms in patients with aortic stenosis who are not surgical candidates.

Ref: Grimard BH, Safford RE, Burns EL: Aortic stenosis: Diagnosis and treatment. *Am Fam Physician* 2016;93(5):371-378.

Item 218

ANSWER: D

A diagnosis of the syndrome of inappropriate secretion of antidiuretic hormone (SIADH) generally starts with the discovery of hyponatremia and is confirmed after all other possible causes are excluded. The root cause is the pathologic secretion of antidiuretic hormone (ADH), which can occur in response to some drugs and a variety of conditions, including infections, tumors, and dysregulation in the nervous system involving sympathetic tone and baroreflex response. Inappropriate release of ADH increases free water reabsorption, which increases circulating blood volume, dilutes sodium, and lowers hematocrit and hemoglobin. Urine output is often lowered because of this reabsorption, and the urine is more concentrated (urine osmolality > plasma osmolality) with sodium levels > 20 mEq/L. Modest weight gain may be noted as a result of the increased blood volume.

Polydipsia also causes dilution of serum sodium and hemodilution but results in dilution of urine. Excessive beer drinking may result in hyponatremia and hypokalemia (beer potomania) as a result of overhydration with a fluid containing inadequate solute. Laboratory testing for sodium can be falsely reduced in a hyperglycemic state. A simple calculation can correct for this: Corrected (Na+) = Measured (Na+) + (2.4 × glucose (mg/dL) – 100 mg/dL)/100 mg/dL.

Ref: Pliquett RU, Mohr P, Obermuller N: Endocrine testing for the syndrome of inappropriate antidiuretic hormone secretion (SIADH). *Endotext* website, 2014. 2) Braun MM, Barstow CH, Pyzocha NJ: Diagnosis and management of sodium disorders: Hyponatremia and hypernatremia. *Am Fam Physician* 2015;91(5):299-307.

Item 219

ANSWER: B

This patient has classic signs and symptoms of viral bronchiolitis, likely due to respiratory syncytial virus (RSV). A chest radiograph is not indicated in a patient with a classic presentation and no focal findings on examination. Most concerning is his history of low urine output, suggesting inadequate oral intake. This is often related to a high respiratory rate and copious nasal secretions. The patient requires hospitalization for monitoring of his respiratory status and supportive care, including intravenous or nasogastric rehydration. At this time the infant does not require supplemental oxygen, as his oxygen saturation is above 90%. Many medications have been studied for the treatment of bronchiolitis in children and most have been found to not provide benefit with regard to the need for hospitalization, length of hospitalization, or disease resolution. Medications that are NOT recommended include inhaled bronchodilators, inhaled epinephrine, inhaled or systemic corticosteroids, and antibiotics.

Ref: Ralston SL, Lieberthal AS, Meissner HC, et al: Clinical practice guideline: The diagnosis, management, and prevention of bronchiolitis. *Pediatrics* 2014;134(5):e1474-e1502. 2) Smith DK, Seales S, Budzik C: Respiratory syncytial virus bronchiolitis in children. *Am Fam Physician* 2017;95(2):94-99.

Item 220

ANSWER: C

Puncture wounds to the foot commonly get infected. Most soft-tissue infections from puncture wounds are caused by gram-positive organisms. *Staphylococcus aureus* is the most common, followed by other staphylococcal and streptococcal species. When the puncture wound is through the rubber sole of an athletic shoe, *Pseudomonas* is the most frequent pathogen. Ciprofloxacin is the only oral antibiotic that has antipseudomonal activity, and would be the most appropriate choice.

Ref: Tintinalli JE, Stapczynski JS, Ma OJ, et al (eds): *Emergency Medicine: A Comprehensive Study Guide*, ed 8. McGraw-Hill, 2016, pp 313-319.

Item 221

ANSWER: D

Back pain that regularly occurs at night and awakens a child is usually associated with tumors or infections, such as osteomyelitis, diskitis, osteoid osteoma, osteoblastoma, and spinal cord tumors. Other possible symptoms associated with nighttime back pain include fever, malaise, and weight loss. Back pain that occurs at night is an indication for immediate medical evaluation.

Ref: Bernstein RM, Cozen H: Evaluation of back pain in children and adolescents. *Am Fam Physician* 2007;76(11):1669-1676. 2) Kliegman RM, Stanton BF, Geme JW III, et al (eds): *Nelson Textbook of Pediatrics*, ed 20. Elsevier Saunders, 2016, pp 3293-3295.

