American Board of Family Medicine

2019 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: A

This patient presents with symptoms of chronic obstructive lung disease, and spirometry confirms airflow limitation or obstruction with an $FEV_1/FVC < 0.7$. Her age, the lack of tobacco smoke or occupational exposures, and the chest radiograph findings are typical of α_1-antitrypsin deficiency. While left heart failure, interstitial lung disease, bronchiectasis, and diffuse panbronchiolitis are all causes of chronic cough, they are not necessarily associated with the development of COPD and these spirometry findings. Furthermore, the radiologic findings in this patient are not consistent with these conditions. Left heart failure would present with pulmonary edema on a chest radiograph and volume restriction on pulmonary function testing. Bronchiectasis would present with bronchial dilation and bronchial wall thickening on a chest radiograph. Interstitial lung disease would present with reticular or increased interstitial markings. Diffuse panbronchiolitis would present with diffuse small centrilobular nodular opacities along with hyperinflation.

Ref: Global Strategy for the Diagnosis, Management, and Prevention of Chronic Obstructive Pulmonary Disease. Global Initiative for Chronic Obstructive Lung Disease, 2017.

Item 2

ANSWER: D

In men who are diagnosed with hypogonadism with symptoms of testosterone deficiency and unequivocally and consistently low serum testosterone concentrations, further evaluation with FSH and LH levels is advised as the initial workup to distinguish between primary and secondary hypogonadism. If secondary hypogonadism is indicated by low or inappropriately normal FSH and LH levels, prolactin and serum iron levels and measurement of total iron binding capacity are recommended to determine secondary causes of hypogonadism, with possible further evaluation to include other pituitary hormone levels and MRI of the pituitary. If primary hypogonadism is found, karyotyping may be indicated for Klinefelter's syndrome.

Ref: Bhasin S, Brito JP, Cunningham GR, et al: Testosterone therapy in men with hypogonadism: An Endocrine Society clinical practice guideline. *J Clin Endocrinol Metab* 2018;103(5):1715-1744.

Item 3

ANSWER: D

This patient presents with symptoms compatible with functional constipation. Daily use of polyethylene glycol (PEG) solution has been found to be more effective than lactulose, senna, or magnesium hydroxide in head-to-head studies. Evidence does not support the use of fiber supplements in the treatment of functional constipation. No adverse effects were reported with PEG therapy at any dosing regimen. Low-dose regimens of PEG are 0.3 g/kg/day and high-dose regimens are up to 1.0–1.5 g/kg/day.

Ref: Tabbers MM, DiLorenzo C, Berger MY, et al: Evaluation and treatment of functional constipation in infants and children: Evidence-based recommendations from ESPGHAN and NASPGHAN. *J Pediatr Gastroenterol Nutr* 2014;58(2):258-274. 2) Gordon M, MacDonald JK, Parker CE, et al: Osmotic and stimulant laxatives for the management of childhood constipation. *Cochrane Database Syst Rev* 2016;(8):CD009118. 3) Lauters R, Saguil A: Laxatives for the management of childhood constipation. *Am Fam Physician* 2017;96(7):433-434.

Item 4

ANSWER: C

A patient who uses intravenous drugs and has a fever without a clear source must be evaluated for infectious endocarditis (IE). The first step in this evaluation is to obtain blood cultures. Although this patient might have a less serious condition, it is critical to evaluate for bacteremia in this situation. If the concern for IE is high, blood cultures should be obtained and antibiotics may be started while waiting for results and arranging for urgent echocardiography.

IE in people who inject drugs is more likely to be right-sided, specifically involving the tricuspid valve. Right-sided IE is less frequently associated with systemic findings of endocarditis such as Janeway lesions or Roth spots. Patients often do not have a heart murmur.

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

Item 5

ANSWER: A

This patient has flexible metatarsus adductus, the most common congenital foot deformity. Flexible metatarsus adductus usually resolves spontaneously by 1 year of age and does not require treatment. Rigid metatarsus adductus should be treated with serial casting. Using adjustable shoes is an alternative that is less expensive than serial casting for motivated parents with children who are not yet walking. Surgical correction should be reserved for older children who are already walking or for those with persistent symptomatic metatarsus adductus that is resistant to casting.

Ref: Rerucha CM, Dickison C, Baird DC: Lower extremity abnormalities in children. *Am Fam Physician* 2017; 96(4):226-233.

Item 6

ANSWER: E

Psychogenic tremor is characterized by an abrupt onset, spontaneous remission, changing characteristics, and extinction with distraction. Cerebellar tremor is an intention tremor with ipsilateral involvement on the side of the lesion. Neurologic testing will reveal past-pointing on finger-to-nose testing. CT or MRI of the head is the diagnostic test of choice. Parkinsonian tremor is noted at rest, is asymmetric, and decreases with voluntary movement. Bradykinesia, rigidity, and postural instability are generally noted. For atypical presentations a single-photon emission CT or positron emission tomography may help with the diagnosis. One of the treatment options is carbidopa/levodopa.

Patients who have essential tremor have symmetric, fine tremors that may involve the hands, wrists, head, voice, or lower extremities. This may improve with ingestion of small amounts of alcohol. There is no specific diagnostic test but the tremor is treated with propranolol or primidone. Enhanced physiologic tremor is a postural tremor of low amplitude exacerbated by medication. There is usually a history of caffeine use or anxiety.

Ref: Crawford P, Zimmerman EE: Tremor: Sorting through the differential diagnosis. *Am Fam Physician* 2018;97(3):180-186.

Item 7

ANSWER: C

Behavioral and psychological symptoms of dementia include delusions, hallucinations, aggression, and agitation. Antipsychotics are frequently used for treatment of these symptoms and are continued indefinitely. For patients who have been taking antipsychotics for ≥3 months and whose symptoms have stabilized, or for patients who have not responded to an adequate trial of an antipsychotic, it is recommended that the drug be tapered slowly (SOR B).

Physicians should collaborate with the patient and caregivers when deciding whether to use an antipsychotic. This is recommended because antipsychotic medications have adverse effects, including an increased overall risk of death, cerebrovascular events, extrapyramidal symptoms, gait disturbances, falls, somnolence, edema, urinary tract infections, weight gain, and diabetes mellitus. The risk of these harms increases with prolonged use in the elderly.

One tapering method to consider is to reduce the daily dose to 75%, 50%, and 25% of the original dose every 2 weeks until stopping the medication. This reduction pace can be slowed for some patients. Diphenhydramine and lorazepam are on the Beers list of potentially inappropriate medications to use in older patients and would not be recommended.

Ref: American Geriatrics Society 2015 Beers Criteria Update Expert Panel: American Geriatrics Society 2015 Updated Beers criteria for potentially inappropriate medication use in older adults. *J Am Geriatr Soc* 2015;63(11):2227-2246. 2) Bjerre LM, Farrell B, Hogel M, et al: Deprescribing antipsychotics for behavioural and psychological symptoms of dementia and insomnia: Evidence-based clinical practice guideline. *Can Fam Physician* 2018;64(1):17-27. 3) Hauk L: Deprescribing antipsychotics for behavioral and psychological symptoms of dementia and insomnia. *Am Fam Physician* 2018;98(6):394-395.

Item 8

ANSWER: C

Individuals who travel internationally to areas with a high prevalence of tuberculosis (TB) are at risk for contracting the disease if they have prolonged exposure to individuals with TB, such as working in a health care setting. The CDC recommends either a TB skin test or an interferon-gamma release assay prior to leaving the United States. If the test is negative, the individual should repeat the testing 8–10 weeks after returning. A chest radiograph in asymptomatic individuals or prophylactic treatment at any point is not recommended. Isoniazid and rifampin are options for treatment of latent TB.

Ref: Tuberculosis (TB) fact sheet. Tuberculosis information for international travelers. Centers for Disease Control and Prevention, 2012. 2) Latent tuberculosis infection: A guide for health care providers: Treatment regimens. Centers for Disease Control and Prevention, 2016.

Item 9

ANSWER: B

This patient has thyroiditis with biochemical evidence for autoimmune (Hashimoto's) thyroiditis. The most appropriate plan of care is to begin thyroid hormone replacement and monitor with a repeat TSH level 6–8 weeks later. It is not necessary to include a T_3 level when assessing the levothyroxine dose. There is no need to routinely order thyroid ultrasonography when there are no palpable nodules on a thyroid examination. Fine-needle aspiration may be necessary to rule out infectious thyroiditis when a patient presents with severe thyroid pain and systemic symptoms.

Ref: Sweeney LB, Stewart C, Gaitonde DY: Thyroiditis: An integrated approach. *Am Fam Physician* 2014;90(6):389-396.

Item 10

ANSWER: D

Easy access to a lethal means of suicide is a major risk factor for a successful suicide attempt. It is important to eliminate access to firearms, drugs, or toxins for a patient with any suicidal ideation. Other risk factors include, but are not limited to, a family history of suicide, previous suicide attempts, a history of mental disorders, a history of alcohol or substance abuse, and physical illness. Another risk factor in this patient is loss of a personal relationship. A history of borderline personality disorder (associated with cutting) is not a risk for successful suicide. Any support from family or friends is helpful, even if it is limited.

Ref: Screening for suicide risk in adolescents, adults, and older adults in primary care: Recommendation statement. *Am Fam Physician* 2015;91(3):190F-190I. 2) Suicide: Risk and protective factors. Centers for Disease Control and Prevention, 2017.

Item 11

ANSWER: E

This patient's EKG shows type II second degree (Mobitz type II) atrioventricular (AV) block. Conduction disturbances are one of the most common manifestations of cardiac sarcoidosis. In addition to AV block, supraventricular and ventricular arrhythmias can be seen. Mobitz type II AV block is treated with pacemaker placement. Metoprolol could be used for treatment of nonsustained ventricular tachycardia, apixaban for anticoagulation in patients with atrial fibrillation or atrial flutter, and amiodarone for either supraventricular or ventricular tachycardias.

Ref: Kandolin R, Lehtonen J, Airaksinen J, et al: Cardiac sarcoidosis: Epidemiology, characteristics, and outcome over 25 years in a nationwide study. *Circulation* 2015;131(7):624-632. 2) Jameson JL, Fauci AS, Kasper DL, et al (eds): *Harrison's Principles of Internal Medicine*, ed 20. McGraw-Hill, 2018, pp 1728-1729.

Item 12

ANSWER: B

High-intensity statin therapy is recommended for patients younger than 75 years of age with known coronary artery disease. For those who are intolerant of high-intensity statins, a trial of a moderate-intensity statin is appropriate. There is evidence to support ezetimibe plus a statin in patients with acute coronary syndrome or chronic kidney disease. Omega-3 fatty acids, fibrates, and niacin should not be prescribed for primary or secondary prevention of atherosclerotic cardiovascular disease because they do not affect patient-oriented outcomes. PCSK9 inhibitors such as evolocumab are injectable monoclonal antibodies that lower LDL-cholesterol levels significantly and have produced some promising results, but more studies are needed to determine when this would be cost effective.

Ref: Last AR, Ference JD, Menzel ER: Hyperlipidemia: Drugs for cardiovascular risk reduction in adults. *Am Fam Physician* 2017;95(2):78-87. 2) Braun MM, Stevens WA, Barstow CH: Stable coronary artery disease: Treatment. *Am Fam Physician* 2018;97(6):376-384.

Item 13

ANSWER: E

This patient has Dupuytren's disease with a contracture of the affected finger. Surgical release is indicated when the metacarpophalangeal joint contracture reaches 30° or with any degree of contracture of the proximal interphalangeal joint. Intralesional injection may reduce the need for later surgery in a patient with grade 1 disease, but not if there is a contracture. There is no evidence to support the use of physical therapy or cryosurgery.

Ref: Frontera WR, Silver JK, Rizzo TD Jr (eds): *Essentials of Physical Medicine and Rehabilitation: Musculoskeletal Disorders, Pain, and Rehabilitation*, ed 4. Elsevier, 2019, pp 154-158.

Item 14

ANSWER: A

Traveler's diarrhea is the most common infection in international travelers. A short course of antibiotics can be taken after a traveler develops diarrhea and usually shortens the duration of symptoms (SOR A). Azithromycin is preferred to treat severe traveler's diarrhea. Rifaximin or fluoroquinolones may be used to treat severe nondysenteric traveler's diarrhea. Prophylactic antibiotics are not routinely recommended. For patients at high risk, bismuth subsalicylate reduces the risk but does not need to be initiated prior to travel. There is insufficient evidence for the use of probiotics to prevent traveler's diarrhea. Loperamide can be used with or without antibiotics after symptoms develop but is not recommended for prophylaxis.

Ref: Heather CS: Travellers' diarrhoea. *BMJ Clin Evid* 2015;2015:0901. 2) Sanford C, McConnell A, Osborn J: The pretravel consultation. *Am Fam Physician* 2016;94(8):620-627. 3) Travelers' health: Chapter 2: The pretravel consultation: Self-treatable conditions: Travelers' diarrhea. Centers for Disease Control and Prevention, 2017.

Item 15

ANSWER: C

There are several decision support tools to assist in predicting 30-day mortality for patients with community-acquired pneumonia. Calculating the number of high-risk markers can aid in deciding whether to admit the patient to the hospital. The risk of mortality increases with a respiratory rate ≥30/min, hypotension, confusion or disorientation, a BUN level ≥20 mg/dL, age >65 years, male sex, or the presence of heart failure or COPD.

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

Item 16

ANSWER: B

This elderly patient is exhibiting classic signs of depression. The PHQ-2 has a similar sensitivity to the PHQ-9, but the PHQ-9 has a higher specificity in diagnosing depression (91%–94% compared to 78%–92%) and can assist in diagnosing depression. In addition to the PHQ-2 and PHQ-9 there are specific screening tools for use in the elderly population, including the Geriatric Depression Scale and the Cornell Scale for Depression in Dementia. Somatic issues and dementia can make it more difficult to screen for and diagnose depression in this population. The CAGE questionnaire screens for substance abuse. Megestrol is used to stimulate the appetite, but in this patient the appetite symptoms are likely secondary to depression so treating the depression would be a more appropriate starting point. The tricyclic nortriptyline is used to treat depression but is not first-line therapy, especially in the elderly. In general, a more extensive medical history and a physical examination are indicated before ordering MRI of the brain.

Ref: Maurer DM, Raymond TJ, Davis BN: Depression: Screening and diagnosis. *Am Fam Physician* 2018;98(8):508-515.

Item 17

ANSWER: D

The U.S. Preventive Services Task Force (USPSTF) recommends exercise interventions to prevent falls in community-dwelling adults ≥65 years of age who are at increased risk for falls (B recommendation). This recommendation is based on several studies that demonstrated improved fall-related outcomes for individuals from this population who participated in exercise programs. Strength and resistance exercises were specifically identified as beneficial. The evidence exists to support group-based exercises is less convincing.

It is also recommended that clinicians selectively offer multifactorial interventions to prevent falls in this population, based on the possible small benefit and minimal risk (C recommendation). The USPSTF recommends against vitamin D supplementation to prevent falls in community-dwelling adults ≥65 years of age with the caveat that this applies only to those who are not known to have osteoporosis or vitamin D deficiency (D recommendation).

Ref: *Final Recommendation Statement: Falls Prevention in Community-Dwelling Older Adults: Interventions.* US Preventive Services Task Force, 2018.

Item 18

ANSWER: E

This patient has classic pityriasis rosea. This is generally a benign disease except in pregnancy. The epidemiology and clinical course suggest an infectious etiology. Pregnant women are more susceptible to pityriasis rosea because of decreased immunity. Pityriasis rosea is associated with an increased rate of spontaneous abortion in the first 15 weeks of gestation. It is not associated with an increased risk for a small-for-gestational-age newborn, congenital cataracts, or multiple birth defects.

Ref: Villalon-Gomez JM: Pityriasis rosea: Diagnosis and treatment. *Am Fam Physician* 2018;97(1):38-44.

Item 19

ANSWER: D

This patient's clinical findings and radiographs indicate a diagnosis of inflammatory arthritis, most likely rheumatoid arthritis. Symmetric small-joint inflammatory arthritis is typical of rheumatoid arthritis and systemic lupus erythematosus (SLE), but bony erosions are not seen in SLE. Psoriatic arthritis can also affect small joints but is typically not symmetric. Dermatomyositis can present with a thick, bright red rash over the metacarpophalangeal (MCP) and interphalangeal joints (Gottron's sign) but is typically associated with proximal muscle weakness rather than joint pain or erosions that can be seen on radiographs. Osteoarthritis does not typically cause the soft-tissue swelling seen in the image. It usually affects the distal and proximal interphalangeal joints while sparing the MCP joints, and it results in osteophytes and joint space narrowing that can be seen on radiographs.

Ref: Pujalte GG, Albano-Aluquin SA: Differential diagnosis of polyarticular arthritis. *Am Fam Physician* 2015;92(1):35-41.

Item 20

ANSWER: A

When professional interpreters participate in patient care it is important to speak directly in the first person, using "I" statements rather than statements that start with "tell her" (SOR C). It is ideal to seat the interpreter next to or slightly behind the patient, so that the patient is the focus of the interaction. Sentence-by-sentence interpretation can prevent miscommunication errors, as opposed to expecting the interpreter to remember every detail of a complex care plan. It is not appropriate for the medical interpreter to also serve as a witness to consent. Focusing on three or fewer key points rather than over-communicating multiple complex issues increases the likelihood that the patient will comprehend the plan of care.

Ref: Juckett G, Unger K: Appropriate use of medical interpreters. *Am Fam Physician* 2014;90(7):476-480.

Item 21

ANSWER: E

Treatments to reduce awareness of tinnitus and tinnitus-related distress include cognitive-behavioral therapy, acoustic stimulation, and educational counseling. No medications, supplements, or herbal remedies have been shown to substantially reduce the severity of tinnitus.

Ref: Bauer CA: Tinnitus. *N Engl J Med* 2018;378(13):1224-1231.

Item 22

ANSWER: E

Polycystic ovary syndrome can significantly affect multiple organ systems, and menstrual irregularities from anovulatory cycles are very common. Treatment should be based on the patient's goals and modified based on her desire for fertility. In a patient who is not interested in near-term fertility and whose goal is to control menstrual irregularities, a levonorgestrel IUD is most likely to reduce the frequency, duration, and volume of bleeding. Metformin is used to treat insulin resistance, dietary modifications are used to treat obesity, spironolactone can be used to treat hirsutism or acne, and clomiphene is used to induce ovulation and fertility.

Ref: Williams T, Mortada R, Porter S: Diagnosis and treatment of polycystic ovary syndrome. *Am Fam Physician* 2016;94(2):106-113.

Item 23

ANSWER: A

This patient's symptoms and the examination suggest viral bronchiolitis. Supportive therapy, including adequate hydration, is recommended for treatment. Treatment with bronchodilators, epinephrine, hypertonic saline, or corticosteroids is not indicated (SOR A).

Ref: Smith DK, Seales S, Budzik C: Respiratory syncytial virus bronchiolitis in children. *Am Fam Physician* 2017;95(2):94-99.

Item 24

ANSWER: C

Sarcoidosis has numerous extrapulmonary manifestations. Because inflammation of the eye can result in permanent impairment and is often asymptomatic, patients require yearly eye examinations as well as additional monitoring with disease flares. Although skin involvement is common it is usually readily apparent and rarely has serious sequelae. Cardiac sarcoidosis can potentially lead to progressive heart failure and sudden death, but evaluation is needed only in patients who are symptomatic. Similarly, evaluation for neurologic involvement is needed only in patients who are symptomatic.

Ref: Soto-Gomez N, Peters JI, Nambiar AM: Diagnosis and management of sarcoidosis. *Am Fam Physician* 2016; 93(10):840-848.

Item 25

ANSWER: B

Orthostatic blood pressure measurement and an EKG are indicated in the routine evaluation of patients with syncope. All other testing should be directed by findings obtained in the history and on the physical examination.

Ref: Runser LA, Gauer RL, Houser A: Syncope: Evaluation and differential diagnosis. *Am Fam Physician* 2017;95(5):303-312.

Item 26

ANSWER: A

Anemia is often diagnosed incidentally on laboratory testing and is often asymptomatic. It is associated with increased morbidity and mortality in older adults, and is often caused by nutritional deficiencies, chronic kidney disease, occult blood loss from gastrointestinal malignancies, or chronic inflammation. However, in many patients the cause remains unknown. A detailed history and physical examination are indicated. In patients with normocytic or microcytic anemia, a serum ferritin level should be ordered. A low serum ferritin level is associated with iron deficiency and should be further evaluated so the underlying cause can be addressed. A serum transferrin-receptor–ferritin index should be determined for patients with a serum ferritin level between 46 and 100 ng/mL to distinguish between iron deficiency anemia and other types of anemia. Referring this patient to a gastroenterologist would not be indicated at this time.

Ref: Lanier JB, Park JJ, Callahan RC: Anemia in older adults. *Am Fam Physician* 2018;98(7):437-442.

Item 27

ANSWER: C

This patient has typical symptoms and findings of Achilles tendinopathy. The best management involves eccentric calf-strengthening exercises. A local injection with corticosteroids or with platelet-rich plasma is ineffective and may increase the risk of a tendon rupture. Immobilization and surgical debridement may be considered if more conservative therapies have failed.

