

2009

**Step 2
Clinical Knowledge (CK)**

**Content Description and
General Information**

US·MLE

United States

Medical

Licensing

Examination

TM

A Joint Program of the Federation of State
Medical Boards of the United States, Inc.,
and the National Board of Medical Examiners®

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Introduction

This booklet is intended to help you prepare for the Step 2 Clinical Knowledge (Step 2 CK) component of the United States Medical Licensing Examination™ (USMLE™) if you are an applicant with an eligibility period that has an ending date in 2009. *Eligibility periods* are explained in the *2009 USMLE Bulletin of Information*, with which you must become familiar to apply for the examination. In addition to reading the *Bulletin*, you should run the sample Step 2 CK test materials and tutorials provided at the USMLE website.

The information in this booklet, USMLE sample test materials and software tutorials, and other informational materials are available at the USMLE website (<http://www.usmle.org>). Information regarding any changes in the USMLE program will also be posted at the USMLE website. You must obtain the most recent information to ensure an accurate understanding of current USMLE rules.

Preparing for the Test, Applying for the Test, Scheduling Test Dates, and Testing

In addition to the information in this booklet, you should review the sections that appear in the *Bulletin*: Preparing for the Test, Applying for the Test, Scheduling Your Test Date, and Testing.

Although the sample test materials in this booklet are provided in computer format at the USMLE website, you must run the tutorial and sample materials to become familiar with test software prior to your test date. The sample materials at the USMLE website include an additional block of items with associated audio or video findings and sequential item sets. You should become familiar with test items that have audio and video components and sequential item sets as these formats may be used in the actual examination. The block of items with associated audio or video and sequential item sets does not appear in this booklet.

The Step 2 CK examination consists of questions ("test items") presented in standard multiple-choice formats, as described on pages 4-5 of this booklet. The test items are divided into "blocks" (see Test Lengths and Formats in the *Bulletin*), and test item formats may vary within each block. You may want to study the descriptions of test item formats that follow before you run the sample test items. A Normal Laboratory Values Table, including Standard International conversions, is

reproduced on pages 20 and 21 of this booklet. This table will be available as an online reference when you take the examination. Please note that values shown in the actual examination may differ slightly from those printed in this booklet.

Examination Content

Step 2 CK consists of multiple-choice questions prepared by examination committees composed of faculty members, teachers, investigators, and clinicians with recognized prominence in their respective fields. Committee members are selected to provide broad representation from the academic, practice, and licensing communities across the United States and Canada. Test questions focus on the principles of clinical science that are deemed important for the practice of medicine under supervision in postgraduate training. The examination is constructed from an integrated content outline that organizes clinical science material along two dimensions.

Normal Conditions and Disease categories (Dimension 1) form the main axis for organizing the outline. The first section deals with normal growth and development, basic concepts, and general principles. The remaining sections deal with individual disorders.

Sections focusing on individual disorders are subdivided according to Physician Task (Dimension 2). The first set of physician tasks, Promoting Preventive Medicine and Health Maintenance, encompasses the assessment of risk factors, appreciation of epidemiologic data, and the application of primary and secondary preventive measures.

The second set of tasks, Understanding Mechanisms of Disease, encompasses etiology, pathophysiology, and effects of treatment modalities in the broadest sense.

The third set of tasks, Establishing a Diagnosis, pertains to interpretation of history and physical findings and the results of laboratory, imaging, and other studies to determine the most likely diagnosis or the most appropriate next step in diagnosis.

The fourth set of tasks, Applying Principles of Management, concerns the approach to care of patients with chronic and acute conditions in ambulatory and inpatient settings. Questions in this category will focus on the same topics covered in the diagnosis sections.

A full content outline for the USMLE Step 2 CK examination is provided on pages 6-18. It describes the scope of the examination in detail. To facilitate review, the major categories are indicated in bold type, with the subcategories in regular type.

The diseases noted in the outline do *not* represent an all-inclusive registry of disorders about which questions may be asked. They reflect the development of a “High-Impact Disease List” that includes common problems, less common problems where early detection or treatability are important considerations, and noteworthy exemplars of pathophysiology. Questions are generally, *but not exclusively*, focused on the listed disorders. In addition, not all listed topics are included on each examination.

The content outline is not intended as a curriculum development or study guide. It provides a flexible structure for test construction that can readily accommodate new topics, emerging content domains, and shifts in emphases. The categorizations and content coverage are subject to change. Broadly based learning that establishes a strong general foundation of understanding of concepts and principles in the clinical sciences is the best preparation for the examination.

Test Question Formats

Single One Best Answer Questions

This is the traditional, most frequently used multiple-choice format. It consists of a statement or question followed by three to twenty-six options that are in alphabetical or logical order. The response options in this format are lettered (eg, A, B, C, D, E). Examinees are required to select the best answer to the question. Other options may be partially correct, but there is only ONE BEST answer.

Strategies for Answering Single One Best Answer Test Questions

- Read each question carefully. It is important to understand what is being asked.
- Try to generate an answer and then look for it in the option list.
- Alternatively, read each option carefully, eliminating those that are clearly incorrect.
- Of the remaining options, select the one that is most correct.

- If unsure about an answer, it is better to guess, since unanswered questions are automatically counted as wrong answers.

Example Item 1

1. A 32-year-old woman with type 1 diabetes mellitus has had progressive renal failure over the past 2 years. She is not yet on dialysis. Examination shows no abnormalities. Her hemoglobin concentration is 9 g/dL, hematocrit is 28%, and mean corpuscular volume is 94 μm^3 . A blood smear shows normochromic, normocytic cells. Which of the following is the most likely cause?

- (A) Acute blood loss
- (B) Chronic lymphocytic leukemia
- (C) Erythrocyte enzyme deficiency
- (D) Erythropoietin deficiency
- (E) Immuno-hemolysis
- (F) Microangiopathic hemolysis
- (G) Polycythemia vera
- (H) Sickle cell disease
- (I) Sideroblastic anemia
- (J) β -Thalassemia trait

(Answer D)

Sequential Item Sets

A single patient-centered vignette may be associated with two or three consecutive questions about the information presented. Each question is linked to the initial patient vignette but is testing a different point. Questions are designed to be answered in sequential order. You are required to select the one best answer to each question. Other options may be partially correct, but there is only ONE BEST answer. You must click “Proceed to Next Item” to view the next item in the set; once you click on this button, you will not be able to add or change an answer to the displayed (previous) item.

Matching Sets

This format consists of a series of questions related to a common topic. All matching sets contain set-specific instructions, a list of lettered response options, and at least two questions. There will be between four and twenty-six response options. Each set is preceded by a box that indicates the number of questions in the set associated with the response options that follow. Examinees are directed to select one answer for each question in the set. Questions will be presented one at a time, with instructions and response options repeated for each subsequent question.

Strategies for Answering Matching Sets

- Begin each set by reading through the option list to become familiar with the available responses.
- Read each question carefully.
- Within a set, some options may be used several times, while other options may not be used at all. Respond to each question independently.
- For matching sets with large numbers of options, try to generate an answer to the question and then locate the answer in the option list. This is more efficient than considering each option individually.

The response options for the next 2 items are the same. Select one answer for each item in the set.

Example Items 2-3: Matching set

- (A) Chronic lymphocytic leukemia
- (B) Drug reaction
- (C) Hodgkin disease
- (D) Infectious mononucleosis
- (E) Metastatic carcinoma
- (F) Sarcoidosis
- (G) Systemic lupus erythematosus
- (H) Toxoplasmosis
- (I) Tuberculosis
- (J) Tularemia

For each patient with lymphadenopathy, select the most likely diagnosis.

2. A previously healthy 30-year-old man has had fever, night sweats, pruritus, and an enlarging lump above his left clavicle for 3 weeks. Examination shows a 3-cm, nontender, rubbery, supraclavicular lymph node. An x-ray of the chest shows mediastinal lymphadenopathy.

(Answer C)

3. A 41-year-old woman comes to the physician for a follow-up examination. She has taken aspirin for chronic headaches and phenytoin for a seizure disorder for 2 years. Examination shows mild epigastric tenderness and bilateral, 3-cm, nontender axillary lymph nodes. A lymph node biopsy shows hyperplasia.

(Answer B)

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1. General Principles

Infancy and Childhood

- Normal growth and development

Adolescence

- Sexuality; separation from parents/autonomy; physical changes of puberty

Senescence

- Normal physical and mental changes associated with aging

Medical Ethics and Jurisprudence

- Consent and informed consent to treatment (eg, full disclosure, alternate therapies, risks and benefits, life support, advance directives, health care proxy) and research issues (eg, consent, placebos, conflict of interest, vulnerable populations)
- Physician-patient relationship (eg, truth telling, confidentiality, privacy, autonomy, public reporting) and birth-related issues (eg, prenatal diagnosis, abortion, maternal-fetal conflict)
- Death and dying (eg, diagnosing death, organ donation, euthanasia, physician-assisted suicide) and palliative care (eg, hospice, pain management, family counseling, psychosocial and spiritual issues, fear and loneliness)

Applied Biostatistics and Clinical Epidemiology

- Understanding statistical concepts of measurement in medical practice
- Interpretation of the medical literature

Systems-Based Practice and Patient Safety

- System-based practice and quality improvement (microsystems and teams including hand-offs, standardization of processes, reducing deviance)
- Patient safety, medical errors and near misses (sentinel events, problem identification, root cause analysis)

2. Infectious and Parasitic Diseases

(Topic covered under each organ system)

3. Neoplasms

(Topic covered under each organ system)

4. Immunologic Disorders

Health and Health Maintenance

- Anaphylaxis and other allergic reactions
- HIV infection/AIDS
- Immunization against infectious agents (including infants, children, adults, the elderly; patients having compromised immune systems)

4. Immunologic Disorders (continued)

Mechanisms of Disease

- Abnormalities of cell-mediated immunity
- Abnormalities of humoral immunity

Diagnosis

- Anaphylactic reactions and shock
- Connective tissue disorders (eg, mixed connective tissue disease and systemic lupus erythematosus)
- HIV infection/AIDS; deficiencies of cell-mediated immunity
- Deficiencies of humoral immunity; combined immune deficiency

Principles of Management

(With emphasis on topics covered in Diagnosis)

- Pharmacotherapy only
- Management decision (treatment/diagnosis steps)
- Treatment only

5. Diseases of the Blood and Blood-forming Organs

Health and Health Maintenance

- Anemia (iron deficiency, vitamin-related, drug-induced, sickle cell)
- Infection (systemic)

Mechanisms of Disease

- Red cell disorders
- Coagulation disorders
- White cell disorders, including leukopenia, agranulocytosis, and neoplasms

Diagnosis

- Anemia, disorders of red cells, hemoglobin, and iron metabolism (eg, blood loss; iron deficiency anemia, nutritional deficiencies; pernicious anemia, other megaloblastic anemias; hemolytic anemia; anemia associated with chronic disease; aplastic anemia, pancytopenia; thalassemia; sickle cell disease; polycythemia vera; hemochromatosis)
- Bleeding disorders, coagulopathies, thrombocytopenia (eg, hemophilia, von Willebrand disease; qualitative and quantitative platelet deficiencies; disseminated intravascular coagulation; hypofibrinogenemia; immune thrombocytopenic purpura; hemolytic uremic syndrome)
- Neoplastic disorders (eg, Hodgkin disease, non-Hodgkin lymphoma; acute leukemia in children; acute leukemia in adults; chronic leukemic states; mycosis fungoides; multiple myeloma)
- Eosinophilia and reactions to transfusion of blood components (including complications) and leukopenic disorders, agranulocytosis
- Infection (eg, sepsis, malaria, mononucleosis)

5. Diseases of the Blood and Blood-forming Organs (continued)

Principles of Management

(With emphasis on topics covered in Diagnosis)

- Pharmacotherapy only
- Management decision (treatment/diagnosis steps)
- Treatment only

6. Mental Disorders

Health and Health Maintenance

- Early identification and intervention (eg, suicide potential, depression, alcohol/substance abuse, family involvement in schizophrenia)

Mechanisms of Disease

- Biologic markers of mental disorders and mental retardation syndromes
- Intended/unintended effects of therapeutic interventions, including effects of drugs on neurotransmitters

Diagnosis

- Mental disorders usually first diagnosed in infancy, childhood, or adolescence (eg, mental retardation; communication disorders; pervasive developmental disorders; attention-deficit/hyperactivity disorder; disruptive disorders; tic disorders; elimination disorders)
- Substance-related disorders (eg, alcohol and other substances)
- Schizophrenia and other psychotic disorders
- Mood disorders (eg, bipolar disorders; major unipolar depressive disorders; dysthymic disorder; mood disorder due to a general medical condition; medication-induced mood disorder)
- Anxiety disorders (eg, panic disorder; phobia; obsessive-compulsive disorder; post-traumatic stress disorder; generalized anxiety disorder; acute stress disorder; separation anxiety disorder; anxiety due to a general medical condition; substance-induced anxiety disorder)
- Somatoform disorders (eg, factitious disorder; somatization disorder; pain disorder; conversion disorder; hypochondriasis)
- Other disorders/conditions (eg, sexual and gender identity disorders; personality disorders; child, spouse, elder abuse; eating disorders; adjustment disorders; dissociative disorders; psychological factors affecting medical conditions)

Principles of Management

(With emphasis on topics covered in Diagnosis)

- Pharmacotherapy only
- Management decision (treatment/diagnosis steps)
- Treatment only

7. Diseases of the Nervous System and Special Senses

Health and Health Maintenance

- Cerebrovascular disease, cerebral infarction
- Nutritional deficiencies, toxic injuries, and occupational disorders including lead, carbon monoxide, and organophosphate poisoning
- Infection involving the nervous system, eyes, or ears
- Degenerative and demyelinating disorders, including Alzheimer disease and multiple sclerosis

Mechanisms of Disease

- Localizing anatomy:
 - brain and special senses
 - brain stem
 - spinal cord
 - neuromuscular system
- Anatomy of cerebral circulation
- Increased intracranial pressure and altered state of consciousness
- Infection
- Degenerative/developmental and metabolic disorders

Diagnosis

- Disorders of the eye (eg, blindness; glaucoma; infection; papilledema; optic atrophy; retinal disorders; diabetic retinopathy; diplopia; cataract; neoplasms; vascular disorders; uveitis; iridocyclitis; traumatic, toxic injury; toxoplasmosis)
- Disorders of the ear, olfaction, and taste (eg, deafness, hearing loss, otitis, mastoiditis; vertigo, tinnitus, Meniere disease; acoustic neuroma; traumatic, toxic injury)
- Disorders of the nervous system:
 - paroxysmal disorders (eg, headache; trigeminal neuralgia; seizure disorders; syncope)
 - cerebrovascular disease (eg, intracerebral hemorrhage; ischemic disorders; aneurysm, subarachnoid hemorrhage; cavernous sinus thrombosis)
 - traumatic, toxic injury; including lead, carbon monoxide, and organophosphate poisoning
 - infections (eg, bacterial, fungal, viral, opportunistic infection in immunocompromised patients; Lyme disease; abscess; neurosyphilis; Guillain-Barré syndrome)
 - neoplasms (eg, primary; metastatic; neurofibromatosis)
 - metabolic disorders (eg, metabolic encephalopathy, vitamin B₁₂ [cobalamin] deficiency, vitamin B₁ [thiamine] deficiency; coma, confusion, delirium, dementia)
 - degenerative and developmental disorders (eg, Alzheimer disease; Huntington disease; parkinsonism; amyotrophic lateral sclerosis; Tay-Sachs disease; multiple sclerosis; cerebral palsy; dyslexia)
 - neuromuscular disorders, gait abnormalities, and disorders relating to the spine and spinal nerve roots (eg, myasthenia gravis; muscular dystrophy; peripheral neuropathy; neck pain; cervical radiculopathy; lumbosacral radiculopathy; spinal stenosis)
 - sleep disorders (eg, narcolepsy, idiopathic hypersomnolence, restless legs syndrome, REM sleep behavior disorder, circadian rhythm sleep disorder, sleep apnea)

7. Diseases of the Nervous System and Special Senses (continued)

Principles of Management

(With emphasis on topics covered in Diagnosis)

- Pharmacotherapy only
- Management decision (treatment/diagnosis steps)
- Treatment only

8. Cardiovascular Disorders

Health and Health Maintenance

- Arterial hypertension
- Atherosclerosis and coronary artery disease; hyperlipidemia
- Prevention of rheumatic heart disease, thromboembolic disease, pulmonary emboli, bacterial endocarditis

Mechanisms of Disease

- Cardiac output, resistance, central venous pressure
- Valvular stenosis, incompetence
- Congenital heart disease
- Regulation of blood pressure
- Disorders of the arteries and veins

Diagnosis

- Dysrhythmias; palpitations, syncope (eg, premature beats; paroxysmal tachycardias; atrial flutter and fibrillation; bradycardias; ventricular fibrillation; cardiac arrest)
- Heart failure (congestive, diastolic, systolic dysfunction), dyspnea, fatigue, peripheral edema of cardiac origin (eg, chronic heart failure; cor pulmonale)
- Ischemic heart disease; chest pain of cardiac origin (eg, angina pectoris; coronary insufficiency; myocardial infarction)
- Diseases of the myocardium (eg, hypertrophic; myocarditis)
- Diseases of the pericardium (eg, acute pericarditis; chronic constrictive pericardiopathy; pericardial effusion; pericardial tamponade)
- Valvular heart disease (eg, acute rheumatic fever; mitral and aortic valve disorders; infective endocarditis)
- Congenital cardiovascular disease (eg, patent ductus arteriosus; atrial septal defect; ventricular septal defect; endocardial cushion defect; tetralogy of Fallot; coarctation of the aorta)
- Systemic hypotension, hypovolemia, cardiogenic shock; cyanosis
- Arterial hypertension (eg, essential; secondary)
- Atherosclerosis - lipoproteins
- Disorders of the great vessels (eg, dissecting aortic aneurysm; ruptured aneurysm; aortoiliac disease)
- Peripheral arterial vascular diseases, vasculitis (eg, polyarteritis; temporal arteritis; arteriovenous fistula)
- Diseases of the veins, peripheral edema (eg, varicose veins; thrombophlebitis; deep venous thrombosis)
- Traumatic injury

