FULL-LENGTH PRACTICE TEST 11

Practice Test 11: Infectious Disease

50 Questions — Recommended Time: 50 Minutes

1. A 32-year-old man presents with fever, night sweats, weight loss, and a chronic cough with blood-tinged sputum for the past 6 weeks. He recently immigrated from Sub-Saharan Africa. Chest X-ray reveals a cavitary lesion in the right upper lobe with ipsilateral hilar lymphadenopathy. Three sputum acid-fast bacilli smears are positive. Which of the following is the most appropriate initial treatment regimen?

A. Isoniazid monotherapy for 9 months

B. Isoniazid and rifampin for 6 months

C. Azithromycin and ethambutol for 12 months

D. Rifampin, isoniazid, pyrazinamide, and ethambutol (RIPE) for 2 months, followed by rifampin and isoniazid for 4 months

2. A 28-year-old man presents with a painless genital ulcer on the penile shaft. The ulcer has a clean base, raised indurated borders, and is non-tender. He reports unprotected sexual contact three weeks ago. Bilateral, non-tender inguinal lymphadenopathy is present. Dark-field microscopy of the ulcer exudate reveals spirochetes. Which of the following is the most appropriate treatment?

A. Oral azithromycin 1 gram single dose

B. Intramuscular benzathine penicillin G 2.4 million units single dose

C. Oral doxycycline for 21 days

D. Intravenous ceftriaxone for 14 days

3. A 45-year-old woman presents with fever, dysuria, urinary frequency, flank pain, and costovertebral angle tenderness. Urinalysis reveals pyuria, bacteriuria, and positive leukocyte esterase and nitrites. Urine culture grows greater than 100,000 CFU/mL of Escherichia coli. Blood cultures are negative. She is able to tolerate oral medications. Which of the following is the most likely diagnosis?

A. Acute pyelonephritis

B. Acute cystitis

C. Urethritis

D. Renal abscess

4. A 6-year-old boy presents with a 5-day history of high fever, bilateral non-exudative conjunctivitis, erythema and cracking of the lips, strawberry tongue, cervical lymphadenopathy, and a polymorphous rash involving the trunk. His extremities show erythema and edema of the hands and feet. Which of the following is the most serious potential complication of this disease?

A. Meningitis

B. Pneumonia

C. Coronary artery aneurysms

D. Hepatitis

5. A 22-year-old college student presents with fever, severe sore throat, fatigue, and posterior cervical lymphadenopathy for the past 10 days. Physical examination reveals tonsillar exudates, splenomegaly, and a maculopapular rash that developed after she was prescribed amoxicillin for presumed strep throat. Heterophile antibody (monospot) test is positive. Which of the following is the most likely diagnosis?

A. Infectious mononucleosis (Epstein-Barr virus)

B. Group A streptococcal pharyngitis

C. Acute HIV infection

D. Cytomegalovirus infection

6. A 35-year-old HIV-positive man with a CD4 count of 45 cells/μL presents with headache, fever, neck stiffness, and altered mental status. CSF analysis reveals elevated opening pressure (300 mmH_2O), lymphocytic pleocytosis, elevated protein, and low glucose. India ink stain of CSF reveals encapsulated yeast forms. CSF cryptococcal antigen is positive. Which of the following is the most appropriate initial treatment?

A. Fluconazole monotherapy

B. Voriconazole

C. Trimethoprim-sulfamethoxazole

D. Intravenous amphotericin B plus flucytosine (induction therapy)

7. A 65-year-old diabetic man presents with fever, erythema, warmth, and swelling of his right lower leg that has rapidly progressed over 24 hours. The affected area is well-demarcated with raised, palpable borders. There is no crepitus or bullae. He has no history of trauma or animal bite. Which of the following is the most likely causative organism?

A. Staphylococcus aureus

B. Group A Streptococcus (Streptococcus pyogenes)

C. Pseudomonas aeruginosa

D. Clostridium perfringens

8. A 30-year-old woman presents with a circular, expanding erythematous skin lesion on her right thigh with central clearing (target-like appearance). She reports a tick bite in the area three weeks ago while hiking in Connecticut. She also reports fatigue, headache, and myalgias. Which of the following is the most likely diagnosis?

A. Cellulitis

B. Rocky Mountain spotted fever

C. Lyme disease (erythema migrans)

D. Southern tick-associated rash illness

9. A 4-year-old girl is brought to the clinic with a honey-crusted, weeping rash around her nose and mouth that has spread over the past five days. She attends daycare. The lesions began as small vesicles that ruptured and formed golden-yellow crusts. Which of the following is the most likely diagnosis?

A. Impetigo

B. Herpes simplex virus infection

C. Contact dermatitis

D. Varicella

10. A 40-year-old man with HIV (CD4 count 150 cells/μL) presents with painful white plaques on his tongue and buccal mucosa that can be scraped off, leaving an erythematous base. He is not currently on antiretroviral therapy. Which of the following is the most likely diagnosis?

A. Oral hairy leukoplakia

B. Oral candidiasis (thrush)

C. Aphthous ulcers

D. Herpes simplex stomatitis

11. A 55-year-old man presents with high fever, productive cough, and diarrhea after returning from a conference at a hotel with a large air conditioning system. Chest X-ray reveals rapidly progressive multilobar infiltrates. Sputum Gram stain reveals many neutrophils but no organisms. Urinary antigen testing is positive. Serum sodium is 128 mEq/L. Which of the following is the most likely causative organism?

A. Streptococcus pneumoniae

B. Mycoplasma pneumoniae

C. Staphylococcus aureus

D. Legionella pneumophila

12. A 25-year-old woman presents with fever, severe headache, photophobia, and neck stiffness that developed over 12 hours. She has a petechial rash on her trunk and lower extremities. CSF analysis reveals elevated WBC (2,500 cells/μL, predominantly neutrophils), elevated protein, low glucose, and gram-negative diplococci on Gram stain. Which of the following is the most likely causative organism?

A. Neisseria meningitidis

B. Streptococcus pneumoniae

C. Haemophilus influenzae

D. Listeria monocytogenes

13. A 60-year-old woman who underwent abdominal surgery three weeks ago presents with profuse watery diarrhea (10-15 stools per day), abdominal cramping, and low-grade fever. She received perioperative cephalosporin antibiotics. Stool PCR for Clostridioides difficile toxin is positive. Colonoscopy reveals characteristic yellowish-white pseudomembranes overlying the colonic mucosa. Which of the following is the most likely pathologic finding?

A. Caseating granulomas

B. Pseudomembranous colitis

C. Transmural granulomatous inflammation

D. Villous atrophy

14. A 70-year-old man with a history of a prosthetic knee replacement one year ago presents with progressive knee pain, swelling, and a draining sinus tract. He had a dental procedure without antibiotic prophylaxis six weeks ago. Aspiration of the joint reveals turbid fluid with 45,000 WBCs/μL. Culture grows coagulase-negative Staphylococcus. Which of the following is the most likely diagnosis?

A. Gout flare

B. Aseptic loosening of the prosthetic joint

C. Prosthetic joint infection

D. Reactive arthritis

15. A 19-year-old college freshman living in a dormitory presents with acute onset of fever, severe headache, neck stiffness, and a rapidly spreading purpuric rash. She becomes hypotensive and develops disseminated intravascular coagulation. Which of the following is the most appropriate immediate empiric treatment while awaiting diagnostic studies?

A. Intravenous ceftriaxone plus vancomycin

B. Oral azithromycin

C. Intravenous acyclovir

D. Intravenous fluconazole

16. A 50-year-old man presents with a painless, non-healing ulcer on his right hand that developed two weeks after cleaning his fish tank. The lesion has a violaceous, nodular appearance with satellite nodules progressing proximally along the lymphatic channels of his forearm (sporotrichoid spread). Which of the following is the most likely causative organism?