Ref: Tu P: Heel pain: Diagnosis and management. *Am Fam Physician* 2018;97(2):86-93.

Item 28

ANSWER: B

Bupropion can improve antidepressant-related sexual arousal dysfunction (SOR B). Black cohosh is considered a safe alternative for treating menopausal vasomotor symptoms, but not for treating sexual arousal dysfunction in women who are premenopausal. Ethinyl estradiol may be taken to improve sexual dysfunction related to menopausal symptoms. Vaginal estrogen therapy is recommended over oral estrogen when vaginal dryness is the primary symptom. Ospemifene is indicated for dyspareunia related to vulvar and vaginal atrophy due to menopause. Testosterone has proven to be effective for treating menopause-

related low sexual desire but the evidence is limited due to the lack of long-term data. The Endocrine Society recommends consideration of a 3- to 6-month course of testosterone specifically for postmenopausal women with low sexual desire.

Ref: Randel A: AACE releases guidelines for menopausal hormone therapy. *Am Fam Physician* 2012;86(9):864-868. 2) Faubion SS, Rullo JE: Sexual dysfunction in women: A practical approach. *Am Fam Physician* 2015;92(4):281-288.

Item 29

ANSWER: A

This patient has blepharitis, a chronic inflammation of the eyelids. Seborrhea is a common cause in older adults. In younger patients including children, colonization with *Staphylococcus* may be a contributing factor. Meibomian gland dysfunction is often part of this condition, contributing to a reduced quality of tear films, which leads to dry eyes and irritation. Other diagnoses to consider in this patient include conjunctivitis, preseptal cellulitis, and Sjögren's syndrome. Conjunctivitis typically involves the conjunctiva and an eye discharge but less involvement of the eyelids is present. Cellulitis is an acute rather than chronic condition and involves more pain and swelling. Sjögren's syndrome causes dry eye but not inflammatory changes of the lid.

The initial treatment of blepharitis consists of lid hygiene using warm compresses to remove dried secretions and debris. Mild shampoo can help in this process and aid in keeping the bacterial colonization load down. In severe or recalcitrant cases a topical antibiotic ointment may be applied to the lids. Oral antibiotics can be considered for more severe cases.

Ref: Turnbull AM, Mayfield MP: Blepharitis. *BMJ* 2012;344:e3328.

Item 30

ANSWER: B

Nonnutritive sweeteners contain few or no calories. According to the American Diabetes Association, nonnutritive sweeteners may be acceptable to use instead of nutritive sweeteners such as sucrose. They should be used in moderation if they are used.

The use of nonnutritive sweeteners can help to reduce overall intake of carbohydrates and calories. They do not significantly affect glycemic control. Research is inconsistent regarding the effects of nonnutritive sweeteners on weight loss, but most systematic reviews and meta-analyses demonstrate a benefit.

There is no recommendation to avoid sucralose or aspartame in patients with type 2 diabetes. Beverages sweetened with sugar are associated with an increased risk of type 2 diabetes.

Ref: American Diabetes Association: Standards of medical care in diabetes—2019 abridged for primary care providers. *Diabetes Care* 2018;42(Suppl 1):S1-S194.

Item 31

ANSWER: A

The American Academy of Otolaryngology defines chronic rhinosinusitis as the presence of two of four cardinal symptoms, which include nasal drainage, nasal obstruction, facial pain or pressure, and hyposmia or anosmia, along with objective signs on examination or radiographic studies. This patient has three cardinal symptoms of chronic rhinosinusitis and objective evidence on the physical examination. No nasal polyps were seen on the examination. Granulomatosis with polyangiitis and sarcoidosis can both present similarly but are uncommon causes of chronic rhinosinusitis. Allergic rhinitis can be associated with chronic rhinosinusitis but would also present with allergic symptoms.

Ref: Sedaghat AR: Chronic rhinosinusitis. *Am Fam Physician* 2017;96(8):500-506.

Item 32

ANSWER: D

Malignant epidural spinal cord compression is an oncologic emergency that requires urgent MRI to confirm the diagnosis. It is caused by a tumor compressing the dural sac and should be suspected with new-onset progressive back pain that is worse when the patient is lying down. It is most commonly associated with breast cancer and develops in approximately 5% of all patients with cancer. Once the diagnosis is confirmed, an urgent management approach is needed. Corticosteroids and neurosurgical intervention can preserve motor and sensory function. Attempting to alleviate the pain would not address this emergency.

Ref: Higdon ML, Atkinson CJ, Lawrence KV: Oncologic emergencies: Recognition and initial management. *Am Fam Physician* 2018;97(11):741-748.

Item 33

ANSWER: B

In order for patients to show they have the capacity to make a decision they must demonstrate an understanding of the situation, including the risks, benefits, and consequences of the decision or refusal of care. If a patient gives inconsistent answers to questions after multiple explanations, this indicates that there is a lack of understanding and would meet one of the criteria to determine that the patient lacks the capacity to make that decision. The presence of dementia can be associated with an increased incidence of having a lack of capacity; however, a diagnosis of dementia by itself does not indicate that the patient lacks the capacity to make a decision. While disorientation to time or a lower score on the Mini-Mental State Examination is associated with an increased risk of lacking capacity, these findings alone would not be enough to determine that the patient lacks capacity. The patient asking that her son be her medical decision maker instead of her daughter would not be an indication that she lacks capacity.

Ref: Barstow C, Shahan B, Roberts M: Evaluating medical decision-making capacity in practice. *Am Fam Physician* 2018;98(1):40-46.

Item 34

ANSWER: C

According to national guidelines echocardiography is the preferred initial noninvasive testing modality when pulmonary hypertension is suspected (SOR C). Pulmonary function tests provide helpful information in regard to pulmonary capacity but are not necessarily diagnostic of pulmonary hypertension. CT of the chest with contrast will not provide pulmonary pressures but may assist in the detection of pulmonary emboli. A coronary calcium scan may be indicated to evaluate for coronary artery disease but it is not a diagnostic test for pulmonary hypertension. Although right heart catheterization would provide pulmonary pressure values it is considered more invasive than echocardiography and is not always necessary for making the diagnosis.

Ref: Seeger W, Adir Y, Barberà JA, et al: Pulmonary hypertension in chronic lung diseases. *J Am Coll Cardiol* 2013;62(25 Suppl):D109-D116. 2) Dunlap B, Weyer G: Pulmonary hypertension: Diagnosis and treatment. *Am Fam Physician* 2016;94(6):463-469.

Item 35

ANSWER: D

This patient has medial knee pain related to repetitive use, most likely caused by pes anserine bursitis. Iliotibial band syndrome is often related to overuse but causes pain in the lateral knee. The fibular head is also lateral to the knee joint. Osgood-Schlatter disease is also often related to overuse but causes pain at the insertion of the patellar ligament on the midline proximal tibia. A medial meniscal tear would localize to the medial joint line rather than distal to the joint line and would more likely be associated with positive findings from other examinations, such as a McMurray test.

Ref: Wolf M: Knee pain in children: Part I: Evaluation. *Pediatr Rev* 2016;37(1):18-23. 2) Arnold MJ, Moody AL: Common running injuries: Evaluation and management. *Am Fam Physician* 2018;97(8):510-516. 3) Bunt CW, Jonas CE, Chang JG: Knee pain in adults and adolescents: The initial evaluation. *Am Fam Physician* 2018;98(9):576-585.

Item 36

ANSWER: D

Trichomoniasis classically presents as a greenish-yellow, frothy discharge with a foul odor. Erythema and inflammation of the vagina and cervix are often present and can include punctate hemorrhages (strawberry cervix). Atrophic vaginitis may cause a thin, clear discharge and is usually associated with a thin, friable vaginal mucosa. Irritant/allergic vaginitis causes burning and soreness with vulvar erythema but usually does not cause any significant discharge. Bacterial vaginosis more commonly presents as a thin, homogenous discharge with a fishy odor and no cervical or vaginal inflammation. Vulvovaginal candidiasis presents with white, thick, cheesy, or curdy discharge.

Ref: Paladine HL, Desai UA: Vaginitis: Diagnosis and treatment. *Am Fam Physician* 2018; 97(5): 321-329.

Item 37

ANSWER: C

Prodromal symptoms of mumps include myalgia, fatigue, loss of appetite, fever, and headache. Parotitis is the most common manifestation. Infertility, meningitis, and encephalitis are serious complications of orchitis. Measles is characterized by cough, coryza, conjunctivitis, and Koplik spots. Varicella is characterized by a pruritic rash with fluid-filled blisters. MMR vaccine is indicated for this child.

Ref: National Center for Immunization and Respiratory Diseases: *Epidemiology and Prevention of Vaccine-Preventable Diseases*, ed 13. Centers for Disease Control and Prevention, 2015, pp 247-260.

Item 38

ANSWER: C

SGLT2 inhibitors are known to cause an increased risk of yeast vaginitis because their mechanism of action involves blocking renal uptake of glucose, which results in an increase in glucosuria (SOR A). Common side effects of metformin include gastrointestinal upset. DPP-4 inhibitors have very few side effects. GLP-1 receptor agonists typically cause nausea and early satiety and weight loss. Sulfonylureas are associated with weight gain and hypoglycemia.

Ref: Steinberg J, Carlson L: Type 2 diabetes therapies: A STEPS approach. *Am Fam Physician* 2019;99(4):237-243.

Item 39

ANSWER: B

Whenever a pregnant woman presents with pruritus without a primary rash, it is important to evaluate her for intrahepatic cholestasis of pregnancy. This diagnosis is associated with increased fetal mortality and warrants increased antenatal surveillance as well as possible induction by 35–37 weeks gestation. It is most appropriate to check for elevation of liver function tests and serum bile acids. Emollients, topical corticosteroids, and oral antihistamines can all be helpful for pruritus and certain rashes, but in this patient it is most important to promptly look for the cause of the pruritus. Varicella-zoster immune globulin would be indicated if she had no immunity to varicella and had been exposed to varicella or if she had a rash that was suspected to be chickenpox.

Ref: Gregory DS, Wu V, Tuladhar P: The pregnant patient: Managing common acute medical problems. *Am Fam Physician* 2018;98(9):595-602.

Item 40

ANSWER: B

To mitigate the risk of opioid harm, it is essential to understand morphine milligram equivalents (MME). The evidence shows that the risk of an opioid overdose increases at the threshold of 50 MME/day. It is therefore recommended by the CDC that a prescription for naloxone be ordered when an opioid dosage reaches 50 MME/day, which is a high dosage. In general one should avoid prescribing ≥90 MME/day because of the substantially higher risk of an overdose at this dosage level.

Ref: Dowell D, Haegerich TM, Chou R: CDC guideline for prescribing opioids for chronic pain—United States, 2016. *JAMA* 2016;315(15):1624-1645.

Item 41

ANSWER: A

Chronic kidney disease–mineral and bone disorder (CKD-MBD) is found in many patients with CKD and is associated with an increased risk of bone fractures and cardiovascular events due to vascular calcification. In patients with CKD, phosphate is not appropriately excreted and the subsequent hyperphosphatemia leads to secondary hyperparathyroidism and binding of calcium. Decreased production of calcitriol in patients with CKD also leads to hypocalcemic hyperparathyroidism. Patients with CKD stages 3a–5 should have phosphorus, calcium, parathyroid hormone, and 25-hydroxyvitamin D levels checked regularly, and consultation with a nephrologist or endocrinologist should be obtained if CKD-MBD is suspected.

Ref: Gaitonde DY, Cook DL, Rivera IM: Chronic kidney disease: Detection and evaluation. *Am Fam Physician* 2017;96(12):776-783. 2) Jameson JL, Fauci AS, Kasper DL, et al (eds): *Harrison's Principles of Internal Medicine*, ed 20. McGraw-Hill, 2018, pp 2111-2121. 3) Papadakis MA, McPhee SJ, Rabow MW (eds): *Current Medical Diagnosis & Treatment*, ed 58. McGraw-Hill Education, 2019, pp 926-965.

Item 42

ANSWER: B

Recognizing clinically significant abnormalities on the newborn examination is important. Newborns with small sacral dimples located far from the anal verge, without other skin findings such as hair, do not need imaging to rule out spinal dysraphism (tethered cord). While the exact parameters of what is considered large (>0.5 cm diameter) and close (within 2.5 cm of the anal verge) can easily be found in reference materials, the dimple described here is clearly concerning and needs imaging. Ultrasonography can accurately and safely detect spinal dysraphism in these cases.

Ref: Lewis ML: A comprehensive newborn exam: Part II. Skin, trunk, extremities, neurologic. *Am Fam Physician* 2014;90(5):297-302.

Item 43

ANSWER: A

This patient has acute Charcot neuroarthropathy, an inflammatory condition that occurs in obese patients with peripheral neuropathy and ultimately leads to foot deformities (the classic rocker-bottom foot) and resultant ulcerations and infections. Its clinical appearance can easily be initially mistaken for cellulitis. However, the absence of tenderness and other signs of infection such as fever, an elevated WBC count, and inflammatory markers is not consistent with cellulitis. Radiography is an appropriate initial imaging modality but the results are often interpreted as normal early in the disease process. MRI is the modality of choice for a definitive diagnosis and may demonstrate periarticular bone marrow edema, adjacent soft-tissue edema, joint effusion, and microtrabecular or stress fractures.

The treatment of acute Charcot neuroarthropathy is immobilization with total contact casting, which increases the total surface area of contact to the entire lower extremity, distributing pressure away from the foot. Immobilization is typically required for at least 3–4 months but in some cases may be needed for up to 12 months. Bisphosphonates were found to be ineffective as adjunctive therapy in acute Charcot neuroarthropathy. Corticosteroids and antibiotics have no role in the treatment of Charcot foot but would be appropriate therapy for cellulitis or gout, which are important alternative diagnoses to consider. The role of surgery is more controversial but may be indicated in the acute phase of Charcot neuroarthropathy in patients with severe dislocation or instability.

Ref: Marmolejo VS, Arnold JF, Ponticello M, Anderson CA: Charcot foot: Clinical clues, diagnostic strategies, and treatment principles. *Am Fam Physician* 2018;97(9):594-599.

Item 44

ANSWER: C

Spirometry is central to confirming the diagnosis of asthma, which is characterized by a reversible obstructive pattern of pulmonary function. In this case the patient's FEV_1/FVC ratio is normal, which neither confirms nor rules out asthma. A methacholine challenge is recommended in this scenario to assess for the airway hyperresponsiveness that is the hallmark of asthma. Methacholine is a cholinergic agonist. Bronchoconstriction (defined as a reduction in FEV_1 $\geq$20%) observed at low levels of methacholine administration ($<$4 mg/mL) is consistent with asthma. If the FEV_1/FVC ratio is reduced on initial spirometry, a bronchodilator response should be tested. A fixed or partially reversible obstructive pattern suggests an alternative diagnosis such as COPD, and full reversal after bronchodilator use is consistent with asthma. Inhaled corticosteroids are not appropriate for intermittent asthma.

Ref: McCracken JL, Veeranki SP, Ameredes BT, Calhoun WJ: Diagnosis and management of asthma in adults: A review. *JAMA* 2017;318(3):279-290.

Item 45

ANSWER: A

Management of asymptomatic peripheral artery disease (PAD) should initially be conservative and should include a walking program (SOR A), smoking cessation, and a healthy diet. Statins should be started for all patients with PAD regardless of their LDL-cholesterol levels (SOR A). High-intensity statins should be used if tolerated. A single antiplatelet agent is recommended for patients with PAD. Both aspirin and clopidogrel are effective in the reduction of stroke, but the combination of the two is recommended only after revascularization surgery.

Blood pressure control is indicated in patients with PAD but no antihypertensive class is clearly superior to another, although there is some evidence that ACE inhibitors may have additional benefits in terms of walking and pain. In an 80-year-old patient, lowering blood pressure below 120/80 mm Hg can be associated with significant side effects, including a greater risk of falls. Anticoagulants have not been shown to reduce the risk of major cardiovascular events in patients with PAD and they increase the risk of life-threatening bleeding. Referral to a vascular surgeon or for angiography is indicated if conservative therapy fails or symptoms worsen acutely, pain occurs at rest, or the patient develops ulcerations or loss of tissue.

Ref: Carman TL, Fernandez BB: A primary care approach to the patient with claudication. *Am Fam Physician* 2000;61(4):1027-1034. 2) Society for Vascular Surgery: Five things physicians and patients should question: Don't use interventions (including surgical bypass, angiogram, angioplasty or stent) as a first line of treatment for most patients with intermittent claudication. ABIM Foundation Choosing Wisely campaign, updated 2016. 3) Parvar SL, Fitridge R, Dawson J, Nicholls SJ: Medical and lifestyle management of peripheral arterial disease. *J Vasc Surg* 2018;68(5):1595-1606. 4) McDermott MM, Criqui MH: Ankle-brachial index screening and improving peripheral artery disease detection and outcomes. *JAMA* 2018;320(2):143-145.

Item 46

ANSWER: A

Effective interventions for weight loss in nursing home patients include providing meals in a pleasant, home-like environment. Avoiding dietary restrictions has low quality evidence of effectiveness. There is high quality evidence that initiating tube feedings in patients with severe dementia is not only ineffective but may lead to problems such as decubitus ulcers and aspiration. There is low to very low evidence of the effectiveness for prescribing appetite stimulants, selenium, vitamin B, or vitamin D supplements unless there is a documented deficiency. Neither quality of life nor survival is improved.

Ref: Volkert D, Chourdakis M, Faxen-Irving G, et al: ESPEN guidelines on nutrition in dementia. *Clin Nutr* 2015;34(6):1052-1073. 2) Ackermann R, Kemle K, Patel D, and Patel J: Issues in geriatric care. FP Essentials 468, 2018, pp 26-34.

Item 47

ANSWER: B

The latest American College of Cardiology/American Heart Association guidelines promote a radical change in the management of hypertension, which they now define as a blood pressure ≥130/80 mm Hg. Elevated blood pressure is defined as a systolic pressure of 120–129 mm Hg and a diastolic pressure < 80 mm Hg. A blood pressure of 130–139/80–89 mm Hg is classified as stage 1 hypertension and a systolic pressure ≥140 mm Hg or a diastolic pressure ≥90 mm Hg is classified as stage 2 hypertension.

Ref: Ioannidis JPA: Diagnosis and treatment of hypertension in the 2017 ACC/AHA guidelines and in the real world. *JAMA* 2018;319(2):115-116. 2) Whelton PK, Carey RM, Aronow WS, et al: 2017 ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ASH/ASPC/NMA/PCNA guideline for the prevention, detection, evaluation, and management of high blood pressure in adults: A report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. *J Am Coll Cardiol* 2018;71(19):e127-e248.

Item 48

ANSWER: B

The goal fasting blood glucose level in patients with gestational diabetes is < 95 mg/dL. A fasting glucose level < 80 mg/dL is associated with increased maternal and fetal complications. The goal 2-hour postprandial glucose level is < 120 mg/dL and the goal 1-hour postprandial glucose level is < 140 mg/dL.

Ref: Committee on Practice Bulletins—Obstetrics: ACOG Practice Bulletin No. 190: Gestational diabetes mellitus. *Obstet Gynecol* 2018;131(2):e49-e64.

Item 49

ANSWER: A

Patients are at risk of developing glucocorticoid-induced osteoporosis if they are on long-term glucocorticoid therapy, defined as > 2.5 mg of prednisone for a duration of 3 months or longer. The American College of Rheumatology recommends pharmacologic treatment for these patients, as well as for patients receiving glucocorticoids who have a bone mineral density T-score ≤–2.5 at either the spine or the femoral neck and are either male and ≥50 years of age or female and postmenopausal. Therapy is also recommended in patients ≥40 years of age who do not meet these criteria but have a 10-year risk of major osteoporotic fracture of at least 20% or a risk of hip fracture of at least 3% according to the FRAX tool.

Oral bisphosphonates are recommended as first-line agents for preventing glucocorticoid-induced osteoporotic fractures, although intravenous bisphosphonates can be used if patients are unable to use the oral forms. Supplementation of calcium (800–1000 mg) and vitamin D (400–800 IU) is also recommended. Raloxifene and teriparatide are options when bisphosphonate therapy fails or is contraindicated (SOR A).

Ref: Buckley L, Humphrey MB: Glucocorticoid-induced osteoporosis. *N Engl J Med* 2018;379(26):2547-2556.

Item 50

ANSWER: C

At 18 months of age a child should follow one-step directions. Approximately 90% of 18-month-olds say at least three words, and 50%–90% say six words. The ability to point to body parts or pictures after they are named is expected at 2 years of age. Not walking at 18 months would be a red flag for delay, but running well may not yet be accomplished. At 18 months a child would be expected to scribble spontaneously but not to copy a vertical line.

Ref: McLaughlin MR: Speech and language delay in children. *Am Fam Physician* 2011;83(10):1183-1188. 2) Lurio JG, Peay HL, Mathews KD: Recognition and management of motor delay and muscle weakness in children. *Am Fam Physician* 2015;91(1):38-44. 3) Vitrikas K, Savard D, Bucai M: Developmental delay: When and how to screen. *Am Fam Physician* 2017;96(1):36-43. 4) Hagan JF Jr, Shaw JS, Duncan PM (eds): *Bright Futures: Guidelines for Health Supervision of Infants, Children, and Adolescents*, ed 4. National Center for Education in Maternal and Child Health, 2017.