Item 222

ANSWER: E

Although pharmacologic therapy is the mainstay of treatment for hypertension in adults, there are several nonpharmacologic options that have been shown to lower blood pressure. Moderate exercise 3–4 times per week for 40 minutes or more has been shown to lower high blood pressure, with the greatest effect seen when patients exercise 150 minutes or more per week. Limiting sodium intake to 2400 mg/day decreases blood pressure, and further effects are seen when it is limited to 1500 mg/day. Alcohol should be limited to no more than two drinks per day in men, and one drink per day in women. Magnesium and coenzyme Q_{10} do not lower blood pressure.

Ref: Oza R, Garcellano M: Nonpharmacologic management of hypertension: What works? *Am Fam Physician* 2015;91(11):772-776.

Item 223

ANSWER: A

Salmonella is a common cause of gastroenteritis. Transmission is most often associated with eggs, poultry, undercooked ground meat, and dairy products from contaminated animals, or produce contaminated by their waste. *Salmonella* infection is usually associated with nausea, vomiting, diarrhea, and fever starting 6–48 hours after ingestion of contaminated water or food. Stools are usually moderate-volume, loose, and nonbloody, although they can be large-volume watery stools with blood. While *Salmonella* can cause severe infection, it is usually self-limited. Antibiotics should not be routinely used to treat uncomplicated *Salmonella* gastroenteritis and may prolong the duration of *Salmonella* excretion in stool. Antibiotic treatment should be reserved for patients who are severely ill or suspected of being bacteremic. The threshold for treatment should also be decreased in those who are considered to be at higher risk for severe illness and invasive disease, such as infants, the elderly, patients with sickle cell disease, and immunosuppressed patients. Chronic fecal carriers of *Salmonella* may also benefit from treatment. If treatment is required, ciprofloxacin, ampicillin, ceftriaxone, and trimethoprim/sulfamethoxazole are all treatment options.

Ref: Kasper DL, Fauci AS, Hauser SL, et al (eds): *Harrison's Principles of Internal Medicine*, ed 19. McGraw-Hill, 2015, pp 1049-1055. 2) Kliegman RM, Stanton BF, Geme JW III, et al (eds): *Nelson Textbook of Pediatrics*, ed 20. Elsevier Saunders, 2016, pp 1382-1393.

Item 224

ANSWER: A

Diagnostic error is important because it is very common. Anchoring bias, also known as premature closure, is defined by the Agency for Healthcare Research and Quality as relying on an initial diagnostic impression despite subsequent information to the contrary. This is the most frequent single cause of diagnostic error. In this case, once the diagnosis of dehydration and acute kidney injury were made, clinicians became "anchored" to that diagnosis and did not consider other possibilities until much later.

Hindsight bias and outcome bias occur when looking back at a case while knowing the result and outcome. Commission and omission bias relate to the tendency toward action rather than inaction and the tendency toward inaction rather than action, respectively.

Ref: Wellbery C: Flaws in clinical reasoning: A common cause of diagnostic error. *Am Fam Physician* 2011;84(9):1042-1048. 2) Ely JW, Kaldjian LC, D'Alessandro DM: Diagnostic errors in primary care: Lessons learned. *J Am Board Fam Med* 2012;25(1):87-97. 3) Committee on Diagnostic Error in Health Care: *Improving Diagnosis in Health Care*. The National Academies Press, 2015, pp 57-58. 4) Ely JW, Graber ML: Preventing diagnostic errors in primary care. *Am Fam Physician* 2016;94(6):426-432. 5) *Patient Safety Primer: Diagnostic Errors*. Agency for Healthcare Research and Quality, updated 2017.

Item 225

ANSWER: E

This patient is at high risk for malignancy based on his age, sex, and lymphadenopathy for more than 4–6 weeks. Fine-needle aspiration is an acceptable first-line test to evaluate for a reactive node versus malignancy. Further testing may be necessary to confirm the diagnosis. Watchful waiting could delay the diagnosis of a malignancy in a patient at high risk and would not be appropriate. Due to the duration of his symptoms and presentation, lymphadenitis is unlikely and antibiotics would not be appropriate. Corticosteroids are not recommended until a diagnosis is confirmed, as they may interfere with the cytology. While medications can cause lymphadenopathy, lisinopril has not been associated with this problem.

Ref: Gaddey HL, Riegel AM: Unexplained lymphadenopathy: Evaluation and differential diagnosis. *Am Fam Physician* 2016;94(11):896-903.