A. Staphylococcus aureus

B. Sporothrix schenckii

C. Bartonella henselae

D. Mycobacterium marinum

17. A 28-year-old man presents with acute onset of fever, myalgias, and a diffuse maculopapular rash. He reports unprotected sexual contact with a new partner six weeks ago. Laboratory studies reveal a positive HIV-1 RNA viral load of 850,000 copies/mL and a negative HIV antibody test. Which of the following best explains these results?

A. False-positive viral load

B. Acute HIV infection (window period before seroconversion)

C. Chronic HIV infection with loss of antibody response

D. HIV-2 infection not detected by standard antibody tests

18. A 35-year-old woman presents with fever, malaise, and a vesicular rash in a dermatomal distribution along the left T6 dermatome. She reports severe burning pain in the affected area that preceded the rash by 3 days. She has no history of immunosuppression. Which of the following is the most likely diagnosis?

A. Herpes simplex virus reactivation

B. Contact dermatitis

C. Herpes zoster (shingles)

D. Varicella (chickenpox)

19. A 3-year-old boy presents with high fever for 4 days, followed by defervescence and the simultaneous appearance of a diffuse, blanching, rose-pink maculopapular rash on the trunk that spreads to the extremities. He appears well and is playful despite the rash. Which of the following is the most likely diagnosis?

A. Roseola infantum (exanthem subitum, HHV-6)

B. Measles

C. Fifth disease (erythema infectiosum)

D. Scarlet fever

20. A 45-year-old man from the Ohio River Valley presents with fever, cough, mediastinal lymphadenopathy, and diffuse pulmonary infiltrates. He works in a chicken coop and reports exposure to bird droppings. Fungal culture of a bronchoalveolar lavage specimen grows a dimorphic fungus with characteristic small (2-4 μm) intracellular yeast forms within macrophages. Which of the following is the most likely diagnosis?

A. Blastomycosis

B. Histoplasmosis

C. Coccidioidomycosis

D. Aspergillosis

21. A 55-year-old man with uncontrolled diabetes presents with severe ear pain, otorrhea, and granulation tissue in the external auditory canal that has not responded to standard topical antibiotic therapy for two weeks. CT scan reveals erosion of the temporal bone. Which of the following is the most likely diagnosis?

A. Acute otitis media

B. Cholesteatoma

C. Acoustic neuroma

D. Malignant (necrotizing) otitis externa

22. A 20-year-old woman presents with painful genital ulcers, inguinal lymphadenopathy, fever, and dysuria. She reports three episodes of similar lesions over the past year. Physical examination reveals multiple shallow, grouped vesicles on an erythematous base on the labia that have progressed to painful ulcers. Tzanck smear reveals multinucleated giant cells. Which of the following is the most likely diagnosis?

A. Genital herpes (HSV-2)

B. Primary syphilis

C. Chancroid

D. Lymphogranuloma venereum

23. A 60-year-old man with a history of chronic liver disease from hepatitis C presents with fever, abdominal pain, and a rapidly progressive cellulitis with hemorrhagic bullae on his right lower extremity. He reports eating raw oysters two days ago. Blood cultures grow a gram-negative curved rod. Which of the following is the most likely causative organism?

A. Staphylococcus aureus

B. Group A Streptococcus

C. Vibrio vulnificus

D. Aeromonas hydrophila

24. A 35-year-old woman who is 28 weeks pregnant presents with fever, myalgias, and watery diarrhea. Blood cultures grow gram-positive rods that exhibit tumbling motility. CSF analysis reveals a lymphocytic pleocytosis. She reports eating unpasteurized soft cheese purchased from a farmer's market. Which of the following is the most likely causative organism?

A. Salmonella enterica

B. Listeria monocytogenes

C. Escherichia coli O157:H7

D. Campylobacter jejuni

25. A 5-year-old boy presents with a 2-week history of a barking cough, post-tussive emesis, and an inspiratory "whoop" after coughing paroxysms. He was not fully vaccinated. His WBC is 35,000/μL with 70% lymphocytes. Chest X-ray is unremarkable. PCR nasopharyngeal swab is positive for the causative organism. Which of the following is the most likely diagnosis?

A. Croup (parainfluenza virus)

B. Respiratory syncytial virus bronchiolitis

C. Epiglottitis

D. Pertussis (whooping cough)

26. A 42-year-old man with HIV (CD4 count 30 cells/μL) presents with progressive visual loss, floaters, and photopsia in his right eye. Fundoscopic examination reveals areas of perivascular hemorrhage with fluffy white retinal lesions described as "pizza pie" or "cottage cheese and ketchup" appearance. Which of the following is the most likely diagnosis?

A. Cytomegalovirus retinitis

B. Toxoplasma chorioretinitis

C. Herpes simplex virus retinitis

D. Progressive multifocal leukoencephalopathy

27. A 30-year-old man presents with a 3-day history of fever, headache, myalgias, and a maculopapular rash that began on the wrists and ankles and spread centrally to involve the trunk. He recently went camping in North Carolina and recalls a tick bite. Petechial lesions are visible on the palms and soles. Which of the following is the most likely diagnosis?

A. Lyme disease

B. Rocky Mountain spotted fever

C. Ehrlichiosis

D. Meningococcemia

28. A 55-year-old diabetic woman presents with severe facial pain, nasal congestion, and black necrotic tissue on the nasal turbinate. She has been in diabetic ketoacidosis for the past 48 hours. CT scan reveals opacification of the right maxillary and ethmoid sinuses with erosion into the orbit. Biopsy reveals broad, ribbon-like, non-septate hyphae with right-angle branching. Which of the following is the most likely diagnosis?

A. Aspergillosis

B. Chronic bacterial sinusitis

C. Nasal polyps with bacterial superinfection

D. Rhinocerebral mucormycosis (zygomycosis)

29. A 50-year-old man presents with a 2-week history of fever, malaise, night sweats, and a new cardiac murmur. He has a history of IV drug use. Blood cultures drawn from two separate sites grow viridans group streptococci. Transesophageal echocardiography reveals a 1.5-centimeter vegetation on the mitral valve. Which of the following is the most likely diagnosis?

A. Infective endocarditis (subacute bacterial endocarditis)

B. Rheumatic heart disease

C. Libman-Sacks endocarditis

D. Marantic endocarditis

30. A 40-year-old HIV-positive woman with a CD4 count of 80 cells/μL presents with fever, headache, and ring-enhancing brain lesions on contrast-enhanced MRI. Serum Toxoplasma IgG antibody is positive. She is not on prophylaxis. Which of the following is the most appropriate initial treatment?

A. Surgical biopsy and resection

B. Intravenous amphotericin B

C. Pyrimethamine plus sulfadiazine plus leucovorin

D. High-dose IV methotrexate

31. A 25-year-old man presents with urethral discharge, dysuria, and testicular pain. Gram stain of the urethral discharge reveals gram-negative intracellular diplococci within neutrophils. Nucleic acid amplification testing (NAAT) is positive for both Neisseria gonorrhoeae and Chlamydia trachomatis. Which of the following is the most appropriate treatment?

A. Oral azithromycin alone

B. Intramuscular ceftriaxone 500 mg plus oral doxycycline 100 mg twice daily for 7 days

C. Oral ciprofloxacin alone

D. Intramuscular penicillin G

32. A 50-year-old man presents from the San Joaquin Valley of California with fever, cough, chest pain, arthralgias, and erythema nodosum on his shins. Chest X-ray reveals hilar lymphadenopathy and a pulmonary infiltrate. Serologic testing reveals positive coccidioidal IgM antibody. Which of the following is the most likely diagnosis?