Item 51

ANSWER: D

Despite 10%–30% of the population being affected by allergic disease, allergy testing does have limitations and is most useful in certain clinical situations. Allergy testing can be helpful in patients with persistent sinus infections, allergic rhinitis, and poorly controlled asthma. Allergy testing for insect stings is indicated only following systemic/anaphylactic or large local reactions, not with limited localized reactions. Three days of fever followed by a diffuse urticarial rash likely represents a rash associated with a limited viral illness. Allergy testing for penicillin has a negative predictive value of 95%–98%. Testing for allergy to other antibiotics has a much lower sensitivity and specificity but does have limited use to help guide medication choices in patients with multiple allergies and when limited antibiotic options are available. Persistent epigastric pain following the ingestion of tomato products is more indicative of acid reflux symptoms rather than a tomato allergy.

Ref: Chang KL, Guarderas JC: Allergy testing: Common questions and answers. *Am Fam Physician* 2018;98(1):34-39.

Item 52

ANSWER: C

The history, symptoms, and physical examination findings in this case suggest a scaphoid fracture. The scaphoid bone is the most commonly fractured carpal bone and a fall on an outstretched hand can produce enough force to cause this fracture. This fracture is most common in males 15–30 years of age.

The finding of anatomic snuffbox tenderness is highly sensitive but not specific for a scaphoid fracture. Initial radiographs often do not demonstrate a fracture. When there is a high clinical suspicion for a scaphoid fracture but radiographs are negative, it is reasonable to immobilize in a thumb spica splint and reevaluate in 2 weeks.

Treatment for a sprain with or without follow-up would not be ideal in a situation where a scaphoid fracture is suspected. MRI or bone scintigraphy can be considered if the patient desires or needs an immediate diagnosis, but CT and ultrasonography are not appropriate imaging modalities for this fracture.

Ref: Phillips TG, Reibach AM, Slomiany WP: Diagnosis and management of scaphoid fractures. *Am Fam Physician* 2004;70(5):879-884. 2) Eiff MP, Hatch R: *Fracture Management for Primary Care*, ed 3. Elsevier Saunders, 2018, pp 87-90. 3) Walls RM, Hockberger RS, Gausche-Hill M, et al (eds): *Rosen's Emergency Medicine: Concepts and Clinical Practice*, ed 9. Elsevier Inc, 2018, pp 513-515.

Item 53

ANSWER: B

This patient is likely experiencing an acute anterior wall myocardial infarction with possible incipient cardiogenic shock. Along with initiating the hospital's protocol for myocardial infarction, immediate treatment should include dual antiplatelet therapy with a 325-mg dose of nonenteric aspirin, a $P2Y_{12}$ inhibitor (clopidogrel, prasugrel, or ticagrelor), and an anticoagulant (unfractionated heparin or bivalirudin). Given the possibility of cardiogenic shock, β-blockers should not be used. Unless more than a 2-hour delay in percutaneous coronary intervention is expected, fibrinolytics should not be administered. An intravenous vasopressor is not indicated.

Ref: Anderson JL, Morrow DA: Acute myocardial infarction. *N Engl J Med* 2017;376(21):2053-2064.

Item 54

ANSWER: D

This patient presents with 6 out of 11 symptoms of alcohol use disorder within a 12-month period, including a strong desire or urge to use alcohol, recurrent alcohol use that has contributed to the inability to fulfill work obligations, continued alcohol use despite interpersonal problems with her family, continued alcohol use despite knowledge that it is causing physical damage to her liver, development of a tolerance to the effects of alcohol over time, and withdrawal symptoms that require treatment with benzodiazepines.

Mild alcohol use disorder is defined by the presence of 2–3 of the 11 symptoms documented in the *DSM-5*, whereas 3–5 symptoms indicate moderate alcohol use disorder and 6 or more symptoms indicate severe alcohol use disorder. This patient has severe alcohol use disorder that is currently active. Early remission is defined as the absence of symptoms for at least 3 months but less than 12 months. She is not currently intoxicated, and she does not currently have withdrawal symptoms related to her alcohol use over a week ago.

Ref: American Psychiatric Association: *Diagnostic and Statistical Manual of Mental Disorders*, ed 5. American Psychiatric Association, 2013, pp 490-503.

Item 55

ANSWER: C

This patient has symptomatic severe aortic stenosis. The only treatment that improves this condition is aortic valve replacement (SOR B). Transcutaneous aortic valve replacement may be an alternative for patients who are not candidates for surgery. β-Blockers must be used with caution due to the risk of depressing left ventricular systolic function. They have not been shown to improve mortality. Antimicrobial prophylaxis is not indicated unless a patient has undergone valve replacement or has a history of endocarditis (SOR C). Atrial fibrillation is common in patients with aortic stenosis and rate control is important. Symptomatic mitral valve regurgitation may require mitral valve intervention. However, these murmurs are holosystolic, high pitched, and best heard at the cardiac apex. A ventricular septal defect can cause a loud holosystolic murmur with an associated thrill heard best at the third/fourth interspace along the sternal border.

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

Item 56

ANSWER: B

When genital herpes occurs during pregnancy, the best method of diagnosis is either a tissue culture or a polymerase chain reaction (PCR) test, which is more sensitive. Enzyme-linked immunosorbent assays are sensitive, but not as sensitive or specific as PCR.

Ref: Cunningham FG, Leveno KJ, Bloom SL, et al (eds): *Williams Obstetrics*, ed 24. McGraw-Hill Medical, 2014, pp 1271-1274.

Item 57

ANSWER: A

Polyuria occurs in 20%–70% of patients on long-term lithium therapy, even when plasma lithium levels are in the therapeutic range. This is a result of impaired renal concentrating ability that is resistant to vasopressin (nephrogenic diabetes insipidus). Inappropriate antidiuretic hormone secretion causes hyponatremia and fluid retention. The diuresis associated with diabetes mellitus is a result of the osmotic effect of increased serum glucose, which is not present in this case. Patients with hypothalamic or pituitary injuries may develop central diabetes insipidus, which responds to exogenous vasopressin. Psychogenic water drinking occurs in psychiatric patients, but would not be expected to cause impairment of renal concentration or hypernatremia.

Ref: Jameson JL, Fauci AS, Kasper DL, et al (eds): *Harrison's Principles of Internal Medicine*, ed 20. McGraw-Hill, 2018, pp 303, 2685-2686.

Item 58

ANSWER: B

Patients with symptoms typical for GERD can be treated conservatively initially unless there are warning signs such as anemia, weight loss, evidence of bleeding or obstruction, dysphagia, or persistent symptoms despite maximal treatment, or the patient is age 50 or over. In the absence of any of these concerns, medical therapy with a proton pump inhibitor can be initiated. While H_2 histamine blockers can also treat reflux symptoms they are somewhat less effective, and stepwise therapy may increase costs.

Routine testing for *Helicobacter pylori* in patients with GERD alone is not recommended because treating *H. pylori* has been shown in some studies to increase esophagitis and GERD symptoms. However, in the presence of dyspepsia (fullness, bloating, nausea), which can be associated with GERD, testing for and treating *H. pylori* is expected to be beneficial. This patient has classic signs and symptoms of GERD and abdominal ultrasonography would not be likely to reveal any helpful findings. In the presence of warning signs, esophagogastroduodenoscopy would be indicated to evaluate for a more serious pathology. Surgical intervention for GERD should be reserved for patients who fail maximal medical therapy or patients who are unable to take proton pump inhibitors.

Ref: Ebell MH: Diagnosis of gastroesophageal reflux disease. *Am Fam Physician* 2010;81(10):1278. 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 59

ANSWER: A

Acetazolamide is the preferred agent for preventing acute mountain sickness (AMS). Multiple trials have demonstrated its efficacy in preventing AMS. Dexamethasone is a first-line treatment for acute mountain sickness of any severity but is a second-line drug for prevention because of its side-effect profile. Tadalafil is advised as a second-line treatment after nifedipine for the prevention and treatment of high-altitude pulmonary edema. Zolpidem may help with sleep but not AMS, and aspirin is not recommended for prevention of AMS.

Ref: Johnson NJ, Luks AM: High-altitude medicine. *Med Clin North Am* 2016;100(2):357-369.

Item 60

ANSWER: B

Hypertrophic cardiomyopathy is the most common type of cardiomyopathy, with a prevalence of 1:500. It involves left ventricular hypertrophy without chamber dilatation. It is caused by autosomal dominant genetic mutations and is associated with sudden death. Dilated cardiomyopathy is a leading cause of heart failure but most patients are symptomatic. Peripartum cardiomyopathy may occur during and after pregnancy and presents as heart failure. Restrictive cardiomyopathy presents with right-sided heart failure.

Ref: Brieler J, Breeden MA, Tucker J: Cardiomyopathy: An overview. *Am Fam Physician* 2017;96(10):640-646.

Item 61

ANSWER: D

Henoch-Schönlein purpura is an IgA vasculitis that is usually diagnosed clinically. It presents as palpable purpura of the lower extremities without thrombocytopenia or coagulopathy. It is often associated with arthralgias and arthritis, abdominal pain, and renal dysfunction. It is self-limited and treatment is supportive only. Erythema infectiosum (fifth disease) can be identified by an erythematous rash on the cheeks and a lacy reticular rash on the extremities. Gianotti-Crosti syndrome is a sudden papular or papulovesicular eruption on the extensor surfaces of the arms, legs, buttocks, and face, and it is not purpuric. Hemolytic uremic syndrome presents with the classic triad of hemolytic anemia, thrombocytopenia, and kidney injury. Thrombotic thrombocytopenic purpura is rare in the pediatric age group.

Ref: Reamy BV, Williams PM, Lindsay TJ: Henoch-Schönlein purpura. *Am Fam Physician* 2009;80(7):697-704. 2) Jameson JL, Fauci AS, Kasper DL, et al (eds): *Harrison's Principles of Internal Medicine*, ed 20. McGraw-Hill, 2018, pp 826, 1367-1369, 2363, 2586.

Item 62

ANSWER: C

The 2013 U.S. Preventive Services Task Force lung cancer screening guidelines recommend annual low-dose CT screening for all adults between the ages of 55 and 80 who have a 30-pack-year smoking history and either currently smoke or have smoked within the past 15 years (B recommendation).

Ref: *Final Recommendation Statement: Lung Cancer: Screening*. US Preventive Services Task Force, 2013.

Item 63

ANSWER: E

This patient has a medical history, physical examination, and radioactive iodine uptake scan consistent with toxic multinodular goiter, which is the second most common cause of hyperthyroidism in the United States. Although the addition of propranolol and an increase in methimazole may control her palpitations and other symptoms of hyperthyroidism, these measures will not permanently eliminate the problem. Radioactive iodine ablation and thyroidectomy with subsequent thyroid hormone replacement are both appropriate treatments for toxic multinodular goiter, but thyroidectomy is indicated for this patient because she has compressive symptoms from the goiter itself.

Ref: Kravets I: Hyperthyroidism: Diagnosis and treatment. *Am Fam Physician* 2016;93(5):363-370. 2) Davis JR, Dackiw AP, Holt SA, et al: Rapid relief: Thyroidectomy is a quicker cure than radioactive iodine ablation (RAI) in patients with hyperthyroidism. *World J Surg* 2019;43(3):812-817.

Item 64

ANSWER: C

Factors associated with increased prevalence rates for syphilis in the United States include a history of incarceration or commercial sex work, living in the southern or western United States, residing in a major metropolitan area, African-American ethnicity, and being a male younger than 29 years of age. The risk for syphilis infection is highest among men who have sex with men and among persons who are HIV-positive.

The U.S. Preventive Services Task Force (USPSTF) recommends that asymptomatic, nonpregnant adults and adolescents who are at increased risk be screened for syphilis infection (A recommendation). The USPSTF also recommends that local community and socioeconomic factors be considered when identifying patients at increased risk for infection who should be screened.

Ref: Cantor AG, Pappas M, Daeges M, Nelson HD: Screening for syphilis: Updated evidence report and systematic review for the US Preventive Services Task Force. *JAMA* 2016;315(21):2328-2337. 2) Syphilis pocket guide for providers. Centers for Disease Control and Prevention, 2017.

Item 65

ANSWER: B

The Stages of Change Model assesses the patient's motivation for change and determines which stage of the change process the patient is in. The stages include precontemplation, contemplation, preparation, action, and maintenance. Understanding this helps guide counseling strategies for each individual patient.

Ref: Searight HR: Counseling patients in primary care: Evidence-based strategies. *Am Fam Physician* 2018;98(12):719-728.

Item 66

ANSWER: D

Plantar fasciitis is the most common cause of heel pain, affecting more than 2 million people each year. The pain is typically worst when the patient first gets out of bed and improves with activity. Calcaneal stress fractures follow an increase in activity, and the pain tends to worsen with activity and is eventually present all of the time. Achilles tendinopathy is an aching pain that also worsens with increased activity, and there is often tenderness along the tendon. Neuromas present with a burning, tingling, or numb sensation and a painful lump.

Ref: Tu P: Heel pain: Diagnosis and management. *Am Fam Physician* 2018;97(2):86-93.

Item 67

ANSWER: A

Knowing the severity of pancreatitis helps predict how aggressive management should be. Hematocrit, BUN, and creatinine levels are the most useful predictors of the severity of pancreatitis, reflecting the degree of intravascular volume depletion. C-reactive protein is often elevated, but it is not as useful as hematocrit for predicting severity. Serum amylase and lipase have no prognostic value. CT evidence of severe pancreatitis lags behind clinical and laboratory evidence, and early CT underestimates the severity of the acute process.

Ref: Forsmark CE, Vege SS, Wilcox CM: Acute pancreatitis. *N Engl J Med* 2016;375(20):1972-1981.

Item 68

ANSWER: D

Although each state has its own laws regarding obligations to report child abuse, all 50 U.S. states require physicians, whether as a specified professional group or as a part of universal mandated reporting, to report a suspicion of child abuse. The standard is generally suspicion or cause to believe that abuse has occurred. If the possibility of abuse is briefly considered but rejected, or if nonspecific signs are present that do not create a significant suspicion of abuse, this standard is not met. There is no burden of proof placed on the physician to make such a report.

Ref: Kodner C, Wetherton A: Diagnosis and management of physical abuse in children. *Am Fam Physician* 2013;88(10):669-675.

Item 69

ANSWER: A

This patient with sickle cell disease has a new onset of diabetes mellitus. Hemoglobinopathies falsely lower hemoglobin A_{1c} as a result of hemolysis and abnormal glycation. Fructosamine correlates well with hemoglobin A_{1c} levels and is recommended instead of hemoglobin A_{1c} for monitoring glucose control in patients with diabetes and hemoglobinopathies. A 2-hour glucose tolerance test or hemoglobin electrophoresis would not provide useful information. Referral to an endocrinologist is not indicated at this point because the patient has not failed primary care management.

Ref: Smaldone A: Glycemic control and hemoglobinopathy: When A1c may not be reliable. *Diabetes Spectrum* 2008;21(1):46-49. 2) Pippitt K, Li M, Gurgle HE: Diabetes mellitus: Screening and diagnosis. *Am Fam Physician* 2016;93(2):103-109.

Item 70

ANSWER: B

Individuals with nephrotic syndrome often present with edema and fatigue with no evidence of severe liver disease or heart failure. Hallmarks of this problem include heavy proteinuria, hypoalbuminemia, and peripheral edema, often with hyperlipidemia as well. While most of these cases are idiopathic, secondary causes such as diabetes mellitus, systemic lupus erythematosus, and medication reactions should be considered.

To confirm proteinuria in the nephrotic range a spot urine protein/creatinine ratio is now suggested instead of a 24-hour collection of urine. Checking urine for eosinophils has been recommended in the past for evaluation for acute interstitial nephritis but subsequent studies have shown a lack of specificity and sensitivity. Renal ultrasonography would be indicated if the glomerular filtration rate were reduced. Echocardiography would be appropriate if heart failure were suspected. While a renal biopsy is often recommended, it is most useful in patients with suspected underlying systemic lupus erythematosus or similar disorders when a biopsy can guide management decisions and prognosis.

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

Item 71

ANSWER: C

This patient has a CHA_2DS_2-VASc score of 3 (hypertension, age 65–74, female), which classifies her as high risk for thromboembolism. Oral anticoagulation is indicated for patients with a score of 2 or more, who are at high risk for pulmonary embolism/deep vein thrombosis (PE/DVT) (SOR C). Patients with a score of 0–1 have a low to medium risk and may use aspirin with or without clopidogrel.

In patients with atrial fibrillation and stable coronary artery disease, novel oral anticoagulants are preferred (SOR A). They reduce the risk of reinfarction, stroke, and overall mortality in patients with a past history of myocardial infarction, and also help prevent PE/DVT.

Ref: You JJ, Singer DE, Howard PA, et al: Antithrombotic therapy for atrial fibrillation: Antithrombotic therapy and prevention of thrombosis, 9th ed: American College of Chest Physicians evidence-based clinical practice guidelines. *Chest* 2012;141(2 Suppl):e531S-e575S. 2) Gutierrez C, Blanchard DG: Diagnosis and treatment of atrial fibrillation. *Am Fam Physician* 2016;94(6):442-452. 3) Comparison of oral anticoagulants. *Prescribers' Letter*, April 2016. 4) Lip GYH, Banerjee A, Boriani G, et al: Antithrombotic therapy for atrial fibrillation: CHEST guideline and expert panel report. *Chest* 2018;154(5):1121-1201.

Item 72

ANSWER: C

The classic facial dysmorphologies associated with fetal alcohol syndrome are a smooth philtrum, shortened palpebral fissures, and a thin vermilion border of the upper lip. Two out of these three characteristics are required for the diagnosis of fetal alcohol syndrome. Low-set ears and a central chin dimple are not associated findings.

Ref: Denny L, Coles S, Blitz R: Fetal alcohol syndrome and fetal alcohol spectrum disorders. *Am Fam Physician* 2017;96(8):515-522.

Item 73

ANSWER: A

Premature adrenarche without development of secondary sex characteristics is usually idiopathic and does not lead to an abnormal pattern of development. Reassurance and surveillance over the next 3–6 months would be most appropriate at this time. Laboratory studies and radiography warrant consideration if the patient develops secondary sex characteristics before the age of 8, or if her height velocity increases rapidly during the surveillance period.

Ref: Klein DA, Emerick JE, Sylvester JE, Vogt KS: Disorders of puberty: An approach to diagnosis and management. *Am Fam Physician* 2017;96(9):590-599.

Item 74

ANSWER: C

Renal parenchymal diseases such as glomerulonephritis, congenital abnormalities, and reflux nephropathy are the most common cause of hypertension in preadolescent children. Preadolescent children with hypertension should be evaluated for possible secondary causes and renal ultrasonography should be the first choice of imaging in this age group.

Renin and aldosterone levels are indicated if there is a reason to suspect primary hyperaldosteronism, such as unexplained hypokalemia. Measurement of 24-hour urinary fractionated metanephrines and normetanephrines is used to diagnose pheochromocytomas, which are rare and usually present with a triad of symptoms including headache, palpitations, and sweating. Doppler ultrasonography of the renal arteries is useful for diagnosing renal artery stenosis, which should be suspected in patients with coronary or peripheral atherosclerosis or young adults, especially women 19–39 years of age, who are more at risk for renal artery stenosis due to fibromuscular dysplasia. Sleep studies are indicated in patients who are obese or have signs or symptoms of obstructive sleep apnea.

Ref: Charles L, Triscott J, Dobbs B: Secondary hypertension: Discovering the underlying cause. *Am Fam Physician* 2017;96(7):453-461.

Item 75

ANSWER: E

Topiramate increases the risk of kidney stones. It is a carbonic anhydrase inhibitor, which induces a metabolic acidosis that leads to hypercalciuria and the formation of calcium phosphate stones. The risk of kidney stones is not increased by escitalopram, levothyroxine, lisinopril, or metformin.

Ref: Worcester EM, Coe FL: Calcium kidney stones. *N Engl J Med* 2010;363(10):954-962. 2) Salek T, Andel I, Kurfurstova I: Topiramate induced metabolic acidosis and kidney stones–A case study. *Biochem Med (Zagreb)* 2017;27(2):404-410.

Item 76

ANSWER: B

The fifth metatarsal has the least cortical thickness of all of the metatarsals. There are strong ligaments and capsular attachments on the proximal fifth metatarsal that can put significant stress on this area of the bone, leading to fractures. Nondisplaced tuberosity fractures can generally be treated with compressive dressings such as an Aircast or Ace bandage, with weight bearing and range-of-motion exercises as tolerated. Minimally displaced (<3 mm) avulsion fractures of the fifth metatarsal tuberosity can be treated with a short leg walking boot. If the displacement is >3 mm, an orthopedic referral is warranted.

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

Item 77

ANSWER: A

When psychogenic erectile dysfunction (ED) coexists with depression, treatment of the underlying mood disorder is often an appropriate first step (SOR C). An antidepressant that is less likely to worsen the ED, such as bupropion, mirtazapine, or fluvoxamine, should be chosen. Antidepressants that are more likely to cause sexual side effects should be avoided, including SSRIs, SNRIs, and tricyclic and tetracyclic antidepressants. Phosphodiesterase-5 inhibitors are the first line of treatment for ED (SOR A) and can be used effectively in men with depression, in combination with treatments for mood disorders.