8. Cardiovascular Disorders (continued)

Principles of Management

(With emphasis on topics covered in Diagnosis)

- Pharmacotherapy only
- Management decision (treatment/diagnosis steps)
- Treatment only

9. Diseases of the Respiratory System

Health and Health Maintenance

- Chronic bronchitis, asthma, emphysema, carcinoma of the larynx, carcinoma of the lung; pulmonary aspiration, atelectasis; tuberculosis

Mechanisms of Disease

- Ventilatory dysfunction (eg, obstructive disorders: asthma, chronic obstructive pulmonary disease, cystic fibrosis, bronchitis, bronchiectasis, emphysema)
- Respiratory failure, acute and chronic, including oxygenation failure (eg, interstitial pneumonitis, pulmonary edema, acute respiratory distress syndrome, ventilation failure)
- Circulatory dysfunction
- Neoplastic disorders

Diagnosis

- Disorders of the nose, paranasal sinuses, pharynx, larynx, and trachea (eg, rhinitis; pharyngitis, tonsillitis, peritonsillar abscess; thrush; sinusitis; acute laryngotracheitis; epiglottitis; carcinoma of the larynx; laryngeal/pharyngeal obstruction; trauma; tracheoesophageal fistula)
- Infections of the lung (eg, acute bronchiolitis; pneumonia; tuberculosis)
- Obstructive airways disease (eg, chronic bronchitis, bronchiectasis; asthma, bronchospasm, wheezing; emphysema, α_1 -antitrypsin deficiency; cystic fibrosis)
- Atelectasis, pulmonary aspiration
- Pneumothorax, hemothorax, traumatic injury to the lungs and disorders involving the pleura (eg, pleurisy; pleural effusion)
- Pneumoconiosis, fibrosing or restrictive pulmonary disorders (eg, asbestosis; silicosis; sarcoidosis)
- Respiratory failure, hypoxia, hypercapnia, dyspnea (eg, respiratory distress syndrome of the newborn; acute respiratory distress syndrome; acute and chronic respiratory failure; drowning)
- Pulmonary vascular disorders (eg, pulmonary embolism; pulmonary hypertension; pulmonary edema)
- Neoplastic disorders of the lungs and pleura (eg, primary tumors; metastatic tumors)

Principles of Management

(With emphasis on topics covered in Diagnosis)

- Pharmacotherapy only
- Management decision (treatment/diagnosis steps)
- Treatment only

10. Nutritional and Digestive Disorders

Health and Health Maintenance

- Screening (eg, cancer)
- Viral hepatitis and alcohol-related hepatopathy

Mechanisms of Disease

- Malabsorption/malnutrition
- Jaundice
- Infections/parasites
- Obstruction/mechanical

Diagnosis

- Disorders of the mouth, salivary glands, oropharynx, and esophagus (eg, dental disorders; disorders of the salivary glands; esophageal reflux; dysphagia; motility disorders of the esophagus; hiatal hernia; carcinoma of the esophagus)
- Disorders of the stomach, small intestine, colon, and rectum/anus (eg, gastritis; peptic ulcer disease; congenital disorders; malabsorption; appendicitis; granulomatous enterocolitis; ischemic colitis; irritable bowel syndrome; diverticula; colonic polyps; ulcerative colitis; peritonitis; bowel obstruction, volvulus, intussusception; hernia; necrotizing enterocolitis; infection; carcinoma of the stomach, colon, and rectum; antibiotic-associated colitis; hemorrhoids; anal fissures; anal fistula; perianal/perirectal abscess)
- Disorders of the pancreas (eg, pancreatitis; pseudocyst; carcinoma of the pancreas)
- Disorders of the liver and biliary system (eg, hepatitis; cirrhosis; hepatic failure, hepatic encephalopathy, jaundice; portal hypertension; ascites, esophageal varices; cholelithiasis; cholecystitis; hepatic abscess, subphrenic abscess; neoplasms of the liver; storage diseases; neoplasms of the biliary tract)
- Traumatic injury and poisoning (including drain cleaner ingestion)

Principles of Management

(With emphasis on topics covered in Diagnosis)

- Pharmacotherapy only
- Management decision (treatment/diagnosis steps)
- Treatment only

11. Gynecologic Disorders

Health and Health Maintenance

- Postmenarchal/reproductive
- Peri/postmenopausal

Mechanisms of Disease

- Infections (eg, vulvovaginitis; pelvic inflammatory disease; toxic shock; sexually transmitted disease; endometritis; urethritis; Bartholin gland abscess; abscess of the breast; mastitis)
- Urinary incontinence and obstruction
- Menstrual and endocrinologic disorders; infertility

Diagnosis

- Pelvic relaxation and urinary incontinence (eg, urinary tract infection; uterovaginal prolapse; cystocele, rectocele, urethrocele)
- Neoplasms (eg, cervical dysplasia, cancer; leiomyomata uteri; endometrial cancer; ovarian neoplasms; neoplastic disorders of the breast; vulvar neoplasms)
- Benign conditions of the breast
- Menstrual and endocrinologic disorders (eg, amenorrhea [including undiagnosed pregnancy]; abnormal uterine bleeding; dysmenorrhea; menopausal, postmenopausal disorders [osteoporosis]; premenstrual syndrome; hirsutism, virilization; ovarian disorders [ovarian failure, polycystic ovarian syndrome])
- Sexual abuse and rape

Principles of Management

(With emphasis on topics covered in Diagnosis)

- Pharmacotherapy only
- Management decision (treatment/diagnosis steps)
- Treatment only

12. Renal, Urinary, and Male Reproductive Systems

Health and Health Maintenance

- Infections (eg, urinary tract, sexually transmitted diseases [male])
- Acute and chronic renal failure including risk factors and prevention and methods of limiting progression
- Male health maintenance examination (eg, testicular, prostatic)

Mechanisms of Disease

- Disorders of the male reproductive system
- Urinary incontinence and obstruction, enuresis
- Renal insufficiency/failure
- Electrolyte and water metabolism and acid-base balance

12. Renal, Urinary, and Male Reproductive Systems (continued)

Diagnosis

- Disorders of the male reproductive system (eg, infections; torsion of the testis; undescended testicle; neoplasms of the testis; benign prostatic hyperplasia; carcinoma of the prostate; hypospadias; hydrocele, varicocele; urethral stricture, impotence, premature ejaculation)
- Disorders of the urinary bladder and urinary collecting system (eg, cystitis; pyelitis; dysuria, hematuria, pyuria; carcinoma of the bladder; urolithiasis; ureteral reflux; neurogenic bladder; urinary incontinence; enuresis; obstruction; hydronephrosis)
- Disorders of the kidneys (eg, pyelonephritis; glomerulonephritis; interstitial nephropathy; renal insufficiency and failure; oliguria, anuria, azotemia, uremia, renal osteodystrophy; hypertensive renal disease; lupus nephritis; inherited disorders)
- Traumatic injury

Principles of Management

(With emphasis on topics covered in Diagnosis)

- Pharmacotherapy only
- Management decision (treatment/diagnosis steps)
- Treatment only

13. Disorders of Pregnancy, Childbirth, and the Puerperium

Health and Health Maintenance

- Prenatal care (eg, nutrition; prevention of iron deficiency; prevention of vitamin deficiency; Rh immunoglobulin prophylaxis; prenatal diagnosis; teratology, diabetes mellitus, urinary tract infection, α -fetoprotein, rubella, genital herpes, streptococcal infections)
- Assessment of the at-risk pregnancy; risk of preterm labor
- Intrapartum care; signs of fetal compromise
- Contraception; sterilization; prevention of pregnancy after rape

Mechanisms of Disease

- Placenta, placental dysfunction
- Pregnancy and labor, including infection
- Postpartum disorders, including infection
- Fetus and newborn

13. Disorders of Pregnancy, Childbirth, and the Puerperium (continued)

Diagnosis

- Pregnancy and labor, including obstetric complications (eg, ectopic pregnancy; spontaneous abortion/septic abortion; hypertension; third-trimester bleeding; hydramnios; preterm labor, premature rupture of the membranes, normal labor; multiple gestation; intrapartum fetal distress/fetal death; maternal mortality; fetal growth and development abnormalities; congenital abnormalities; gestational trophoblastic disease)
- Nonobstetric complications of pregnancy (eg, major medical complications and preexisting medical conditions; surgical complications; hyperemesis gravidarum)
- Complications of the puerperium (eg, problems with breast-feeding; postpartum hemorrhage; postpartum sepsis; postpartum depression, psychosis; mastitis; venous thromboembolism)

Principles of Management

(With emphasis on topics covered in Diagnosis)

- Pharmacotherapy only
- Management decision (treatment/diagnosis steps)
- Treatment only

14. Disorders of the Skin and Subcutaneous Tissues

Health and Health Maintenance

- Epidemiology and prevention of skin disorders secondary to exposure to the sun; contact dermatitis and drug reactions; decubitus ulcers; dermatophytic skin disorders

Mechanisms of Disease

- Skin disorders, including cancer, infections, and inflammatory disorders

Diagnosis

- Infections (eg, herpes simplex, herpes zoster, chickenpox; cellulitis, carbuncle, abscess, gangrene; dermatophytoses; pilonidal cyst; viral warts; decubitus ulcers)
- Neoplasms (eg, squamous cell carcinoma; melanoma; actinic keratosis, basal cell carcinoma; pigmented nevi; hemangiomas)
- Other skin disorders (eg, industrial, occupational, and atopic dermatitis; psoriasis; seborrhea; acne)

Principles of Management

(With emphasis on topics covered in Diagnosis)

- Pharmacotherapy only
- Management decision (treatment/diagnosis steps)
- Treatment only

15. Diseases of the Musculoskeletal System and Connective Tissue

Health and Health Maintenance

- Epidemiology, impact, and prevention of degenerative joint and disc disease
- Prevention of disability due to musculoskeletal disorders or infection (eg, osteomyelitis; septic arthritis; Lyme disease; gonococcal tenosynovitis)

Mechanisms of Disease

- Infections
- Nerve compressions and degenerative, metabolic, and nutritional disorders
- Inherited, congenital, or developmental disorders
- Inflammatory or immunologic disorders

Diagnosis

- Infections (eg, osteomyelitis; septic arthritis; Lyme disease; gonococcal tenosynovitis)
- Degenerative, metabolic, and nutritional disorders (eg, degenerative joint disease; degenerative disc disease; gout; rickets)
- Inherited, congenital, or developmental disorders (eg, congenital hip dysplasia; phocomelia; osteochondritis; slipped capital femoral epiphysis; scoliosis; syringomyelia, dislocated hip in infantile spinal muscular atrophy)
- Inflammatory, immunologic, and other disorders (eg, polymyalgia rheumatica; lupus arthritis; polymyositis-dermatomyositis; rheumatoid arthritis; ankylosing spondylitis; bursitis; tendinitis; myofascial pain; fibromyalgia; shoulder-hand syndrome; Dupuytren contracture; Paget disease)
- Neoplasms (eg, osteosarcoma; metastases to bone; pulmonary osteoarthropathy)
- Traumatic injury and nerve compression and injury (eg, fractures, sprains, dislocations, carpal tunnel syndrome; cauda equina syndrome, low back pain)

Principles of Management

(With emphasis on topics covered in Diagnosis)

- Pharmacotherapy only
- Management decision (treatment/diagnosis steps)
- Treatment only

16. Endocrine and Metabolic Disorders

Health and Health Maintenance

- Diabetes mellitus, including prevention of morbidity and mortality due to complications
- Screening (eg, cancer)

Mechanisms of Disease

- Thyroid function
- Diabetes mellitus and carbohydrate metabolism
- Parathyroid and calcium metabolism
- Pituitary and hypothalamic function
- Adrenal function

16. Endocrine and Metabolic Disorders (continued)

Diagnosis

- Thyroid disorders (eg, nodule; carcinoma; acquired hypothyroidism; thyroiditis; thyrotoxicosis; congenital hypothyroidism; goiter)
- Diabetes mellitus (eg, type 1, type 2; ketoacidosis; hyperosmolar coma; chronic complications)
- Parathyroid and calcium disorders (eg, hyperparathyroidism; hypoparathyroidism), and hypoglycemia and hyperinsulinism (eg, iatrogenic; insulinoma)
- Pituitary and hypothalamic disorders (eg, diabetes insipidus; inappropriate ADH secretion; panhypopituitarism; acromegaly)
- Adrenal disorders (eg, corticoadrenal insufficiency; Cushing syndrome; adrenogenital syndrome; hyperaldosteronism; pheochromocytoma)
- Heat-related illness

Principles of Management

(With emphasis on topics covered in Diagnosis)

- Pharmacotherapy only
- Management decision (treatment/diagnosis steps)
- Treatment only

17. Congenital Anomalies

(Topic covered under each organ system)

18. Conditions Originating in the Perinatal Period

(Topic covered under Disorders of Pregnancy, Childbirth, and the Puerperium [category 13])

19. Symptoms, Signs, and Ill-defined Conditions

(Topic covered under each organ system)

20. Injury and Poisoning

(Topic covered under each organ system)

Sample Step 2 CK

Sample Questions

The following pages include 138 sample test questions. These questions are the same as those you install on your computer from the USMLE website. For information on obtaining the test software and additional information on preparing to take the test and testing, you must review the *2009 USMLE Bulletin of Information*: see Preparing for the Test and Testing. Please note that reviewing the sample questions as they appear in the *Bulletin* is not a substitute for acquainting yourself with the test software. You should run the Step 2 CK tutorial and sample test questions that are provided on the USMLE website well before your test date. The sample test materials on the USMLE website include an additional block of items with associated audio or video findings and sequential item sets. You should become familiar with test items that have audio or video components and sequential item sets as these formats may be used in the actual examination. The block of items with associated audio or video and sequential item sets does not appear in this booklet.

These sample questions are illustrative of the types of questions used in the Step 2 CK examination. Although the questions exemplify content on the examination, they may not reflect the content coverage on individual examinations. Questions of the same format are grouped together in this booklet. In the actual examination, questions may appear randomly in the examination; they will not be grouped according to type or specific content. In the actual examination, the questions will be presented one at a time in a format designed for easy on-screen reading, including use of exhibit buttons (separate windows) for the Normal Laboratory Values Table (included here on pages 20-21) and some pictorials. Photographs, charts, and x-rays referred to in this booklet are not of the same quality as the pictorials used in the actual examination. In addition, you will have the capability to adjust the brightness and contrast of pictorials on the computer screen.

To take the following sample test questions as they would be timed in the actual examination, you should allow a maximum of one hour for each block, for a total of three hours. Please be aware that most examinees perceive the time pressure to be greater during an actual examination. An answer sheet for recording answers is provided on page 22. In the actual examination, answers will be selected on the screen; **no answer sheet will be provided**. An answer key is provided on page 76.

USMLE Step 2 CK Laboratory Values

* Included in the Biochemical Profile (SMA-12)

	<u>REFERENCE RANGE</u>	<u>SI REFERENCE INTERVALS</u>
BLOOD, PLASMA, SERUM		
* Alanine aminotransferase (ALT), serum	8-20 U/L	8-20 U/L
Amylase, serum	25-125 U/L	25-125 U/L
* Aspartate aminotransferase (AST), serum	8-20 U/L	8-20 U/L
Bilirubin, serum (adult) Total // Direct	0.1-1.0 mg/dL // 0.0-0.3 mg/dL	2-17 μ mol/L // 0-5 μ mol/L
* Calcium, serum (Ca^{2+})	8.4-10.2 mg/dL	2.1-2.8 mmol/L
* Cholesterol, serum	Rec: <200 mg/dL	<5.2 mmol/L
Cortisol, serum	0800 h: 5-23 μ g/dL // 1600 h: 3-15 μ g/dL	138-635 nmol/L // 82-413 nmol/L
	2000 h: \leq 50% of 0800 h	Fraction of 0800 h: \leq 0.50
Creatine kinase, serum	Male: 25-90 U/L	25-90 U/L
	Female: 10-70 U/L	10-70 U/L
* Creatinine, serum	0.6-1.2 mg/dL	53-106 μ mol/L
Electrolytes, serum		
Sodium (Na^+)	136-145 mEq/L	136-145 mmol/L
* Potassium (K^+)	3.5-5.0 mEq/L	3.5-5.0 mmol/L
Chloride (Cl^-)	95-105 mEq/L	95-105 mmol/L
Bicarbonate (HCO_3^-)	22-28 mEq/L	22-28 mmol/L
Magnesium (Mg^{2+})	1.5-2.0 mEq/L	0.75-1.0 mmol/L
Estradiol, total, serum (in pregnancy)		
24-28 wks // 32-36 wks	30-170 ng/mL // 60-280 ng/mL	104-590 nmol/L // 208-970 nmol/L
28-32 wks // 36-40 wks	40-220 ng/mL // 80-350 ng/mL	140-760 nmol/L // 280-1210 nmol/L
Ferritin, serum	Male: 15-200 ng/mL	15-200 μ g/L
	Female: 12-150 ng/mL	12-150 μ g/L
Follicle-stimulating hormone, serum/plasma	Male: 4-25 mIU/mL	4-25 U/L
	Female: premenopause 4-30 mIU/mL	4-30 U/L
	midcycle peak 10-90 mIU/mL	10-90 U/L
	postmenopause 40-250 mIU/mL	40-250 U/L
Gases, arterial blood (room air)		
pH	7.35-7.45	$[\text{H}^+]$ 36-44 nmol/L
PCO_2	33-45 mm Hg	4.4-5.9 kPa
PO_2	75-105 mm Hg	10.0-14.0 kPa
* Glucose, serum	Fasting: 70-110 mg/dL	3.8-6.1 mmol/L
	2-h postprandial: < 120 mg/dL	< 6.6 mmol/L
Growth hormone - arginine stimulation	Fasting: < 5 ng/mL	< 5 μ g/L
	provocative stimuli: > 7 ng/mL	> 7 μ g/L
Immunoglobulins, serum		
IgA	76-390 mg/dL	0.76-3.90 g/L
IgE	0-380 IU/mL	0-380 kIU/L
IgG	650-1500 mg/dL	6.5-15 g/L
IgM	40-345 mg/dL	0.4-3.45 g/L
Iron	50-170 μ g/dL	9-30 μ mol/L
Lactate dehydrogenase, serum	45-90 U/L	45-90 U/L
Luteinizing hormone, serum/plasma	Male: 6-23 mIU/mL	6-23 U/L
	Female: follicular phase 5-30 mIU/mL	5-30 U/L
	midcycle 75-150 mIU/mL	75-150 U/L
	postmenopause 30-200 mIU/mL	30-200 U/L
Osmolality, serum	275-295 mOsmol/kg H_2O	275-295 mOsmol/kg H_2O
Parathyroid hormone, serum, N-terminal	230-630 pg/mL	230-630 ng/L
* Phosphatase (alkaline), serum (p-NPP at 30EC)	20-70 U/L	20-70 U/L
* Phosphorus (inorganic), serum	3.0-4.5 mg/dL	1.0-1.5 mmol/L
Prolactin, serum (hPRL)	< 20 ng/mL	< 20 μ g/L
* Proteins, serum		
Total (recumbent)	6.0-7.8 g/dL	60-78 g/L
Albumin	3.5-5.5 g/dL	35-55 g/L
Globulin	2.3-3.5 g/dL	23-35 g/L
Thyroid-stimulating hormone, serum or plasma	0.5-5.0 μ U/mL	0.5-5.0 mU/L
Thyroidal iodine (^{123}I) uptake	8%-30% of administered dose/24 h	0.08-0.30/24 h
Thyroxine (T_4), serum	5-12 μ g/dL	64-155 nmol/L
Triglycerides, serum	35-160 mg/dL	0.4-1.81 mmol/L
Triiodothyronine (T_3), serum (RIA)	115-190 ng/dL	1.8-2.9 nmol/L
Triiodothyronine (T_3) resin uptake	25%-35%	0.25-0.35
* Urea nitrogen, serum	7-18 mg/dL	1.2-3.0 mmol/L
* Uric acid, serum	3.0-8.2 mg/dL	0.18-0.48 mmol/L