A. Histoplasmosis

B. Tuberculosis

C. Sarcoidosis

D. Coccidioidomycosis (Valley fever)

33. A 35-year-old woman presents with fever, productive cough, and a chest X-ray showing a left lower lobe consolidation. She is otherwise healthy with no comorbidities and is treated as an outpatient. Sputum culture subsequently grows Streptococcus pneumoniae. Which of the following best explains the virulence of this organism?

A. Polysaccharide capsule that inhibits phagocytosis

B. Exotoxin A production

C. Intracellular survival within macrophages

D. Biofilm formation on mucosal surfaces

34. A 68-year-old woman with an indwelling urinary catheter develops fever, suprapubic pain, and cloudy, foul-smelling urine. Urinalysis reveals pyuria and bacteriuria. Urine culture grows greater than 100,000 CFU/mL of Candida albicans. She has been on broad-spectrum antibiotics for the past three weeks. Which of the following is the most appropriate initial management?

A. Oral fluconazole for 14 days

B. Intravenous amphotericin B

C. Remove or replace the urinary catheter and repeat urine culture

D. Intravenous caspofungin

35. A 8-year-old boy presents with facial swelling (bilateral parotid gland enlargement), fever, headache, and myalgias. He has not received the MMR vaccine. Physical examination reveals tender, bilateral parotid glands with obscured angle of the jaw. Which of the following is the most likely diagnosis?

A. Suppurative parotitis

B. Mumps

C. Sjögren syndrome

D. Salivary gland tumor

36. A 35-year-old man with AIDS (CD4 count 25 cells/μL) presents with chronic watery diarrhea, weight loss, and abdominal cramping for the past month. Modified acid-fast stain of stool reveals small (4-6 μm) oocysts. He reports drinking from a stream while camping. Which of the following is the most likely causative organism?

A. Giardia lamblia

B. Entamoeba histolytica

C. Salmonella enterica

D. Cryptosporidium parvum

37. A 40-year-old man presents with recurrent episodes of malaria despite completing treatment. He recently traveled to Southeast Asia. Blood smear reveals ring-form trophozoites within red blood cells, some with multiple ring forms per cell. Banana-shaped (crescent) gametocytes are identified. Which of the following species is most likely responsible?

A. Plasmodium falciparum

B. Plasmodium vivax

C. Plasmodium malariae

D. Plasmodium ovale

38. A 22-year-old woman presents with a painful, swollen right knee and migratory polyarthralgia. She also has scattered painless pustular skin lesions on her extremities and tenosynovitis of the wrist and hand. She is sexually active with multiple partners. Blood cultures are negative, but synovial fluid NAAT is positive. Which of the following is the most likely diagnosis?

A. Reactive arthritis

B. Rheumatoid arthritis

C. Disseminated gonococcal infection

D. Septic arthritis from Staphylococcus aureus

39. A 55-year-old man returns from a trip to India with a 5-day history of profuse, watery "rice-water" diarrhea, vomiting, and severe dehydration. He appears cachectic with sunken eyes and poor skin turgor. Stool culture grows comma-shaped, oxidase-positive, gram-negative rods on thiosulfate-citrate-bile salts-sucrose (TCBS) agar. Which of the following is the most likely causative organism?

A. Escherichia coli

B. Vibrio cholerae

C. Shigella dysenteriae

D. Salmonella typhi

40. A 60-year-old man undergoes a liver transplant and is placed on tacrolimus immunosuppression. Four months post-transplant, he develops fever, leukopenia, and elevated liver enzymes. CMV viral load by PCR is significantly elevated. Liver biopsy reveals intranuclear "owl's eye" inclusion bodies. Which of the following is the most appropriate treatment?

A. Intravenous ganciclovir (or oral valganciclovir)

B. Intravenous acyclovir

C. Intravenous foscarnet as first-line therapy

D. Oral oseltamivir

41. A 10-year-old girl presents with a 3-day history of bloody diarrhea, abdominal cramps, and low-grade fever. She recently attended a barbecue where she ate undercooked hamburgers. Five days later, she develops pallor, petechiae, oliguria, and her laboratory studies reveal hemoglobin 7.2 g/dL, platelet count 45,000/μL, and creatinine 3.8 mg/dL. Peripheral smear reveals schistocytes. Which of the following is the most likely complication?

A. Disseminated intravascular coagulation

B. Thrombotic thrombocytopenic purpura

C. Hemolytic uremic syndrome

D. Immune thrombocytopenic purpura

42. A 30-year-old man presents with a 2-day history of severe watery diarrhea (15-20 stools per day), nausea, and low-grade fever. He reports eating at a buffet restaurant two days ago. No blood is present in the stool. Stool culture grows Salmonella enteritidis. He is immunocompetent and not bacteremic. Which of the following is the most appropriate management?

A. Ciprofloxacin for 7 days

B. Supportive care with oral rehydration (antibiotics are not routinely indicated for uncomplicated non-typhoidal Salmonella gastroenteritis in immunocompetent adults)

C. Metronidazole for 10 days

D. Intravenous vancomycin

43. A 45-year-old man who underwent a renal transplant six months ago presents with progressive multifocal leukoencephalopathy. MRI reveals non-enhancing white matter lesions without mass effect. Brain biopsy reveals demyelination with bizarre astrocytes. Which of the following is the most likely causative organism?

A. Cytomegalovirus

B. Epstein-Barr virus

C. Herpes simplex virus type 1

D. JC virus (John Cunningham virus)

44. A 35-year-old woman presents to the emergency department with high fever, hypotension, diffuse erythroderma (sunburn-like rash), and desquamation of the palms and soles. She reports using a superabsorbent tampon during her menstrual period. Laboratory studies reveal elevated creatinine, elevated liver enzymes, and thrombocytopenia. Blood cultures are negative. Which of the following is the most likely diagnosis?

A. Toxic shock syndrome (Staphylococcus aureus)

B. Necrotizing fasciitis

C. Streptococcal toxic shock syndrome

D. Meningococcemia

45. A 40-year-old man with HIV (CD4 count 50 cells/μL) presents with dysphagia, odynophagia, and retrosternal chest pain. Upper endoscopy reveals large, shallow, well-circumscribed ulcers in the mid-esophagus. Biopsy of the ulcer base reveals intranuclear inclusion bodies with a surrounding clear halo (Cowdry type A inclusions) and multinucleated giant cells. Which of the following is the most likely diagnosis?

A. Candida esophagitis

B. Cytomegalovirus esophagitis

C. Herpes simplex virus esophagitis

D. Pill esophagitis

46. A 65-year-old man with chronic lymphocytic leukemia presents with a painful vesicular eruption in a dermatomal distribution involving the left V1 (ophthalmic division of the trigeminal nerve) dermatome. Vesicles are present on the tip of his nose (Hutchinson sign). Which of the following is the most important concern requiring urgent ophthalmologic evaluation?

A. Facial nerve palsy

B. Herpes zoster ophthalmicus with risk of corneal involvement and vision loss

C. Trigeminal neuralgia

D. Postherpetic neuralgia

47. A 2-year-old girl presents with a barking cough, inspiratory stridor, hoarseness, and a low-grade fever. She has a 2-day history of rhinorrhea and nasal congestion. An anteroposterior neck X-ray reveals subglottic narrowing (steeple sign). Which of the following is the most likely diagnosis?

A. Epiglottitis

B. Bacterial tracheitis

C. Foreign body aspiration

D. Croup (laryngotracheobronchitis)

48. A 55-year-old man with a history of a dog bite to his right hand three days ago presents with rapidly progressive erythema, swelling, purulent discharge, and pain at the bite site. He has lymphangitic streaking up the forearm. Wound culture grows a gram-negative coccobacillus. Which of the following is the most likely causative organism and first-line treatment?