Item 226

ANSWER: A

Mammographic screening is not recommended at the age of 38. The U.S. Preventive Services Task Force (USPSTF) recommends against routine mammographic screening for breast cancer between the ages of 40 and 49, but promotes a policy of individualized shared decision making. Mammography every 2 years is recommended for women between the ages of 50 and 74 (B recommendation). The USPSTF recommends any of several familial risk stratification tools for use in women who have a family member with breast, ovarian, tubal, or peritoneal cancer, to assess for an increased risk of a *BRCA1* or *BRCA2* mutation. If the screen is positive, a referral for genetic counseling is recommended to determine if *BRCA* testing is indicated (B recommendation). MRI of the breasts is not recommended for screening by the USPSTF but is recommended by some organizations as an adjunct to mammography for women determined to be at high risk of breast cancer, such as those with a *BRCA* mutation.

Ref: *Final Recommendation Statement: BRCA-Related Cancer: Risk Assessment, Genetic Counseling, and Genetic Testing*. US Preventive Services Task Force, 2013. 2) Nelson HD, Pappas M, Zakher B, et al: Risk assessment, genetic counseling, and genetic testing for *BRCA*-related cancer in women: A systematic review to update the US Preventive Services Task Force recommendation. *Ann Intern Med* 2014;160(4):255-266. 3) *Final Update Summary: Breast Cancer: Screening*. US Preventive Services Task Force, 2016.

Item 227

ANSWER: C

A single dose of oral dexamethasone improves symptoms in children with mild croup when compared with placebo. It is as effective for reducing croup symptoms as nebulized budesonide and is less distressing for the child. There is currently no evidence from randomized, controlled trials to support the use of humidification or a helium-oxygen mixture to reduce the symptoms of croup.

Ref: Johnson DW: Croup. *Am Fam Physician* 2016;94(6):476-478.

Item 228

ANSWER: D

This patient would benefit from exercise to prevent or delay the onset of heart disease and hypertension, and to manage her weight. Exercise stress testing is not specifically indicated for this patient. Current recommendations are for healthy adults to engage in 30 minutes of accumulated moderate-intensity physical activity on 5 or more days per week.

Ref: Meriwether RA, Lee JA, Lafleur AS, et al: Physical activity counseling. *Am Fam Physician* 2008;77(8):1129-1136. 2) Lanier JB, Bury DC, Richardson SW: Diet and physical activity for cardiovascular disease prevention. *Am Fam Physician* 2016;93(11):919-924.

Item 229

ANSWER: B

This patient has pneumonia based on the clinical presentation and the physical findings of fever, cough, and abnormal lung findings. A fever would not be a typical finding in pulmonary embolus or heart failure. An upper respiratory infection is unlikely given the abnormal lung findings that suggest a lower respiratory tract infection. This would not be a typical presentation for acute leukemia.

Ref: Kaysin A, Viera AJ: Community-acquired pneumonia in adults: Diagnosis and management. *Am Fam Physician* 2016;94(9):698-706.

Item 230

ANSWER: C

Early systemic Lyme disease may manifest with facial nerve palsy, and treatment should include corticosteroids. The evidence for efficacy of antivirals for facial nerve palsy is lacking, especially beyond 3–4 days after onset. But in this case, specific treatment to eradicate the Lyme disease is also indicated, in order to prevent later, more severe systemic complications.

For facial nerve palsy, treatment with doxycycline or amoxicillin for 14 days is effective. Patients with more severe neurologic manifestations of Lyme disease, such as altered mental status, meningoencephalitis, or other cranial nerve palsies, require longer courses of antibiotics, usually intravenously.

A single-dose treatment with doxycycline or amoxicillin is recommended as prophylaxis in asymptomatic patients after a known tick bite. This is only recommended for tick attachment longer than 36 hours, or of unknown duration.

Ref: Treatment of Lyme disease. *Med Lett Drugs Ther* 2016;58(1494):57-58.

Item 231

ANSWER: D

Patients with a history of cryptorchidism are at high risk for the development of testicular cancer, especially if orchiopexy is performed after puberty. If sonography shows a hypoechoic mass, a testicular biopsy is contraindicated, since it may contaminate the scrotum or alter the lymphatic drainage. Radical inguinal orchiectomy is both diagnostic and therapeutic. Watchful waiting would not be an option in this high-risk patient. CT of the chest, abdomen, and pelvis, and measurement of the tumor markers are useful for staging and as an indication of tumor burden, but they are not diagnostic.