USMLE Step 2 CK Laboratory Values (continued)

	<u>REFERENCE RANGE</u>	<u>SI REFERENCE INTERVALS</u>
BODY MASS INDEX (BMI)		
Body mass index.....	Adult: 19-25 kg/m ²	
CEREBROSPINAL FLUID		
Cell count.....	0-5/mm ³	0-5 x 10 ⁶ /L
Chloride.....	118-132 mEq/L	118-132 mmol/L
Gamma globulin.....	3%-12% total proteins	0.03-0.12
Glucose.....	40-70 mg/dL	2.2-3.9 mmol/L
Pressure.....	70-180 mm H ₂ O	70-180 mm H ₂ O
Proteins, total.....	<40 mg/dL	<0.40 g/L
HEMATOLOGIC		
Bleeding time (template).....	2-7 minutes	2-7 minutes
Erythrocyte count.....	Male: 4.3-5.9 million/mm ³ Female: 3.5-5.5 million/mm ³	4.3-5.9 x 10 ¹² /L 3.5-5.5 x 10 ¹² /L
Erythrocyte sedimentation rate (Westergren).....	Male: 0-15 mm/h Female: 0-20 mm/h	0-15 mm/h 0-20 mm/h
Hematocrit.....	Male: 41%-53% Female: 36%-46%	0.41-0.53 0.36-0.46
Hemoglobin A _{1c}	≤ 6%	≤ 0.06
Hemoglobin, blood.....	Male: 13.5-17.5 g/dL Female: 12.0-16.0 g/dL	2.09-2.71 mmol/L 1.86-2.48 mmol/L
Hemoglobin, plasma.....	1-4 mg/dL	0.16-0.62 mmol/L
Leukocyte count and differential		
Leukocyte count.....	4500-11,000/mm ³	4.5-11.0 x 10 ⁹ /L
Segmented neutrophils.....	54%-62%	0.54-0.62
Bands.....	3%-5%	0.03-0.05
Eosinophils.....	1%-3%	0.01-0.03
Basophils.....	0%-0.75%	0-0.0075
Lymphocytes.....	25%-33%	0.25-0.33
Monocytes.....	3%-7%	0.03-0.07
Mean corpuscular hemoglobin.....	25.4-34.6 pg/cell	0.39-0.54 fmol/cell
Mean corpuscular hemoglobin concentration.....	31%-36% Hb/cell	4.81-5.58 mmol Hb/L
Mean corpuscular volume.....	80-100 μm ³	80-100 fL
Partial thromboplastin time (activated).....	25-40 seconds	25-40 seconds
Platelet count.....	150,000-400,000/mm ³	150-400 x 10 ⁹ /L
Prothrombin time.....	11-15 seconds	11-15 seconds
Reticulocyte count.....	0.5%-1.5%	0.005-0.015
Thrombin time.....	<2 seconds deviation from control	<2 seconds deviation from control
Volume		
Plasma.....	Male: 25-43 mL/kg Female: 28-45 mL/kg	0.025-0.043 L/kg 0.028-0.045 L/kg
Red cell.....	Male: 20-36 mL/kg Female: 19-31 mL/kg	0.020-0.036 L/kg 0.019-0.031 L/kg
SWEAT		
Chloride.....	0-35 mmol/L	0-35 mmol/L
URINE		
Calcium.....	100-300 mg/24 h	2.5-7.5 mmol/24 h
Chloride.....	Varies with intake	Varies with intake
Creatinine clearance.....	Male: 97-137 mL/min Female: 88-128 mL/min	
Estriol, total (in pregnancy)		
30 wks.....	6-18 mg/24 h	21-62 μmol/24 h
35 wks.....	9-28 mg/24 h	31-97 μmol/24 h
40 wks.....	13-42 mg/24 h	45-146 μmol/24 h
17-Hydroxycorticosteroids.....	Male: 3.0-10.0 mg/24 h Female: 2.0-8.0 mg/24 h	8.2-27.6 μmol/24 h 5.5-22.0 μmol/24 h
17-Ketosteroids, total.....	Male: 8-20 mg/24 h Female: 6-15 mg/24 h	28-70 μmol/24 h 21-52 μmol/24 h
Osmolality.....	50-1400 mOsmol/kg H ₂ O	
Oxalate.....	8-40 μg/mL	90-445 μmol/L
Potassium.....	Varies with diet	Varies with diet
Proteins, total.....	<150 mg/24 h	<0.15 g/24 h
Sodium.....	Varies with diet	Varies with diet
Uric acid.....	Varies with diet	Varies with diet

Answer Sheet for Step 2 CK Sample Questions

Block 1 (Questions 1-46)

- | | | | | |
|-----------|-----------|-----------|-----------|-----------|
| 1. _____ | 11. _____ | 21. _____ | 31. _____ | 41. _____ |
| 2. _____ | 12. _____ | 22. _____ | 32. _____ | 42. _____ |
| 3. _____ | 13. _____ | 23. _____ | 33. _____ | 43. _____ |
| 4. _____ | 14. _____ | 24. _____ | 34. _____ | 44. _____ |
| 5. _____ | 15. _____ | 25. _____ | 35. _____ | 45. _____ |
| 6. _____ | 16. _____ | 26. _____ | 36. _____ | 46. _____ |
| 7. _____ | 17. _____ | 27. _____ | 37. _____ | |
| 8. _____ | 18. _____ | 28. _____ | 38. _____ | |
| 9. _____ | 19. _____ | 29. _____ | 39. _____ | |
| 10. _____ | 20. _____ | 30. _____ | 40. _____ | |
-

Block 2 (Questions 47-92)

- | | | | | |
|-----------|-----------|-----------|-----------|-----------|
| 47. _____ | 57. _____ | 67. _____ | 77. _____ | 87. _____ |
| 48. _____ | 58. _____ | 68. _____ | 78. _____ | 88. _____ |
| 49. _____ | 59. _____ | 69. _____ | 79. _____ | 89. _____ |
| 50. _____ | 60. _____ | 70. _____ | 80. _____ | 90. _____ |
| 51. _____ | 61. _____ | 71. _____ | 81. _____ | 91. _____ |
| 52. _____ | 62. _____ | 72. _____ | 82. _____ | 92. _____ |
| 53. _____ | 63. _____ | 73. _____ | 83. _____ | |
| 54. _____ | 64. _____ | 74. _____ | 84. _____ | |
| 55. _____ | 65. _____ | 75. _____ | 85. _____ | |
| 56. _____ | 66. _____ | 76. _____ | 86. _____ | |
-

Block 3 (Questions 93-138)

- | | | | | |
|------------|------------|------------|------------|------------|
| 93. _____ | 103. _____ | 113. _____ | 123. _____ | 133. _____ |
| 94. _____ | 104. _____ | 114. _____ | 124. _____ | 134. _____ |
| 95. _____ | 105. _____ | 115. _____ | 125. _____ | 135. _____ |
| 96. _____ | 106. _____ | 116. _____ | 126. _____ | 136. _____ |
| 97. _____ | 107. _____ | 117. _____ | 127. _____ | 137. _____ |
| 98. _____ | 108. _____ | 118. _____ | 128. _____ | 138. _____ |
| 99. _____ | 109. _____ | 119. _____ | 129. _____ | |
| 100. _____ | 110. _____ | 120. _____ | 130. _____ | |
| 101. _____ | 111. _____ | 121. _____ | 131. _____ | |
| 102. _____ | 112. _____ | 122. _____ | 132. _____ | |

Sample Questions

Block 1 (Questions 1-46)

1. A 67-year-old woman comes to the physician because of easy bruising for 4 months. She has a history of lung cancer treated with radiation therapy 6 months ago. She has a 2-year history of hypertension treated with a thiazide diuretic and an angiotensin-converting enzyme (ACE) inhibitor. Examination, including neurologic examination, shows no abnormalities except for multiple ecchymoses. Her hemoglobin concentration is 13 g/dL, leukocyte count is 5000/mm³, and platelet count is 35,000/mm³. A serum antiplatelet antibody assay is negative. Which of the following is the most appropriate next step in diagnosis?

 - (A) Bone scan
 - (B) CT scan of the abdomen
 - (C) CT scan of the chest
 - (D) Bronchoscopy
 - (E) Bone marrow aspiration
2. A 19-year-old nulligravid woman comes to the physician for counseling prior to conception. She has a history of seizure disorder treated with carbamazepine. Her temperature is 37.2°C (99°F), pulse is 68/min, respirations are 18/min, and blood pressure is 110/70 mm Hg. Examination shows no abnormalities. Which of the following is the most appropriate recommendation for this patient?

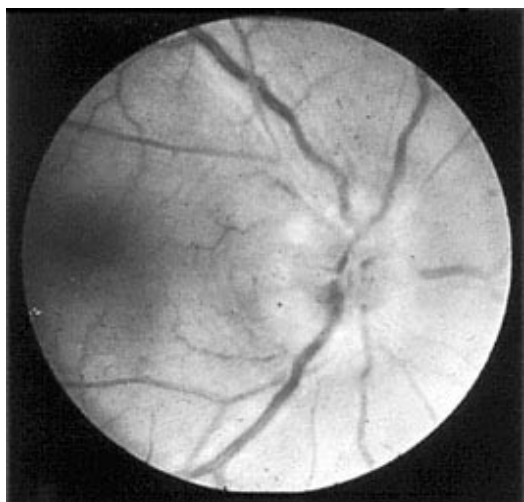
 - (A) Recommend adoption
 - (B) Measure serum fasting glucose concentration
 - (C) Measure serum ferritin concentration
 - (D) Begin folic acid supplementation
 - (E) Discontinue carbamazepine therapy
 - (F) Switch to valproic acid therapy
3. A 48-year-old man with alcoholism comes to the physician because of fever, a facial rash, and rapidly progressive swelling of the left side of the face. The swelling began 12 hours ago when a scab on his left cheek began to itch. His temperature is 39.2°C (102.5°F). He is unable to open his left eye because of the severity of the swelling. Which of the following is the most likely causal organism?

 - (A) Group A streptococcus
 - (B) *Haemophilus influenzae*
 - (C) Herpes simplex virus
 - (D) *Neisseria meningitidis*
 - (E) *Streptococcus pneumoniae*
4. A previously healthy 27-year-old man comes to the physician 4 weeks after noticing three nontender lesions on his penis. He says they have not changed in size. He is sexually active with multiple male and female partners and uses condoms inconsistently. He takes no medications. He drinks two to five beers on social occasions. He occasionally smokes marijuana. His temperature is 36.9°C (98.4°F). There is no lymphadenopathy. Examination shows three sessile, flesh-colored lesions on the shaft of the penis that are 10 mm in diameter. On application of a dilute solution of acetic acid, the lesions turn white. The remainder of the examination shows no abnormalities. Which of the following is the most appropriate next step in management?

 - (A) Topical ganciclovir therapy
 - (B) Oral acyclovir therapy
 - (C) Oral doxycycline therapy
 - (D) Intramuscular penicillin therapy
 - (E) Cryotherapy

5. A 6-year-old boy is brought to the emergency department 2 hours after injuring his arm when he fell out of a tree. His mother says that he is extremely active and likes to climb. During the past year, he fractured his right tibia after falling off a trampoline and sustained a concussion after falling off his bicycle. She says that his teachers reprimand him frequently for running wildly in the classroom, talking excessively, and getting out of his seat; he often forgets to turn in his homework. His parents are currently divorcing. His father has a history of illicit drug use. The patient is at the 50th percentile for height and weight. His pulse is 80/min, and blood pressure is 100/80 mm Hg. Physical examination shows a dislocated left shoulder, healing abrasions over the elbows, and ecchymoses in various stages of healing over the knees. Mental status examination shows a neutral affect. He says that he likes to run and climb trees. Which of the following is the most likely explanation for these findings?
- (A) Attention-deficit/hyperactivity disorder
 (B) Conduct disorder
 (C) Learning disorder
 (D) Seizure disorder
 (E) Age-appropriate behavior
6. In a study of prophylactic administration of isoniazid, tuberculin-positive schoolchildren were randomly assigned to drug or placebo treatment groups. A third group, consisting of those who elected not to enroll in the study, was also observed. After several years, the third group had a significantly higher rate of tuberculosis than the placebo group. Which of the following is the most likely cause of these results?
- (A) Observer bias
 (B) Placebo effect
 (C) Poor randomization
 (D) Self-selection bias
 (E) Unblinded bias
7. A 65-year-old man who is quadriplegic as a result of multiple sclerosis is hospitalized for treatment of left lower lobe pneumonia. His temperature is 38.1°C (100.5°F), pulse is 95/min, respirations are 12/min, and blood pressure is 120/80 mm Hg. He appears malnourished. Rhonchi are heard at the left lower lobe of the lung on auscultation. Examination of the heart, lymph nodes, abdomen, and extremities shows no abnormalities. There is a 1-cm area of erythema over the sacrum with intact skin and no induration. Neurologic examination shows quadriparesis. Test of the stool for occult blood is negative. Which of the following is the most effective intervention for this patient's skin lesion?
- (A) Frequent turning
 (B) Use of wet to dry dressings
 (C) Whirlpool therapy
 (D) Broad-spectrum antibiotic therapy
 (E) Surgical debridement
8. Over the past week, a previously healthy 17-year-old girl has had pruritus and an increasingly severe rash. She has no history of skin problems or associated symptoms. She takes no medications. Her sister with whom she shares a room had a similar condition during the previous week. The patient's temperature is 36.8°C (98.2°F). There are multiple 2- to 5-mm erythematous papules over the trunk, especially at the waistline, and over the forearms, hands, and fingers. There is no lymphadenopathy or hepatosplenomegaly. Which of the following is the most likely causal organism?
- (A) Epstein-Barr virus
 (B) Group A streptococcus
 (C) Measles virus
 (D) *Sarcoptes scabiei*
 (E) Varicella-zoster virus

9. A previously healthy 17-year-old girl comes to the emergency department because of a 5-day history of progressive lower abdominal pain, fever, and malodorous vaginal discharge. Menarche was at the age of 12 years, and her last menstrual period was 2 weeks ago. She is sexually active with one male partner and uses a combination contraceptive patch. Her temperature is 37.8°C (100°F), pulse is 90/min, respirations are 22/min, and blood pressure is 110/70 mm Hg. Abdominal examination shows severe lower quadrant tenderness bilaterally. Pelvic examination shows a purulent cervical discharge, cervical motion tenderness, and bilateral adnexal tenderness. Her hemoglobin concentration is 10.5 g/dL, leukocyte count is 13,000/mm³, and platelet count is 345,000/mm³. A urine pregnancy test is negative. Which of the following is the most appropriate pharmacotherapy?
- (A) Oral azithromycin
 - (B) Vaginal clindamycin
 - (C) Intravenous penicillin and vancomycin
 - (D) Intramuscular ceftriaxone and oral doxycycline
 - (E) Intravenous oxacillin and metronidazole
10. A 22-year-old college basketball player comes to the physician because of a left-sided scrotal mass; he first noticed the mass 2 weeks ago after he was hit with the ball in the left groin during a game. Abdominal examination shows no abnormalities. A 3-cm nontender mass is palpated near the superior pole of the left testis; the mass is nontender and does not transilluminate. Which of the following is the most likely diagnosis?
- (A) Epididymitis
 - (B) Hematoma
 - (C) Hernia
 - (D) Hydrocele
 - (E) Tumor
11. A previously healthy 22-year-old college student is brought to the emergency department by her parents 20 minutes after they observed her having a seizure. After the seizure, she was confused and had difficulty thinking of some words. She has had a headache, cough, and fever for 3 days treated with acetaminophen and dextromethorphan. Her temperature is 38.9°C (102°F). Neurologic examination shows diffuse hyperreflexia. On mental status examination, she is confused and has short-term memory deficits. She has difficulty naming objects and makes literal paraphasic errors. An MRI of the brain shows bitemporal hyperintensities. A lumbar puncture is done; cerebrospinal fluid analysis shows an erythrocyte count of 340/mm³, a leukocyte count of 121/mm³ (88% monocytes), and a protein concentration of 78 mg/dL. Which of the following is the most likely diagnosis?
- (A) Bacterial meningitis
 - (B) Dextromethorphan intoxication
 - (C) Herpes simplex encephalitis
 - (D) HIV encephalopathy
 - (E) Reye syndrome
 - (F) Syphilis
12. A 19-year-old woman noticed a mass in her left breast 2 weeks ago while doing monthly breast self-examination. Her mother died of metastatic breast cancer at the age of 40 years. Examination shows large dense breasts; a 2-cm, firm, mobile mass is palpated in the upper outer quadrant of the left breast. There are no changes in the skin or nipple, and there is no palpable axillary adenopathy. Which of the following is the most likely diagnosis?
- (A) Fibroadenoma
 - (B) Fibrocystic changes of the breast
 - (C) Infiltrating ductal carcinoma
 - (D) Intraductal papilloma
 - (E) Lobular carcinoma



13. A moderately obese 14-year-old girl has a 2-week history of severe bifrontal headaches and early morning vomiting. She appears alert and is cooperative. She is right-handed. Her pulse is 82/min, and blood pressure is 112/76 mm Hg. Funduscopy results are shown. Her visual acuity is 20/20 bilaterally; neurologic examination and CT scan of the head show no abnormalities. Which of the following is the most likely diagnosis?