A. Pasteurella multocida; amoxicillin-clavulanate

B. Staphylococcus aureus; cephalexin

C. Eikenella corrodens; metronidazole

D. Clostridium tetani; metronidazole

49. A 25-year-old man presents with a 2-week history of painless, firm, non-pruritic papules on his palms and soles, diffuse lymphadenopathy, mucous patches on the oral mucosa, and condylomata lata in the perianal area. He had a painless genital ulcer that healed spontaneously two months ago. RPR is positive at 1:64, and FTA-ABS is positive. Which of the following is the most likely diagnosis?

A. Primary syphilis

B. Secondary syphilis

C. Tertiary syphilis

D. Latent syphilis

50. A 40-year-old woman presents with recurrent urinary tract infections (4 episodes in the past 12 months), each confirmed by urine culture growing E. coli. She has completed appropriate antibiotic courses for each episode. She uses a diaphragm with spermicide for contraception. Which of the following is the most appropriate preventive strategy?

A. Long-term prophylactic ciprofloxacin

B. Cranberry juice three times daily

C. Low-dose antibiotic prophylaxis (nitrofurantoin or trimethoprim-sulfamethoxazole) or post-coital prophylaxis, plus consider alternative contraception

D. Chronic broad-spectrum antibiotics

PRACTICE TEST 11: ANSWER KEY WITH EXPLANATIONS

Infectious Disease

1. D. Rifampin, isoniazid, pyrazinamide, and ethambutol (RIPE) for 2 months, followed by rifampin and isoniazid for 4 months. The standard treatment for drug-susceptible pulmonary tuberculosis is a 6-month regimen consisting of an intensive phase (2 months of RIPE — rifampin, isoniazid, pyrazinamide, and ethambutol) followed by a continuation phase (4 months of rifampin and isoniazid). Ethambutol is included in the initial phase to cover potential isoniazid resistance until susceptibility results are available. Pyridoxine (vitamin B6) is co-administered to prevent isoniazid-induced peripheral neuropathy. Patients must be placed on airborne isolation precautions until three consecutive negative sputum AFB smears are obtained. Directly observed therapy (DOT) is recommended to ensure adherence.

2. B. Intramuscular benzathine penicillin G 2.4 million units single dose. This presentation describes primary syphilis — a painless chancre with clean base and indurated borders caused by Treponema pallidum. Dark-field microscopy confirming spirochetes is the definitive early diagnostic test. Benzathine penicillin G 2.4 million units IM as a single dose is the treatment of choice for primary, secondary, and early latent syphilis. For penicillin-allergic non-pregnant patients, doxycycline 100 mg twice daily for 14 days is the alternative. Late latent syphilis and tertiary syphilis require three weekly doses of benzathine penicillin G. Neurosyphilis requires IV aqueous crystalline penicillin G for 10-14 days. The Jarisch-Herxheimer reaction (fever, myalgias, tachycardia within 24 hours of treatment) may occur.

3. A. Acute pyelonephritis. Acute pyelonephritis is a bacterial infection of the renal parenchyma presenting with the classic triad of fever, flank pain, and costovertebral angle tenderness, in addition to lower urinary tract symptoms (dysuria, frequency). Urine culture growing greater than 100,000 CFU/mL of E. coli (the most common uropathogen accounting for 70-95% of uncomplicated UTIs) confirms the diagnosis. Acute cystitis produces lower tract symptoms only without systemic findings (fever, flank pain). Outpatient treatment for uncomplicated pyelonephritis in patients tolerating oral medications includes oral fluoroquinolone (ciprofloxacin or levofloxacin) or trimethoprim-sulfamethoxazole. Hospitalization is indicated for sepsis, inability to tolerate oral medications, pregnancy, or obstruction.

4. C. Coronary artery aneurysms. This presentation describes Kawasaki disease (mucocutaneous lymph node syndrome), an acute systemic vasculitis primarily affecting children under 5 years. Diagnosis requires fever lasting at least 5 days plus four of five criteria — bilateral non-exudative conjunctivitis, oral mucosal changes (strawberry tongue, cracked lips), polymorphous rash, extremity changes (erythema, edema, desquamation), and cervical lymphadenopathy. Coronary artery aneurysms are the most serious complication, occurring in 15-25% of untreated patients and potentially leading to myocardial infarction

and sudden death. Treatment with IV immunoglobulin (IVIG) and high-dose aspirin within the first 10 days of illness reduces the risk of coronary aneurysms to approximately 3-5%.

5. A. Infectious mononucleosis (Epstein-Barr virus). EBV infectious mononucleosis presents with the classic triad of fever, pharyngitis with tonsillar exudates, and lymphadenopathy (particularly posterior cervical). Splenomegaly occurs in approximately 50% of patients. The characteristic maculopapular rash that develops after amoxicillin or ampicillin administration occurs in approximately 70-100% of mononucleosis patients given these antibiotics and is not a true penicillin allergy. Heterophile antibody (monospot) test is positive in approximately 85% of cases by the second week of illness. Atypical lymphocytes (activated T cells responding to EBV-infected B cells) are seen on peripheral blood smear. Patients should avoid contact sports for at least 3-4 weeks due to risk of splenic rupture.

6. D. Intravenous amphotericin B plus flucytosine (induction therapy). Cryptococcal meningitis is the most common cause of meningitis in HIV/AIDS patients with severely depressed CD4 counts (typically below 100 cells/μL). Cryptococcus neoformans is an encapsulated yeast acquired through inhalation of aerosolized pigeon droppings. Elevated CSF opening pressure is a hallmark and requires therapeutic large-volume lumbar puncture. India ink stain reveals encapsulated yeast forms, and CSF cryptococcal antigen is highly sensitive and specific. Treatment follows a three-phase approach — induction (amphotericin B liposomal plus flucytosine for at least 2 weeks), consolidation (fluconazole 400 mg daily for 8 weeks), and maintenance (fluconazole 200 mg daily until immune reconstitution with ART).

7. B. Group A Streptococcus (Streptococcus pyogenes). Erysipelas is a superficial skin infection (involving the upper dermis and superficial lymphatics) caused predominantly by Group A Streptococcus. Classic features include well-demarcated, raised, erythematous borders with a "peau d'orange" (orange peel) texture, warmth, and swelling. It differs from cellulitis, which involves deeper dermis and subcutaneous tissue with poorly demarcated borders. The well-demarcated raised borders described in this case are characteristic of erysipelas. S. aureus is the more common cause of deeper cellulitis and abscess-associated infections. Treatment is penicillin or amoxicillin for uncomplicated erysipelas, with broader coverage added for cellulitis or in diabetic patients.

8. C. Lyme disease (erythema migrans). Lyme disease is caused by the spirochete Borrelia burgdorferi, transmitted by the Ixodes tick (deer tick). Erythema migrans (EM) — an expanding annular erythematous lesion with central clearing (target or "bull's eye" appearance) — is the pathognomonic rash of early localized Lyme disease, occurring in approximately 70-80% of patients 3-30 days after the tick bite. Connecticut and the northeastern United States are endemic areas. Early disseminated disease can produce multiple EM lesions, cardiac conduction abnormalities (AV block), Bell palsy, and meningitis. Late disease produces arthritis (typically large joint monoarthritis, especially the knee). Treatment for early localized disease is oral doxycycline for 10-21 days.

9. A. Impetigo. Impetigo is the most common superficial bacterial skin infection in children, caused by Staphylococcus aureus (most common in the US) or Group A Streptococcus (Streptococcus pyogenes). Non-bullous impetigo (the most common form, 70%) presents with vesicles that rupture and form the characteristic honey-colored (golden-yellow) crusts, typically around the nose and mouth. Bullous

impetigo (caused by S. aureus producing exfoliative toxins) presents with flaccid bullae. Impetigo is highly contagious and spreads through direct contact, particularly in daycare settings. Treatment is topical mupirocin for localized disease and oral antibiotics (cephalexin or dicloxacillin) for widespread or refractory cases.