Ref: Hanna NH, Einhorn LH: Testicular cancer—Discoveries and updates. *N Engl J Med* 2014;371(21):2005-2016.

Item 232

ANSWER: D

The initial "destructive" phase of subacute thyroiditis presents with signs, symptoms, and laboratory findings of overt hyperthyroidism; however, a radioactive iodine uptake scan is negative in this phase. Graves disease and toxic multinodular goiter also present with overt hyperthyroidism, but radioactive iodine uptake is high. Factitious thyrotoxicosis is associated with low TSH and elevated or normal free T_4 and total T_3, but a goiter is not present. A TSH-secreting pituitary adenoma results in elevated TSH, free T_4, and total T_3.

Ref: Kasper DL, Fauci AS, Hauser SL, et al (eds): *Harrison's Principles of Internal Medicine*, ed 19. McGraw-Hill, 2015, pp 2283-2308. 2) Kravets I: Hyperthyroidism: Diagnosis and treatment. *Am Fam Physician* 2016;93(5):363-370.

Item 233

ANSWER: D

According to U.S. Preventive Services Task Force guidelines, adults age 40–70 should be screened for diabetes mellitus if they are overweight (BMI >25.0 kg/m^2) or obese (BMI ≥ 30.0 kg/m^2), so this patient should not be screened until age 40. Screening for diabetes mellitus should be considered for any adult who has a risk factor such as a family history of diabetes, a personal history of gestational diabetes, polycystic ovary syndrome, or being a member of a high-risk ethnic group (African-American, Hispanic, American Indian, Alaskan Native, or Native Hawaiian).

Ref: Campos-Outcalt D: USPSTF update: Screening for abnormal blood glucose, diabetes. *J Fam Pract* 2016;65(7):481-483.

Item 234

ANSWER: C

The radiograph shows a fracture of the fifth metacarpal head, commonly known as a boxer's fracture. There is only slight volar angulation and no displacement. The proper treatment for this fracture is an ulnar gutter splint, which immobilizes the wrist, hand, and fourth and fifth digits. The wrist should be positioned in slight extension with the metacarpophalangeal joint in 70°–90° of flexion and the proximal interphalangeal joint in 5°–10° of flexion. Generally, 3 or 4 weeks of continuous splinting is adequate for healing.

Surgical pinning is indicated in cases of significant angulation (35°–40° or more of volar angulation) or in fractures with significant rotational deformity or displacement. The other options listed are not appropriate treatments for this injury. This injury most commonly results from "man-versus-wall" pugilistics, but other mechanisms of injury are possible.

Ref: Boyd AS, Benjamin HJ, Asplund C: Splints and casts: Indications and methods. *Am Fam Physician* 2009;80(5):491-499. 2) Abraham MK, Scott S: The emergent evaluation and treatment of hand and wrist injuries. *Emerg Med Clin North Am* 2010;28(4):789-809.

Item 235

ANSWER: B

Patellofemoral pain syndrome is a common cause of anterior knee pain, especially in women. It is worse with running downhill or going down stairs. It is not associated with a knee effusion. The examination is often positive for an apprehension test over the patella. A torn meniscus can cause medial joint line tenderness as well as a positive McMurray's test, defined as a click and/or pain when moving the knee from flexion to extension with valgus stress. Prepatellar bursitis causes anterior knee pain, usually associated with tenderness, swelling, and redness over the prepatellar bursa. Osgood-Schlatter syndrome causes anterior knee pain over the tibial tuberosity. Pes anserine bursitis causes medial knee pain just distal and slightly posterior to the joint space.

Ref: Covey CJ, Hawks MK: Nontraumatic knee pain: A diagnostic & treatment guide. *J Fam Pract* 2014;63(12):720-728. 2) Crossley KM, Callaghan MJ, van Linscholen R: Patellofemoral pain. *BMJ* 2015;351:h3939.

Item 236

ANSWER: B

Of the options given, only a GLP-1 agonist such as liraglutide could be used for this patient because of his comorbidities of chronic kidney disease and heart failure. Metformin is contraindicated in males with a creatinine level >1.5 mg/dL and in females with a creatinine level >1.4 mg/dL. SGLT2 inhibitors are not as safe or effective if the patient's estimated glomerular filtration rate (eGFR) is <50 mL/min/1.73 m^2, and it is not recommended in patients with an eGFR <30 mL/min/1.73 m^2. The initiation of rosiglitazone is contraindicated in patients with established New York Heart Association class III or class IV heart failure.