Ref: Yuan J, Zhang R, Yang Z, et al: Comparative effectiveness and safety of oral phosphodiesterase type 5 inhibitors for erectile dysfunction: A systematic review and network meta-analysis. *Eur Urol* 2013;63(5):902-912. 2) Rew KT, Heidelbaugh JJ: Erectile dysfunction. *Am Fam Physician* 2016;94(10):820-827.

Item 78

ANSWER: B

HPV vaccine is currently recommended for males and females at age 11. Catch-up vaccination is recommended until age 21 in males and 26 in females. Children who receive the first dose of the vaccine before the age of 15 and receive two doses are considered adequately vaccinated. If the first dose is given after age 15, a three-dose series is recommended.

Ref: Immunization schedules: Recommended immunization schedule for children and adolescents aged 18 years or younger, United States, 2018. Centers for Disease Control and Prevention, updated 2018.

Item 79

ANSWER: D

Atrial ventricular nodal ablation is recommended for patients whose atrial fibrillation is refractory to medical therapy, and requires that patients be anticoagulated for at least 1 month prior to the procedure and for several months afterward (SOR C). Patients with atrial fibrillation who are hemodynamically unstable should be considered for emergent cardioversion (SOR C). Atrial ventricular nodal ablation is not necessary for patients successfully converted to sinus rhythm or for those who are successfully treated with medical interventions for rate control and anticoagulation.

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

Item 80

ANSWER: A

Uncomplicated acute low back pain and/or radiculopathy is a benign, self-limited condition and early imaging is associated with worse overall outcomes and is likely to identify minor abnormalities even in asymptomatic patients. Imaging for acute low back pain should be reserved for cases that are suspicious for cauda equina syndrome, malignancy, fracture, or infection. In the absence of red flags such as progressive motor or sensory loss, new urinary retention or overflow incontinence, a history of cancer, a recent invasive spinal procedure, or significant trauma relative to age, imaging is not warranted regardless of whether radiculopathy is present, unless symptoms persist despite a trial of at least 6 weeks of medical management and physical therapy.

Ref: Patel ND, Broderick DF, Burns J, et al: ACR Appropriateness Criteria low back pain. *J Am Coll Radiol* 2016;13(9):1069-1078. 2) Will JS, Bury DC, Miller JA: Mechanical low back pain. *Am Fam Physician* 2018; 98(7):421-428.

Item 81

ANSWER: A

Prophylactic antibiotics should be given for all closed-fist injuries unless the skin has not been penetrated, and for puncture wounds caused by cat bites. The antibiotic should have both aerobic and anaerobic activity and include *Pasteurella* coverage for animal bites and *Eikenella* coverage for human bites. Suggested regimens include amoxicillin/clavulanate. If the patient is allergic to penicillin, clindamycin plus levofloxacin or moxifloxacin, which has anaerobic coverage, can be used. Azithromycin, cephalexin, and metronidazole are not first-line antibiotics following a cat bite.

Ref: Bystritsky R, Chambers H: Cellulitis and soft tissue infections. *Ann Intern Med* 2018;168(3):ITC17-ITC32.

Item 82

ANSWER: A

Given this patient's age, lack of symptoms, and possible family history, the presence of asymptomatic bilateral hilar lymphadenopathy most likely represents stage 1 pulmonary sarcoidosis. Because the patient does not have any symptoms and stage 1 sarcoidosis resolves in most cases, the most prudent course is to reevaluate her in 6 months with a careful history, a physical examination, and a chest radiograph. Given the normal spirometry results, pulmonary function tests are not needed at this time. Neither CT nor a lung biopsy would change management at this time. Treatment is not indicated in stage 1 sarcoidosis but would be merited if she developed increasing pulmonary symptoms or any extrapulmonary symptoms.

Ref: Soto-Gomez N, Peters JI, Nambiar AM: Diagnosis and management of sarcoidosis. *Am Fam Physician* 2016;93(10):840-848.

Item 83

ANSWER: B

This patient presents with typical vasomotor symptoms that can begin in perimenopause and affect sleep quality. Hormone therapy is the gold standard for treatment of vasomotor symptoms. Combination estrogen and progesterone therapy is highly effective for vasomotor symptoms and provides protection against uterine neoplasia. Although micronized progesterone decreases vasomotor symptoms there are no long-term studies to assess the safety of progestin-only treatment for menopausal symptoms.

Compounded bioidentical hormone therapy creates safety concerns and is not a first-line therapy due to limited government regulation and monitoring, the potential for overdosing and underdosing, impurities or lack of sterility, and the lack of labeling describing risks. Testosterone alone is not FDA-approved for use in women. Additionally, it has not been shown to be beneficial for treatment of vasomotor symptoms in combination with hormone therapy and is associated with significant side effects. It may be useful for hypoactive sexual desire in postmenopausal women. There is insufficient data to recommend the use of herbal remedies such as black cohosh.

Ref: Somboonporn W, Davis S, Seif MW, Bell R: Testosterone for peri- and postmenopausal women. *Cochrane Database Syst Rev* 2005;(4):CD004509. 2) Wierman ME, Arlt W, Basson R, et al: Androgen therapy in women: A reappraisal: An Endocrine Society clinical practice guideline. *J Clin Endocrinol Metab* 2014;99(10):3489-3510. 3) Hill DA, Crider M, Hill SR: Hormone therapy and other treatments for symptoms of menopause. *Am Fam Physician* 2016;94(11):884-889. 4) The NAMS 2017 Hormone Therapy Position Statement Advisory Panel: The 2017 hormone therapy position statement of The North American Menopause Society. *Menopause* 2017;24(7):728-753.

Item 84

ANSWER: E

Catheter ablation is the most appropriate treatment for a patient with symptomatic Wolff-Parkinson-White syndrome (WPW). Catheter ablation has a very high immediate success rate (96%–98%). The most significant risk associated with the procedure is permanent atrioventricular block, which occurs in approximately 0.4% of procedures. Adenosine and amiodarone are used for the acute management of supraventricular tachycardia, but not for long-term management. Node-blocking medications such as diltiazem and metoprolol should not be used for the long-term treatment of WPW, due to the increased risk of ventricular fibrillation.

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

Item 85

ANSWER: B

The CDC's Advisory Committee on Immunization Practices recommends that patients with egg allergy receive influenza vaccination. Previously unvaccinated patients ages 6 months to 8 years should receive two doses of either trivalent or quadrivalent vaccine separated by 1 month.

Ref: Armstrong C: Influenza vaccination recommendations for 2018-2019: Updates from ACIP. *Am Fam Physician* 2018;98(8):541-542. 2) Prevention and control of seasonal influenza with vaccines. American Academy of Family Physicians, 2018.

Item 86

ANSWER: E

A Zenker's diverticulum is an oropharyngeal structural lesion and is most common in the elderly population, with an estimated prevalence of 1:1000 to 1:10,000 in this age group. The pathogenesis involves stenosis of the cricopharyngeus and increased hypopharyngeal pressure during swallowing that causes a pulsion diverticulum above the cricopharyngeus. The radiographic findings in this case are consistent with a Zenker's diverticulum. A pharyngeal neoplasm would not necessarily retain barium in this fashion. A cervical web or Schatzki ring would be identified by a short segment of narrowing without diverticula. Barium would be seen in the trachea with a tracheoesophageal fistula.

Ref: Jameson JL, Fauci AS, Kasper DL, et al (eds): *Harrison's Principles of Internal Medicine*, ed 20. McGraw-Hill, 2018, pp 249-252, 2209-2220.

Item 87

ANSWER: B

Patients who have a venous thromboembolism (VTE) require anticoagulation therapy for treatment and prevention of recurrence. The risk of recurrence is greatest in the first year after the event and remains elevated indefinitely. The risk for VTE recurrence is dependent on patient factors, such as active cancers and thrombophilia. Current guidelines recommend treatment for at least 3 months. In patients who have a reversible provoking factor such as surgery, anticoagulation beyond 3 months is not recommended.

Ref: Wilbur J, Shian B: Deep venous thrombosis and pulmonary embolism: Current therapy. *Am Fam Physician* 2017;95(5):295-302.

Item 88

ANSWER: A

The recommended first-line treatment for primary focal hyperhidrosis is topical 20% aluminum chloride. It should be applied to affected areas nightly for 6–8 hours and works by obstructing the eccrine sweat glands and destroying secretory cells. Iontophoresis and botulinum toxin are alternative first- or second-line therapies for palmar and plantar hyperhidrosis and hyperhidrosis affecting the axillae, palms, soles, or face.

Topical 2% glycopyrrolate must be compounded by a pharmacy and is indicated only for craniofacial hyperhidrosis. Oral anticholinergics such as oxybutynin can be considered if other first-line treatments fail. However, up to 10% of patients will stop taking these medications due to side effects such as dry mouth, constipation, urinary retention, and blurred vision. Microwave technology is a newer treatment option that has shown some promising results but should not be recommended as a first-line treatment. Sympathetic denervation should be used only if other less invasive therapies have already been tried.

Ref: McConaghy JR, Fosselman D: Hyperhidrosis: Management options. *Am Fam Physician* 2018; 97(11):729-734.

Item 89

ANSWER: E

With the advent of new medications to treat diabetes mellitus, including many medications that help lower cardiovascular risk, it is tempting to begin treatment with these medications. Unless there are contraindications, however, metformin is still the initial medication of choice for patients with newly diagnosed diabetes. If this patient's hemoglobin A_{1c} were ≥10%, it would be reasonable to start insulin therapy. If it becomes necessary to add an additional antidiabetic agent it would be reasonable to consider a GLP-1 receptor agonist or a DPP-4 inhibitor in addition to metformin at that time, given the patient's history of coronary artery disease.

Ref: American Diabetes Association: Pharmacologic approaches to glycemic treatment: Standards of medical care in diabetes—2018. *Diabetes Care* 2018;41(Suppl 1):S73-S85.

Item 90

ANSWER: C

LASIK corrective vision surgery has become increasingly common over the last 20 years. A laser is used to cut a flap the size of a contact lens consisting of corneal epithelium and stroma. This flap is repositioned and heals without sutures.

It is important to counsel patients on realistic expectations. Vision following the procedure may not be as clear as with glasses or contact lenses and some individuals still require external correction. Up to 40% of patients experience dry eyes following the surgery (SOR B). These symptoms may be worse in patients with chronic pain syndromes such as fibromyalgia, migraine, and irritable bowel syndrome (SOR C). Glares, halos, and starbursts may affect up to 20% of patients following LASIK. This may be especially bothersome at night (SOR B).

LASIK does not correct age-related presbyopia (SOR C). Reading glasses may be necessary if this develops in certain patients. Overall, however, most patients are satisfied with their results and only 3% are unhappy with their vision following surgery (SOR C).

Ref: Messmer JJ: LASIK: A primer for family physicians. *Am Fam Physician* 2010;81(1):42-47. 2) Wilkinson JM, Cozine EW, Kahn AR: Refractive eye surgery: Helping patients make informed decisions about LASIK. *Am Fam Physician* 2017;95(10):637-644.

Item 91

ANSWER: A

Written self-management plans have been shown to decrease respiratory-related hospitalizations in patients with COPD. Although regular physical activity has clear health benefits, the methods are so varied in studies of physical activity that there is currently no strong evidence to show it reduces hospitalizations in COPD patients. Although FEV_1 is important for predicting hospitalizations for a population, it is not accurate enough to be useful in an individual patient. Daily oxygen therapy does not help to postpone the first hospitalization. Nightly CPAP therapy reduces hospitalizations in patients with COPD and sleep apnea, but not those with COPD alone.

Ref: Lenferink A, Brusse-Keizer M, van der Valk PD, et al: Self-management interventions including action plans for exacerbations versus usual care in patients with chronic obstructive pulmonary disease. *Cochrane Database Syst Rev* 2017;(8):CD011682. 2) *Global Strategy for the Diagnosis, Management, and Prevention of Chronic Obstructive Pulmonary Disease*. Global Initiative for Chronic Obstructive Lung Disease, 2019.

Item 92

ANSWER: D

Somatic symptom disorders account for approximately 5% of primary care visits. Effective pharmacologic treatment includes sertraline and other SSRI-based therapy in addition to cognitive-behavioral therapy (SOR B). Bupropion, monoamine oxidase inhibitors such as selegiline, anticonvulsants such as topiramate, and antipsychotics such as clozapine are ineffective.

Ref: Kurlansik SL, Maffei MS: Somatic symptom disorder. *Am Fam Physician* 2016;93(1):49-54.

Item 93

ANSWER: A

The TSH reference range is lower during pregnancy because of the cross-reactivity of the α-subunit of hCG. Levels of hCG peak during weeks 7–13 of pregnancy, and hCG has mild TSH-like activity, leading to slightly high free T_4 levels in early pregnancy. This leads to a feedback decrease in TSH.

Ref: Pekonen F, Alfthan H, Stenman UH, Ylikorkala O: Human chorionic gonadotropin (hCG) and thyroid function in early human pregnancy: Circadian variation and evidence for intrinsic thyrotropic activity of hCG. *J Clin Endocrinol Metab* 1988;66(4):853-856. 2) Carney LA, Quinlan JD, West JM: Thyroid disease in pregnancy. *Am Fam Physician* 2014;89(4):273-278.

Item 94

ANSWER: C

This patient's laboratory results and back pain suggest multiple myeloma (MM). He has a normocytic anemia and evidence of renal insufficiency, which can indicate MM. The laboratory findings along with worsening back pain indicate a need to order serum protein electrophoresis to look for MM. Flow cytometry is generally used in patients with an elevated WBC count and suspected lymphoma. The remainder of this patient's CBC is normal, which makes a bone marrow issue less likely. His mean corpuscular volume is also normal, making vitamin B_{12} deficiency less likely. A haptoglobin level could be ordered, but protein electrophoresis is a better choice because the peripheral smear demonstrated no evidence of a hemolytic problem.

Ref: Michels TC, Petersen KE: Multiple myeloma: Diagnosis and treatment. *Am Fam Physician* 2017;95(6):373-383.

Item 95

ANSWER: A

Breast cancer survivors should undergo a history and physical examination every 3–6 months for the first 3 years after treatment, then every 6–12 months for the next 2 years, and then annually thereafter (SOR C).

Papanicolaou testing guidelines do not change for patients with a history of breast cancer. Screening should be repeated every 3–5 years according to American Society for Colposcopy and Cervical Pathology (ASCCP) guidelines.

Mammograms of both breasts or the remaining breast are recommended no more often than yearly (SOR A). Breast MRI is not recommended on a regular basis unless the patient has a high risk of recurrence, a significant family history of breast or ovarian cancer, or a personal history of Hodgkin's disease (SOR C). While it is important to be alert for signs of cardiotoxicity due to prior chemotherapy, echocardiography is indicated only if the patient has cardiac symptoms. Routine echocardiography is not recommended (SOR C).

Ref: Shapiro CL: Cancer survivorship. *N Engl J Med* 2018;379(25):2438-2450. 2) Zoberi K, Tucker J: Primary care of breast cancer survivors. *Am Fam Physician* 2019;99(6):370-375.

Item 96

ANSWER: E

Several decision support tools can help guide the decision to order imaging of an injured knee, such as the Ottawa Knee Rule, the Pittsburgh Knee Rule, and American College of Radiology (ACR) criteria. The inability to take four or more steps immediately after an injury or in the emergency setting is an indication for radiography in all three rules.

Age is an indication for radiography in acute knee pain in patients over 55 years of age according to the Ottawa rule, or under 12 or over 50 years of age according to the Pittsburgh rule. The patient's sex does not factor into the criteria for imaging.

Bony tenderness is an indication for imaging according to the ACR and Ottawa rules, but only if isolated over the proximal fibula or over the patella without other bony tenderness. The inability to flex the knee to 90° is also an indication for imaging according to the ACR and Ottawa rules.

Ref: Bunt CW, Jonas CE, Chang JG: Knee pain in adults and adolescents: The initial evaluation. *Am Fam Physician* 2018;98(9):576-585.

Item 97

ANSWER: E

Tamsulosin promotes passage of ureter stones that are 5–10 mm in diameter. The number needed to treat is five patients to cause the expulsion of one stone (SOR B). There was no difference in the percentage of patients passing stones smaller than 5 mm when comparing tamsulosin to placebo, as these stones have a high rate of spontaneous passage without any intervention. Naproxen and promethazine are sometimes used for the management of pain and nausea associated with stones, but they have not been shown to facilitate stone expulsion. Ciprofloxacin and nitrofurantoin are used to treat urinary tract infections but have not been shown to facilitate stone expulsion.

Ref: Furyk JS, Chu K, Banks C, et al: Distal ureteric stones and tamsulosin: A double-blind, placebo-controlled, randomized, multicenter trial. *Ann Emerg Med* 2016;67(1):86-95.

Item 98

ANSWER: C

This patient has severe community-acquired pneumonia based on clinical criteria, including an elevated respiratory rate, confusion, and hypotension requiring aggressive fluid resuscitation. Corticosteroids such as methylprednisolone have been shown to improve clinical outcomes such as length of stay, duration of antibiotic treatment, and the risk of developing adult respiratory distress syndrome. The preferred choice of antibiotic treatment for patients in the intensive-care unit is a β-lactam antibiotic (ceftriaxone, cefotaxime) or ampicillin/sulbactam, plus a macrolide alone or a macrolide and a respiratory fluoroquinolone. The addition of levofloxacin is not necessarily preferred over just ceftriaxone and azithromycin. Clindamycin is not indicated in the absence of risk factors for anaerobic infection such as aspiration or alcoholism. Oseltamivir is not indicated in the absence of known or suspected influenza infection.

Ref: Kaysin A, Viera AJ: Community-acquired pneumonia in adults: Diagnosis and management. *Am Fam Physician* 2016;94(9):698-706. 2) Shrikant KN: Steroids beneficial as adjunctive treatment for community-acquired pneumonia. *Am Fam Physician* 2016;93(3):227.

Item 99

ANSWER: A

Postpartum thyroiditis is defined as a transient or persistent thyroid dysfunction that occurs within 1 year of childbirth, miscarriage, or medical abortion. Release of preformed thyroid hormone in the bloodstream initially results in hyperthyroidism. During the hyperthyroid phase, radioactive iodine uptake will be low, which can help to confirm the diagnosis. Pregnancy and breastfeeding are contraindications to radionuclide imaging. Thyroid peroxidase antibody levels are elevated with chronic autoimmune thyroiditis (Hashimoto's thyroiditis), and patients present with symptoms of hypothyroidism. The Endocrine Society and American Association of Clinical Endocrinologists do not recommend routine thyroid ultrasonography in patients with abnormal thyroid function tests if there is no palpable abnormality of the thyroid gland. Thyrotropin receptor antibody levels are positive in Graves disease.

Ref: Sweeney LB, Stewart C, Gaitonde DY: Thyroiditis: An integrated approach. *Am Fam Physician* 2014;90(6):389-396.

Item 100

ANSWER: B

Frailty is an increasingly common problem in the geriatric population, especially as individuals are living longer. The current literature supports resistance training to improve physical function before aerobic exercise is introduced. Although there was hope that nutritional counseling would improve outcomes, it does not seem to have an effect. Vitamin D supplementation also does not improve outcomes in these individuals. Mirtazapine is on the Beers list, and without a compelling indication such as weight loss with depression it should be avoided in the elderly.

Ref: Walston J, Buta B, Xue QL: Frailty screening and interventions: Considerations for clinical practice. *Clin Geriatr Med* 2018;34(1):25-38. 2) Bolzetta F, Stubbs B, Noale M, et al: Low-dose vitamin D supplementation and incident frailty in older people: An eight year longitudinal study. *Exp Gerontol* 2018;101:1-6. 3) American Geriatrics Society 2019 updated AGS Beers criteria for potentially inappropriate medication use in older adults. *J Am Geriatr Soc* 2019;67(4):674-694.

Item 101

ANSWER: E

Multiple studies have determined that parenteral antiemetics have benefits for the treatment of acute migraine beyond their effect on nausea. Most outpatient clinics do not have the ability to administer intravenous metoclopramide, which is the preferred treatment. However, most clinics do have the ability to administer intramuscular prochlorperazine or promethazine. Due to concerns about oversedation, misuse, and rebound, treatment with parenteral opiates is discouraged but may be an option if other treatments fail. Oral butalbital/acetaminophen/caffeine and oral ergotamine/caffeine have less evidence of success in the treatment of acute migraine. Sumatriptan is contraindicated within 24 hours of the use of rizatriptan.

Ref: Saguil A, Lax JW: Acute migraine treatment in emergency settings. *Am Fam Physician* 2014;89(9):742-744. 2) Mayans L, Walling A: Acute migraine headache: Treatment strategies. *Am Fam Physician* 2018;97(4):243-251.

Item 102

ANSWER: B

The American Gastroenterological Association guidelines on acute pancreatitis recommend initiating oral feedings early in the course in order to protect the gut-mucosal barrier, which may limit infectious complications and does not increase hospital length of stay or other complications. Nasogastric or nasojejunal tube feeding may be considered at 3–5 days if oral feedings are not tolerated. Total parenteral nutrition is indicated only when enteral feedings cannot supply adequate caloric intake or are not possible for other reasons. The incidence of single or multiple organ failure or infected necrosis is significantly increased with the use of total parenteral nutrition.