10. B. Oral candidiasis (thrush). Oral candidiasis is the most common opportunistic fungal infection in HIV/AIDS, occurring when CD4 counts fall below 200 cells/μL. Candida albicans is the most common species. The hallmark presentation is white, creamy plaques on the tongue, buccal mucosa, palate, or oropharynx that can be scraped off with a tongue depressor, leaving an erythematous, sometimes bleeding base. This distinguishes it from oral hairy leukoplakia (caused by EBV), which produces white, corrugated, non-removable plaques on the lateral tongue. Treatment is topical antifungals (nystatin suspension or clotrimazole troches) for mild disease and oral fluconazole for moderate to severe or refractory cases.

11. D. Legionella pneumophila. Legionnaires disease is caused by Legionella pneumophila, an intracellular gram-negative rod transmitted through aerosolized water from contaminated water systems (cooling towers, air conditioning systems, hot water tanks). Classic features include high fever, rapidly progressive pneumonia with multilobar infiltrates, GI symptoms (particularly watery diarrhea), hyponatremia, and relative bradycardia. Sputum Gram stain reveals neutrophils without organisms because Legionella does not stain well with standard Gram stain. Legionella urinary antigen test (detects serogroup 1, the most common) is the rapid diagnostic test of choice. Treatment is a respiratory fluoroquinolone (levofloxacin) or azithromycin. Pontiac fever is a milder, self-limited form of Legionella infection.

12. A. Neisseria meningitidis. Bacterial meningitis in a young adult with petechial rash and gram-negative diplococci on CSF Gram stain is virtually diagnostic of Neisseria meningitidis (meningococcus). Meningococcal meningitis can be complicated by purpura fulminans and Waterhouse-Friderichsen syndrome (bilateral adrenal hemorrhagic necrosis from DIC causing acute adrenal crisis). CSF findings of elevated neutrophilic pleocytosis, elevated protein, and low glucose are characteristic of bacterial meningitis. Treatment is IV penicillin G or ceftriaxone. Chemoprophylaxis with rifampin, ciprofloxacin, or ceftriaxone is recommended for close contacts. Meningococcal vaccine (MenACWY and MenB) is recommended for adolescents, college freshmen in dormitories, and asplenic patients.

13. B. Pseudomembranous colitis. Clostridioides difficile infection produces pseudomembranous colitis — characteristic yellowish-white raised plaques (pseudomembranes) composed of fibrin, mucus, inflammatory debris, and necrotic epithelial cells overlying the colonic mucosa. C. difficile produces toxin A (enterotoxin) and toxin B (cytotoxin) that disrupt the colonic epithelial cytoskeleton and tight junctions, causing inflammation, fluid secretion, and mucosal necrosis. Risk factors include recent antibiotic exposure (fluoroquinolones, clindamycin, cephalosporins), hospitalization, advanced age, and PPI use. Severity assessment guides treatment — oral vancomycin or fidaxomicin for initial episodes, with fecal microbiota transplantation reserved for recurrent infections.

14. C. Prosthetic joint infection. Prosthetic joint infection (PJI) is a devastating complication of arthroplasty occurring in 1-2% of primary joint replacements. This patient presents with classic features — progressive joint pain, effusion, draining sinus tract (pathognomonic for PJI), and elevated synovial fluid WBC count. Coagulase-negative staphylococci (particularly S. epidermidis) are the most common cause of late-onset PJI, forming biofilm on the prosthetic surface. The recent dental procedure may have caused transient bacteremia seeding the prosthesis. Treatment typically requires a combination of prolonged IV antibiotics and surgical intervention (debridement with implant retention for early infections, or two-stage exchange arthroplasty for chronic infections).

15. A. Intravenous ceftriaxone plus vancomycin. Acute bacterial meningitis with purpuric rash, hypotension, and DIC in a college student (high-risk for meningococcal disease) is a medical emergency requiring immediate empiric antibiotic therapy without waiting for diagnostic results. For patients aged 2-50 years, empiric treatment is a third-generation cephalosporin (ceftriaxone) plus vancomycin (to cover potential penicillin-resistant S. pneumoniae). Dexamethasone should be administered 15-20 minutes before or concurrently with the first antibiotic dose to reduce neurologic sequelae, particularly in pneumococcal meningitis. For neonates and patients over 50, ampicillin is added to cover Listeria monocytogenes. Every hour of antibiotic delay increases mortality.

16. D. Mycobacterium marinum. M. marinum is an atypical (non-tuberculous) mycobacterium associated with aquatic environments — fish tanks, swimming pools, and marine environments. It causes a characteristic skin infection presenting as a painless papulonodular lesion at the inoculation site (typically hands or extremities) that may develop sporotrichoid lymphocutaneous spread (satellite nodules along lymphatic channels), mimicking sporotrichosis. The incubation period is 2-3 weeks after aquatic exposure. Optimal growth temperature is 30-33°C (explaining its predilection for cooler extremities). Treatment is a combination of clarithromycin or azithromycin plus ethambutol or rifampin for 3-4 months. Sporothrix schenckii causes similar sporotrichoid spread but is associated with rose thorns and soil exposure.

17. B. Acute HIV infection (window period before seroconversion). Acute (primary) HIV infection presents 2-6 weeks after exposure with an acute retroviral syndrome — fever, myalgias, lymphadenopathy, sore throat, and maculopapular rash — resembling mononucleosis. During the window period (before antibody seroconversion, which takes 2-12 weeks), HIV antibody tests may be negative while the viral RNA load is extremely high (often exceeding 100,000 copies/mL), reflecting massive viremia. Fourth-generation HIV tests detect both HIV antibodies and p24 antigen, reducing the window period. An RNA viral load test (or p24 antigen) is necessary to diagnose acute infection during the window period. Early diagnosis and immediate ART initiation are critical to reduce transmission and preserve immune function.

18. C. Herpes zoster (shingles). Herpes zoster results from reactivation of latent varicella-zoster virus (VZV) in dorsal root ganglia, producing a painful vesicular eruption in a dermatomal distribution. A prodrome of burning, tingling, or shooting pain typically precedes the rash by 1-5 days. The rash does not cross the midline (unilateral) and follows a single dermatome, distinguishing it from primary varicella (diffuse, bilateral rash in all stages). Risk factors include age over 50, immunosuppression, and stress.

Treatment with oral antivirals (valacyclovir, famciclovir, or acyclovir) within 72 hours of rash onset reduces duration, severity, and the risk of postherpetic neuralgia. The recombinant zoster vaccine (Shingrix) is recommended for adults over 50.

19. A. Roseola infantum (exanthem subitum, HHV-6). Roseola is caused by human herpesvirus 6 (HHV-6) and primarily affects infants and young children aged 6 months to 2 years. The classic pattern is 3-5 days of high fever (often exceeding 104°F) that resolves abruptly ("crisis"), followed immediately by the appearance of a diffuse, rose-pink, blanching, maculopapular rash on the trunk that spreads centrifugally to the extremities. The child appears remarkably well once the fever breaks despite the rash. Febrile seizures may occur during the high-fever phase. The diagnosis is clinical based on the characteristic sequence of fever followed by rash. Treatment is supportive, and the illness is self-limited.

20. B. Histoplasmosis. Histoplasma capsulatum is a dimorphic fungus endemic to the Ohio and Mississippi River Valleys, found in soil contaminated with bird or bat droppings. Acute pulmonary histoplasmosis presents with fever, cough, and mediastinal lymphadenopathy. The organism exists as a mold at 25°C (producing macroconidia and microconidia in the environment) and converts to small (2-4 μm) intracellular yeast forms within macrophages at 37°C — this thermal dimorphism is characteristic. Mild disease is self-limited, while moderate-severe or disseminated disease requires treatment with itraconazole for mild-moderate disease or amphotericin B for severe or disseminated disease. Urine and serum Histoplasma antigen testing aids diagnosis.