- (A) Migraine
- (B) Optic neuritis
- (C) Posterior fossa tumor
- (D) Pseudotumor cerebri
- (E) Tension headaches

14. A 4-year-old boy is brought to the physician because of temperatures to 39.4°C (102.9°F) for 8 days. Examination shows anterior cervical lymphadenopathy, nonexudative conjunctivitis bilaterally, a strawberry tongue, an erythematous truncal rash, and edema of the hands and feet. Which of the following is the most appropriate pharmacotherapy to prevent complications of this illness?

- (A) Intravenous immune globulin
- (B) Intravenous penicillin
- (C) Intravenous prednisone
- (D) Oral isoniazid
- (E) Oral rifampin

15. A 25-year-old woman is brought to the emergency department by police because she is extremely agitated, sweating, and restless. No family or friends can be located, and the patient is unable to give a coherent history. Her temperature is 37°C (98.6°F). She will not cooperate to obtain the rest of her vital signs or extensive physical examination. The pupils are somewhat dilated. During the examination, she has a generalized tonic-clonic seizure. Her condition is most likely caused by use of which of the following?

- (A) Cocaine
- (B) Ecstasy
- (C) Heroin
- (D) γ -Hydroxybutyric acid
- (E) LSD
- (F) Nitrous oxide

16. A 42-year-old woman, gravida 2, para 2, comes to the physician because of increasingly frequent loss of urine during the past year. She has loss of urine when she coughs, sneezes, exercises, or plays with her children. Her incontinence is never preceded by a sudden urge to void, and she does not have loss of urine at night. Her children were born after uncomplicated vaginal deliveries. She has no history of other hospitalizations or serious illness. She takes no medications. Abdominal examination shows no abnormalities. The external genitalia, vagina, and cervix appear normal. The uterus and adnexa are normal to palpation. There is loss of a small amount of urine with Valsalva maneuver. Her postvoid residual volume is 50 mL. Urinalysis shows no abnormalities. Which of the following is the most appropriate next step in management?

- (A) Oral ciprofloxacin therapy
- (B) Oral oxybutynin therapy
- (C) Vaginal estrogen therapy
- (D) Intermittent self-catheterization
- (E) Midurethral sling procedure

17. A 2-week-old newborn is brought to the physician because his lips have turned blue on three occasions during feeding; he also sweats during feeding. He was born at 38 weeks' gestation and weighed 2466 g (5 lb 7 oz); he currently weighs 2778 g (6 lb 2 oz). His temperature is 37.8°C (100°F), pulse is 170/min, respirations are 44/min, and blood pressure is 75/45 mm Hg. A grade 3/6 harsh systolic ejection murmur is heard at the left upper sternal border. An x-ray of the chest shows a small boot-shaped heart and decreased pulmonary vascular markings. Which of the following is the most likely diagnosis?

- (A) Anomalous coronary vessels
- (B) Atrial septal defect
- (C) Endocardial fibroelastosis
- (D) Tetralogy of Fallot
- (E) Total anomalous pulmonary venous return

18. A 62-year-old woman comes to the physician for a routine health maintenance examination. On questioning, she has had fatigue, constipation, and a 9-kg (20-lb) weight gain during the past year. She receives estrogen replacement therapy. Serum lipid studies were within the reference range 5 years ago. She is 157 cm (5 ft 2 in) tall and weighs 77 kg (170 lb); BMI is 31 kg/m². Physical examination shows no other abnormalities. Serum lipid studies today show:

Total cholesterol	269 mg/dL
HDL-cholesterol	48 mg/dL
LDL-cholesterol	185 mg/dL
Triglycerides	180 mg/dL

Which of the following is the most likely cause?

- (A) Alcohol
- (B) Diabetes mellitus
- (C) Estrogen deficiency
- (D) Estrogen replacement therapy
- (E) Hypothyroidism
- (F) Thiazide diuretic therapy

19. A 7-year-old boy is brought to the physician 3 days after sustaining a small laceration of the left eyebrow. His temperature is 38.8°C (101.8°F). Examination shows erythema and edema of the left eyelid and periorbital region with moderate proptosis and decreased ocular movement; eye movement is painful. The disc margins are sharp, and there are no retinal abnormalities. Which of the following is the most likely diagnosis?

- (A) Cavernous sinus thrombosis
- (B) Lateral sinus thrombosis
- (C) Orbital cellulitis
- (D) Preseptal (periorbital) cellulitis
- (E) Sagittal sinus thrombosis

20. A previously healthy 18-year-old man is brought to the emergency department because of abdominal pain and nausea for 6 hours. He has had decreased appetite for the past week. He takes no medications. He drinks one to two beers daily and occasionally more on weekends. He does not use illicit drugs. His temperature is 37.8°C (100°F), pulse is 120/min, respirations are 24/min, and blood pressure is 105/60 mm Hg. Abdominal examination shows diffuse tenderness with no guarding or rebound. Bowel sounds are normal. Laboratory studies show:

Serum	
Na ⁺	135 mEq/L
Cl ⁻	98 mEq/L
K ⁺	3.8 mEq/L
HCO ₃ ⁻	16 mEq/L
Glucose	360 mg/dL
Ketones	present
Urine ketones	present

Arterial blood gas analysis on room air shows a pH of 7.30. Which of the following is the most likely diagnosis?

- (A) Acute appendicitis
- (B) Acute pancreatitis
- (C) Alcoholic ketoacidosis
- (D) Diabetic ketoacidosis
- (E) Lactic acidosis

21. A 58-year-old man comes to the physician because of extreme fatigue and malaise for 3 weeks. He has felt well except for a toothache 5 weeks ago treated with a root canal procedure. He has a history of a cardiac murmur first noted at the age of 19 years. His temperature is 37.8°C (100°F), pulse is 110/min, and blood pressure is 120/80 mm Hg. The lungs are clear to auscultation. Cardiac examination shows a grade 2/6, systolic ejection murmur heard best at the right second intercostal space as well as an S₄ and an ejection click. Laboratory studies show:

Hemoglobin	9.3 g/dL
Leukocyte count	10,000/mm ³
Segmented neutrophils	90%
Bands	10%
Erythrocyte sedimentation rate	90 mm/h
Urine, blood	positive

Blood cultures are obtained. Gram stain of the blood culture is most likely to show which of the following?

- (A) Gram-positive cocci in chains
 - (B) Gram-positive cocci in clusters
 - (C) Gram-positive diplococci
 - (D) Gram-negative bacilli in chains
 - (E) Gram-negative diplococci
-

22. An asymptomatic 18-year-old primigravid woman at 18 weeks' gestation is found to be positive for hepatitis B surface antigen (HBsAg) on routine prenatal screening. Her husband was diagnosed with hepatitis B 3 months ago. She states that she intends to breast-feed her infant. Examination shows a firm liver with a span of 12 cm. Serologic testing for hepatitis shows:

anti-HBsAg	negative
IgM-anti-HBcAg	positive
anti-HAV	negative

Which of the following should be administered to the newborn to prevent transmission of hepatitis?

- (A) Hepatitis B immune globulin (HBIG) only at birth
- (B) Hepatitis B vaccination only at birth
- (C) HBIG and hepatitis B vaccination at birth
- (D) HBIG at birth and hepatitis B vaccination with the cessation of breast-feeding
- (E) HBIG and hepatitis B vaccination only if serologic testing at birth for HBsAg and anti-HBcAg is negative

23. A 37-year-old woman, gravida 5, para 4, at 34 weeks' gestation comes to the emergency department because of vaginal bleeding for 2 hours. She has had no prenatal care. Her second child was delivered by lower segment transverse cesarean section because of a nonreassuring fetal heart rate; her other three children were delivered vaginally. Her pulse is 92/min, respirations are 18/min, and blood pressure is 134/76 mm Hg. The abdomen is nontender, and no contractions are felt. There is blood on the vulva, the introitus, and on the medial aspect of each thigh. The fetus is in a transverse lie presentation. The fetal heart rate is 144/min. Which of the following is the most likely diagnosis?
- (A) Abruptio placentae
 - (B) Amniotic fluid embolism
 - (C) Latent phase of labor
 - (D) Placenta previa
 - (E) Ruptured uterus
 - (F) Ruptured vasa previa
24. An otherwise asymptomatic 13-year-old girl is brought to the physician because of lower abdominal pain for 24 hours. She had sexual intercourse for the first time 1 day before the onset of symptoms. Examination shows suprapubic tenderness. Urinalysis shows 10–25 WBC/hpf and 2–5 RBC/hpf. This patient's symptoms are most likely caused by which of the following mechanisms of bacterial spread?
- (A) Ascending urethral transmission
 - (B) Descending ureteral spread
 - (C) Hematogenous seeding
 - (D) Perimenarcheal contamination
 - (E) Retrograde vaginal extension
25. A 22-year-old man is brought to the emergency department 30 minutes after he sustained a gunshot wound to the abdomen. His pulse is 120/min, respirations are 28/min, and blood pressure is 70/40 mm Hg. Breath sounds are normal on the right and decreased on the left. Abdominal examination shows an entrance wound in the left upper quadrant at the midclavicular line below the left costal margin. There is an exit wound laterally in the left axillary line at the 4th rib. Intravenous fluid resuscitation is begun. Which of the following is the most appropriate next step in management?
- (A) Upright x-ray of the chest
 - (B) CT scan of the chest
 - (C) Intubation and mechanical ventilation
 - (D) Peritoneal lavage
 - (E) Left tube thoracostomy
26. A 78-year-old man comes to the physician because of swelling of both ankles for 4 days. He has been taking indomethacin for low back pain for 2 weeks with partial relief of symptoms. Examination confirms the pedal edema but is otherwise unremarkable; the bladder is not distended. His serum urea nitrogen concentration is 56 mg/dL, and creatinine level is 2.9 mg/dL; these values were previously within normal limits. Which of the following is the most appropriate next step?
- (A) Discontinuation of indomethacin
 - (B) Prescription for a thiazide diuretic
 - (C) Evaluation for multiple myeloma
 - (D) Measurement of urine sodium and creatinine concentrations
 - (E) Renal ultrasonography

27. A 47-year-old woman with end-stage renal disease comes to the physician because of increased shortness of breath since her last hemodialysis 2 days ago. Her pulse is 88/min and regular, respirations are 26/min and slightly labored, and blood pressure is 176/110 mm Hg. Examination shows jugular venous distention and pitting edema below the knees. Diffuse crackles are heard. Cardiac examination shows no murmurs, rubs, or gallops. Laboratory studies show:

Serum	
Na ⁺	138 mEq/L
Cl ⁻	100 mEq/L

Arterial blood gas analysis on room air:

pH	7.30
PCO ₂	28 mm Hg
PO ₂	88 mm Hg
HCO ₃ ⁻	14 mEq/L

Which of the following is the most likely acid-base status of this patient?

- (A) Metabolic acidosis, respiratory compensation
- (B) Metabolic acidosis, uncompensated
- (C) Metabolic alkalosis, respiratory compensation
- (D) Metabolic alkalosis, uncompensated
- (E) Respiratory acidosis, renal compensation
- (F) Respiratory acidosis, uncompensated
- (G) Respiratory alkalosis, renal compensation
- (H) Respiratory alkalosis, uncompensated
- (I) Normal acid-base balance

-
28. A 20-year-old primigravid woman delivers a full-term 3200-g (7-lb 1-oz) newborn vaginally under epidural anesthesia. A second-degree midline episiotomy was required. On postpartum day 1, she has perineal pain. The perineum is slightly edematous with no evidence of purulent drainage or episiotomy breakdown. Which of the following is the most appropriate next step in management?

- (A) Sitz baths twice daily
- (B) Local injection of lidocaine in the perineum
- (C) Intravenous ampicillin therapy
- (D) Intramuscular morphine therapy
- (E) Epidural anesthesia

29. A 22-year-old man with a seizure disorder has had increasing cough and shortness of breath for 3 days and fever for 1 day. He has foul-smelling sputum. He had a generalized tonic-clonic seizure 1 week ago. His temperature is 39.4°C (103°F). Crackles are heard on auscultation of the chest. An x-ray of the chest shows a right upper-lobe infiltrate of the lung. Which of the following is the most likely cause?

- (A) Chemical pneumonitis
- (B) Pneumonia secondary to anaerobes
- (C) Pneumonia secondary to gram-negative aerobes
- (D) Pneumonia secondary to gram-positive aerobes
- (E) Pneumonia secondary to *Mycoplasma pneumoniae*

30. A 42-year-old man who is HIV positive comes to the physician because of a 3-week history of increasingly severe daily headaches and a 3-day history of right-sided weakness. The headaches are present when he awakens in the morning and become more severe throughout the day. He also has had increasing weakness and clumsiness of his right arm and leg and has begun to have trouble finding the right words when speaking. He was diagnosed with HIV infection 6 months ago after developing *Pneumocystis jiroveci* (formerly *P. carinii*) pneumonia. Medications include indinavir, lamivudine (3TC), and zidovudine (AZT). His temperature is 38.1°C (100.6°F), pulse is 70/min and regular, and blood pressure is 115/60 mm Hg. There is mild blunting of the right nasolabial fold. Muscle strength is 4/5 in the right triceps, wrist extensors, and interossei muscles; muscle strength is 5/5 otherwise. Deep tendon reflexes are 3+ on the right and 2+ on the left. Babinski sign is present on the right and absent on the left. Sensation is intact. He has some difficulty with naming objects, but he follows complex commands without difficulty. A CT scan of the head with contrast shows multiple ring-enhancing lesions in both cerebral hemispheres. Which of the following is the most likely cause of these findings?
- (A) Candidiasis
 - (B) Glioblastoma multiforme
 - (C) HIV encephalopathy
 - (D) Primary central nervous system lymphoma
 - (E) *Staphylococcus aureus* infection
 - (F) Toxoplasmosis
31. A 5-year-old girl is brought to the physician by her parents for evaluation of recurrent injuries. Her parents say that she started walking at the age of 14 months and since then has always seemed clumsier and had more injuries than other children. She has had increasingly frequent chest pain with exertion since starting a soccer program 3 months ago. She usually has pain or swelling of her knees or ankles after practice. She has been wearing glasses for 2 years. Her 16-year-old brother has required two operations for a severe rotator cuff injury he sustained while taking a shower, and she has a maternal cousin who died of a ruptured aortic aneurysm at the age of 26 years. Today, the patient walks with a limp. She is at the 99th percentile for height and 50th percentile for weight. A midsystolic click is heard at the apex. The left ankle is swollen and tender; range of motion is limited by pain. The joints of the upper and lower extremities are hypermobile, including 25 degrees of genu recurvatum, thumbs that may be extended to touch the forearms, and flexibility at the waist, with palms easily touching the floor with straight knees. Which of the following is the most appropriate next step in diagnosis?
- (A) Skeletal survey
 - (B) Echocardiography
 - (C) Bone scan
 - (D) MRI of the shoulder
 - (E) Aortic angiography



32. A 56-year-old man has had the painful weeping rash shown for 2 days. He underwent chemotherapy for non-Hodgkin lymphoma 1 year ago. His temperature is 36.7°C (98°F), pulse is 80/min, and blood pressure is 138/76 mm Hg. Examination shows no other abnormalities. Which of the following is the most likely diagnosis?
- (A) Herpes zoster
 - (B) Impetigo
 - (C) Pyoderma gangrenosum
 - (D) Syphilis
 - (E) Systemic lupus erythematosus

33. A 64-year-old woman comes to the physician because of a 5-month history of increasing shortness of breath, sore throat, and a cough productive of a small amount of white phlegm. Over the past week, she has had nausea related to excess coughing. Over the past year, she has had a 3.2-kg (7-lb) weight loss. She has asthma treated with theophylline and inhaled β -adrenergic agonists and corticosteroids. She has smoked one pack of cigarettes daily for 44 years and drinks one alcoholic beverage daily. She appears thin. Examination shows a 2-cm, nontender lymph node in the right supraclavicular area. Examination shows no other abnormalities. An x-ray of the chest shows a large right lower lobe density. A CT scan of the chest shows a 7.5 x 7.5 x 6-cm right lower lobe mass with some scattered calcifications. The lesion abuts the posterior chest wall without clear invasion. There are right lower peritracheal, precarinal, right hilar, and subcarinal lymph nodes. There is a 1.5-cm mass in the right adrenal gland. A biopsy specimen of the lung mass is most likely to show which of the following?
- (A) B-cell lymphoma
 - (B) Lung abscess
 - (C) Mesothelioma
 - (D) Metastatic adenocarcinoma of the breast
 - (E) Multiple endocrine neoplasia
 - (F) Non-small cell lung carcinoma
 - (G) Sarcoidosis
 - (H) Tuberculosis

34. A previously healthy 34-year-old woman is brought to the physician because of fever and headache for 1 week. She has not been exposed to any disease. She takes no medications. Her temperature is 39.3°C (102.8°F), pulse is 104/min, respirations are 24/min, and blood pressure is 135/88 mm Hg. She is confused and oriented only to person. Examination shows jaundice of the skin and conjunctivae. There are a few scattered petechiae over the trunk and back. There is no lymphadenopathy. Physical and neurologic examinations show no other abnormalities. Test of the stool for occult blood is positive. Laboratory studies show:

Hematocrit	32% with fragmented and nucleated erythrocytes
Leukocyte count	12,500/mm ³
Platelet count	20,000/mm ³
Prothrombin time	10 sec
Partial thromboplastin time	30 sec
Fibrin split products	negative
Serum	
Urea nitrogen	35 mg/dL
Creatinine	3.0 mg/dL
Bilirubin	
Total	3.0 mg/dL
Direct	0.5 mg/dL
Lactate dehydrogenase	1000 U/L

Blood and urine cultures are negative. A CT scan of the head shows no abnormalities. Which of the following is the most likely diagnosis?