Ref: Crockett SD, Wani S, Gardner TB, et al: American Gastroenterological Association Institute guideline on initial management of acute pancreatitis. *Gastroenterology* 2018;154(4):1096-1101.

Item 103

ANSWER: E

Solar lentigines occur on sun-exposed skin and are known commonly as liver spots. A biopsy should be performed if they grow rapidly, change rapidly, are painful, itch, bleed easily, heal poorly, or have an atypical or suspicious appearance.

If no suspicious changes or symptoms are present there are various options for treatment, including topical therapy with hydroquinone or retinoids, or ablative therapy with chemical peels, cryotherapy, intense pulsed light, or laser therapies.

Ref: Plensdorf S, Livieratos M, Dada N: Pigmentation disorders: Diagnosis and management. *Am Fam Physician* 2017;96(12):797-804.

Item 104

ANSWER: A

For women at high risk of developing preeclampsia, the U.S. Preventive Services Task Force (USPSTF) recommends starting low-dose aspirin after 12 weeks gestation (B recommendation). While calcium appears to be helpful in preventing preeclampsia for women with a diet deficient in calcium, the evidence is not yet conclusive. The USPSTF recommendation does not address the use of fish oil, magnesium gluconate, vitamin C, or vitamin D for the prevention of preeclampsia.

Ref: Mol BWJ, Roberts CT, Thangaratinam S, et al: Pre-eclampsia. *Lancet* 2016;387(10022):999-1011.

Item 105

ANSWER: E

This patient has a calcaneal stress fracture as suggested by the history of increased running on a hard surface, improvement with rest, and a positive calcaneal squeeze on examination. A delay in diagnosis increases the risk of delayed union. MRI is the preferred imaging modality because radiographs often do not detect a calcaneal stress fracture. A C-reactive protein level could be indicated if there were symptoms or signs of infection or autoimmune illness. The clinical picture does not suggest a neurologic condition, so nerve conduction velocity testing is not appropriate. While there are some case reports of the diagnosis of stress fractures using ultrasonography, this is not the preferred imaging method.

Ref: Tu P: Heel pain: Diagnosis and management. *Am Fam Physician* 2018;97(2):86-93.

Item 106

ANSWER: B

Koilonychia, also known as spoon nail, is a finding that can be associated with multiple systemic conditions such as iron deficiency, hypothyroidism, and systemic lupus erythematosus. Clubbing of the nails involves thickening of the soft tissue proximal to the nail. Leukonychia is a white discoloration of the nail plate and can be a normal variant. Onychomycosis is a fungal infection generally presenting as a thickened, yellow, dystrophic nail. Squamous cell carcinoma presents as an erythematous, proliferating mass that disrupts normal nail morphology.

Ref: Tully AS, Trayes KP, Studdiford JS: Evaluation of nail abnormalities. *Am Fam Physician* 2012;85(8):779-787.

Item 107

ANSWER: A

Several professional organizations have published criteria for the diagnosis of polycystic ovary syndrome (PCOS) using various combinations of hyperandrogenism (clinical or biochemical), ovulatory dysfunction (typically oligomenorrhea), and the presence of at least one polycystic ovary by imaging criteria. Hypertension, hypothyroidism, infertility, and obesity are common symptoms in patients with PCOS but are not diagnostic.

The National Institutes of Health advises that patients must have both hyperandrogenism and oligomenorrhea to meet the criteria for PCOS. The Endocrine Society recommends diagnosing PCOS based on the 2003 Rotterdam criteria, which require the presence of two of the following: hyperandrogenism, ovulatory dysfunction, and at least one polycystic ovary. The Androgen Excess and PCOS Society says that patients must have hyperandrogenism plus either oligomenorrhea or at least one polycystic ovary for the diagnosis to be made.

Ref: Williams T, Mortada R, Porter S: Diagnosis and treatment of polycystic ovary syndrome. *Am Fam Physician* 2016;94(2):106-113. 2) McCartney CR, Marshall JC: Polycystic ovary syndrome. *N Engl J Med* 2016;375(1):54-64.

Item 108

ANSWER: C

Asymptomatic carotid artery disease is considered a coronary artery disease risk equivalent; therefore, statin therapy is indicated. Repeating ultrasonography annually to monitor for progression of the disease and to guide intervention is also considered reasonable. According to the 2014 guidelines for the primary prevention of stroke issued by the American Heart Association/American Stroke Association, prophylactic carotid artery stenting might be considered in highly selected asymptomatic patients with >70% carotid stenosis, but the effectiveness of this intervention compared with statin therapy alone is not well established. The guidelines also state that it is reasonable to consider carotid endarterectomy for asymptomatic patients with >70% stenosis if the risks of perioperative complications are low.

Ref: Meschia JF, Bushnell C, Boden-Albala B, et al: Guidelines for the primary prevention of stroke: A statement for healthcare professionals from the American Heart Association/American Stroke Association. *Stroke* 2014;45(12):3754-832.

Item 109

ANSWER: A

The clinical presentation and esophagogastroduodenoscopy findings indicate eosinophilic esophagitis (EoE) in this patient. In the absence of other causes of eosinophilia, the presence of >15 eosinophils/hpf is considered diagnostic. Application of corticosteroids to the esophagus is generally the treatment of choice, either in the form of an oral suspension of budesonide or an inhaled corticosteroid sprayed into the mouth and swallowed. Although EoE can occur in patients with other atopic illnesses, this patient does not have any symptoms of allergies or asthma, so an antihistamine such as fexofenadine is not needed. EoE does not respond to proton pump inhibitor therapy or H_2-blocker therapy and systemic corticosteroids are not necessary.

Ref: Clayton S, Emerson JF: Eosinophilic esophagitis: A mimic of gastroesophageal reflux disease. *Am Fam Physician* 2018;97(10):628-629. 2) Dellon ES, Liacouras CA, Molina-Infante J, et al: Updated international consensus diagnostic criteria for eosinophilic esophagitis: Proceedings of the AGREE conference. *Gastroenterology* 2018;155(4):1022-1033.e10.

Item 110

ANSWER: E

It is important for patients with posttraumatic stress disorder (PTSD) to receive psychotherapy. For those who continue to have symptoms it is appropriate to initiate medications. SSRIs and venlafaxine are considered first-line medications for the treatment of PTSD. Bupropion and buspirone have not been found to be effective treatments. The use of benzodiazepine medications is not recommended because of the high risk of misuse. Antipsychotic medications would be appropriate in patients with disabling symptoms and behaviors that do not respond to psychological or drug treatment.

Ref: Post-traumatic stress disorder: Guidance. National Institute for Health and Care Excellence, 2018.

Item 111

ANSWER: D

This patient was inadvertently challenged with amoxicillin and did not develop an allergic reaction. Her demonstrated tolerance allows the future use of all penicillin antibiotics. Although a low-risk history allows for an amoxicillin challenge in the clinic under medical observation, patients with moderate-risk histories of an urticarial or other pruritic rash should undergo skin testing. If that testing is negative, it should be followed with an amoxicillin challenge under observation. RAST testing is not indicated for penicillin allergy testing.

Ref: Shenoy ES, Macy E, Rowe T, Blumenthal KG: Evaluation and management of penicillin allergy: A review. *JAMA* 2019;321(2):188–199.

Item 112

ANSWER: E

The goals of osteoarthritis therapy are to minimize pain and improve function. The American Academy of Orthopedic Surgery and the American College of Rheumatology have agreed that first-line treatment includes aerobic exercise, resistance training, and weight loss. For patients with osteoarthritis of the knee, supervised exercise was found to reduce pain and improve physical function and quality of life (SOR A). Vitamin D is not currently recommended, and glucosamine and chondroitin are less effective than placebo. Initial pharmacotherapy includes full-strength acetaminophen, or oral or topical NSAIDs. If patients have an inadequate response to these agents other treatments to consider include tramadol, other opioids, duloxetine, or intra-articular injections with corticosteroids or hyaluronate.

Ref: Lyon C, Mullen R, Ashby D: PURL: Time to stop glucosamine and chondroitin for knee OA? *J Fam Pract* 2018;67(9):566-568.

Item 113

ANSWER: A

While recent data is not available, 45% of pregnancies in the United States in 2011 were unintentional. About 42% of pregnant women with unintended pregnancies chose to terminate the pregnancy by one means or another. Of the 58% that chose to carry the pregnancy to term, only about 1% placed the infant for adoption.

Ref: Moss DA, Snyder MJ, Lu L: Options for women with unintended pregnancy. *Am Fam Physician* 2015;91(8):544-549. 2) Finer LB, Zolna MR: Declines in unintended pregnancy in the United States, 2008–2011. *N Engl J Med* 2016;374(9):843-852.

Item 114

ANSWER: D

Medications reported to be associated with osteoporosis and increased fracture risk include antiepileptic drugs, long-term heparin, cyclosporine, tacrolimus, aromatase inhibitors, glucocorticoids, gonadotropin-releasing hormone agonists, thiazolidinediones, excessive doses of levothyroxine, proton pump inhibitors, SSRIs, parenteral nutrients, medroxyprogesterone contraceptives, methotrexate, and aluminum antacids. Atorvastatin, hydrochlorothiazide, metformin, and ranitidine are not associated with osteoporosis.

Ref: Ensrud KE, Crandall CJ: Osteoporosis. *Ann Intern Med* 2017;167(3):ITC17-ITC32.

Item 115

ANSWER: D

The following factors have been found to increase the risk for developing an abdominal aortic aneurysm (AAA): a history of smoking, advanced age, above-average height, having a first degree relative with an AAA, a personal history of atherosclerosis, high cholesterol levels, and hypertension. Smokers have a seven times greater risk of developing an AAA compared with nonsmokers. This single factor outweighs all of the other risk factors except age. Although women are less likely to develop an AAA, they have a 2–3 times greater chance of an AAA rupturing if it is present.

In addition to significantly increasing the risk for AAA development, current smoking increases the risk for further AAA expansion and rupture. Epidemiologic studies suggest that the duration of smoking influences the risk for AAA significantly more than the total number of cigarettes smoked. The U.S. Preventive Services Task Force currently recommends one-time screening for AAA in males between the ages of 65 and 75 who have ever smoked (B recommendation). There was not enough evidence to determine the risk and benefits of screening females with the same risk factors (I recommendation).

Ref: *Final Recommendation Statement: Abdominal Aortic Aneurysm Screening*. US Preventive Services Task Force, 2014. 2) Chaikof EL, Dalman RL, Eskandari MK, et al: The Society for Vascular Surgery practice guidelines on the care of patients with an abdominal aortic aneurysm. *J Vasc Surg* 2018;67(1):2-77.e2.

Item 116

ANSWER: D

The appropriate recommendation for head lice is to wash any recently used bedding and clothing with hot water or expose them for 5 minutes to a temperature $>130°F$ to kill lice and eggs. Items that cannot be washed or dried in this manner or dry-cleaned should be sealed in a plastic bag for 2 weeks. Additional or alternative treatments include topical ivermectin, benzoyl alcohol, malathion, and spinosad. Other recommended measures include removal of any visible nits (eggs) with a nit comb, not a brush. Topical petroleum jelly is not an effective treatment. Conditioners can interfere with the action of permethrin, decreasing its effectiveness. Human head lice are specific to humans, so pets are not affected.

Ref: Division of Parasitic Diseases: Head lice: Resources for health professionals. Centers for Disease Control and Prevention, 2015.

Item 117

ANSWER: D

Characteristics that are more commonly associated with malignant lesions include a nonsolid "ground glass" appearance, a size >6 mm, noncalcified lesions, a lesion size or volume doubling time between 1 month and 1 year, and irregular or spiculated borders. Findings on a chest radiograph that are more commonly associated with benign lesions include a lesion size <6 mm, concentric or "popcorn-like" calcifications, doubling times of <1 month or >2–4 years, dense solid-appearing lesions, and lesions with smooth regular borders. Other diagnostic imaging modalities are also utilized, including CT and PET, and a biopsy is sometimes necessary to establish the diagnosis. Chest radiographs are still useful for monitoring patients with multiple findings that correlate most often with benign lesions. Informed decision making by the patient and family physician can sensibly guide the follow-up of patients with solitary pulmonary nodules without automatically referring them to specialists or ordering the most sophisticated imaging.

Ref: Albert RH, Russell JJ: Evaluation of the solitary pulmonary nodule. *Am Fam Physician* 2009;80(8):827-831. 2) MacMahon H, Naidich DP, Goo JM, et al: Guidelines for management of incidental pulmonary nodules detected on CT images: From the Fleischner Society 2017. *Radiology* 2017;284(1):228-243.

Item 118

ANSWER: E

Wasp stings, penicillin, shellfish, and tree nuts are all relatively common causes of severe allergic reactions, including anaphylaxis. Immunotherapy is available and recommended for the stings of insects, including wasps and bees, to prevent recurrent anaphylaxis (SOR B). It is not available for penicillin, poison ivy, shellfish, or tree nut allergens. Poison ivy typically causes a type 4 hypersensitivity contact dermatitis rather than anaphylaxis.

Ref: Simons FE, Sheikh A: Anaphylaxis: The acute episode and beyond. *BMJ* 2013;346:f602. 2) Chang KL, Guarderas JC: Allergy testing: Common questions and answers. *Am Fam Physician* 2018;98(1):34-39.

Item 119

ANSWER: D

Persons who inject drugs are at increased risk for HIV, hepatitis A, hepatitis B, hepatitis C, and latent tuberculosis. These patients should be screened at the initial visit and treated for any conditions found, according to routine guidelines. If titers are low or absent for hepatitis A or B, the patient should be vaccinated. Although gonorrhea and *Chlamydia* screening is recommended for females under 25 years of age who use injectable drugs, it is not appropriate in this asymptomatic patient.

Ref: Centers for Disease Control and Prevention: Integrated prevention services for HIV infection, viral hepatitis, sexually transmitted diseases, and tuberculosis for persons who use drugs illicitly: Summary guidance from CDC and the US Department of Health and Human Services. *MMWR Recomm Rep* 2012;61(RR-5):1-40. 2) Visconti AJ, Sell J, Greenblatt AD: Primary care for persons who inject drugs. *Am Fam Physician* 2019;99(2):109-116.

Item 120

ANSWER: A

This patient has Osgood-Schlatter disease, a common cause of knee pain in active children with immature skeletons. It occurs as a result of abnormal development, injury, or overuse of the growth plate and the surrounding ossification centers. Osteochondrosis is a more general term for this condition, which can occur at growth plates around other joints, including the hip, foot, elbow, and back. In Osgood-Schlatter disease repetitive traction of the patellar tendon on the tibial tubercle ossification center leads to inflammation and pain. Imaging is not required to make the diagnosis when patients present with typical symptoms and physical examination findings. Radiographs may be obtained if there is uncertainty about the diagnosis. Radiographic findings in Osgood-Schlatter disease include soft-tissue swelling and fragmentation of the tibial tubercle.

This condition is self-limited and treatment consists of activity modification and the use of acetaminophen or NSAIDs. An orthopedic referral is indicated if symptoms persist in a patient with a mature skeleton.

Ref: Kliegman RM, St Geme JW III, Blum NJ, et al (eds): *Nelson Textbook of Pediatrics*, ed 21. Elsevier Saunders, 2020, pp 3620-3621.

Item 121

ANSWER: D

Bullous impetigo is caused by *Staphylococcus aureus*, which produces a toxin responsible for flaccid bullae and is more likely to affect the intertriginous areas. This usually resolves within 3 weeks without scarring. Impetigo, either bullous or nonbullous, may be treated with topical antibiotics such as mupirocin. Because of emerging drug resistance, oral azithromycin and other macrolides should not be used. Oral penicillin is no longer recommended because it is less effective than other antibiotics such as amoxicillin/clavulanate, cephalexin, clindamycin, or dicloxacillin. Bacitracin/neomycin/polymyxin B is not indicated for either form of impetigo. Nystatin is recommended for *Candida* infections.

Ref: Hartman-Adams H, Banvard C, Juckett G: Impetigo: Diagnosis and treatment. *Am Fam Physician* 2014;90(4):229-235.

Item 122

ANSWER: D

Maternal vaccination helps prevent disease in newborn infants. Currently, two vaccines are recommended for women during each pregnancy: Tdap and inactivated influenza vaccine. Live vaccines, such as MMR and varicella, are contraindicated. Hepatitis B vaccine is recommended for high-risk women but not routinely. Pneumococcal vaccine is currently being studied for this use but is not recommended.

Ref: Omer SB: Maternal immunization. *N Engl J Med* 2017;376(13):1256-1267.

Item 123

ANSWER: C

Current recommendations state that nursing home–acquired pneumonia should be treated as community-acquired pneumonia unless patients have severe illness, chronic wounds, foreign bodies in the airway, a history of antibiotic use in the last 90 days or recent hospitalization, colonization with multidrug-resistant pathogens, or very low functional status, or reside in a facility with a high prevalence of multidrug-resistant pathogens. Community-acquired pneumonia should be treated with either a respiratory fluoroquinolone or an advanced macrolide plus a β-lactam antibiotic. Doxycycline could also be used in place of the macrolide.

Ref: Casey C, Fullerton MJ, Somerville N: Common questions about pneumonia in nursing home residents. *Am Fam Physician* 2015;92(7):612-620.

Item 124

ANSWER: A

This patient has diastolic heart failure, also called heart failure with preserved ejection fraction (HFpEF). Patients who have HFpEF with active fluid overload should be treated with diuretics such as furosemide (SOR B). If concomitant hypertension is present along with HFpEF, the patient's blood pressure should be treated according to accepted evidence-based hypertension guidelines (SOR C). Although this patient's blood pressure is elevated, a diagnosis of hypertension has not been confirmed, so antihypertensives are not warranted at this time.

Ref: Gazewood JD, Turner PL: Heart failure with preserved ejection fraction: Diagnosis and management. *Am Fam Physician* 2017;96(9):582-588.

Item 125

ANSWER: D

Hormonal intervention therapy should not be offered prior to puberty. However, stage 2 or 3 of sexual maturity is an appropriate time to consider gonadotropin-releasing hormone analogue therapy (SOR B). Individuals who receive hormone therapy often report less anxiety, increased self-esteem, and better quality of life (SOR A). Delaying gender-affirming therapy may actually increase emotional distress and gender-associated abuse. It is unethical and against recommended guidelines to convert a person's gender identity to the sex assigned at birth (SOR C). This patient has brought medical records to the appointment, making it unnecessary to order confirmatory testing, which may also induce emotional harm and additional medical costs.

Ref: Klein DA, Paradise SL, Goodwin ET: Caring for transgender and gender-diverse persons: What clinicians should know. *Am Fam Physician* 2018;98(11):645-653.

Item 126

ANSWER: D

Intimate partner violence and the abuse of older or vulnerable adults are common in the United States. Immediate effects such as injury and death and other health consequences, including mental health conditions, substance abuse, sexually transmitted infections, unintended pregnancies, and chronic pain, often affect the traumatized individual. The U.S. Preventive Services Task Force recommends screening for intimate partner violence in all women of reproductive age (B recommendation). Screening for breast cancer, colon cancer, ovarian cancer, or hepatitis C is not appropriate for this patient at this time.

Ref: *Final Recommendation Statement: Intimate Partner Violence, Elder Abuse, and Abuse of Vulnerable Adults: Screening*. US Preventive Services Task Force, 2018.

Item 127

ANSWER: A

Elevated ammonia levels may occur with urea cycle disorders, portosystemic shunting, urinary tract infection from urease-producing organisms, gastrointestinal bleeding, shock, renal disease, heavy exercise, smoking, parenteral nutrition, salicylate intoxication, use of medications including diuretics, and alcohol use. In patients with chronic liver disease, hepatic encephalopathy is diagnosed based on the overall clinical presentation and not on ammonia levels. A normal ammonia level does not exclude the diagnosis of hepatic encephalopathy, nor does an elevated ammonia level establish the diagnosis. This patient had an elevated serum ammonia level that was found incidentally during his hospital admission for gastrointestinal bleeding. Because there was no clinically significant encephalopathy, treatment based on ammonia levels is not indicated. The patient's elevated ammonia level was probably from diuretic use. Lactulose, methotrexate, neomycin, or prednisone would not be appropriate.

Ref: Ge PS, Runyon BA: Serum ammonia level for the evaluation of hepatic encephalopathy. *JAMA* 2014;312(6):643-644.

Item 128

ANSWER: B

An infant's dimpled cheeks during breastfeeding is a sign of a poor latch, with the infant not getting enough of the breast in the mouth. With a good latch, most or all of the mother's areola is completely in the infant's mouth and thus not visible during breastfeeding. The infant's chin, not the nose, should be against the breast. Inverted (rather than everted) or very large nipples may be problematic and require additional lactation support. The transition of the infant stool from dark meconium stools to yellow stools is a sign that the infant is digesting milk.

Ref: Westerfield KL, Koenig K, Oh R: Breastfeeding: Common questions and answers. *Am Fam Physician* 2018;98(6):368-373.

Item 129

ANSWER: A

The most common complications for patients who inject drugs are skin and soft-tissue infections. These are the most frequent infections leading to hospitalization. This patient is also at risk for endocarditis, osteomyelitis, pneumonia, and pyelonephritis, but these infections are less common.

Ref: Visconti AJ, Sell J, Greenblatt AD: Primary care for persons who inject drugs. *Am Fam Physician* 2019;99(2):109-116.