Ref: Avandia prescribing information. US Food and Drug Administration, 2007. 2) Lipska KJ, Bailey CJ, Inzucchi SE: Use of metformin in the setting of mild-to-moderate renal insufficiency. *Diabetes Care* 2011;34(6):1431-1437. 3) Lisenby KM, Meyer A, Slater NA: Is an SGLT2 inhibitor right for your patient with type 2 diabetes? *J Fam Pract* 2016;65(9):587-593. 4) Marso SP, Daniels GH, Brown-Frandsen K, et al: Liraglutide and cardiovascular outcomes in type 2 diabetes. *N Engl J Med* 2016;375(4):311-322.

Item 237

ANSWER: D

Microscopic colitis is characterized by intermittent secretory diarrhea in older patients, although all ages can be affected. The cause is unknown, but there is some evidence that more than 6 months of NSAID use increases the risk. Only a biopsy from the transverse colon can confirm the diagnosis. Two histologic patterns are found: lymphocytic colitis and collagenous colitis. The other diagnostic studies listed do not confirm the diagnosis.

Ref: Olesen M, Eriksson S, Bohr J, et al: Microscopic colitis: A common diarrhoeal disease. An epidemiological study in Orebro, Sweden, 1993–1998. *Gut* 2004;53(3):346-350. 2) Juckett G, Trivedi R: Evaluation of chronic diarrhea. *Am Fam Physician* 2011;84(10):1119-1126. 3) Nguyen GC, Smalley WE, Vege SS, et al: American Gastroenterological Association Institute guideline on the medical management of microscopic colitis. *Gastroenterology* 2016;150(1):242-246.

Item 238

ANSWER: A

No pharmacologic treatment shortens the course of viral bronchiolitis in a young child. Supplemental oxygen is indicated if the oxygen saturation falls below 90%, but otherwise the most effective treatment is simply supportive care (fluids, antipyretics, nasal bulb suction, etc.). None of the pharmacologic options listed are recommended in the treatment of bronchiolitis in this scenario.

Ref: Meissner HC: Viral bronchiolitis in children. *N Engl J Med* 2016;374(1):62-72.

Item 239

ANSWER: A

This patient has type 2 diabetes mellitus and presents with new-onset edema in her lower extremities, the most common presenting symptom of nephrotic syndrome (NS). Patients with NS may also report foamy urine, exertional dyspnea or fatigue, and significant fluid-associated weight gain. A 24-hour urine collection for protein (not creatinine) can be used to diagnose proteinuria, but the collection process is cumbersome and the specimen is often collected incorrectly. The protein-to-creatinine ratio from a single urine sample is commonly used to diagnose nephrotic-range proteinuria. The role of a renal biopsy in patients with NS is controversial and there are no evidence-based guidelines regarding indications for a biopsy. Renal ultrasonography may be appropriate to assess for underlying conditions and/or disease complications if the glomerular filtration rate is reduced. There is no data to support using MRI in the diagnosis and management of nephrotic syndrome.

Ref: Kodner C: Diagnosis and management of nephrotic syndrome in adults. *Am Fam Physician* 2016;93(6):479-485.

Item 240

ANSWER: D

Childhood constipation is a very common problem encountered in outpatient practice. Most childhood constipation is functional, which appears to be the case with this patient. She has no evidence of organic disease, and she had a change in lifestyle that caused her to retain stool, resulting in a cycle of constipation. Polyethylene glycol is easily tolerated, safe, and easy to use. For this reason, it is the first-line therapy. A daily dose should resolve this issue, although it is likely that the child will need another course of treatment, as functional constipation is likely to recur. It is not reasonable in this case to provide no treatment, as the child is uncomfortable. An enema would be unnecessary since oral therapies are very likely to be effective. Behavioral therapies have not been shown to be as effective as laxatives for functional constipation, and stringent therapy that is not related to food intake is likely to increase the stress surrounding going to the toilet. There is no role for imaging in a case where the suspicion of an organic cause is so low.

Ref: Gordon M, Naidoo K, Akobeng AK, Thomas AG: Osmotic and stimulant laxatives for the management of childhood constipation. *Cochrane Database Syst Rev* 2012;(7):CD009118. 2) Nurko S, Zimmerman LA: Evaluation and treatment of constipation in children and adolescents. *Am Fam Physician* 2014;90(2):82-90.