- (A) Disseminated intravascular coagulation
- (B) Immune thrombocytopenic purpura
- (C) Meningococcal meningitis
- (D) Sarcoidosis
- (E) Systemic lupus erythematosus
- (F) Thrombotic thrombocytopenic purpura

35. A 70-year-old man comes to the physician because of fever, productive cough, and pleuritic chest pain for 1 day. Over the past 2 years, he has had two similar episodes. He also has had persistent pain in the thoracic spine for 1 month. His temperature is 39.2°C (102.6°F), pulse is 94/min, respirations are 22/min, and blood pressure is 110/60 mm Hg. There is dullness to percussion and decreased breath sounds over the right base. Examination shows tenderness of the midthoracic spine. Laboratory studies show:

Hematocrit	34%
Leukocyte count	15,000/mm ³
Segmented neutrophils	81%
Bands	4%
Lymphocytes	15%
Serum calcium	10.9 mg/dL

X-rays of the chest show consolidation of the right lower lobe, lytic lesions at T8 and T10, and diffuse osteopenia. Which of the following is the most likely diagnosis of this patient's back condition?

- (A) HIV infection
- (B) Multiple myeloma
- (C) Prostate cancer
- (D) Staphylococcal osteomyelitis
- (E) Tuberculosis osteomyelitis

-
36. A 28-year-old woman comes to the emergency department 6 hours after the onset of insomnia, flank discomfort, and constipation that she attributes to a kidney stone. She is a resident of another state and is here visiting relatives. She takes oxycodone (six to eight tablets daily) for chronic low back pain, sumatriptan for migraines, and amitriptyline (25 mg at bedtime) and paroxetine (30 mg daily) for bulimia nervosa. Her pulse is 100/min, and blood pressure is 130/80 mm Hg. Examination shows diaphoresis and dilated pupils. She is alert and cooperative but seems restless. She has not had hallucinations or suicidal ideation. She becomes angry when she is asked for the telephone numbers of her regular physicians. Serum amitriptyline concentration is 150 mg/dL. Urinalysis shows 0–2 RBC/hpf. Which of the following is the most likely explanation for her symptoms?

- (A) Anticholinergic poisoning
- (B) Opiate withdrawal
- (C) Renal calculi
- (D) Serotonin syndrome
- (E) Tricyclic intoxication

37. A 20-year-old man has had frequent upper respiratory tract infections over the past 4 years. He has daily purulent sputum and has noted decreased exercise tolerance over the past 2 years. He and his wife have been unable to conceive because of his low sperm count. Scattered expiratory wheezing and rhonchi are heard throughout both lung fields. An x-ray of the chest shows hyperinflation. Spirometry shows a decreased FEV₁:FVC ratio. Which of the following is most likely to confirm the diagnosis?

- (A) Arterial blood gas analysis
- (B) Examination of sputum for eosinophils
- (C) Sweat chloride test
- (D) Sputum cytology
- (E) Bronchoscopy

38. Three days after hospitalization for diabetic ketoacidosis, an 87-year-old woman refuses insulin injections. She says that her medical condition has declined so much that she no longer wishes to go on living; she is nearly blind and will likely require bilateral leg amputations. She reports that she has always been an active person and does not see how her life will be of value anymore. She has no family and most of her friends are sick or deceased. On mental status examination, she is alert and cooperative. She accurately describes her medical history and understands the consequences of refusing insulin. There is no evidence of depression. She dismisses any attempts by the physician to change her mind, saying that the physician is too young to understand her situation. She says, "I know I will die, and this is what I want." Which of the following is the most appropriate next step in management?
- (A) Discharge the patient after she has signed an "against medical advice" form
 - (B) Seek a court order to appoint a legal guardian
 - (C) Offer insulin but allow the patient to refuse it
 - (D) Admit to the psychiatric unit
 - (E) Administer insulin against the patient's wishes

39. Two days after admission to the hospital for congestive heart failure, an 82-year-old man is unable to walk because of severe, throbbing pain in his left foot. He has no history of similar episodes or recent trauma. He also has coronary artery disease and hypertension. Current medications include atenolol, lisinopril, furosemide, and aspirin. He does not smoke or drink alcohol. He is in moderate distress. His temperature is 38°C (100.4°F), pulse is 68/min and regular, respirations are 12/min, and blood pressure is 138/88 mm Hg. Jugular venous pulsations are present 3 cm above the sternal angle. Crackles are heard at both lung bases. A grade 2/6 systolic murmur is heard best at the left sternal border and second intercostal space. Examination of the lower extremities shows pitting pedal edema. There is tenderness, erythema, and edema of the left great toe. Active and passive range of motion of the first metacarpophalangeal joint produces pain; arthrocentesis of the joint is performed. Analysis of joint fluid aspirate is most likely to show which of the following?

	WBC (/mm³)	Microscopic Examination for Crystals	Gram Stain
(A)	100	needle-shaped	no organisms
(B)	100	none	gram-positive cocci
(C)	100	none	no organisms
(D)	100	rhomboid	no organisms
(E)	20,000	needle-shaped	no organisms
(F)	20,000	none	gram-positive cocci



40. A 62-year-old woman comes to the physician because of a 3-day history of a rash over her face and hands that has not improved with the use of skin moisturizers, antibiotic ointments, or corticosteroid cream. She has a 1-month history of progressive weakness. She has difficulty rising from a chair or reaching over her head. She has not had any pain. Vital signs are within normal limits. A photograph of the hands is shown. Muscle strength is 3/5 in the proximal upper and lower extremities. Which of the following is the most likely diagnosis?
- (A) Dermatomyositis
 - (B) Myasthenia gravis
 - (C) Psoriasis
 - (D) Systemic lupus erythematosus
 - (E) Systemic sclerosis (scleroderma)

41. A 27-year-old man comes to the physician for a routine health maintenance examination. He says he feels well and has not had any problems. He has no history of serious illness. He occasionally takes acetaminophen for headaches. His brother had kidney failure at the age of 32 years. There is no family history of liver disease. The patient does not smoke. He occasionally drinks a beer or a glass of wine. He has never used intravenous illicit drugs. He has had 10 lifetime male sexual partners and uses condoms consistently. He has been in a monogamous relationship for the past 3 years. His temperature is 37°C (98.6°F), pulse is 72/min, and blood pressure is 118/70 mm Hg. Examination shows no abnormalities except for mild scleral icterus. Laboratory studies show:

Hematocrit	44%
Leukocyte count	5000/mm ³
Prothrombin time	11 sec (INR=1)
Serum	
Na ⁺	141 mEq/L
K ⁺	4.2 mEq/L
Cl ⁻	104 mEq/L
HCO ₃ ⁻	24 mEq/L
Urea nitrogen	14 mg/dL
Creatinine	0.8 mg/dL
Bilirubin, total	3.0 mg/dL
Direct	0.2 mg/dL
AST	14 U/L
ALT	15 U/L

Serologic testing for hepatitis A and B is negative. Abdominal ultrasonography shows no abnormalities. Which of the following is the most likely cause of these findings?

- (A) Decreased conjugation of bilirubin
- (B) Decreased excretion of bilirubin by hepatocytes
- (C) Decreased intracellular storage of bilirubin
- (D) Delayed uptake of bilirubin
- (E) Hemolysis

42. A 67-year-old man is brought to the emergency department because of a 1-week history of nausea, generalized weakness, and malaise. He has congestive heart failure, hypertension, and coronary artery disease. Current medications include lisinopril, digoxin, isosorbide, spironolactone, and metoprolol. His temperature is 37.2°C (99°F), pulse is 88/min, and blood pressure is 140/90 mm Hg. Examination shows a soft abdomen. There is 2+ edema in the lower extremities. Laboratory studies show:

Hematocrit	36%
Leukocyte count	10,000/mm ³
Serum	
Na ⁺	140 mEq/L
K ⁺	7.3 mEq/L
HCO ₃ ⁻	18 mEq/L
Urea nitrogen	40 mg/dL
Creatinine	1.8 mg/dL
AST	20 U/L

Urinalysis shows no abnormalities. Which of the following is the most likely explanation for this patient's hyperkalemia?

- (A) Adverse effect of medications
- (B) Laboratory error
- (C) Metabolic acidosis
- (D) Renal failure
- (E) Rhabdomyolysis

The response options for the next 2 items are the same. Select one answer for each item in the set.

- | | |
|-------------------------|--------------------------------------|
| (A) Acute sinusitis | (G) Pheochromocytoma |
| (B) Chronic sinusitis | (H) Post-traumatic headache |
| (C) Cluster headache | (I) Subarachnoid hemorrhage |
| (D) Intracranial tumor | (J) Temporal arteritis |
| (E) Meningoencephalitis | (K) Temporomandibular joint syndrome |
| (F) Migraine | |

For each patient with headache, select the most likely diagnosis.

43. A 43-year-old man comes to the emergency department at 3:00 AM because of a constant severe headache for 1 hour. The pain is localized behind the left eye. He also has had a watery discharge from the left nostril. He has had similar episodes nightly over the past week. He has a history of similar symptoms over a 3-week period 2 years ago. His left pupil is smaller than his right, and there is ptosis on the left. A watery discharge is visible in the left naris.
44. A 19-year-old woman comes to the physician because of recurrent severe headaches for 1 year. The headaches are unilateral and throbbing and are accompanied by nausea, vomiting, and light sensitivity. The headaches occur once or twice monthly, reach their peak intensity in 1 hour, and last 12–24 hours. There is no aura. Examination shows no abnormalities.

The response options for the next 2 items are the same. Select one answer for each item in the set.

- | | |
|--|----------------------|
| (A) Allergic contact dermatitis | (F) Nummular eczema |
| (B) Atopic dermatitis | (G) Pityriasis rosea |
| (C) Dyshidrotic eczema | (H) Psoriasis |
| (D) Irritant contact dermatitis | (I) Scabies |
| (E) Lichen simplex chronicus (localized neurodermatitis) | (J) Tinea corporis |

For each patient with a pruritic skin condition, select the most likely diagnosis.

45. A 30-year-old woman comes to the physician because of an itchy, scaly rash for 1 year; the rash is most severe over her elbows and knees. The rash occurs only in the winter months and is moderately relieved by emollients. Examination shows discrete oval plaques 4–6 cm in diameter over the knees and elbows; they have an erythematous base and the overlying scale is silvery.
46. A 23-year-old woman comes to the physician because of pink spots on her back for the past 2 months. She first noted a 3 x 4-cm oval patch on her upper back, followed by smaller spots with occasional itching. She has tried tanning oils and salons with no relief. Examination shows multiple 3- to 5-mm macules on her back in a Christmas-tree distribution; the macules are pinker than the surrounding skin.

Sample Questions

Block 2 (Questions 47-92)

47. A 42-year-old man comes to the physician for a routine follow-up examination. He has a 15-year history of type 1 diabetes mellitus and an 8-year history of hypertension. Current medications include insulin, lisinopril, and hydrochlorothiazide. He is 173 cm (5 ft 8 in) tall and weighs 68 kg (150 lb); BMI is 23 kg/m². His pulse is 80/min, and blood pressure is 124/74 mm Hg. Examination of the lower extremities shows hair loss over the shins. No other abnormalities are noted. His hemoglobin A_{1c} is 6.3%. Which of the following is most appropriate to reduce diabetic complications in this patient?
- (A) Reduction of systolic blood pressure to less than 120 mm Hg
 - (B) Annual ophthalmologic examination
 - (C) Annual exercise stress test
 - (D) Add metformin to the regimen
 - (E) Switch from lisinopril to atenolol
48. A 32-year-old man who is HIV positive comes to the physician because of fever and cough for 6 weeks. He has had a 9-kg (20-lb) weight loss during this period. He appears cachectic. Examination shows no peripheral adenopathy or organomegaly. An x-ray of the chest shows hilar and mediastinal adenopathy. Which of the following is the most likely diagnosis?
- (A) Aspergillosis
 - (B) Cryptococcosis
 - (C) Histoplasmosis
 - (D) Kaposi sarcoma
 - (E) Tuberculosis
49. A 70-year-old woman, gravida 3, para 3, has a 2-month history of pain during sexual intercourse, especially during penile insertion. She has difficulty initiating urination and cannot easily defecate. She has the sensation that her "insides are falling out." Examination shows descent of the anterior vaginal wall 4 cm outside the vaginal introitus and bulging of the posterior vaginal wall through the introitus. Which of the following is the most appropriate nonoperative management?
- (A) Biofeedback
 - (B) Kegel exercises
 - (C) Continuous use of tampons
 - (D) Use of lubricants during coitus
 - (E) Placement of a pessary
50. A 46-year-old man comes to the physician because of intermittent lower abdominal pain over the past 3 months. There is no family history of cancer. Examination shows no other abnormalities. His hematocrit is 38%. Test of the stool for occult blood is positive. Colon contrast studies show a 1.5-cm polyp in the descending colon. An upper gastrointestinal series shows no abnormalities. Which of the following is the most appropriate next step in management?
- (A) CT scan of abdomen
 - (B) Repeat test of the stool for occult blood after 3 days on a meat-free diet
 - (C) Measurement of serum carcinoembryonic antigen (CEA) concentration
 - (D) Colonoscopy with polypectomy
 - (E) Total colectomy

51. A 30-year-old woman comes to the physician because of intermittent throbbing headaches, sweating, and pallor over the past 3 months. She has had several blood pressure measurements that fluctuate from 110/80 mm Hg to 160/108 mm Hg. Her pulse is 100/min, and blood pressure now is 138/88 mm Hg. Serum studies show:

Na ⁺	140 mEq/L
Cl ⁻	110 mEq/L
K ⁺	4.5 mEq/L
HCO ₃ ⁻	26 mEq/L
Urea nitrogen	14 mg/dL
Creatinine	1 mg/dL

Which of the following is the most likely location of the abnormality?

- (A) Adrenal cortex
- (B) Adrenal medulla
- (C) Aorta
- (D) Renal arterioles
- (E) Renal glomeruli
- (F) Thyroid gland

52. A 34-year-old woman has had gradually progressive hirsutism over the face and body over the past 2 years. She takes no medications. Her blood pressure is 116/80 mm Hg. Examination shows a slightly abnormal amount of hair growth over the upper lip, chin, chest, and abdomen. There is no truncal obesity or purple striae. Pelvic examination shows normal ovaries. The most appropriate next step in diagnosis is measurement of which of the following serum concentrations?

- (A) Cortisol and thyroxine (T₄)
- (B) Estrogen and progesterone
- (C) Follicle-stimulating and luteinizing hormones
- (D) 17 α -Hydroxyprogesterone and prolactin
- (E) Testosterone and dehydroepiandrosterone sulfate

53. A 60-year-old nulligravid woman comes to the physician because of intermittent, light vaginal bleeding for 4 months. She has no history of illness except for hypertension controlled with nifedipine therapy. Menopause occurred 9 years ago. Her last Pap smear was 2 years ago and showed normal findings. Her temperature is 37.1°C (98.8°F), pulse is 84/min, and blood pressure is 138/86 mm Hg. There is a small amount of blood at the cervical os; examination is otherwise noncontributory. Which of the following is the most appropriate next step in management?

- (A) Reexamination in 6 months
- (B) Oral conjugated estrogen therapy
- (C) Colposcopy
- (D) Endometrial sampling
- (E) Ablation of the endometrium

54. Four days after undergoing open reduction and internal fixation of a fracture of the right femur sustained in a motor vehicle collision, a 47-year-old man continues to have agitation and confusion despite treatment with haloperidol. He has mild hypertension. Other medications include acetaminophen, atenolol, and prophylactic subcutaneous heparin. His temperature is 37.2°C (99°F), pulse is 98/min, respirations are 24/min, and blood pressure is 168/98 mm Hg. During the examination, he is uncooperative and refuses to answer questions. Neurologic examination shows tremulousness and no focal findings. He is oriented to person but not to place or time. A CT scan of the head shows no abnormalities. Which of the following is the most likely cause of these findings?