Item 130

ANSWER: C

Ulnar collateral ligament (UCL) disruption, or "skier's thumb," should be suspected in traumatic thumb injuries. It is important to recognize and treat this injury because it can lead to joint instability and a weak pincer grip if untreated. Initial treatment of UCL disruption involves immobilization of the affected thumb in a thumb spica cast or brace for 6 weeks. In the absence of an avulsion fracture, indications for referral to an orthopedic surgeon would include 35°–40° of joint opening or no end point on stress abduction testing. A Stener lesion (entrapment of the UCL outside of the adductor aponeurosis) would usually present with joint instability and a tender mass and would necessitate an orthopedic referral.

Ref: Schroeder NS, Goldfarb CA: Thumb ulnar collateral and radial collateral ligament injuries. *Clin Sports Med* 2015;34(1):117-126.

Item 131

ANSWER: D

The best laboratory assessment of thyroid function is a serum TSH test, which is the preferred test for diagnosing primary hypothyroidism. If an elevated serum TSH level is detected and hypothyroidism is suspected, then a free T_4 measurement would be indicated.

Ref: Gaitonde DY, Rowley KD, Sweeney LB: Hypothyroidism: An update. *Am Fam Physician* 2012;86(3):244-251.

Item 132

ANSWER: E

Turner syndrome is associated with higher risks of endometrial cancer, celiac disease, and structural heart defects. Physicians providing primary care to patients with Turner syndrome should recognize these increased risks and provide testing for celiac disease and serial screening for cardiac and/or aortic defects, and should also have a low threshold for evaluating any abnormal uterine bleeding. Complete androgen insensitivity syndrome, gonadal dysgenesis, congenital adrenal hyperplasia, and Klinefelter syndrome carry increased risks of other conditions, but not endometrial cancer, celiac disease, or structural heart defects.

Ref: Gomez-Lobo V, Amies Oelschlager AM: Disorders of sexual development in adult women. *Obstet Gynecol* 2016;128(5):1162-1173.

Item 133

ANSWER: E

The most common causes of chronic cough in adults include upper airway cough syndrome, tobacco use, GERD, asthma, and ACE inhibitor use. The physical examination of this patient is most consistent with upper airway cough syndrome, previously referred to as postnasal drip syndrome. Given the patient's lack of tobacco use and normal blood pressure, bronchogenic carcinoma and obstructive sleep apnea are less likely. There are no risk factors in this patient's history to suggest chronic aspiration or tuberculosis.

Ref: Michaudet C, Malaty J: Chronic cough: Evaluation and management. *Am Fam Physician* 2017;96(9):575-580.

Item 134

ANSWER: A

Strong evidence suggests that prophylaxis with either colchicine or NSAIDs reduces the risk for acute gout attacks in patients starting urate-lowering therapy. The optimal duration of such prophylactic therapy is unknown, but moderate evidence suggests that it should be longer than 8 weeks. Although prednisone would be helpful it is not the preferred agent in this patient with normal renal function. Prophylaxis with aspirin, methotrexate, or probenecid is also not appropriate.

Ref: Shekelle PG, Newberry SJ, FitzGerald JD, et al: Management of gout: A systematic review in support of an American College of Physicians clinical practice guideline. *Ann Intern Med* 2017;166(1):37-51.

Item 135

ANSWER: B

This patient has hypercalcemia with a normal albumin level. Hydrochlorothiazide can cause drug-induced hypercalcemia. Alendronate, lisinopril, and omeprazole do not cause hypercalcemia. A high vitamin D level can cause hypercalcemia, so increasing vitamin D is not appropriate at this point. A laboratory evaluation can help differentiate between PTH- and non–PTH-mediated hypercalcemia.

Ref: Griebeler ML, Kearns AE, Ryu E, et al: Thiazide-associated hypercalcemia: Incidence and association with primary hyperparathyroidism over two decades. *J Clin Endocrinol Metab* 2016;101(3):1166-1173. 2) Barstow C, Braun M: Electrolytes: Calcium disorders. *FP Essent* 2017;459:29-34.

Item 136

ANSWER: A

Early mobilization leads to better outcomes with ankle sprains, and using a functional ankle brace such as a semi-rigid air stirrup brace or a soft lace-up ankle brace will protect the ankle from inversion and eversion sprains while still allowing for mobility during physical activity. These braces lead to improved functional outcomes at 1 month when compared to elastic compression taping. Patellar tendon straps relieve the pain associated with patellar tendinopathy but are not indicated with acute ankle sprains. Use of a semi-rigid air stirrup splint has been shown to be superior to neuromuscular training for prevention of recurrent ankle sprains.

Ref: Sprouse RA, McLaughlin AM, Harris GD: Braces and splints for common musculoskeletal conditions. *Am Fam Physician* 2018;98(10):570-576.

Item 137

ANSWER: A

For patients with a COPD exacerbation, systemic glucocorticoids can improve FEV_1, improve oxygenation, shorten recovery time, and reduce the length of hospitalization (level of evidence A). Prednisone, 40 mg daily for 5 days, is recommended for COPD exacerbations. Studies have shown that oral administration is equally efficacious compared to the intravenous route. The duration of therapy should not be longer than 5–7 days (level of evidence A).

Ref: *Global Strategy for the Diagnosis, Management, and Prevention of Chronic Obstructive Pulmonary Disease*. Global Initiative for Chronic Obstructive Lung Disease, 2019, pp 114-117.

Item 138

ANSWER: D

Abnormal uterine bleeding is the most common cause of iron deficiency anemia in premenopausal women, accounting for 20%–30% of cases. Gastrointestinal causes are less common but should be considered if the gynecologic evaluation is normal or the anemia fails to resolve with iron supplementation. Blood donation and hematuria are less common causes.

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

Item 139

ANSWER: C

Androgenetic alopecia is associated with bitemporal thinning of the frontal and vertex scalp in men, but in women the frontal hairline is spared and hair thinning is most apparent at the vertex. There is often a family history of hair loss in patients with androgenetic alopecia. Alopecia areata results in acute, patchy hair loss. Anagen effluvium results in diffuse hair loss days to weeks after exposure to chemotherapeutic agents. The incidence of anagen effluvium after chemotherapy is estimated at 65%. Tinea capitis is a dermatophyte infection of the hair shaft and follicles that results in patchy hair loss and requires systemic antifungal treatment. Trichorrhexis nodosa is characterized by breaks in the hair secondary to trauma or because of fragile hair, often due to excessive brushing, heat application, or hairstyles that lead to pulling on hairs.

Ref: Phillips TG, Slomiany WP, Allison R: Hair loss: Common causes and treatment. *Am Fam Physician* 2017;96(6):371-378.

Item 140

ANSWER: A

Acne affects 85% of 12- to 25-year-olds in the United States. This patient has mild acne as evidenced by the absence of cystic lesions and localization to the facial T-zone. Topical retinoids are first-line treatment for any level of severity of acne (SOR A). Adapalene is an effective retinoid and is available over-the-counter. Benzoyl peroxide is also very effective in the control of acne because it reduces the concentration of cystic acne with no risk of bacterial resistance. The combination of a topical retinoid and benzoyl peroxide is more effective than either agent alone.

Topical antibiotics such as clindamycin and erythromycin should not be used as monotherapy due to high rates of microbial resistance. There is little evidence that salicylic acid is effective in combating acne despite its widespread use.

Tazarotene is effective in the treatment of acne but is teratogenic (pregnancy category X) and should be avoided in women of reproductive age. Combined oral contraceptives can be effective, but norethindrone and other first-generation progestins are androgenic and can worsen acne.

Ref: 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. 2) Zaenglein AL: Acne vulgaris. *N Engl J Med* 2018;(379)14:1343-1352.

Item 141

ANSWER: A

The U.S. Preventive Services Task Force (USPSTF) recommends against screening with either resting or stress EKGs to prevent cardiovascular disease (CVD) events in asymptomatic individuals at low risk of CVD events (D recommendation). Potential harms of EKG screening include invasive confirmatory testing and treatment. The USPSTF concluded that current evidence is insufficient to determine the balance of benefits and harms of screening with resting or stress EKGs to prevent CVD events in asymptomatic adults at intermediate or high risk of CVD events (I recommendation).

Ref: *Final Recommendation Statement: Cardiovascular Disease Risk: Screening with Electrocardiography*. US Preventive Services Task Force, 2018.

Item 142

ANSWER: D

Americans who live in rural areas face many health challenges compared to their counterparts who live in urban areas. This includes health care workforce shortage problems. The number of primary care and specialty care physicians, physician assistants, advanced practice nurses, registered nurses, dentists, and mental health professionals per 10,000 residents is lower.

People who live in rural areas are also affected by socioeconomic factors. They tend to be older and poorer on average, with a higher percentage living below the poverty level. Rural areas also have higher unemployment rates. In 2017, 18.1% of rural populations were over the age of 64 compared to 14.3% of urban populations. Residents of rural areas are more likely to be uninsured and rely more heavily on the Supplemental Nutrition Assistance Program (SNAP) and Medicaid. Fewer 18- to 24-year-olds in rural areas have high school diplomas. Tobacco use is higher among rural youth, including cigarette smoking and smokeless tobacco use. Transportation difficulties are also more common.

Health inequity issues are also challenges in rural areas, including higher rates of diabetes mellitus and coronary heart disease. Deaths related to drug overdoses have been rising and in 2017 overtook the death rate for people who live in urban areas. Family physicians are only 15% of the U.S. outpatient physician workforce nationwide, but they provide 42% of the care in rural areas.

Ref: Mack KA, Jones CM, Ballesteros MF: Illicit drug use, illicit drug use disorders, and drug overdose deaths in metropolitan and nonmetropolitan areas—United States. *MMWR Surveill Summ* 2017;66(19):1-12. 2) Chart gallery: Rural-urban differences. Rural Health Information Hub, 2019.

Item 143

ANSWER: D

Heatstroke can be nonexertional from prolonged exposure to a high heat index, or it can be exertional, as in this case. A core temperature >40°C (104°F) is consistent with heatstroke. In treating patients with either clinical variant of heatstroke, cold or ice-water immersion is the most effective treatment and should be initiated as soon as possible, without delaying for transfer to the hospital setting (SOR A). Treatment should continue until the core body temperature is <39°C (102°F). If cold water immersion is not possible other forms of cooling such as cold intravenous fluids, ice packs, cold water immersion of the extremities, and evaporative cooling have been shown to have some benefit. Once the body temperature is decreased patients should be transferred to a hospital for evaluation for known complications of heatstroke, including coagulopathy, renal and hepatic dysfunction, hypoglycemia, electrolyte disturbance, and rhabdomyolysis.

Ref: Kinkade S, Warhol M: Beat the heat: Identification and treatment of heat-related illness. *J Fam Pract* 2018;67(8):468-472.

Item 144

ANSWER: C

This patient most likely has nonalcoholic fatty liver disease (NAFLD). The initial evaluation should include studies to rule out uncommon, but not rare, causes of liver disease. This would include viral hepatitis studies, iron studies for hemochromatosis, serum albumin levels, and a CBC. Discontinuing statin therapy is generally not necessary because statins have been shown to be safe for patients with chronic liver disease. Metformin is not commonly associated with elevated transaminases. If NAFLD is determined to be the most likely cause, an NAFLD fibrosis score should be calculated to preclude the need for a liver biopsy.

Ref: Oh RC, Hustead TR, Ali SM, Pantsari MW: Mildly elevated liver transaminase levels: Causes and evaluation. *Am Fam Physician* 2017;96(11):709-715.

Item 145

ANSWER: E

Pyogenic flexor tenosynovitis usually develops 2–5 days after a penetrating hand injury. The flexor tendon sheath has a poor vascular supply and the synovial fluid is a prime growth medium for bacteria. Flexor tenosynovitis is a clinical diagnosis characterized by the four "Kanavel" signs: pain with passive extension, tenderness with palpation of the tendon sheath, flexed position of the involved finger, and fusiform swelling of the finger. Treatment includes prompt intravenous antibiotics and surgical debridement and irrigation.

Flexor tenosynovitis requires urgent surgical consultation and treatment. Patients with suspected flexor tenosynovitis should be seen by a surgeon within 72 hours of symptom onset (SOR C). Oral antibiotics and splinting of the hand alone are insufficient treatments for the condition. Incision and drainage would also not be sufficient to clear the infection. Ordering MRI can unnecessarily delay surgical consultation, although the surgeon may obtain one to guide treatment.

Ref: Hyatt BT, Bagg MR: Flexor tenosynovitis. *Orthop Clin North Am* 2017;48(2):217-227. 2) Rerucha CM, Ewing JT, Oppenlander KE, Cowan WC: Acute hand infections. *Am Fam Physician* 2019;99(4):228-236.

Item 146

ANSWER: C

Overscreening is defined as the use of screening tests at ages younger or older than the range recommended by national guidelines or at shorter intervals than recommended. Current guidelines from the U.S. Preventive Services Task Force recommend screening for colon cancer starting at age 50 and continuing until age 75 (A recommendation). The decision to screen adults 76–85 years of age should be an individual one, taking into account the patient's overall health and prior screening history (C recommendation). In this case ordering a screening colonoscopy would be an example of overscreening because the patient is above the recommended upper age of 75 and he has multiple comorbid conditions that limit his life expectancy. Overscreening can result in increased cost, morbidity, and/or mortality, especially in older individuals. Overdiagnosis is when a diagnosis is made correctly, but the diagnosis is irrelevant because it will never cause symptoms or death during a patient's ordinarily expected lifetime. Overtreatment refers to unnecessary medical interventions.

Ref: Ebell M, Herzstein J: Improving quality by doing less: Overscreening. *Am Fam Physician* 2015;91(1):22-24. 2) Siwek J: Screening and surveillance for colorectal cancer: Avoiding the pitfalls of overscreening. *Am Fam Physician* 2015;91(2):82-83.

Item 147

ANSWER: B

In patients who use the etonogestrel/ethinyl estradiol vaginal ring, emergency contraception is recommended if they have intercourse when the same ring has been in place for ≥5 weeks. Backup protection is advised until the new ring has been in place for 1 week. Backup protection is generally unnecessary with the depot medroxyprogesterone injection unless the patient is more than 2 weeks late for her injection. Backup protection is then recommended for 7 days after the injection. Emergency contraception is recommended for women who miss two or more doses of their combined contraceptive in 1 month, especially if these doses were missed during the first week and unprotected intercourse occurs during that week. Backup protection should continue until the oral contraceptive pill has been taken for 7 consecutive days. Emergency contraception is generally only recommended up to 5 days after unprotected intercourse. The progestin-only mini-pill is effective alone for contraception when taken as prescribed.

Ref: Kaunitz AM: Long-acting injectable contraception with depot medroxyprogesterone acetate. *Am J Obstet Gynecol* 1994;170(5 Pt 2):1543-1549. 2) Mulders TM, Dieben TO: Use of the novel combined contraceptive vaginal ring (NuvaRing) for ovulation inhibition. *Fertil Steril* 2001;75(5):865-870. 3) US Selected Practice Recommendations for Contraceptive Use, 2013. 4) Practice bulletin no. 152: Emergency contraception. *Obstet Gynecol* 2015;126(3):e1-e11. 5) Norethindrone tablet. USFDA approved product information. US National Library of Medicine, revised 2015.

Item 148

ANSWER: D

Vitamin B_{12} deficiency, which is most commonly related to a deficiency of intrinsic factor that is produced by the gastric mucosa and is necessary for absorption of vitamin B_{12} in the terminal ileum, is manifested as a megaloblastic macrocytic anemia. In addition to an elevated mean corpuscular volume, the classic finding on microscopy of the peripheral smear is the presence of multiple (usually five or more) segments in the WBC nuclei. Vitamin B_{12} levels are low and a high methylmalonic acid level helps to confirm the diagnosis. A methylmalonic acid level is recommended in patients who have borderline low vitamin B_{12} levels but are at risk for deficiency. Risk factors include chronic proton pump inhibitor use; chronic metformin therapy; chronic malnutrition due to alcoholism, chronic gastritis, or peptic ulcer disease; and diseases of the terminal ileum, such as Crohn's disease. People who have had gastric bypass surgery are also at risk for vitamin B_{12} deficiency, which is why supplementation should be provided in these patients.

Microcytic, hypochromic RBCs are typical of iron deficiency anemia but may also be seen in anemia of chronic disease. Sickled or crescent-shaped cells are seen with sickle cell anemia, and basophilic stippling may be seen in anemia associated with lead toxicity. Schistocytes are seen in hemolytic anemia.

Ref: Jameson JL, Fauci AS, Kasper DL, et al (eds): *Harrison's Principles of Internal Medicine*, ed 20. McGraw-Hill, 2018, pp 698-708.

Item 149

ANSWER: D

Praxis is the ability to carry out intentional motor acts and is commonly assessed by giving the patient a common object such as a hairbrush or pencil and asking the patient to show how it is used. A patient unable to carry out such motor acts is referred to as having apraxia (SOR C). Several other common components of the cognitive assessment will be impaired in persons with dementia. Executive functioning is the ordering and implementation of cognitive functions necessary to engage in appropriate behavior and is often assessed by asking a patient to draw a clock with the hands set at a certain time.

Gnosia is the ability to name objects and their function and is often assessed by showing a patient a common object such as a pen, watch, or stethoscope and asking whether he or she can identify it and describe how it is used. Orientation is the ability of the patient to recognize his or her place in time and space. Orientation is commonly assessed by asking a patient the date, the current location, his or her name, and his or her place of birth. Visuospatial proficiency is the ability to perceive and manipulate objects and shapes in space. It is often assessed by asking the patient to copy intersecting pentagons or a three-dimensional cube on paper.

Ref: Lin JS, O'Connor E, Rossom R, et al: Screening for cognitive impairment in older adults: An evidence update for the US Preventive Services Task Force. Evidence report no. 107. Agency for Healthcare Research and Quality, 2013. 2) Creavin ST, Wisniewski S, Noel-Storr AH, et al: Mini-Mental State Examination (MMSE) for the detection of dementia in clinically unevaluated people aged 65 and over in community and primary care populations. *Cochrane Database Syst Rev* 2016;(1):CD011145. 3) Norris D, Clark MS, Shipley S: The mental status examination. *Am Fam Physician* 2016;94(8):635-641.

Item 150

ANSWER: A

This patient has a blood pressure that is elevated according to all major current guidelines. Amlodipine, a long-acting dihydropyridine calcium channel blocker (CCB), is the best pharmacologic choice because it will lower blood pressure and treat angina without the risk of heart block. Short-acting CCBs such as non–extended-release nifedipine may cause reflex tachycardia and are not recommended. Nondihydropyridine CCBs such as diltiazem would put this patient at risk for heart block because he is already taking long-acting metoprolol and his heart rate is in the 50s. Long-acting nitrates and ranolazine are options to treat stable angina but would not be effective blood pressure medications.

Ref: Braun MM, Stevens WA, Barstow CH: Stable coronary artery disease: Treatment. *Am Fam Physician* 2018;97(6):376-384.

Item 151

ANSWER: A

In a Cochrane review of five trials of β_2-agonist therapy in adults, there was no significant difference between β_2-agonists and placebo in cough reduction. Based on reports of adverse effects, the number needed to harm is 2. It is important to set reasonable expectations for cough duration after an acute respiratory illness.

Ref: Cayley WE Jr: β_2-Agonists for acute cough or a clinical diagnosis of acute bronchitis. *Am Fam Physician* 2017;95(9):551-552.

Item 152

ANSWER: D

Celiac disease affects approximately 1% of the U.S. population and can affect all ages. Individuals with northern European ancestry are most commonly affected. The condition is caused by autoimmunity induced by gluten-containing foods in susceptible individuals. Untreated celiac disease is associated with anemia, malabsorption, osteoporosis, weight loss, and gastrointestinal lymphomas. In children, growth stunting and delayed puberty are also common. With strict adherence to a gluten-free diet most complications from celiac disease are preventable and, in children, growth and development return to normal. The World Gastroenterology Organisation recommends annual monitoring of children and adolescents with celiac disease by anthropometry, pubertal development, and celiac serology. The preferred serology is IgA antibody to tissue transglutaminase (IgA anti-tTG) due to its balance of good performance and low cost. Failure of IgA anti-tTG titers to decrease in 6 months suggests continued ingestion of gluten. Repeat duodenoscopy with a biopsy would be unnecessary and would subject the child to potential harm.

Ref: Pelkowski TD, Viera AJ: Celiac disease: Diagnosis and management. *Am Fam Physician* 2014;89(2):99-105. 2) Global guidelines: Celiac disease. World Gastroenterology Organisation, 2016.

Item 153

ANSWER: A

Women of reproductive age should take a daily supplement of 0.4–0.8 mg of folic acid starting before conception in order to reduce the risk of neural tube defects. A higher folic acid dosage of 4 mg daily starting 1 month prior to conception is recommended for women who have a high risk of pregnancy complicated by a neural tube defect. This includes women with a previous pregnancy with a neural tube defect, a personal or family history of neural tube defects, type 1 diabetes, or a seizure disorder. Vitamin B_6, vitamin B_{12}, vitamin C, and vitamin D do not require supplementation prior to conception.