21. D. Malignant (necrotizing) otitis externa. Malignant otitis externa is a severe, invasive infection of the external auditory canal that extends to the temporal bone and skull base. It occurs almost exclusively in elderly diabetic or immunocompromised patients. Pseudomonas aeruginosa is the causative organism in greater than 95% of cases. Granulation tissue at the bony-cartilaginous junction of the ear canal is a hallmark finding. Failure to respond to topical therapy, severe otalgia out of proportion to examination, temporal bone erosion on CT, and cranial nerve palsies (facial nerve VII is most commonly affected) indicate invasive disease. Treatment requires prolonged IV antipseudomonal antibiotics (ciprofloxacin or antipseudomonal beta-lactam) for 6-8 weeks.

22. A. Genital herpes (HSV-2). Genital herpes is the most common cause of genital ulcer disease worldwide. Primary infection presents with multiple, painful, grouped vesicles on an erythematous base that progress to shallow ulcers, often accompanied by inguinal lymphadenopathy, fever, and dysuria. HSV-2 accounts for the majority of genital herpes, though HSV-1 is increasing in prevalence as a cause. Recurrences are common (average 4-5 episodes per year with HSV-2) and are typically shorter and less severe. Tzanck smear showing multinucleated giant cells supports the diagnosis but cannot distinguish HSV-1, HSV-2, and VZV. PCR is the most sensitive diagnostic test. Treatment is acyclovir, valacyclovir, or famciclovir; suppressive therapy reduces recurrence frequency by 70-80%.

23. C. Vibrio vulnificus. V. vulnificus is a halophilic (salt-loving) gram-negative rod found in warm coastal waters and associated with raw shellfish (particularly oysters). Patients with chronic liver disease (cirrhosis, hepatitis C) and iron overload states are at dramatically increased risk for severe, often fatal septicemia and wound infections. V. vulnificus causes rapidly progressive cellulitis with characteristic

hemorrhagic bullae that can progress to necrotizing fasciitis and septic shock with a mortality rate of 50% or higher. The organism grows on TCBS agar. Treatment requires urgent IV antibiotics (doxycycline plus a third-generation cephalosporin) and surgical debridement of necrotic tissue. Patients with liver disease should be counseled to avoid raw shellfish consumption.

24. B. Listeria monocytogenes. Listeria is a gram-positive rod with characteristic "tumbling" motility that grows at refrigerator temperatures (4°C), an unusual property called cold enrichment. Pregnant women, neonates, elderly patients, and immunocompromised individuals are at highest risk. Transmission occurs through contaminated foods — unpasteurized dairy products, soft cheeses, deli meats, hot dogs, and ready-to-eat foods. In pregnancy, Listeria can cause septicemia, meningitis, and fetal loss. CSF characteristically shows lymphocytic pleocytosis (unusual for bacterial meningitis, which typically shows neutrophilic predominance). Treatment is IV ampicillin (with or without gentamicin for synergy). Cephalosporins are not effective against Listeria — this is a critical point for empiric meningitis treatment in at-risk populations.

25. D. Pertussis (whooping cough). Pertussis is caused by Bordetella pertussis, a gram-negative coccobacillus. The disease progresses through three phases — catarrhal (1-2 weeks of URI symptoms, most contagious), paroxysmal (2-6 weeks of severe coughing paroxysms followed by inspiratory "whoop" and post-tussive emesis), and convalescent (gradual resolution over weeks to months). Marked lymphocytosis (WBC often exceeding 20,000-50,000 with lymphocyte predominance) is a classic laboratory finding. PCR of nasopharyngeal specimen is the preferred diagnostic test. Treatment is azithromycin (or erythromycin) to reduce transmission and symptom duration if given during the catarrhal phase. Post-exposure prophylaxis with azithromycin is recommended for close contacts.

26. A. Cytomegalovirus retinitis. CMV retinitis is the most common ocular opportunistic infection in AIDS, typically occurring when CD4 counts fall below 50 cells/μL. The characteristic fundoscopic appearance is described as "pizza pie" or "cottage cheese and ketchup" — fluffy white-yellow retinal lesions (areas of necrosis) adjacent to perivascular hemorrhages. It is painless and progressively destroys the retina, leading to irreversible vision loss if untreated. Diagnosis is clinical based on fundoscopic findings. Treatment is IV ganciclovir or oral valganciclovir (induction followed by maintenance), with foscarnet as an alternative for ganciclovir-resistant or intolerant patients. Immune reconstitution with ART is essential to prevent relapse and allow discontinuation of maintenance therapy.

27. B. Rocky Mountain spotted fever. RMSF is caused by Rickettsia rickettsii, transmitted by the Dermacentor tick (dog tick and wood tick). Despite its name, most cases occur in the southeastern and south-central United States (North Carolina, Oklahoma, Arkansas, Tennessee). The hallmark rash characteristically begins on the wrists and ankles (peripherally) and spreads centrally (centripetally) to the trunk, eventually involving the palms and soles. A rash involving the palms and soles narrows the differential to RMSF, secondary syphilis, endocarditis, and hand-foot-and-mouth disease. RMSF can be fatal if untreated, with mortality exceeding 20% without antibiotics. Doxycycline is the treatment of choice for all ages, including children, and should be initiated empirically based on clinical suspicion without waiting for confirmatory serologic testing.

28. D. Rhinocerebral mucormycosis (zygomycosis). Mucormycosis is caused by fungi of the order Mucorales (Rhizopus, Mucor, Lichtheimia), characterized by broad, non-septate (pauci-septate) hyphae with right-angle (90-degree) branching — distinguishing them from Aspergillus, which has narrow, septate hyphae with acute-angle (45-degree) branching. Rhinocerebral mucormycosis is the most common form, occurring in patients with diabetic ketoacidosis and immunocompromised states. The organism has tropism for blood vessels (angioinvasion), causing thrombosis, tissue infarction, and the characteristic black necrotic eschar on the nasal turbinates or palate. Treatment requires emergent surgical debridement of necrotic tissue, IV amphotericin B (liposomal formulation preferred), and correction of underlying metabolic derangement.

29. A. Infective endocarditis (subacute bacterial endocarditis). Subacute bacterial endocarditis (SBE) presents with an insidious course over weeks to months with low-grade fever, malaise, night sweats, and a new or changing heart murmur. Viridans group streptococci (S. mutans, S. mitis, S. sanguinis) are the most common cause of SBE on native valves in non-IV drug users. Modified Duke criteria are used for diagnosis — major criteria include persistently positive blood cultures with a typical organism and echocardiographic evidence of endocardial involvement (vegetation, abscess, new valvular regurgitation). Complications include embolic events (stroke, septic pulmonary emboli, mycotic aneurysms), heart failure from valvular destruction, and abscess formation. Treatment is prolonged IV antibiotics (4-6 weeks).

30. C. Pyrimethamine plus sulfadiazine plus leucovorin. Toxoplasma gondii is the most common cause of ring-enhancing brain lesions in AIDS patients with CD4 counts below 100 cells/μL. Positive Toxoplasma IgG serology indicates prior exposure and risk for reactivation. Multiple ring-enhancing lesions with surrounding edema, typically in the basal ganglia, are characteristic on contrast-enhanced CT or MRI. An empiric 2-week treatment trial with pyrimethamine plus sulfadiazine plus leucovorin (folinic acid to prevent pyrimethamine-induced bone marrow suppression) is the standard approach — clinical and radiographic improvement within 2 weeks confirms the diagnosis. If no improvement occurs, brain biopsy should be performed to evaluate for primary CNS lymphoma (the main differential diagnosis).