- (A) Adverse effect of medication
- (B) Alcohol withdrawal
- (C) Fat emboli
- (D) Sepsis
- (E) Subdural hematoma

55. A 19-year-old woman comes to the physician in October for a follow-up examination. She feels well. She has a 2-year history of type 1 diabetes mellitus controlled with insulin. She had a normal Pap smear 3 months ago and saw her ophthalmologist 6 months ago. Her 67-year-old grandmother has breast cancer. She is 168 cm (5 ft 6 in) tall and weighs 57 kg (125 lb); BMI is 20 kg/m². Her hemoglobin A_{1c} is 6.2%, and fingerstick blood glucose concentration is 118 mg/dL. Which of the following health maintenance recommendations is most appropriate at this time?
- (A) Begin running for exercise
 - (B) Dietary modification for weight loss
 - (C) Human papillomavirus testing
 - (D) Mammography
 - (E) Influenza virus vaccine
 - (F) Supplementation with vitamins C and D
56. A 19-year-old man has the sudden onset of shortness of breath and confusion 36 hours after admission to the hospital for injuries sustained in a motor vehicle collision. He underwent placement of an external fixator device for open fractures of the left tibia and fibula. Current medications include morphine. He is not oriented to person, place, or time. His temperature is 39.1°C (102.4°F), pulse is 110/min, respirations are 26/min, and blood pressure is 100/50 mm Hg. Pulse oximetry on room air shows an oxygen saturation of 88%. Examination shows petechiae on the shoulders, chest, and axillae. There is no evidence of bleeding in the lower extremities. Which of the following is the most appropriate next step in diagnosis?
- (A) Measurement of fat in stool
 - (B) Measurement of fat in urine
 - (C) Measurement of serum lipase activity
 - (D) X-ray of the chest
 - (E) Petechial biopsy
57. A 15-year-old girl is brought to the physician because of irritability, restlessness, difficulty concentrating, and deteriorating academic performance over the past 2 months. She has had occasional heart palpitations and a 1-kg (2-lb) weight loss during this period despite an increased appetite. Menarche was at the age of 12 years, and her menses occur at regular intervals. She does not use drugs and is not sexually active. Her parents state that she has no problems at home. Examination shows no abnormalities. Serum triiodothyronine (T₃) and thyroxine (T₄) concentrations are increased. Which of the following is the most likely diagnosis?
- (A) Attention-deficit/hyperactivity disorder
 - (B) Diabetes mellitus
 - (C) Hyperthyroidism
 - (D) Pituitary adenoma
 - (E) Thyroid cancer
58. A 39-year-old man is brought to the hospital by his brother for evaluation of increasing forgetfulness and confusion over the past month. His brother reports that the patient has been drinking heavily and eating very little, and has been slightly nauseated and tremulous. He wanders at night because he cannot sleep. On admission to the hospital, intravenous administration of 5% dextrose in water is initiated. Two hours later, the patient has ophthalmoplegia and is completely confused. Which of the following is the most appropriate next step in management?
- (A) Administration of an anticoagulant
 - (B) Administration of diazepam
 - (C) Administration of large doses of vitamin B₁ (thiamine), intravenously
 - (D) Administration of large doses of vitamin C, intravenously
 - (E) Continued administration of intravenous fluids with magnesium

59. A previously healthy 17-year-old girl is brought to the emergency department because of a 1-day history of fever, vomiting, myalgias, and a rash over her body, especially on her hands and feet. She takes no medications. She is sexually active with one male partner and uses condoms inconsistently. Menses occur at regular 28-day intervals. Her last menstrual period began 4 days ago. She alternates between using tampons and sanitary pads. Her temperature is 38.9°C (102°F), pulse is 90/min, and blood pressure is 90/60 mm Hg. Physical examination shows a diffuse, erythematous, macular rash over the body. Pelvic examination shows external genitalia that are tender to touch and erythema of the vagina. There are ulcerations over the cervix. Which of the following is the most appropriate pharmacotherapy?
- (A) Acyclovir
 - (B) Clindamycin
 - (C) Fluconazole
 - (D) Metronidazole
 - (E) Vancomycin
 - (F) Zidovudine (AZT)
60. A 17-year-old boy comes to the physician because of right groin pain for 2 hours; elevation of the scrotum does not relieve the pain. There is no history of trauma. He is sexually active and has had multiple sexual partners over the past 3 years. He does not use condoms regularly. He had chlamydial urethritis 1 year ago treated with doxycycline. Examination shows an enlarged, swollen, erythematous, and acutely tender right scrotum. The left testis is found in a horizontal position; the cremasteric reflex is absent on the right. Which of the following is the most likely diagnosis?
- (A) Epididymitis
 - (B) Hemorrhagic tumor
 - (C) Incarcerated hernia
 - (D) Torsion of the testicle
 - (E) Torsion of the testicular appendix
61. A 37-year-old woman with AIDS comes to the physician because of a 1-month history of progressive diarrhea and a 1.8-kg (4-lb) weight loss. During the past week, she has had six large watery stools daily. She is currently receiving triple antiretroviral therapy. She is employed as a flight attendant and works regularly on domestic flights throughout the USA. She also flies to Asia at least once monthly. She is 163 cm (5 ft 4 in) tall and weighs 59 kg (130 lb); BMI is 22 kg/m². Her temperature is 37°C (98.6°F), pulse is 88/min, and blood pressure is 112/64 mm Hg. The abdomen is scaphoid. The remainder of the examination shows no abnormalities. Her CD4+ T-lymphocyte count is 400/mm³ (Normal ≥500). Which of the following is the most likely causal organism?
- (A) *Cryptosporidium parvum*
 - (B) Cytomegalovirus
 - (C) *Mycobacterium avium-intracellulare* complex
 - (D) *Salmonella enteritidis*
 - (E) *Strongyloides stercoralis*
62. A 45-year-old woman has a 2-week history of increased anxiety, abdominal discomfort, irritability, and difficulty concentrating; she was robbed at knifepoint in a parking lot 3 weeks ago. She takes levothyroxine for hypothyroidism and uses an over-the-counter inhaler as needed for exercise-induced asthma. Her blood pressure is 140/80 mm Hg, and pulse is 100/min. Examination shows dry skin and hair. She is cooperative but appears anxious, glancing around quickly when a loud noise is heard outside the office. Leukocyte count is 12,000/mm³, and serum thyroid-stimulating hormone concentration is 5.0 μU/mL. An ECG shows sinus tachycardia. Which of the following is the most likely diagnosis?
- (A) Acute stress disorder
 - (B) Agoraphobia
 - (C) Generalized anxiety disorder
 - (D) Hypothyroidism
 - (E) Panic disorder

63. An otherwise healthy 18-year-old woman comes to the physician because of a 3-day history of increasing, green, foul-smelling vaginal discharge. Her last menstrual period was 8 days ago; she routinely uses tampons. She is sexually active and uses a combination oral contraceptive. Pelvic examination shows an ectropion on the cervix. The vulva and vaginal mucosa appear normal; there is profuse, foul-smelling, green discharge in the vaginal vault. Bimanual examination shows no abnormalities. A wet mount preparation of the vaginal fluid shows numerous flagellated protozoa, increased leukocytes, few clue cells, but no yeast hyphae. The pH of the vaginal discharge is 6. Which of the following is the most appropriate pharmacotherapy?
- (A) Oral clindamycin
 - (B) Oral doxycycline
 - (C) Oral fluconazole
 - (D) Oral metronidazole
 - (E) Vaginal clindamycin
 - (F) Vaginal metronidazole
 - (G) Vaginal miconazole
64. A 27-year-old woman, gravida 2, para 1, at 10 weeks' gestation comes to the physician for a routine prenatal visit. She is concerned about the risk for Down syndrome in her fetus because her first child has Down syndrome. She would like to be tested as soon as possible. There is no personal or other family history of serious illness. Examination shows a uterus consistent in size with a 10-week gestation. Which of the following is the most appropriate diagnostic test for this syndrome in this patient at this time?
- (A) Measurement of fetal nuchal fold
 - (B) Measurement of maternal serum α -fetoprotein concentration
 - (C) Chorionic villus sampling
 - (D) Amniocentesis
 - (E) Cordocentesis
65. An otherwise healthy 62-year-old man is brought to the emergency department 45 minutes after an episode of loss of consciousness while shaving. Prior to the episode, he had light-headedness, nausea, and dimming of vision. His wife states that he was unconscious for about 1 minute and lost control of bladder function. She did not notice any movement during the episode. He had a similar episode 1 month ago while shaving. At that time, echocardiography, 24-hour ambulatory ECG monitoring, and a tilt test showed no abnormalities; cardiac enzyme activities were within the reference range. His current blood pressure is 150/96 mm Hg. A grade 2/6, systolic ejection murmur is heard best at the upper left sternal border. The remainder of the examination shows no abnormalities. Which of the following is the most likely diagnosis?
- (A) Absence seizure
 - (B) Aortic stenosis
 - (C) Carotid sinus hypersensitivity
 - (D) Generalized tonic-clonic seizure
 - (E) Neurocardiogenic (vasovagal) syncope
 - (F) Transient ischemic attack
66. A 32-year-old man is brought to the emergency department 30 minutes after he drove his motorcycle into a guardrail at a high speed. He was riding without a helmet. On arrival, his pulse is 100/min, respirations are 14/min, and blood pressure is 120/80 mm Hg. Examination shows a deep perineal laceration. There is mild suprapubic tenderness. He voids 25 mL of bloody urine. An x-ray of the pelvis shows a widened pubic symphysis. Which of the following is the most appropriate next step in diagnosis?
- (A) Measurement of urine hemoglobin concentration
 - (B) Cystography
 - (C) Urethrography
 - (D) Placement of a urinary catheter
 - (E) Intravenous pyelography



67. A 67-year-old woman comes to the physician 1 month after noticing a nontender nodule on the back of her left hand. She initially thought it was an insect bite, but it has grown in size over the past week. It bleeds when she picks at it. She has no history of serious illness. She lives in a retirement community in Florida and frequently plays golf and tennis. Examination of the dorsum of the left hand shows a 2.5-cm lesion. Photographs of the lesion are shown. Which of the following is the most appropriate next step in management?
- (A) Observation
 - (B) Topical application of fluorouracil
 - (C) Sentinel lymph node biopsy
 - (D) Cryosurgery
 - (E) Excision of the lesion

68. A previously healthy 47-year-old man comes to the physician because of a 6.8-kg (15-lb) weight loss over the past 6 months. He spent 2 weeks in Mexico 3 months ago. Since returning, he has noticed that his stools have changed in size and consistency. He has not had fever, night sweats, or change in appetite. He takes no medications. He has smoked one pack of cigarettes daily for 20 years. He appears healthy and well nourished. His temperature is 37°C (98.6°F), pulse is 105/min, respirations are 16/min, and blood pressure is 130/78 mm Hg. Examination shows pale conjunctivae. The abdomen is soft with no organomegaly. Rectal examination shows a normal prostate with no masses. Test of the stool for occult blood is positive. Laboratory studies show:

Hemoglobin	11 g/dL
Mean corpuscular volume	72 μm^3
Platelet count	300,000/mm ³
Red cell distribution width	16% (N=13%–15%)

Which of the following is the most appropriate next step in diagnosis?

- (A) Second complete blood count in 3 months
- (B) CT scan of the abdomen
- (C) Colonoscopy
- (D) Esophagogastroduodenoscopy
- (E) Sigmoidoscopy

69. A 52-year-old woman comes to the emergency department because of a 1-week history of low-grade fever and increasing abdominal cramps that are exacerbated by bowel movements. She began a course of amoxicillin-clavulanate and metronidazole 2 days ago but has had no relief of her symptoms. She has had intermittent constipation for the past 12 years. She has not had nausea, vomiting, urinary symptoms, or bloody stools. She has a 3-year history of hypertension. She underwent total abdominal hysterectomy and bilateral salpingo-oophorectomy 5 years ago because of leiomyomata uteri. She is 165 cm (5 ft 5 in) tall and weighs 86 kg (190 lb); BMI is 32 kg/m². Her temperature is 38.1°C (100.6°F), pulse is 75/min, and blood pressure is 150/80 mm Hg. The lungs are clear to auscultation. Cardiac examination shows no abnormalities. The abdomen is soft, and there is tenderness to palpation of the left lower quadrant with guarding but no rebound. Bowel sounds are normal. The stool is brown, and test for occult blood is negative. Her hemoglobin concentration is 14.5 g/dL, leukocyte count is 15,000/mm³, and platelet count is 280,000/mm³; serum studies and urinalysis show no abnormalities. Which of the following is the most appropriate next step in diagnosis?

- (A) Examination of the stool for ova and parasites
- (B) Test of the stool for *Clostridium difficile* toxin
- (C) Endoscopic retrograde cholangiopancreatography
- (D) Pelvic ultrasonography
- (E) CT scan of the abdomen with contrast
- (F) Colonoscopy

70. A previously healthy 32-year-old man is brought to the emergency department after being found unconscious on the floor at his workplace. On arrival, he is obtunded. He is intubated and mechanical ventilation is begun. Examination shows flaccid paralysis on the right. A CT scan of the head shows a large evolving cerebral infarction on the left. Carotid duplex ultrasonography shows dissection of the left carotid artery. After receiving intensive medical care for 6 hours, the patient develops decerebrate posturing and becomes hemodynamically unstable. Vasopressor therapy is begun. A second CT scan of the head shows a massive left hemispheric cerebral infarction with severe edema and herniation. The physician determines that surgical intervention is not indicated because of the patient's poor prognosis. The patient's driver's license indicates that he wishes to be an organ donor. The physician meets with the patient's family and informs them about the patient's prognosis, and they are devastated. During the meeting, they say that they were unaware of his willingness to be an organ donor and agree that he should not receive cardiopulmonary resuscitation. Which of the following is the most appropriate next step with respect to organ donation?

- (A) Arrange for the regional organ procurement organization to address the issue with the patient's family
- (B) Delay further consideration of the issue until after 24 hours of aggressive care
- (C) Delay further consideration of the issue until the family seems ready
- (D) Initiate organ donation at this time

71. Over the past 8 weeks, a 66-year-old woman with moderately severe aortic stenosis has had worsening of her shortness of breath and exertional chest pains. Examination shows pallor and jugular venous distention. Bilateral crackles are heard on auscultation. A harsh, late-peaking systolic murmur is heard best at the cardiac base. Test of the stool for occult blood is positive. Laboratory studies show:

Hemoglobin	7.4 g/dL
Mean corpuscular volume	70 μm^3
Leukocyte count	5400/mm ³
Platelet count	580,000/mm ³
Erythrocyte sedimentation rate	33 mm/h

A blood smear shows hypochromic, microcytic erythrocytes with moderate poikilocytosis. Which of the following is the most likely diagnosis?

- (A) Anemia of chronic disease
- (B) Autoimmune hemolytic anemia
- (C) Folate deficiency anemia
- (D) Iron deficiency anemia
- (E) Microangiopathic hemolytic anemia

72. A double-blind placebo-controlled trial is conducted to investigate the efficacy of methylprednisolone for treatment of bronchiolitis. Patients were enrolled over a 1-month study period. The study data are shown below:

Group	Number of Patients	Age	Gender		Race		Number of Patients Improved at 48 Hours
			M	F	Group A	Group B	
Placebo	8	3.5 months \pm 3 months	3	5	5	3	4
Treatment	6	2.5 months \pm 2 months	4	2	2	4	4

Chi-squared analysis is $p > 0.05$. The investigators conclude that methylprednisolone is ineffective for the treatment of bronchiolitis. Which of the following features of the study is most likely to invalidate the investigator's conclusions?

- (A) Power analysis was not performed to determine sample size
- (B) Student's *t*-test should have been used to detect significant difference
- (C) Treatment group had fewer patients
- (D) Treatment group had more Group B participants
- (E) Treatment group had more males
- (F) Treatment group had younger patients

73. A 57-year-old man comes to the emergency department because of fever, shortness of breath, chest pain, rigor, and cough productive of blood-tinged sputum for 4 hours; the chest pain is sharp, nonradiating, and located just below the scapula on the right. He says that he has had a cold for the past week. He has a history of alcoholism, cholelithiasis, hypertension, and seasonal allergic rhinitis. He does not smoke cigarettes and has been abstinent from alcohol for 6 months. He appears diaphoretic and slightly cyanotic. His temperature is 39.9°C (103.8°F), pulse is 110/min, respirations are 34/min and shallow, and blood pressure is 130/70 mm Hg. There is dullness to percussion and bronchial breath sounds over the right posterior lung field. The remainder of the examination shows no abnormalities. Laboratory studies show:

Hemoglobin	14 g/dL
Leukocyte count	18,000/mm ³
Segmented neutrophils	60%
Bands	30%
Lymphocytes	10%
Platelet count	500,000/mm ³

An x-ray of the chest shows a right lower lobe infiltrate. This patient most likely has which of the following types of pneumonia?

- | | |
|-----------------------------------|--|
| (A) Aspiration | (I) Pneumococcal |
| (B) <i>Haemophilus influenzae</i> | (J) <i>Pneumocystis jiroveci</i> (formerly <i>P. carinii</i>) |
| (C) <i>Histoplasma capsulatum</i> | (K) <i>Pseudomonas aeruginosa</i> |
| (D) <i>Klebsiella pneumoniae</i> | (L) Staphylococcal |
| (E) <i>Legionella pneumophila</i> | (M) Tuberculous |
| (F) <i>Moraxella catarrhalis</i> | (N) Varicella |
| (G) <i>Mycoplasma pneumoniae</i> | |
| (H) Nocardial | |

74. A 24-year-old primigravid woman with type 1 diabetes mellitus delivers a 3856-g (8-lb 8-oz) newborn at 38 weeks' gestation. The pregnancy was complicated by poor control of her diabetes. The labor lasted 4 hours. Apgar scores were 7 and 7 at 1 and 5 minutes, respectively. Which of the following is the most appropriate neonatal blood test in the first 30 minutes after birth?
- (A) Determination of blood group and Rh
 (B) Measurement of hematocrit
 (C) Measurement of pH
 (D) Measurement of serum bilirubin concentration
 (E) Measurement of serum glucose concentration
75. A 25-year-old primigravid woman at 42 weeks' gestation delivers a 4000-g (8-lb 13-oz) newborn after induction of labor with oxytocin. The first and second stages of labor lasted 14 and 3 hours, respectively. A midline episiotomy was done, and the placenta appeared to be intact. Ten minutes after delivery, she has copious vaginal bleeding estimated to be 500 mL over a 5-minute period; the fundus is soft and boggy. Which of the following is the most likely cause of the hemorrhage?
- (A) Cervical laceration
 (B) Disseminated intravascular coagulation
 (C) Retained placental tissue
 (D) Uterine atony
 (E) Uterine inversion

76. A 62-year-old man comes to the physician because of a 3-month history of progressive fatigue and joint pain, a 2-month history of sinus congestion, a 3-week history of cough, and a 1-week history of blood-tinged sputum. He has not had fever, nausea, vomiting, or diarrhea. He has hypercholesterolemia, stable angina pectoris, and hypertension. Medications include atorvastatin, labetalol, isosorbide, and aspirin. Over the past 3 weeks, he has been taking over-the-counter ibuprofen as needed for the joint pain. His pulse is 84/min, respirations are 12/min, and blood pressure is 132/76 mm Hg. Examination shows clear nasal discharge with no nasal or oral lesions. The joints are diffusely tender with no warmth or erythema; range of motion is full. Laboratory studies show:

Hematocrit	36%
Mean corpuscular volume	83 μm^3
Leukocyte count	14,000/ mm^3
Segmented neutrophils	74%
Eosinophils	1%
Lymphocytes	14%
Monocytes	11%
Platelet count	275,000/ mm^3
Serum	
Urea nitrogen	28 mg/dL
Creatinine	3.2 mg/dL
Antinuclear antibodies	1:256
Rheumatoid factor	negative
Antineutrophil cytoplasmic antibodies	positive
Urine	
Blood	3+
Protein	3+
RBC	15–17/hpf
WBC	1–2/hpf
RBC casts	rare

Which of the following is the most likely underlying mechanism of this patient's renal failure?