Ref: Wilkes J: AAFP releases position paper on preconception care. *Am Fam Physician* 2016;94(6):508-510. 2) National Center on Birth Defects and Developmental Disabilities: Steps to a healthier me and baby-to-be. Centers for Disease Control and Prevention. 3) Good health before pregnancy: Preconception care: Frequently asked questions: Pregnancy. American College of Obstetricians and Gynecologists, 2017.

Item 154

ANSWER: A

Measles outbreaks are becoming more common and the CDC has outlined who should receive postexposure prophylaxis with the MMR vaccine. To be effective as postexposure prophylaxis the vaccine must be administered within 72 hours of exposure.

Infants < 12 months of age are considered to be at high risk for complications from measles and should receive postexposure MMR vaccine, although intramuscular immunoglobulin is also an option. Children who are otherwise fully vaccinated do not need additional prophylaxis. Pregnant women cannot receive the MMR vaccine due to fetal risk, but they should receive intravenous immunoglobulin if they do not have evidence of immunity. Health care workers only need to be given the MMR vaccine as prophylaxis if they did not receive two doses previously.

Ref: Measles (rubeola): For healthcare professionals. Centers for Disease Control and Prevention, updated 2018.

Item 155

ANSWER: B

Correcting the potassium level is the best treatment choice for this patient. A low serum potassium level in diabetic ketoacidosis (DKA) indicates a significant potassium deficiency, placing the patient at risk for a cardiac arrhythmia, among other complications. Potassium deficiency is usually the product of urinary losses due to glucose osmotic diuresis and secondary hyperaldosteronism. However, serum potassium can remain normal when there is a whole body deficiency, as a result of movement of potassium out of cells in response to the acidosis, insulin deficiency, and hyperosmolality. This patient's serum potassium is low, which indicates severe deficiency.

Sodium bicarbonate can be used in some cases of DKA but is not the most important next step in this case. If insulin therapy is initiated prior to potassium replacement the insulin can force more potassium into cells, worsening the serum deficiency. If the serum potassium level is <3.3 mEq/L potassium should be replaced prior to insulin therapy. Ketone measurement can also be part of DKA management but is not the most appropriate next step for this patient.

Ref: Murthy K, Harrington JT, Siegel RD: Profound hypokalemia in diabetic ketoacidosis: A therapeutic challenge. *Endocr Pract* 2005;11(5):331-334. 2) Kitabchi AE, Umpierrez GE, Miles JM, Fisher JN: Hyperglycemic crises in adult patients with diabetes. *Diabetes Care* 2009;32(7):1335-1343. 3) Davis SM, Maddux AB, Alonso GT, et al: Profound hypokalemia associated with severe diabetic ketoacidosis. *Pediatr Diabetes* 2016;17(1):61-65.

Item 156

ANSWER: C

Buprenorphine therapy is an important option for maintenance therapy for patients with opioid use disorder. It can be initiated in the outpatient setting but should be done when the patient is in mild to moderate withdrawal in order to avoid the risk of precipitated withdrawal (SOR C). Buprenorphine therapy is more convenient than methadone maintenance therapy and is equally as effective. Buprenorphine/naloxone combinations are preferred over buprenorphine monotherapy due to lower abuse potential, except when naloxone is contraindicated such as in patients who are pregnant or breastfeeding (SOR C). Because relapse rates are higher in patients who discontinue medication-assisted therapy for opioid use disorder, long-term use is recommended.

Ref: Zoorob R, Kowalchuk A, Mejia de Grubb M: Buprenorphine therapy for opioid use disorder. *Am Fam Physician* 2018;97(5):313-320.

Item 157

ANSWER: A

Atrial fibrillation is characterized by an irregularly irregular rhythm, without any discernible P waves. In multifocal atrial tachycardia the P waves show varying morphology, and this rhythm is typically seen in patients with underlying lung disease, especially COPD. Acute ST-segment elevation myocardial infarction is characterized by the presence of hyperacute ST-segment and T-wave changes in contiguous EKG leads, accompanied by reciprocal changes. Pulmonary embolism is characterized by EKG findings of sinus tachycardia (a heart rate $\geq$100 beats/min), nonspecific ST-T changes, and new-onset right bundle branch block (SOR C).

Ref: Goldberger AL, Goldberger ZD, Shvilkin A: *Goldberger's Clinical Electrocardiography: A Simplified Approach*, ed 9. Elsevier Saunders, 2018, pp 144-155.

Item 158

ANSWER: B

Risk factors for adhesive capsulitis include female sex, age between 40 and 60 years of age, diabetes mellitus, and hypothyroidism. This is a clinical diagnosis of exclusion that is based on physical findings of loss of active and passive range of motion. Glenohumeral arthritis may present with similar findings but is ruled out by normal radiographs. A patient with acromioclavicular arthritis will have radiographic findings and a painful cross-arm test. Rotator cuff disease and bursitis typically present with painful active range of motion but preserved passive range of motion and tenderness to palpation.

Ref: Ramirez J: Adhesive capsulitis: Diagnosis and management. *Am Fam Physician* 2019;99(5):297-300.

Item 159

ANSWER: B

Hyponatremia is an extremely common condition, affecting 4%–7% of the ambulatory population. While a number of medications can cause hyponatremia, among the most common offenders are SSRIs and thiazide diuretics. Acetaminophen and metoprolol are not known to affect sodium levels. Vitamin D deficiency has also been linked to hyponatremia so supplementation would likely improve rather than worsen hyponatremia.

Ref: Hwang KS, Kim GH: Thiazide-induced hyponatremia. *Electrolyte Blood Press* 2010;8(1):51-57. 2) Cervellin G, Salvagno G, Bonfanti L, et al: Association of hyponatremia and hypovitaminosis D in ambulatory adults. *J Med Biochem* 2015;34(4):450-454.

Item 160

ANSWER: E

This patient has airflow obstruction consistent with a diagnosis of COPD, evidenced by an FEV_1/FVC ratio <0.7. An evidence-based standard approach to COPD is found in the annual guidelines published by the Global Initiative for Chronic Obstructive Lung Disease (GOLD). According to the 2019 report, this patient's FEV_1 of 75% of predicted puts her in the GOLD grade 2 (moderate) category of airflow limitation. Her symptoms and risk of exacerbations places her in GOLD group B. Patients in this category have symptoms that bother them regularly without having frequent COPD exacerbations. Patients in this category benefit from daily use of long-acting bronchodilators, either long-acting β-agonists (LABAs) or long-acting muscarinic agents (LAMAs). Long-acting agents such as tiotropium (a LAMA) or salmeterol (a LABA) are preferred over the short-acting agents ipratropium and albuterol for patients in this category of disease severity. Patients with persistent symptoms while using one of these agents may benefit from a combination of a LABA and a LAMA.

Monotherapy with inhaled corticosteroids has not been shown to improve mortality or prevent a long-term decline in FEV_1. The combination of an inhaled corticosteroid plus a LABA has evidence of superiority over either agent alone for improving lung function and health status, and for reducing exacerbations in patients who have more severe disease. No improvement in all-cause mortality has been noted.

Ref: *Global Strategy for the Diagnosis, Management, and Prevention of Chronic Obstructive Pulmonary Disease*. Global Initiative for Chronic Obstructive Lung Disease, 2019.

Item 161

ANSWER: D

Impacted molars are a mechanical problem where the tooth does not emerge properly because of abnormal angulation or not enough room in the mouth. Pregnant women may experience impacted third molars (wisdom teeth) because they typically emerge in the late teens or early twenties, but pregnancy itself does not predispose to this condition. However, the risk of dental caries, loose teeth, gingivitis, and periodontitis all increase during pregnancy. Pregnant women are at higher risk for dental caries because the oral cavity is exposed to more gastric acidity due to vomiting with morning sickness, and acid reflux due to a lax esophageal sphincter and upward pressure from a gravid uterus. Increased levels of estrogen and progesterone during pregnancy can relax the ligaments and bones that support the teeth, leading to a temporary loosening of teeth. Gingivitis and periodontitis increase during pregnancy because of a fluctuation in estrogen and progesterone levels in combination with changes in oral flora and a decreased immune response. Periodontitis is of particular concern during pregnancy and should be treated because of its association with preterm birth and low birth weights.

Ref: Boggess KA, Edelstein BL: Oral health in women during preconception and pregnancy: Implications for birth outcomes and infant oral health. *Matern Child Health J* 2006;10:S169-S174. 2) Silk H, Douglass AB, Douglass JM, et al: Oral health during pregnancy. *Am Fam Physician* 2008;77(8):1139-1144. 3) Division of Oral Health, National Center for Chronic Disease Prevention and Health Promotion: Pregnancy and oral health. Centers for Disease Control and Prevention, 2019.

Item 162

ANSWER: E

The Rome IV criteria for irritable bowel syndrome are symptom-based diagnostic criteria used to identify patients with irritable bowel syndrome (IBS). According to these criteria, IBS is defined as recurrent abdominal pain at least 1 day per week for at least 3 months. At least two of the following must be present: abdominal pain related to defecation, a change in stool form, and/or a change in stool frequency. The diagnosis can be made from the patient history, a physical examination, and a minimal laboratory evaluation. This patient meets the criteria.

This patient does not have any "alarm" symptoms (a positive family history of colorectal cancer, rectal bleeding in the absence of documented bleeding hemorrhoids or anal fissures, unintentional weight loss, or anemia) so colon cancer would be unlikely. Celiac disease and inflammatory bowel disease are unlikely in a patient with constipation-predominant IBS. Serologic and inflammatory marker testing would be warranted in patients with predominant diarrhea or mixed types of IBS. Hyperparathyroidism does not usually present with this clinical picture, and calcium levels would likely be elevated.

Ref: Mearin F, Lacy BE, Chang L, et al: Bowel disorders. *Gastroenterology* 2016;150(6):1393-1407. 2) Drossman DA, Hasler WL: Rome IV–Functional GI disorders: Disorders of gut-brain interaction. *Gastroenterology* 2016;150(6):1257-1261. 3) Simren M, Palsson OS, Whitehead WE: Update on Rome IV criteria for colorectal disorders: Implications for clinical practice. *Curr Gastroenterol Rep* 2017;19(4):15.

Item 163

ANSWER: C

Acute symptomatic urinary retention should be treated with immediate urethral catheterization. The catheter should be left in place for 3 days, followed by a voiding trial. During this time the patient should be evaluated for underlying causes of the retention, such as infection, and prescribed or over-the-counter medications. Starting an α-blocker while the catheter is in place should be considered, but initial treatment with an α-blocker without catheterization is not indicated. Suprapubic catheter placement should only be used when urethral catheterization is unsuccessful. Transurethral resection of the prostate may be necessary later but is not the initial treatment.

Ref: Serlin DC, Heidelbaugh JJ, Stoffel JT: Urinary retention in adults: Evaluation and initial management. *Am Fam Physician* 2018;98(8):496-503.

Item 164

ANSWER: E

Carpal tunnel syndrome of mild to moderate severity can be treated nonsurgically. Patients with severe symptoms or nerve damage seen on electromyography should be referred for surgical therapy. Nonsurgical management options include splinting, physical therapy, therapeutic ultrasound, and corticosteroids (oral or injection). Oral prednisone, 20 mg daily, for 10–14 days improves symptoms and function compared with placebo, for up to 8 weeks, but oral corticosteroids are less effective than corticosteroid injections. In a 2013 double-blind, placebo-controlled, randomized clinical trial comparing methylprednisolone injection (40 mg and 80 mg) to saline injection, patients in the 80-mg injection group were less likely to have surgery at 12 months.

While corticosteroid injections have the best evidence for delaying the need for surgery, night splints, physical therapy, and therapeutic ultrasound have some evidence of benefit. Splinting was found to be effective in a Cochrane review. It is low cost and safe and especially recommended in pregnancy-related disease. Limited evidence supports the use of physical therapy to treat carpal tunnel syndrome. Nerve glide exercises are simple hand and finger movements that are easy to learn, can be performed at home, and can be combined with other treatments such as splinting. Therapeutic ultrasound also has limited evidence of benefit. It requires an experienced therapist and requires multiple sessions, typically 5 days/week for 2–4 weeks.

Ref: Atroshi I, Flondell M, Hofer M, Ranstam J: Methylprednisolone injections for the carpal tunnel syndrome: A randomized, placebo-controlled trial. *Ann Intern Med* 2013;159(5):309–317. 2) Wipperman J, Goerl K: Carpal tunnel syndrome: Diagnosis and management. *Am Fam Physician* 2016;94(12):993-999.

Item 165

ANSWER: B

NSAIDs such as ibuprofen should be used as first-line treatment for the control of pleuritic pain (SOR B). NSAIDs do not have the analgesic potency of narcotics, but they do not cause respiratory suppression and do not change the patient's sensorium. Corticosteroids should be reserved for patients who cannot take NSAIDs. Colchicine is used to treat pericarditis but not pleuritic pain.

Ref: Reamy BV, Williams PM, Odom MR: Pleuritic chest pain: Sorting through the differential diagnosis. *Am Fam Physician* 2017;96(5):306-312.

Item 166

ANSWER: C

Patients with secondary hypertension frequently take several medications and are classified as having "resistant" hypertension. It is important to recognize that many antihypertensive medications can affect the results of the aldosterone/renin ratio. An aldosterone antagonist, such as spironolactone or eplerenone, can increase renin and aldosterone levels and should be discontinued 4–6 weeks before obtaining a ratio. Angiotensin receptor blockers and ACE inhibitors can increase renin levels. Oral potassium supplements should be continued or started in patients with hypokalemia, since aldosterone biosynthesis is dependent on potassium. Medications such as hydralazine, terazosin, and verapamil may be continued or started for blood pressure control because they do not affect aldosterone or renin levels.

Ref: Charles L, Triscott J, Dobbs B: Secondary hypertension: Discovering the underlying cause. *Am Fam Physician* 2017;96(7):453-461. 2) Jameson JL, Fauci AS, Kasper DL, et al (eds): *Harrison's Principles of Internal Medicine*, ed 20. McGraw-Hill, 2018, pp 1897-1898.

Item 167

ANSWER: D

Agitation and delirium are common end-of-life symptoms. It is important to assess for treatable causes, including constipation, urinary retention, uncontrolled pain, and adverse medication effects. The antipsychotic medication risperidone is effective for treating agitation and nausea at this stage, but dosing is much lower than when this medication is used for psychiatric disorders. Benzodiazepines can provoke increased agitation and should be used with caution; however, they can be useful for treating significant end-of-life anxiety. Generally, a longer-acting form such as lorazepam would be a better choice than short-acting alprazolam. Amitriptyline and diphenhydramine can both cause urinary retention, potentially leading to delirium and agitation.

Ref: Albert RH: End-of-life care: Managing common symptoms. *Am Fam Physician* 2017;95(6):356-361.

Item 168

ANSWER: A

For patients who experience a seizure, the risk factors for recurrent seizures include two unprovoked seizures more than 24 hours apart, epileptiform abnormalities on an EEG, abnormal brain imaging results, severe head trauma, and a syndrome associated with epilepsy. In children who do not have any of these risk factors, antiepileptic drug therapy is not indicated after a first unprovoked seizure. When there are no risk factors there is no difference in 1- to 2-year seizure remission rates if antiepileptic drug therapy is started after a second seizure as opposed to starting it after the first seizure. If therapy is indicated, monotherapy should be the initial approach. The risk of adverse effects of drug therapy are as high as 50%. This includes subtle cognitive and behavioral effects in many cases.

Ref: Liu G, Slater N, Perkins A: Epilepsy: Treatment options. *Am Fam Physician* 2017;96(2):87-96.

Item 169

ANSWER: A

This patient has stage 1 hypertension based on his average blood pressure of 131/88 mm Hg after three measurements. He is asymptomatic so the initial recommendation is therapeutic lifestyle changes and close follow-up in 2–3 weeks (SOR C). If his blood pressure remains elevated, an evaluation for secondary hypertension would be appropriate. Medication would be appropriate for stage 1 hypertension with either evidence of end-organ disease or persistent hypertension after a trial of therapeutic lifestyle changes or progression to stage 2 hypertension (SOR C). Thiazide diuretics or ACE inhibitors would be appropriate choices for initial treatment. β-Blockers are no longer considered first-line treatment for hypertension in adolescents or children. This patient would need blood pressure monitoring at every visit due to his elevated blood pressure.

Ref: Riley M, Hernandez AK, Kuznia AL: High blood pressure in children and adolescents. *Am Fam Physician* 2018;98(8):486-494.

Item 170

ANSWER: E

Screening for developmental dysplasia of the hip (DDH) is somewhat controversial because the benefit of treatment remains somewhat unclear. Despite the widespread practice of screening for DDH, ethical newborn practices are difficult to determine. The American Academy of Family Physicians and the U.S. Preventive Services Task Force have found insufficient evidence to recommend routine screening for DDH. The American Academy of Pediatrics, however, recommends routine screening of all newborns with physical examination maneuvers, and targeted screening ultrasonography for infants who were breech in the third trimester, have a family history of DDH, or have a personal history of instability. Given this, decisions should be individualized. Additional risk factors include female sex, firstborn status, oligohydramnios, and a large-for-gestational-age infant.

Ref: Shaw BA, Segal LS: Evaluation and referral for developmental dysplasia of the hip in infants. *Pediatrics* 2016;138(6):pii:e20163107. 2) Hauk L: Developmental dysplasia of the hip in infants: A clinical report from the AAP on evaluation and referral. *Am Fam Physician* 2017;96(3):196-197.

Item 171

ANSWER: B

The U.S. Preventive Services Task Force recommends oral fluoride supplementation for the prevention of dental caries beginning at age 6 months for children whose primary water supply is fluoride deficient (B recommendation). Well water may be fluoridated naturally depending on the aquifer, but the water is highly variable and should be tested before deciding on the need for supplementation. Testing well water is also advisable because excessive fluoride may lead to fluorosis of the bones. Bottled water is variable, making it undependable as an adequate source of fluoride. Topical fluoride, in toothpaste or applications of fluoride varnish, is effective in preventing tooth decay in children and can be used in addition to properly fluoridated water. Twice-yearly application of fluoride varnish to primary teeth should begin when the first tooth comes in and repeated every 6 months thereafter in children (SOR B).

Ref: Stephens MB, Wiedemer JP, Kushner GM: Dental problems in primary care. *Am Fam Physician* 2018;98(11):654-660.

Item 172

ANSWER: D

Once the diagnosis of acute rheumatic fever is made, NSAIDs such as aspirin or naproxen should be administered (SOR B). The therapeutic response to NSAIDs is often remarkable. Acetaminophen has not been shown to be a superior analgesic for acute rheumatic fever. Gabapentin is not indicated, especially considering that the pain does not have a neuropathic etiology. Opioids would not be considered first-line treatment because of their adverse effects and the dramatic response of NSAIDs alone.

Ref: Maness DL, Martin M, Mitchell G: Poststreptococcal illness: Recognition and management. *Am Fam Physician* 2018;97(8):517-522.

Item 173

ANSWER: C

A large cohort study indicated that the Global Initiative for Chronic Obstructive Lung Disease criterion (FEV_1/FVC ratio $<70\%$) is more sensitive for COPD in individuals 65 years and older compared to the American Thoracic Society criteria (SOR C). COPD is present if the FEV_1/FVC ratio is reduced to $<70\%$ and is irreversible with bronchodilator therapy. A reversible response to bronchodilator therapy is more consistent with asthma.

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

Item 174

ANSWER: C

Takotsubo cardiomyopathy, also known as stress-induced cardiomyopathy, can develop following emotional distress and is characterized by the abrupt onset of dysfunction of the left ventricle. The clinical presentation and laboratory studies can mirror acute coronary syndrome and should be treated similarly. Once symptoms and cardiac abnormalities resolve, treatment is no longer indicated and may be withdrawn if there are no signs of coronary disease. Because this patient currently has cardiomyopathic abnormalities, a diuretic, ACE inhibitor, and β-blocker are indicated. Ambulatory cardiac monitors are not indicated for this patient with a known diagnosis of Takotsubo cardiomyopathy. A pacemaker is not indicated in the absence of arrhythmias caused by conduction abnormalities.

Ref: Brieler J, Breeden MA, Tucker J: Cardiomyopathy: An overview. *Am Fam Physician* 2017;96(10):640-646.

Item 175

ANSWER: D

Studies have documented an increased rate of metered-dose inhaler (MDI) use errors in certain patient subgroups that could adversely affect the efficacy of treatment. For patients over the age of 15, the ability to demonstrate correct MDI use drops significantly with increasing age. One large study of MDI technique, after a minimum of 3 months of prescribed use, confirmed error frequencies of 61% in patients 15–30 years of age, 70% in patients 30–60 years of age, 77% in patients 60–75 years of age, and 86% in patients ≥75 years of age.

Other patient characteristics also affect MDI error rates. A higher level of education and a diagnosis of asthma rather than COPD are both associated with fewer errors, whereas the frequency of errors is higher for females and lower-income patients. Disease severity and the presence of comorbidities has also been found to affect MDI use. The error rate is lower for patients who have had prior training, and the rate of proper usage relates directly to the duration of the training session.

Ref: Chrystyn H, van der Palen J, Sharma R, et al: Device errors in asthma and COPD: Systematic literature review and meta-analysis. *NPJ Prim Care Respir Med* 2017;27(1):22. 2) Barbara S, Kritikos V, Bosnic-Anticevich S: Inhaler technique: Does age matter?: A systematic review. *Eur Respir Rev* 2017;26(146):pii:170055.