31. B. Intramuscular ceftriaxone 500 mg plus oral doxycycline 100 mg twice daily for 7 days. Gonococcal and chlamydial co-infection is extremely common (10-30% co-infection rate), requiring simultaneous treatment for both organisms. Current CDC guidelines recommend IM ceftriaxone 500 mg as a single dose for gonorrhea (increased from 250 mg due to rising resistance) plus oral doxycycline 100 mg twice daily for 7 days for chlamydia. Fluoroquinolone resistance in N. gonorrhoeae has become widespread, making ciprofloxacin no longer recommended empirically. Azithromycin alone is no longer recommended for gonorrhea treatment due to increasing resistance. Test of cure is recommended for pharyngeal gonorrhea and when alternative regimens are used.

32. D. Coccidioidomycosis (Valley fever). Coccidioides immitis/posadasii is a dimorphic fungus endemic to the southwestern United States (San Joaquin Valley of California, Arizona, New Mexico, West Texas) and northern Mexico. Infection occurs through inhalation of arthroconidia from soil, particularly after dust storms or soil disruption. Primary pulmonary coccidioidomycosis presents with fever, cough, chest pain,

and flu-like symptoms. Erythema nodosum and arthralgias ("desert rheumatism" or "valley fever") are hypersensitivity manifestations that actually indicate a robust immune response and good prognosis. Serologic testing (IgM indicates acute infection, IgG and complement fixation titer correlate with disease burden) aids diagnosis. Mild disease may be self-limited; moderate-severe or disseminated disease requires fluconazole or amphotericin B.

33. A. Polysaccharide capsule that inhibits phagocytosis. The polysaccharide capsule is the primary virulence factor of Streptococcus pneumoniae, enabling the organism to evade host immune defenses by inhibiting complement-mediated opsonization and phagocytosis by neutrophils and macrophages. The capsule is also the target of pneumococcal vaccines — PCV13 (conjugate vaccine, 13 serotypes) and PPSV23 (polysaccharide vaccine, 23 serotypes), now replaced by PCV15 and PCV20 in updated guidelines. S. pneumoniae is the most common cause of community-acquired pneumonia, bacterial meningitis in adults, and otitis media in children. The quellung reaction (capsular swelling with type-specific antisera) is a classic laboratory identification method.

34. C. Remove or replace the urinary catheter and repeat urine culture. Candiduria in a catheterized patient most commonly represents colonization of the catheter biofilm rather than true infection, particularly in patients on broad-spectrum antibiotics that suppress normal bacterial flora. The most important initial management step is removal or replacement of the indwelling catheter (eliminating the biofilm reservoir) and repeating the urine culture after catheter change. Asymptomatic candiduria in catheterized patients generally does not require antifungal treatment unless the patient is neutropenic, undergoing urologic procedures, or has documented systemic candidal infection. If candiduria persists after catheter change with symptoms of infection, oral fluconazole for 14 days is appropriate treatment.

35. B. Mumps. Mumps is caused by the mumps virus (paramyxovirus family), producing painful bilateral parotid gland swelling (parotitis) as the hallmark clinical feature. The swollen parotid glands obscure the angle of the mandible, a distinguishing clinical sign. Transmission is via respiratory droplets, with an incubation period of 16-18 days. Complications include orchitis (most common in post-pubertal males, rarely causing sterility), oophoritis, aseptic meningitis, pancreatitis, and sensorineural hearing loss. The MMR vaccine has dramatically reduced mumps incidence, though outbreaks still occur in close-contact settings (colleges, dormitories). Diagnosis is confirmed by mumps-specific IgM antibody or viral PCR from buccal or oral swab. Treatment is supportive.

36. D. Cryptosporidium parvum. Cryptosporidium is an intracellular protozoan parasite that causes chronic, severe watery diarrhea in immunocompromised patients, particularly AIDS patients with CD4 counts below 100 cells/μL. Transmission is fecal-oral, commonly through contaminated water (the oocysts are resistant to chlorine disinfection). Modified acid-fast staining of stool reveals small (4-6 μm) pink-red oocysts. In immunocompetent individuals, cryptosporidiosis is typically self-limited. In AIDS patients, it causes prolonged, debilitating watery diarrhea with significant weight loss. The most effective treatment is immune reconstitution with antiretroviral therapy. Nitazoxanide may provide some benefit in immunocompetent patients but is less effective in severely immunocompromised individuals.

37. A. Plasmodium falciparum. P. falciparum is the most virulent Plasmodium species, responsible for the vast majority of malaria deaths worldwide and prevalent in sub-Saharan Africa and Southeast Asia. Characteristic blood smear findings include multiple ring-form trophozoites per red blood cell (indicating high parasitemia), appliqué forms (ring forms at the cell periphery), and banana-shaped (crescent) gametocytes, which are pathognomonic. P. falciparum uniquely sequesters in the microvasculature through cytoadherence, causing cerebral malaria, severe anemia, metabolic acidosis, renal failure, and ARDS. P. vivax and P. ovale form dormant liver hypnozoites requiring primaquine for radical cure to prevent relapse. Treatment of severe P. falciparum malaria is IV artesunate.

38. C. Disseminated gonococcal infection. Disseminated gonococcal infection (DGI) is the most common form of infectious arthritis in sexually active young adults. The classic triad includes migratory polyarthralgia/arthritis, tenosynovitis (particularly of the wrists, hands, and ankles), and scattered painless vesiculopustular skin lesions on the extremities. DGI occurs when Neisseria gonorrhoeae disseminates hematogenously from a mucosal site. Blood cultures are positive in only approximately 30-40% of cases, while synovial fluid NAAT has higher sensitivity. Treatment is IV ceftriaxone 1 g daily until clinical improvement (usually 24-48 hours), then oral cefixime to complete at least 7 days total. All patients should be concurrently treated for possible chlamydial co-infection.

39. B. Vibrio cholerae. Cholera is caused by Vibrio cholerae, a comma-shaped, oxidase-positive, gram-negative rod that produces cholera toxin (an AB toxin that activates adenylyl cyclase, increasing cAMP in intestinal epithelial cells, causing massive secretory diarrhea). The hallmark is profuse, painless, watery "rice-water" diarrhea (resembling water in which rice has been washed) that can produce up to 10-20 liters of fluid loss per day, leading to severe isotonic dehydration, metabolic acidosis, hypokalemia, and circulatory collapse. The organism grows on TCBS agar (producing yellow colonies). Treatment priority is aggressive fluid and electrolyte replacement — oral rehydration solution (ORS) for mild-moderate cases and IV Ringer's lactate for severe dehydration. Antibiotics (doxycycline or azithromycin) reduce disease duration and shedding.

40. A. Intravenous ganciclovir (or oral valganciclovir). CMV is the most important viral pathogen in solid organ transplant recipients, causing tissue-invasive disease in 20-60% of at-risk patients. Intranuclear "owl's eye" inclusion bodies (large eosinophilic intranuclear inclusions with a surrounding clear halo) on histopathology are pathognomonic for CMV. CMV disease in transplant recipients can involve the GI tract, lungs, liver, eyes, and CNS. Treatment is IV ganciclovir (which requires phosphorylation by viral UL97 kinase for activation) or oral valganciclovir (prodrug of ganciclovir with excellent oral bioavailability). The main side effect is myelosuppression (neutropenia). Foscarnet is reserved for ganciclovir-resistant CMV. Preemptive monitoring with CMV PCR viral load guides therapy in transplant recipients.