- (A) Atheroembolic disease
- (B) Cold agglutinins
- (C) Interstitial nephritis
- (D) Lyme disease
- (E) Septic arthritis
- (F) Vasculitis

77. An 82-year-old woman is brought to the emergency department by her son because of a 1-week history of nausea. She has had a decreased appetite resulting in a 4.5-kg (10-lb) weight loss over the past month. She has atrial fibrillation, congestive heart failure, and well-controlled type 2 diabetes mellitus. Medications include lisinopril, digoxin, furosemide, and glipizide. Her pulse is 60/min and regular, and blood pressure is 130/70 mm Hg. Visual acuity is 20/20. Deep tendon reflexes are absent at the knees and ankles bilaterally. Her serum glucose concentration is 120 mg/dL. Arterial blood gas analysis shows no abnormalities. Which of the following is the most likely cause of this patient's symptoms?
- (A) Digoxin toxicity
 - (B) Hyperthyroidism
 - (C) Inadequate control of blood glucose concentration
 - (D) Lacunar cerebral infarction
 - (E) Subacute meningitis
-

78. A 67-year-old man is brought to the emergency department because of headache and decreased level of consciousness over the past hour. He has a 20-year history of poorly controlled hypertension. He is unresponsive to verbal stimuli. With painful stimulation, he moves the left extremities semipurposely but not the right extremities. The left pupil is larger than the right and reacts sluggishly to light. Babinski sign is present on the right. A CT scan of the head shows a large hyperintense mass in the left basal ganglia with compression of the left lateral ventricle and shift of the midline structures. Which of the following is the most likely diagnosis?
- (A) Acute cerebral infarction
 - (B) Arteriovenous malformation
 - (C) Astrocytoma
 - (D) Bacterial abscess
 - (E) Carotid cavernous fistula
 - (F) Epidural abscess
 - (G) Epidural hematoma
 - (H) Fungal abscess
 - (I) Glioblastoma multiforme
 - (J) Intracerebral hemorrhage
 - (K) Medulloblastoma
 - (L) Meningioma
 - (M) Metastatic carcinoma
 - (N) *Mycobacterium avium-intracellulare* granuloma
 - (O) Sturge-Weber syndrome
 - (P) Subarachnoid hemorrhage
 - (Q) Subdural hematoma
79. A 37-year-old woman comes to the physician because she is concerned about her risk for breast and ovarian cancer. She has no history of serious illness and takes no medications. Menses occur at regular 28-day intervals. She has had two uncomplicated spontaneous vaginal deliveries. She breast-fed both children for 1 year. The patient is sexually active with her husband. Her mother, maternal grandmother, and older sister died of ovarian cancer in their 40s. Her maternal aunt was treated for breast cancer and underwent prophylactic oophorectomy after genetic testing showed a *BRCA1* mutation. Physical and pelvic examinations show no abnormalities. The patient asks if there is anything that will help decrease her risk for ovarian cancer. Which of the following is the most appropriate recommendation?
- (A) Annual measurement of serum carcinoembryonic antigen (CEA) concentration if genetic testing shows *BRCA1* mutation
 - (B) Annual pelvic examination if genetic testing shows *BRCA1* mutation
 - (C) Laparoscopy to evaluate the ovaries if genetic testing shows *BRCA1* mutation
 - (D) Prophylactic oophorectomy if genetic testing shows *BRCA1* mutation
 - (E) No testing is indicated

80. A 19-year-old man has had general malaise, recurrent sore throat, anorexia, swollen glands, and a 4-kg (9-lb) weight loss over the past 5 weeks. Four weeks ago, a throat culture grew *Streptococcus pyogenes* (group A), and the patient was treated with penicillin. His temperature is 38.5°C (101.3°F). Examination shows exudative pharyngitis, anterior and posterior cervical lymphadenopathy, and splenomegaly. Laboratory studies show:

Hematocrit	37%
Leukocyte count	3200/mm ³
Segmented neutrophils	55%
Lymphocytes	34%
Platelet count	84,000/mm ³
Serum AST	75 U/L

Which of the following is the most appropriate next step in diagnosis?

- (A) Antiplatelet antibody studies
- (B) Antistreptolysin O titer
- (C) Bone marrow examination
- (D) Screening for hepatitis
- (E) Serologic test for Epstein-Barr virus

81. An 18-year-old man with sickle cell disease comes to the emergency department because of shortness of breath for 6 hours. He has had a low-grade fever, joint aches, and a rash for 3 days. He was previously healthy and has had few vaso-occlusive crises. He takes folic acid regularly and has required no blood transfusions for 8 years. His hematocrit has been stable at 32%. His temperature is 38.1°C (100.6°F), pulse is 120/min, respirations are 36/min, and blood pressure is 120/86 mm Hg. The lungs are clear to percussion and auscultation. Cardiac examination shows normal findings. There is no hepatomegaly or splenomegaly. He has pain with movement of the joints, but there is no evidence of arthritis. His hematocrit is 21%, leukocyte count is 11,500/mm³, and platelet count is 450,000/mm³. An x-ray of the chest shows normal findings. Which of the following is the most appropriate next step in diagnosis?

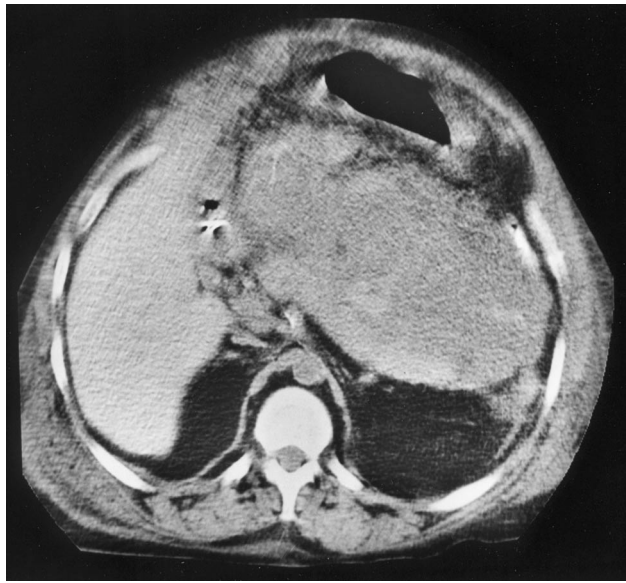
- (A) Hemoglobin electrophoresis
- (B) Measurement of bleeding time
- (C) Measurement of reticulocyte count
- (D) Serum HIV antibody assay
- (E) CT scan of the abdomen

82. One day after an emergency repair of a ruptured aortic aneurysm, a 66-year-old man has a urine output of 35 mL over a 4-hour period; a Foley catheter is still in place. He received 14 units of blood during the operation. His temperature is 37.8°C (100°F), pulse is 126/min, and blood pressure is 104/68 mm Hg. Examination shows diffuse peripheral edema. Heart sounds are normal. The lungs are clear to auscultation. There is no jugular venous distention. The abdomen is soft. Laboratory studies show:

Hematocrit	27%
Serum	
Na ⁺	143 mEq/L
K ⁺	5.0 mEq/L
Urine Na ⁺	6 mEq/L

Which of the following is the most likely cause of the oliguria?

- (A) Heart failure
- (B) Hypovolemia
- (C) Occluded Foley catheter
- (D) Renal artery thrombosis
- (E) Transfusion reaction



83. A 52-year-old man with alcoholism is brought to the emergency department because of a 2-day history of nausea, vomiting, and increasingly severe abdominal pain that radiates to his left shoulder and back. He appears extremely dehydrated and is short of breath. His temperature is 37.8°C (100°F), pulse is 120/min, respirations are 18/min, and blood pressure is 80/60 mm Hg. Abdominal examination shows distention with epigastric tenderness. Bowel sounds are decreased. Rectal examination shows no abnormalities. Test of the stool for occult blood is negative. Laboratory studies show:

Hemoglobin	5.5 g/dL
Leukocyte count	15,500/mm ³
Serum	
Ca ²⁺	7.5 mg/dL
Amylase	750 U/L

A CT scan of the abdomen is shown. Which of the following is the most likely diagnosis?

- (A) Acute portal vein thrombosis
- (B) Hemorrhagic pancreatitis
- (C) Perforated posterior gastric ulcer
- (D) Ruptured gastric varices
- (E) Splenic artery rupture

84. A 19-year-old college student is brought to the emergency department by his roommate because the patient was difficult to arouse in the morning. He has had a flu-like illness with fever and muscle and joint aches for 12 hours. His temperature is 39.5°C (103.1°F), pulse is 120/min, and blood pressure is 90/60 mm Hg. There is a diffuse petechial rash over the trunk and extremities. He has a stiff neck that cannot be passively flexed. Which of the following is the most likely pathogen?

- (A) Coxsackievirus B
- (B) Echovirus
- (C) *Haemophilus influenzae*
- (D) *Neisseria meningitidis*
- (E) *Streptococcus pneumoniae*

85. A 67-year-old man with chronic obstructive pulmonary disease comes to the emergency department because of a 3-day history of temperatures to 38.4°C (101.2°F), progressive shortness of breath, and cough. He says that at first the cough was nonproductive and he had mild shortness of breath after walking 50 feet, but his symptoms have worsened during the past 24 hours. The cough is now productive of yellow, blood-tinged sputum, and he has mild shortness of breath at rest and moderate shortness of breath after walking 10 feet. He has hypertension and type 2 diabetes mellitus. Current medications include a thiazide diuretic, a calcium-channel blocking agent, an oral hypoglycemic agent, and inhaled albuterol (2 puffs twice daily). On arrival, he is in moderate respiratory distress and is breathing through pursed lips. He is 178 cm (5 ft 10 in) tall and weighs 59 kg (130 lb); BMI is 19 kg/m². His temperature is 38.8°C (101.9°F), pulse is 105/min, respirations are 24/min, and blood pressure is 105/80 mm Hg. Pulse oximetry on room air shows an oxygen saturation of 87%. The anteroposterior diameter of the chest is increased. Breath sounds are decreased bilaterally. Coarse crackles are heard at the lung bases. Heart sounds are distant. The abdomen is scaphoid and nontender. Bowel sounds are normal. The remainder of the examination shows no abnormalities. Laboratory studies show:

Hematocrit	55%
Leukocyte count	11,000/mm ³
Segmented neutrophils	75%
Bands	3%
Lymphocytes	22%
Platelet count	200,000/mm ³
Serum glucose	210 mg/dL

Arterial blood gas analysis on room air shows:

pH	7.30
PCO ₂	50 mm Hg
PO ₂	65 mm Hg

A chest x-ray shows flattened diaphragms with no infiltrates. In addition to antibiotic therapy, which of the following is the most appropriate next step in management?

- (A) Add inhaled budesonide to the regimen and schedule an outpatient follow-up visit in 1 week
- (B) Begin intensive bronchodilator therapy in the hospital
- (C) Increase inhaled albuterol to 2 puffs four times daily and schedule an outpatient follow-up visit in 1 week
- (D) Intubate the patient and begin mechanical ventilation
- (E) No additional management is indicated at this time

86. A 60-year-old woman comes to the physician because of severe aching and stiffness in her neck, shoulders, and hips for 2 months. Her symptoms are most pronounced in the morning shortly after awakening. She has had chronic fatigue and low-grade fevers during this period. Range of motion of the neck, shoulders, and hips is normal. The muscles are minimally tender to palpation. Muscle strength, sensation, and deep tendon reflexes are normal. Serum creatine kinase activity is 40 U/L, and erythrocyte sedimentation rate is 80 mm/h. Serum rheumatoid factor and antinuclear antibody assays are negative. Which of the following is the most likely diagnosis?

- (A) Fibromyositis
- (B) Osteoarthritis
- (C) Polymyalgia rheumatica
- (D) Polymyositis
- (E) Seronegative rheumatoid arthritis

87. A 40-year-old man is brought to the emergency department because of hallucinations for 24 hours; he ended a drinking binge 3 days ago. He has a history of type 2 diabetes mellitus and hypertension. He takes medications but does not remember the names of the drugs. His temperature is 37.8°C (100°F), pulse is 110/min, and blood pressure is 165/100 mm Hg. He is disoriented, tremulous, and diaphoretic. The liver measures 16 cm and is tender to palpation. Laboratory studies show:

Hemoglobin	11.2 g/dL
Mean corpuscular volume	103 μm^3
Leukocyte count	5000/ mm^3
Platelet count	50,000/ mm^3
Prothrombin time	15.0 sec
Serum	
Bilirubin	1.3 mg/dL
AST	120 U/L

Which of the following is the most likely explanation for these findings?

- (A) Adverse drug interaction
- (B) Hypersplenism
- (C) Myelophthistic marrow
- (D) Peripheral destruction of cells
- (E) Suppression of bone marrow production

88. A 37-year-old man comes to the emergency department because of headache and malaise for 4 days. He has a long-standing history of intravenous drug use, and he last used intravenous drugs 2 days ago. Twelve years ago, he had staphylococcal endocarditis treated with a 4-week course of intravenous nafcillin. He appears uncomfortable. He is 196 cm (6 ft 5 in) tall and weighs 66 kg (145 lb); BMI is 17 kg/m². His temperature is 38°C (100.4°F), pulse is 96/min, respirations are 16/min, and blood pressure is 130/80 mm Hg. There are uninfected track marks over both antecubital fossae. A grade 2/6, systolic ejection murmur is heard at the cardiac base. A lumbar puncture is performed. Cerebrospinal fluid analysis shows:

Glucose	45 mg/dL
Protein	200 mg/dL
Leukocyte count	50/mm ³
Segmented neutrophils	10%
Lymphocytes	90%

A Gram stain of the cerebrospinal fluid shows round, budding yeast. Which of the following is the most likely host defense abnormality?

- (A) C1 esterase inhibitor deficiency
- (B) Chronic granulomatous disease
- (C) Common variable immunodeficiency
- (D) Deficiency of terminal complement components (C7–C9)
- (E) Deficient cell-mediated immunity
- (F) Hyposplenism
- (G) IgA deficiency
- (H) IgM deficiency
- (I) Job syndrome
- (J) Neutropenia
- (K) Wiskott-Aldrich syndrome

The response options for the next 2 items are the same. Select one answer for each item in the set.

- | | |
|----------------------------------|----------------------------------|
| (A) Chronic lymphocytic leukemia | (F) Sarcoidosis |
| (B) Drug reaction | (G) Systemic lupus erythematosus |
| (C) Hodgkin disease | (H) Toxoplasmosis |
| (D) Infectious mononucleosis | (I) Tuberculosis |
| (E) Metastatic carcinoma | (J) Tularemia |

For each patient with lymphadenopathy, select the most likely diagnosis.

89. A previously healthy 30-year-old man has had fever, night sweats, pruritus, and an enlarging lump above his left clavicle for 3 weeks. Examination shows a 3-cm, nontender, rubbery, supraclavicular lymph node. An x-ray of the chest shows mediastinal lymphadenopathy.
90. A 41-year-old woman comes to the physician for a follow-up examination. She has taken aspirin for chronic headaches and phenytoin for a seizure disorder for 2 years. Examination shows mild epigastric tenderness and bilateral, 3-cm, nontender axillary lymph nodes. A lymph node biopsy shows hyperplasia.

The response options for the next 2 items are the same. Select one answer for each item in the set.

- | | |
|--|--|
| (A) Alcohol-induced amnesic episode (blackout) | (J) Medication toxicity |
| (B) Alcohol withdrawal | (K) Normal age-associated memory decline |
| (C) Apathetic hyperthyroidism | (L) Normal-pressure hydrocephalus |
| (D) Bipolar disorder, depressed | (M) Parkinson disease |
| (E) Delirium because of medical condition | (N) Pick disease |
| (F) Dementia, alcohol-related | (O) Pseudodementia |
| (G) Dementia, Alzheimer type | (P) Residual schizophrenia |
| (H) Generalized anxiety disorder | (Q) Multi-infarct (vascular) dementia |
| (I) Masked depression | |

For each patient with a memory problem, select the most likely diagnosis.

91. A 29-year-old woman with an 11-year history of bipolar disorder comes to the physician because she is concerned about memory loss over the past 2 weeks. She has had difficulty remembering appointments that she has made, and on one occasion, she got lost going to the health club where she has been a member for years. She has taken lithium carbonate for 8 years, and she has been taking a friend's diuretic for perimenstrual weight gain over the past 3 months. Physical examination shows a resting tremor of both hands and mild ataxia. On mental status examination, she is oriented to person, place, and time, but recalls only one of three objects at 5 minutes.
92. A 63-year-old man is brought to the physician by his daughter because she is concerned about his memory loss over the past year. Yesterday he could not remember his 18-month-old granddaughter's name. Although he denies that there is any problem, she says he has been forgetful and becomes easily confused. There is no history of alcohol abuse. His temperature is 37°C (98.6°F), pulse is 77/min, respirations are 12/min, and blood pressure is 118/84 mm Hg. On mental status examination, his mood is normal. He is oriented to person and place but initially gives the wrong month, which he is able to correct. He recalls memories from his youth in great detail but only recalls one of three words after 5 minutes. He has difficulty recalling the names of common objects and does not remember the name of the current US president. Physical examination, laboratory studies, and thyroid function tests show no abnormalities.