Item 176

ANSWER: A

This patient has mild croup based on the clinical findings. A single dose of dexamethasone is recommended in all cases of croup (SOR A). Hospitalization is not necessary if the child is stable. Racemic epinephrine, which has been shown to reduce symptoms at 30 minutes but not at 2 hours or 6 hours, is recommended for the treatment of moderate to severe croup when patients are being observed in a medical setting such as the emergency department or hospital (SOR A). Amoxicillin and albuterol are not indicated in the management of croup.

Ref: Smith DK, McDermott AJ, Sullivan JF: Croup: Diagnosis and management. *Am Fam Physician* 2018;97(9):575-580.

Item 177

ANSWER: D

This patient has early Lyme disease as evidenced by erythema migrans, fever, myalgias, and arthralgias. The treatment of early Lyme disease is doxycycline for 7–21 days. Single-dose doxycycline is used for prophylaxis to prevent Lyme disease after a tick bite in an area where Lyme disease is endemic. Longer treatment periods are required for Lyme arthritis and patients may require intravenous antibiotics. With this patient's clinical presentation, antibiotic treatment would be recommended and serologic testing is not needed. In clinical scenarios where diagnostic testing is needed, testing for early Lyme disease should be performed with a two-tier test starting with an enzyme immunoassay and, if positive, confirmed with a Western blot.

Ref: Treatment of Lyme disease. *Med Lett Drugs Ther* 2016;58(1494):57-58. 2) *Tickborne Diseases of the United States: A Reference Manual for Healthcare Providers*, ed 5. Centers for Disease Control and Prevention, 2018.

Item 178

ANSWER: B

It is recommended that all printed patient education information be written at or below a fifth- to sixth-grade reading level. This aligns with universal health literacy precautions in which easy-to-understand concepts and terms are used for all patients instead of focusing on those with low literacy. These literacy precautions are recommended by professional organizations such as the American Medical Association and the Agency for Healthcare Research and Quality.

Ref: Hersh L, Salzman B, Snyderman D: Health literacy in primary care practice. *Am Fam Physician* 2015;92(2):118-124.

Item 179

ANSWER: B

Multiple reports have associated iron deficiency with impaired neurodevelopment and it is therefore essential to ensure adequate iron intake. Based on expert opinion, the American Academy of Pediatrics recommends measuring a child's hemoglobin level at 12 months of age.

Ref: Turner K: Well-child visits for infants and young children. *Am Fam Physician* 2018;98(6):347-353.

Item 180

ANSWER: E

This patient has tried first-line treatment for hemorrhoids with increased fiber intake but has returned with symptoms of a thrombosed external hemorrhoid. Office-based surgical excision of the thrombosed external hemorrhoid within 2–3 days of symptom onset may provide significant symptomatic relief (SOR B) and result in a lower risk of recurrence. While conservative treatment with topical therapies such as corticosteroids may be helpful, symptomatic relief is prolonged with excision of the thrombosed hemorrhoid.

Bioflavonoids are used outside the United States for symptomatic treatment of hemorrhoids but evidence is lacking and they are not approved by the FDA for this use. Oral antibiotic therapy has no role in the treatment of thrombosed external hemorrhoids but may be beneficial in treating an abscess, which would present with a gradual onset of pain and a fluctuant rectal mass. Rubber band ligation is an appropriate treatment for grades I–III internal hemorrhoids (SOR A).

Ref: Mounsey AL, Halladay J, Sadiq TS: Hemorrhoids. *Am Fam Physician* 2011;84(2):204-210. 2) Mott T, Latimer K, Edwards C: Hemorrhoids: Diagnosis and treatment options. *Am Fam Physician* 2018;97(3):172-179.

Item 181

ANSWER: B

Patients with chronic adrenal insufficiency, either primary or secondary, may not be able to mount a stress response to infection or surgical procedures. Common practice during minor infections is to increase the corticosteroid supplementation (SOR C). Fludrocortisone should be continued, but stress dosing is not necessary.

Ref: Michels A, Michels N: Addison disease: Early detection and treatment principles. *Am Fam Physician* 2014;89(7):563-568.

Item 182

ANSWER: D

The FDA issued a warning that systemic fluoroquinolones can increase the occurrence of aortic dissections or ruptures. Drugs in this group should be avoided in patients with an existing aortic aneurysm or in patients at increased risk for developing an aortic aneurysm unless there are no other treatment options available. Patients at increased risk include those with peripheral vascular disease, hypertension, Marfan syndrome, or Ehlers-Danlos syndrome. Similarly, the use of systemic fluoroquinolones should be avoided in the elderly. Aztreonam, ceftriaxone, and doxycycline are not associated with this side effect (SOR A).

Ref: FDA Drug Safety Communication: FDA warns about increased risk of ruptures or tears in the aorta blood vessel with fluoroquinolone antibiotics in certain patients. US Food and Drug Administration, 2018.

Item 183

ANSWER: C

This patient has a nodular basal cell carcinoma, which has a pearly papular appearance with telangiectasia. Basal cell carcinoma is the most common cutaneous malignancy. The incidence increases with age and occurs most commonly in skin types 1 and 2. The tumors occur most frequently on the face, scalp, ears, and neck, and less frequently on the torso and extremities. While locally destructive, basal cell carcinoma rarely metastasizes.

The skin becomes slightly rough with actinic keratosis, and a slight scale forms gradually. Sebaceous hyperplasia begins as elevated papules that eventually become dome-shaped and umbilicated. It consists of small tumors made up of sebaceous glands. Fibrous papule of the face is a variant of angiofibroma. It is usually 1–5 mm in diameter and most often appears on the nose. Seborrheic keratoses are benign skin neoplasms that are tan or black, well circumscribed, and have a stuck-on appearance.

Ref: Habif TP: *Clinical Dermatology: A Color Guide to Diagnosis and Therapy*, ed 6. Elsevier, 2016, pp 807-823.

Item 184

ANSWER: B

Knowledge of endemic fungi capable of causing infection in otherwise healthy patients can be very helpful in ensuring an appropriate evaluation. Coccidioidomycosis is a common infection in the southwestern United States. In addition to the symptoms in this patient, coccidioidomycosis can also present with a rash such as erythema nodosum. Histoplasmosis is most common in the Midwest and with low-level exposure symptoms are usually mild or absent. Blastomycosis is also present in the Midwest, as well as in the Atlantic and southeastern states. Symptoms include an abrupt onset of fever, chills, pleuritic chest pain, arthralgias, and myalgias. The cough is initially nonproductive but frequently becomes purulent. Cryptococcosis and mucormycosis are more opportunistic infections occurring in immunocompromised hosts.

Ref: Jameson JL, Fauci AS, Kasper DL, et al (eds): *Harrison's Principles of Internal Medicine*, ed 20. McGraw-Hill, 2018, pp 1518-1529, 1537-1541.

Item 185

ANSWER: B

This is a classic presentation for acute poststreptococcal glomerulonephritis (APSGN), with the onset of gross hematuria associated with hypertension and systemic edema. This is most commonly seen in school-age children, usually 1–2 weeks after an episode of pharyngitis or 3–4 weeks after an episode of impetigo, caused by so-called nephritogenic strains of Group A β-hemolytic *Streptococcus*. The hematuria is caused by immune complex–mediated glomerular injury.

Bacteriuria may be seen in both upper and lower urinary tract infections, but may also be a spurious finding, especially with the combined presence of epithelial cells. The classic finding on microscopic urinalysis for acute glomerulonephritis is the presence of RBC casts. WBC casts are seen with acute pyelonephritis. The presence of urinary eosinophils indicates acute interstitial nephritis. Calcium oxalate makes up the most common type of kidney stones.

Antibiotics prescribed for antecedent pharyngitis do not prevent APSGN. Treatment is supportive, controlling blood pressure and edema with a thiazide or a loop diuretic. The prognosis for resolution and full recovery of the vast majority of patients with APSGN is excellent, especially in the pediatric age group.

Ref: Jameson JL, Fauci AS, Kasper DL, et al (eds): *Harrison's Principles of Internal Medicine*, ed 20. McGraw-Hill, 2018, p 2137.

Item 186

ANSWER: A

This patient has olecranon bursitis, which is a superficial bursitis caused by chronic microtraumas to the affected area. The initial management for this condition includes conservative measures such as padding, elevation, icing, and analgesics (SOR B). If significant pain is associated with the swelling, or a decrease in range of motion is present due to severe swelling, aspiration should be offered. This is not indicated in this particular case and should be avoided to reduce the risk of septic bursitis. Septic bursitis would require empiric antibiotics to cover common skin organisms (SOR B). Aspiration should be performed if infection is suspected and the aspirate should be sent for a cell count, Gram stain, culture, glucose measurement, and crystal analysis (SOR C). Plain radiographs are indicated only if there is acute trauma and concern that a fracture may be present. If recurrent superficial bursitis occurs, a referral for surgery is indicated.

Ref: Khodaee M: Common superficial bursitis. *Am Fam Physician* 2017;95(4):224-231.

Item 187

ANSWER: A

Diabetic gastroparesis is a delay in the emptying of food from the upper gastrointestinal tract in the absence of a mechanical obstruction of the stomach or duodenum. Metoclopramide is the only prokinetic agent that has been studied specifically for long-term use in gastroparesis and is considered first-line therapy (SOR B). It is among the only FDA-approved medications for gastroparesis. Nortriptyline is a prokinetic agent but has not been shown to be more effective than placebo for decreasing gastroparesis symptoms. Proton pump inhibitors such as omeprazole, histamine H_2-receptor antagonists such as ranitidine, and ondansetron delay gastric emptying and should be withheld in patients with gastroparesis whenever possible.

Ref: Boland BS, Edelman SV, Wolosin JD: Gastrointestinal complications of diabetes. *Endocrinol Metab Clin North Am* 2013;42(4):809-832. 2) Camilleri M, Parkman HP, Shafi MA, et al: Clinical guideline: Management of gastroparesis. *Am J Gastroenterol* 2013;108(1):18-37. 3) Acosta A, Camilleri M: Prokinetics in gastroparesis. *Gastroenterol Clin North Am* 2015;44(1):97-111. 4) Careyva B, Stello B: Diabetes mellitus: Management of gastrointestinal complications. *Am Fam Physician* 2016;94(12):980-986.

Item 188

ANSWER: D

Expedited partner therapy (EPT) is the clinical practice of treating the sex partners of patients diagnosed with *Chlamydia* or gonorrhea by providing prescriptions or medications to the patient to take to his/her partner without the health care provider first examining the partner. When patients have been diagnosed with gonorrhea or *Chlamydia*, EPT has been shown to reduce the overall burden of disease in a given population when the partners cannot be linked to care. In this case, as the partners' identities are unknown, it is impossible for the clinician to examine them or even contact them, so four prescriptions should be written, one with the patient's name and the other three for EPT. The CDC states that EPT is particularly effective in treating the female partners of infected males. The CDC considers having the partners visit a health care provider to be the optimal course of treatment but this is not often practically feasible due to a lack of resources or social factors.

Although conventional practice is to treat only the patient, this does not provide timely treatment for the patient's partners. A prescription written to "EPT" can be filled at the pharmacy without the individual's name or date of birth. Kentucky and South Carolina are the only states that do not allow this practice. A prescription with three refills would be unethical, as presumably the physician would be advising the patient to distribute medications that had been prescribed to only the patient. Blank prescriptions would require the partners to reveal their identities, which may lead to a reluctance to fill the prescriptions.

Ref: *Final Recommendation Statement: Chlamydia and Gonorrhea: Screening*. US Preventive Services Task Force, 2016. 2) Expedited Partner Therapy. Centers for Disease Control and Prevention, 2018.

Item 189

ANSWER: A

A basic understanding of statistics is essential to evaluate clinical evidence. The number needed to treat, which represents the number of patients that must be treated to result in one positive outcome, is one of the most intuitive statistical concepts in explaining the power or relative lack thereof of an intervention. Relative risk reduction in particular can be misleading, since a seemingly large relative risk reduction may result in a very small absolute risk reduction if the prevalence of the disorder in question is low. Specificity indicates the ability of a test to accurately identify a condition but does not indicate the effectiveness of an intervention. A 95% confidence interval relates to statistical variation and the relationship of an outcome to chance. *P*-value deals with statistical significance but not magnitude of the effect.

Ref: American Family Physician: EBM glossary. American Academy of Family Physicians, 2018.

Item 190

ANSWER: B

This patient is experiencing a manic or hypomanic episode. Therapeutic options include lithium, anticonvulsants such as divalproex, and antipsychotic medications such as olanzapine. Benzodiazepines such as lorazepam may be of minimal benefit. SSRIs such as sertraline can aggravate mania. Bupropion would help treat an associated depression and trazodone could possibly help the patient sleep, but these medications are ineffective for treating a manic/hypomanic episode.

Ref: Bobo WV: The diagnosis and management of bipolar I and II disorders: Clinical practice update. *Mayo Clin Proc* 2017;92(10):1532-1551.

Item 191

ANSWER: B

The most common cause of hirsutism in premenopausal women is polycystic ovary syndrome, which accounts for 75%–80% of cases. The second most common cause is idiopathic hirsutism, which accounts for 5%–20% of cases. Other causes are rare, but should be considered when evaluating new cases of hirsutism.

Ref: Mimoto MS, Oyler JL, Davis AM: Evaluation and treatment of hirsutism in premenopausal women. *JAMA* 2018;319(15):1613-1614.

Item 192

ANSWER: C

For patients started on empiric antibiotic therapy at hospital admission, the CDC recommends an antibiotic time-out 48 hours after the initial order to determine if it can be stopped or needs to be changed. The dose, route, and duration should also be reviewed. The rationale is that antibiotics are often ordered empirically at the time of admission, while cultures and other studies are also being ordered. The original empiric order should be reassessed, incorporating the results of these studies while considering the evolving clinical status of the patient. Studies show this reassessment with antibiotic modification does not reliably occur.

Ref: Antibiotic stewardship driver diagram and change package. Centers for Disease Control and Prevention, 2012. 2) Pollack LA, Srinivasan A: Core elements of hospital antibiotic stewardship programs from the Centers for Disease Control and Prevention. *Clin Infect Dis* 2014;59(Suppl 3):S97-100. 3) Graber CJ, Jones MM, Glassman PA, et al: Taking an antibiotic time-out: Utilization and usability of a self-stewardship time-out program for renewal of vancomycin and piperacillin-tazobactam. *Hosp Pharm* 2015;50(11):1011-1124.

Item 193

ANSWER: D

This patient presents with acute epididymitis. Typical symptoms develop gradually over 1–2 days with posterior scrotal pain and swelling. Additional symptoms may include fever, hematuria, dysuria, and urinary frequency. The pain may radiate to the lower abdomen. Physical examination findings may include tenderness of the epididymis and testis along with swelling of the scrotum. Elevation of the scrotum may decrease the pain (Prehn sign). Typical ultrasound findings include hyperemia, swelling, and increased blood flow to the epididymis.

With testicular torsion the pain is often sudden in onset and severe, with associated nausea and vomiting and no other urologic symptoms. A physical examination often demonstrates a high-riding testis that may lie transversely in the scrotum. The cremasteric reflex may be absent. Ultrasound findings would demonstrate decreased or absent blood flow with testicular torsion.

In sexually active adults <35 years of age, gonorrhea and *Chlamydia* are the most common causative organisms of acute epididymitis. Ceftriaxone, 250 mg intramuscularly or intravenously once, with oral doxycycline, 100 mg twice daily for 10 days, would be the appropriate treatment for acute epididymitis (SOR C). In men over the age of 35 or those with a history of recent urinary tract surgery or instrumentation, enteric organisms are the most likely cause and monotherapy with oral levofloxacin or ofloxacin for 10 days would be the recommended treatment.

Ref: McConaghy JR, Panchal B: Epididymitis: An overview. *Am Fam Physician* 2016;94(9):723-726.

Item 194

ANSWER: E

The cause of hip pain is generally determined from the patient's history and physical examination. A positive flexion, abduction, external rotation (FABER) test that produces pain at the sacroiliac joint, lumbar spine, and posterior hip is associated with sacroiliac joint dysfunction. The log roll test involves passive supine internal and external rotation of the hip. When this test is positive for pain it is associated with piriformis syndrome. While femoroacetabular impingement may be associated with a positive FABER test, it would produce pain in the groin. Greater trochanteric pain syndrome results in lateral hip pain rather than posterior pain. Osteoarthritis is usually associated with a limited range of motion and groin pain.

Ref: Wilson JJ, Furukawa M: Evaluation of the patient with hip pain. *Am Fam Physician* 2014;89(1):27-34.

Item 195

ANSWER: B

Immunologic profiles of patients with asthma are influenced by environmental exposures. Those who are exposed to respiratory syncytial virus as an infant have an increased risk, whereas those who are exposed to a high microbial environment have a lower risk than those without such exposure. Otitis media and lactose intolerance are not known to be associated with asthma risk.

Ref: Falk N: Allergy and asthma: Asthma management. *FP Essent* 2018;472:25-29.

Item 196

ANSWER: E

This patient presents with morbid obesity complicated by several obesity-related conditions. Bariatric surgery has been shown to result in greater weight loss compared to nonsurgical interventions (SOR A). It has also been shown to be highly effective in treating obesity-related comorbid conditions such as diabetes mellitus (SOR A). Patients with a BMI ≥40 kg/m^2 should be referred for consideration of bariatric surgery (SOR B). While worksite intervention, exercise therapy, behavioral therapy, and pharmacotherapy are appropriate treatments for obesity, these interventions are all less effective than bariatric surgery.

Ref: Schroeder R, Harrison TD, McGraw SL: Treatment of adult obesity with bariatric surgery. *Am Fam Physician* 2016;93(1):31-37. 2) Erlandson M, Ivey LC, Seikel K: Update on office-based strategies for the management of obesity. *Am Fam Physician* 2016;94(5):361-368.

Item 197

ANSWER: E

In primary care practice the annual incidence of unexplained lymphadenopathy is only 0.6%. Only 1.1% of these cases are related to malignancy. This percentage increases with age. Supraclavicular adenopathy is associated with a high risk of intra-abdominal malignancy in both adults and children, with studies finding 34%–50% of these patients having a malignancy. Lymphadenopathy in the other locations listed is associated with a lower risk of malignancy.

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

Item 198

ANSWER: A

This asymptomatic patient is at low risk for a major adverse cardiac event (< 1%) and requires no further testing prior to undergoing a low-risk, nonurgent surgical intervention. A routine preoperative EKG does not provide any benefit for asymptomatic patients undergoing low-risk surgical procedures (level of evidence 2). A preoperative EKG may be considered for asymptomatic patients without known coronary artery disease who are undergoing intermediate and high-risk surgeries (SOR B). A preoperative EKG is reasonable for patients who have known heart disease, peripheral artery disease, or cerebrovascular disease who are undergoing intermediate and high-risk surgeries (SOR B).

Exercise stress testing for noncardiac surgery is not useful for patients at low risk but may be helpful for patients with an elevated risk and unknown functional capacity (SOR B). Routine chest radiography has no role in the preoperative evaluation. Routine preoperative echocardiography to assess left ventricular function is not recommended in asymptomatic patients (SOR B). It is reasonable for patients with dyspnea of unknown etiology and patients with worsening heart failure symptoms to undergo preoperative evaluation of left ventricular function (SOR C). Preoperative echocardiography is recommended for patients with known or suspected moderate- or high-degree valvular heart disease (SOR C).

Ref: Fleisher LA, Fleischmann KE, Auerbach AD, et al: 2014 ACC/AHA guideline on perioperative cardiovascular evaluation and management of patients undergoing noncardiac surgery: A report of the American College of Cardiology/American Heart Association Task Force on practice guidelines. *J Am Coll Cardiol* 2014;64(22):e77-e137. 2) American College of Cardiology: Five things physicians and patients should question. ABIM Foundation Choosing Wisely campaign, 2017.

Item 199

ANSWER: D

Physicians should respect the patient's individual preferences for receiving bad news and allow adequate time to deliver the diagnosis in a private setting with limited interruptions. After delivering the news it is best to avoid extensive treatment details and making estimates of the patient's survival, and to focus instead on patient-directed questions and providing empathy. Patients should be allowed to have as few or as many family members and friends present as they desire at the time of communication, and this often varies depending on the patient's cultural background.

Ref: Berkey FJ, Wiedemer JP, Vithalani ND: Delivering bad or life-altering news. *Am Fam Physician* 2018;98(2):99-104.

Item 200

ANSWER: D

This patient has a history of symptoms consistent with acute bacterial rhinosinusitis that have persisted for 10 days, warranting empiric antibiotic therapy (SOR B). Doxycycline is an appropriate alternative to amoxicillin/clavulanate for a patient with a history of a reaction to penicillin. Macrolides and trimethoprim/sulfamethoxazole are not recommended as empiric therapy because of high rates of resistance.

Ref: Chow AW, Benninger MS, Brook I, et al: IDSA clinical practice guideline for acute bacterial rhinosinusitis in children and adults. *Clin Infect Dis* 2012;54(8):e72-e112. 2) Aring AM, Chan MM: Current concepts in adult acute rhinosinusitis. *Am Fam Physician* 2016;94(2):97-105.