41. C. Hemolytic uremic syndrome. HUS is the most common cause of acute renal failure in children, classically triggered by Shiga toxin-producing Escherichia coli (STEC), particularly serotype O157:H7, from contaminated undercooked ground beef, unpasteurized milk, or contaminated water. The triad of HUS is microangiopathic hemolytic anemia (schistocytes on peripheral smear from mechanical shearing

of red blood cells through damaged microvasculature), thrombocytopenia (platelet consumption in microthrombi), and acute kidney injury. Shiga toxin damages endothelial cells in the renal glomerular capillaries. Treatment is supportive — IV fluids, monitoring electrolytes, dialysis for severe renal failure, and transfusions as needed. Antibiotics and antidiarrheals are contraindicated as they may worsen toxin release.

42. B. Supportive care with oral rehydration. Uncomplicated non-typhoidal Salmonella gastroenteritis in immunocompetent adults is typically self-limited (resolving in 4-7 days) and does not require antibiotic treatment. Antibiotics do not shorten illness duration, may prolong the carrier state, and contribute to antimicrobial resistance. Supportive care with oral rehydration (or IV fluids for severe dehydration) is the mainstay of treatment. Antibiotics are indicated for severe disease (high fever, bacteremia, hospitalization), immunocompromised patients (HIV, transplant recipients, patients on immunosuppressive therapy), extremes of age (infants under 3 months, elderly), patients with prosthetic joints or vascular grafts, and hemoglobinopathies (sickle cell disease). Fluoroquinolones or azithromycin are first-line when antibiotics are indicated.

43. D. JC virus (John Cunningham virus). Progressive multifocal leukoencephalopathy (PML) is a demyelinating disease of the CNS caused by reactivation of JC virus (a polyomavirus) in immunocompromised patients (AIDS, organ transplant recipients, patients on natalizumab or other immunosuppressive therapies). MRI reveals multifocal, asymmetric, non-enhancing white matter lesions without mass effect or surrounding edema — this absence of enhancement and mass effect distinguishes PML from toxoplasmosis and lymphoma. Brain biopsy reveals demyelination, bizarre reactive astrocytes, and oligodendroglial cells with enlarged nuclei containing viral inclusions. Diagnosis can also be confirmed by JC virus PCR in CSF. There is no specific antiviral treatment — management focuses on immune reconstitution (ART for HIV, reducing immunosuppression for transplant patients).

44. A. Toxic shock syndrome (Staphylococcus aureus). Staphylococcal toxic shock syndrome is caused by toxic shock syndrome toxin-1 (TSST-1), a superantigen that causes massive non-specific T-cell activation and cytokine release. The classic presentation includes acute onset of high fever, diffuse erythroderma (sunburn-like macular rash), hypotension, and multiorgan dysfunction (renal failure, elevated liver enzymes, thrombocytopenia). Desquamation of the palms and soles occurs 1-2 weeks after onset. Menstrual TSS is associated with superabsorbent tampon use, though non-menstrual cases occur with surgical wound infections and nasal packing. Blood cultures are typically negative because the disease is toxin-mediated, not bacteremic. Treatment includes aggressive fluid resuscitation, removal of the foreign body (tampon), IV antistaphylococcal antibiotics (nafcillin or vancomycin), and clindamycin (which inhibits toxin production).

45. C. Herpes simplex virus esophagitis. HSV esophagitis is an opportunistic infection in immunocompromised patients, particularly AIDS patients with CD4 counts below 100 cells/μL. Endoscopic findings include well-circumscribed, shallow ulcers (often described as "volcano-like") in the mid to distal esophagus. The histologic hallmark is Cowdry type A inclusions — eosinophilic intranuclear inclusions with a surrounding clear halo — and multinucleated giant cells with characteristic "ground-

glass" nuclear appearance in squamous epithelial cells at the ulcer margins. This distinguishes HSV from CMV esophagitis, which produces large, deep, linear ulcers with intranuclear and intracytoplasmic inclusion bodies in endothelial cells at the ulcer base. Treatment is IV acyclovir or oral valacyclovir.

46. B. Herpes zoster ophthalmicus with risk of corneal involvement and vision loss. Herpes zoster ophthalmicus involves the ophthalmic division (V1) of the trigeminal nerve and occurs in approximately 10-20% of all zoster cases. Hutchinson sign — vesicles on the tip of the nose — indicates involvement of the nasociliary branch of V1 and is strongly predictive of ocular involvement (corneal keratitis, uveitis, conjunctivitis, retinitis) with a risk of permanent vision loss. Urgent ophthalmologic evaluation is mandatory regardless of whether ocular symptoms are present. Treatment includes systemic antiviral therapy (high-dose IV acyclovir or oral valacyclovir) and topical ophthalmic therapy as directed by ophthalmology. Immunocompromised patients (as in this case with CLL) are at higher risk for severe, disseminated, and complicated zoster.

47. D. Croup (laryngotracheobronchitis). Croup is the most common cause of acute upper airway obstruction in children aged 6 months to 3 years, most commonly caused by parainfluenza virus (types 1 and 2). The hallmark presentation includes a barking ("seal-like") cough, inspiratory stridor, hoarseness, and a viral URI prodrome. The "steeple sign" on anteroposterior neck X-ray represents subglottic narrowing from mucosal edema, a classic but not pathognomonic radiographic finding. Treatment is based on severity — mild cases receive a single dose of dexamethasone (0.15-0.6 mg/kg), moderate-severe cases receive dexamethasone plus nebulized racemic epinephrine, and severe cases with impending respiratory failure require airway management. Most cases are self-limited, resolving in 3-7 days.

48. A. Pasteurella multocida; amoxicillin-clavulanate. Pasteurella multocida is the most common organism isolated from dog and cat bite wound infections, typically presenting with rapidly progressive cellulitis within 24 hours of the bite (faster than typical S. aureus or streptococcal infections). The organism is a gram-negative coccobacillus found in the oral flora of dogs and cats. Cat bites are more likely to become infected than dog bites (80% vs 5-25%) due to the deep puncture wounds from cat teeth introducing bacteria into deeper tissues. Amoxicillin-clavulanate is the first-line treatment providing coverage for Pasteurella, S. aureus, streptococci, and anaerobes. All bite wounds should be assessed for tetanus prophylaxis and rabies risk.

49. B. Secondary syphilis. Secondary syphilis occurs 4-10 weeks after the primary chancre heals (or sometimes while it is still present), representing hematogenous dissemination of Treponema pallidum. Classic manifestations include a diffuse maculopapular rash involving the palms and soles (a hallmark finding), condylomata lata (highly infectious, moist, flat, gray-white wart-like lesions in the genital and perianal areas — distinct from condylomata acuminata of HPV), mucous patches (painless, superficial oral erosions), diffuse lymphadenopathy, and constitutional symptoms. Non-treponemal tests (RPR, VDRL) correlate with disease activity and are used for monitoring treatment response. Treponemal tests (FTA-ABS, TP-PA) confirm the diagnosis and remain positive for life. Treatment is benzathine penicillin G 2.4 million units IM single dose.

50. C. Low-dose antibiotic prophylaxis or post-coital prophylaxis, plus consider alternative contraception. Recurrent UTI is defined as three or more UTIs in 12 months or two or more in 6 months. Diaphragm with spermicide use is a well-established risk factor for recurrent UTIs because spermicide alters vaginal flora, promoting E. coli colonization. Prevention strategies include low-dose continuous prophylaxis (nitrofurantoin 50-100 mg nightly or TMP-SMX half-strength nightly), post-coital prophylaxis (single dose after intercourse) for sexually associated UTIs, and changing contraceptive method. Behavioral measures include adequate hydration, voiding after intercourse, and wiping front-to-back. Vaginal estrogen is effective in postmenopausal women. Cranberry products have shown inconsistent evidence and are not recommended as primary prevention in guidelines.