Sample Questions

Block 3 (Questions 93-138)

93. A previously healthy 30-year-old African American woman has had fatigue, arthralgia, and a nodular rash over the trunk and upper extremities for 3 weeks. There are twelve 0.3- to 0.8-cm, pale, indurated nodular plaques over the chest, back, and upper extremities. The liver is palpable 2 cm below the right costal margin with a percussion span of 14 cm, and the spleen tip is palpable 3 cm below the left costal margin. There is no pain or limitation of motion of the joints. The rest of the examination shows normal findings. An x-ray of the chest shows bilateral hilar lymphadenopathy. A biopsy specimen of the skin lesions is most likely to show which of the following?
- (A) Dermal infiltration with monocytes and Reed-Sternberg cells
 - (B) Fat-laden histiocytes
 - (C) Noncaseating granulomas
 - (D) Paravascular homogeneous eosinophilic infiltrate
 - (E) Vasculitis with giant cells
94. A 32-year-old man who is a jackhammer operator comes to the physician because of pain and swelling of his right arm for 3 days. The symptoms are moderately exacerbated by exertion. Examination of the right upper extremity shows erythema and moderate edema. Capillary refill time is less than 3 seconds. Which of the following is the most likely diagnosis?
- (A) Axillary-subclavian venous thrombosis
 - (B) Deep venous valvular insufficiency
 - (C) Superficial thrombophlebitis of the basilic vein
 - (D) Superior vena cava syndrome
 - (E) Thoracic outlet syndrome
95. A 37-year-old man with type 1 diabetes mellitus is admitted to the hospital because of inadequate control of his glucose concentrations for the past 2 months. Despite his poor control, he demands that he be discharged. He reports that he has had a 3-month history of fatigue, irritability, and feelings of hopelessness. He says that he has been noncompliant with his diabetic regimen, adding, "Sometimes I forget." He has been avoiding his family and friends because he is not in the mood to see them but admits that he is lonely. He did not get out of bed for 2 days, which prompted his wife to call an ambulance and have him admitted to the hospital. Prior to admission to the hospital, his only medication was insulin, although he often missed doses. He does not drink alcohol. He is 168 cm (5 ft 6 in) tall and weighs 100 kg (220 lb); BMI is 36 kg/m². His temperature is 37°C (98.6°F), pulse is 68/min, respirations are 18/min, and blood pressure is 150/85 mm Hg. Physical examination shows no abnormalities. On mental status examination, he is tired and has a restricted affect. There is no evidence of suicidal ideation. Cognition is intact. His fasting serum glucose concentration is 120 mg/dL. Which of the following is the most appropriate next step in management?
- (A) Adhere to the patient's wishes and discuss home-care options
 - (B) Adhere to the patient's wishes on the condition that he agree to home nursing care
 - (C) Schedule neuropsychological testing
 - (D) Seek a court order to appoint a legal guardian
 - (E) Involuntarily hold the patient in the hospital

96. A 54-year-old woman with a 10-year history of progressive systemic sclerosis (scleroderma) undergoes an emergency laparotomy for a perforated appendix with peritonitis. During the immediate postoperative period, she has a blood pressure of 180/110 mm Hg. Over the next 3 days, her serum creatinine concentration increases, and her urinary output decreases to 250 mL/day. On postoperative day 4, she has mild shortness of breath. Her peripheral oxygen saturation on room air is 89%. Serum studies show a potassium concentration of 6.2 mEq/L, a urea nitrogen concentration of 34 mg/dL, and a creatinine concentration of 3.9 mg/dL. Which of the following is the most appropriate next step in management?
- (A) Intravenous administration of ACE inhibitors
 - (B) Intravenous administration of morphine
 - (C) Fluid bolus with 2 L of lactated Ringer solution
 - (D) Hemodialysis
 - (E) Peritoneal dialysis
97. A 47-year-old man comes to the physician 12 hours after the sudden onset of a severe occipital headache and stiff neck. He has not had any other symptoms and has no history of severe headache. He has hypertension and gastroesophageal reflux disease. Current medications include hydrochlorothiazide and ranitidine. He is oriented to person, place, and time. His temperature is 36.7°C (98.1°F), pulse is 100/min, and blood pressure is 160/90 mm Hg. Range of motion of the neck is decreased due to pain. Neurologic examination shows no focal findings. Which of the following is the most likely diagnosis?
- (A) Cluster headache
 - (B) Meningitis
 - (C) Migraine
 - (D) Subarachnoid hemorrhage
 - (E) Tension-type headache
98. A 52-year-old woman has had dyspnea and hemoptysis for 1 month. She has a history of rheumatic fever as a child and has had a cardiac murmur since early adulthood. Her temperature is 36.7°C (98°F), pulse is 130/min and irregularly irregular, respirations are 20/min, and blood pressure is 98/60 mm Hg. Jugular venous pressure is not increased. Bilateral crackles are heard at the lung bases. There is an opening snap followed by a low-pitched diastolic murmur at the third left intercostal space. An x-ray of the chest shows left atrial enlargement, a straight left cardiac border, and pulmonary venous engorgement. Which of the following is the most likely explanation for these findings?
- (A) Aortic valve insufficiency
 - (B) Aortic valve stenosis
 - (C) Mitral valve insufficiency
 - (D) Mitral valve stenosis
 - (E) Tricuspid valve insufficiency
99. A previously healthy 15-year-old boy is brought to the emergency department in August 1 hour after the onset of headache, dizziness, nausea, and one episode of vomiting. His symptoms began during the first hour of full-contact football practice in full uniform. He reported feeling weak and faint but did not lose consciousness. He vomited once after drinking water. On arrival, he is diaphoretic. He is not oriented to person, place, or time. His temperature is 39.5°C (103.1°F), pulse is 120/min, respirations are 40/min, and blood pressure is 90/65 mm Hg. Examination, including neurologic examination, shows no other abnormalities. Which of the following is the most appropriate next step in management?
- (A) Obtain a CT scan of the head
 - (B) Administer sodium chloride tablets
 - (C) Administer intravenous fluids
 - (D) Immerse the patient in an ice water bath
 - (E) Obtain a lumbar puncture

100. A previously healthy 20-year-old college student comes to the emergency department because she has been unable to urinate for 8 hours. She has a 2-day history of fever, fatigue, severe burning with urination, and pain in the genital area. She is sexually active and uses a diaphragm for contraception. She takes no medications. She appears uncomfortable. Her temperature is 38.7°C (101.7°F), pulse is 110/min, and blood pressure is 110/70 mm Hg. Abdominal examination shows a large, cystic, midline pelvic mass. The groin nodes are enlarged and tender. Pelvic examination shows erythematous external genitalia with extensive ulceration. The lesions extend into the vagina. Internal examination is not possible due to patient discomfort. Which of the following is the most appropriate initial step in management?

- (A) Measurement of serum urea nitrogen concentration
- (B) Vaginal cultures
- (C) Intravenous pyelography
- (D) Renal ultrasonography
- (E) Placement of a Foley catheter

101. A 10-year-old boy with chronic sinusitis is brought to the emergency department following a 3-minute generalized tonic-clonic seizure. He has a 3-day history of increasingly severe headaches and a 2-day history of vomiting and temperatures to 38.7°C (101.7°F). His temperature is 39.5°C (103.1°F), pulse is 80/min, respirations are 16/min, and blood pressure is 135/90 mm Hg. He is slightly lethargic but answers questions appropriately. Examination shows papilledema. No other abnormalities are noted. Which of the following is the most appropriate initial step in management?

- (A) Measurement of serum ammonia concentration
- (B) X-rays of the sinuses
- (C) EEG
- (D) CT scan of the head
- (E) Lumbar puncture

102. A 47-year-old woman comes to the physician because of increasingly heavy menstrual periods during the past 5 years. Menses occur at regular 28-day intervals and last 8 days with heavy flow during the first 2 to 3 days. She takes no medications. She is sexually active with one partner and uses a diaphragm consistently. Pelvic examination shows a uterus consistent in size with a 10-week gestation. Examination of an endometrial biopsy specimen obtained 5 days before her last menstrual period shows secretory endometrium. Which of the following is the most likely diagnosis?

- (A) Anovulatory bleeding
- (B) Endometrial polyps
- (C) Endometritis
- (D) Leiomyomata uteri
- (E) Pregnancy

103. A previously healthy 42-year-old man is brought to the emergency department 1 day after the sudden onset of shortness of breath and chest pain at rest; the pain is exacerbated by deep inspiration. His pulse is 100/min, respirations are 22/min, and blood pressure is 140/90 mm Hg. Breath sounds are normal. The remainder of the examination shows no abnormalities. Arterial blood gas analysis on room air shows:

pH	7.49
PCO ₂	30 mm Hg
PO ₂	64 mm Hg
O ₂ saturation	91%

An x-ray of the chest shows no abnormalities. Which of the following is the most likely mechanism of these findings?

- (A) Carbon monoxide poisoning
- (B) Congenital heart disease
- (C) Depressed alveolar ventilation
- (D) Interstitial edema
- (E) Interstitial fibrosis
- (F) Low oxygen-carrying capacity of the blood
- (G) Ventilation-perfusion mismatch

104. A 62-year-old woman comes to the physician for an annual health maintenance examination. She has had fatigue for 3 months but has been able to carry out all of her usual activities. She takes estrogen therapy; she also takes daily aspirin because she read about it in the paper. Her temperature is 37.3°C (99.1°F), pulse is 88/min, respirations are 14/min, and blood pressure is 150/88 mm Hg. There is no lymphadenopathy. Cardiopulmonary examination shows no abnormalities. The liver span is 9 cm, and the edge is palpated in the right midclavicular line. The spleen is not palpable. Laboratory studies show:

Hematocrit	37%
Erythrocyte count	3.6 million/mm ³
Mean corpuscular volume	90 μm ³
Leukocyte count	40,000/mm ³
Segmented neutrophils	10%
Lymphocytes	89%
Monocytes	1%
Platelet count	160,000/mm ³

A blood smear shows numerous mature-appearing small lymphocytes. Which of the following is the most likely diagnosis?

- (A) Acute lymphocytic leukemia
- (B) Acute myelogenous leukemia
- (C) Chronic lymphocytic leukemia
- (D) Chronic myelogenous leukemia
- (E) Leukemoid reaction

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105. A 36-year-old nulligravid woman with primary infertility comes for a follow-up examination. She has been unable to conceive for 10 years; analysis of her husband's semen during this period has shown normal sperm counts. Menses occur at regular 28-day intervals and last 5 to 6 days. She is asymptomatic except for severe dysmenorrhea. An endometrial biopsy specimen 5 days before menses shows secretory endometrium. Hysterosalpingography 1 year ago showed normal findings. Pelvic examination shows a normal vagina and cervix. Bimanual examination shows a normal-sized uterus and no palpable adnexal masses. Rectal examination is unremarkable. Which of the following is the most likely diagnosis?

- (A) Anovulation
- (B) Endometriosis
- (C) Intrauterine synechiae
- (D) Male factor
- (E) Tubal obstruction

106. A 19-year-old college student comes to the physician because of vaginal irritation and pain with urination for 5 days. Two weeks ago, she had streptococcal pharyngitis treated with amoxicillin. She has been sexually active with two partners over the past year; she uses condoms for contraception. Her last menstrual period was 1 week ago. Her temperature is 37.2°C (99°F), and blood pressure is 90/60 mm Hg. Pelvic examination shows erythema of the vulva and vagina and a thick white vaginal discharge. The pH of the discharge is 4. Which of the following is the most likely cause of these findings?

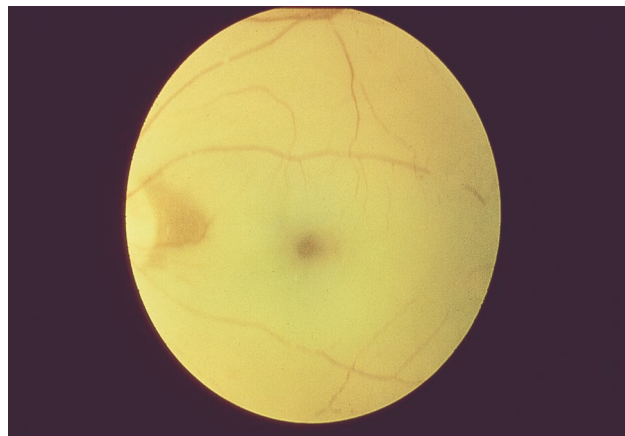
- (A) Bacterial vaginosis
- (B) Candidiasis
- (C) *Chlamydia trachomatis* infection
- (D) *Escherichia coli* infection
- (E) *Neisseria gonorrhoeae* infection
- (F) Trichomoniasis

107. A 19-year-old college student comes to the physician because of progressive hair growth over her face and body since the age of 16 years. She also has acne and oily skin. Menses have occurred at 30- to 90-day intervals since menarche at the age of 14 years. She has no history of serious illness and takes no medications. She is 168 cm (5 ft 6 in) tall and weighs 88 kg (193 lb); BMI is 31 kg/m². Her temperature is 37.2°C (99°F), pulse is 72/min, respirations are 16/min, and blood pressure is 120/80 mm Hg. Physical examination shows coarse, pigmented hair over the chin and upper lip, around both nipples, and along the midline of the lower abdomen. The remainder of the examination, including pelvic examination, shows no abnormalities. Serum studies show:

Fasting glucose	95 mg/dL
Fasting insulin	7.5 μU/mL (N=11–240)
Dehydroepiandrosterone sulfate	3 μg/mL (N=0.5–5.4)
Follicle-stimulating hormone	8 mIU/mL
17α-Hydroxyprogesterone	160 ng/dL (N=20–300)
Luteinizing hormone	10 mIU/mL
Testosterone	4.2 nmol/L (N<3.5)

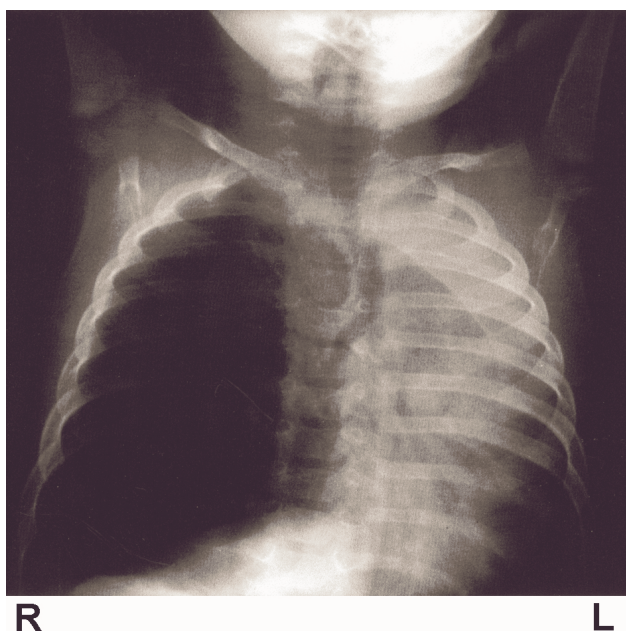
Which of the following is the most appropriate pharmacotherapy?

- (A) Bromocriptine
 - (B) Clomiphene
 - (C) Combination oral contraceptive
 - (D) Dexamethasone
 - (E) Gonadotropin-releasing hormone agonist
-



108. A 72-year-old woman is brought to the emergency department 2 hours after the sudden onset of visual loss in her right eye. Visual acuity is limited to light perception on the right. Examination of the right eye shows an afferent papillary defect. The anterior structures of both eyes appear normal. Funduscopy findings of the right eye are shown. Which of the following is the most likely diagnosis?
- (A) Age-related macular degeneration
 - (B) Background diabetic retinopathy
 - (C) Central artery occlusion
 - (D) Central vein occlusion
 - (E) Proliferative diabetic retinopathy

109. An 18-year-old man is brought to the emergency department by friends after he passed out and became unarousable. He has no history of medical problems. There is alcohol on his breath and no evidence of trauma. His pulse is 70/min, respirations are 6/min, and blood pressure is 110/60 mm Hg. The lungs are clear to auscultation. There is a normal S₁ and S₂. A grade 2/6, systolic ejection murmur is heard. The liver edge and spleen tip are not palpable. Test of the stool for occult blood is negative. Neurologic examination is difficult to assess. Reflexes are 1+ bilaterally. All extremities respond to painful stimuli. His blood alcohol concentration is 200 mg/dL; toxicology screening is also positive for benzodiazepines in the blood and cocaine metabolites in the urine. The patient does not respond to infusion with naloxone, glucose, or vitamin B₁ (thiamine). Abuse of which of the following substances is the most likely cause of these findings?
- (A) Alcohol only
 (B) Alcohol and benzodiazepines
 (C) Alcohol and cocaine
 (D) Alcohol and PCP (phencyclidine)
 (E) Alcohol and salicylates
110. A 4-year-old boy is brought for a follow-up examination. He has a history of chronic recurrent otitis media and recently completed a 10-day course of antibiotics. His vital signs are within normal limits. Examination shows clear ear canals and intact tympanic membranes; a brown, irregular mass is visualized behind the tympanic membrane. Which of the following is the most likely explanation for these findings?
- (A) Epithelial tissue proliferation
 (B) Lingual papillae loss
 (C) Middle ear effusion
 (D) Midface hypoplasia
 (E) Nerve entrapment
 (F) Olfactory hair cell degeneration
 (G) Semicircular canal edema
 (H) Tympanic membrane rupture
111. A 4-year-old boy with a displaced supracondylar fracture of the humerus without neurovascular complication is placed in skeletal traction. Six hours later, he has severe pain in the forearm and increased pain on passive extension of the wrist and fingers. Which of the following is the most appropriate next step in management?
- (A) Increased weight on the traction apparatus
 (B) Administration of analgesic medication
 (C) Exploration of the fracture and fasciotomy of the flexor compartment of the forearm
 (D) Closed reduction with the patient under anesthesia
 (E) Open reduction and internal fixation of the fracture
112. A 21-year-old man comes to the physician because of a 5-day history of an upper respiratory tract infection and a 2-day history of progressive shortness of breath. He has a 5-year history of hay fever. His father has asthma. He appears anxious. His temperature is 37.8°C (100°F), pulse is 115/min, respirations are 24/min and labored, and blood pressure is 140/90 mm Hg. Diffuse wheezes are heard throughout all lung fields. Examination shows no other abnormalities. An x-ray of the chest shows hyperinflation. Pulse oximetry on room air shows an oxygen saturation of 94%. Which of the following is the most appropriate immediate step in management?
- (A) Ventilation-perfusion lung scans
 (B) Oral broad-spectrum antibiotic therapy
 (C) Oral corticosteroid and inhaled β₂-adrenergic agonist therapy
 (D) Inhaled ipratropium and corticosteroid therapy
 (E) Oxygen therapy via nasal cannula and intravenous diazepam therapy



113. A 4-year-old boy with asthma becomes limp during treatment with inhaled albuterol in the emergency department. Ten minutes ago, he received intravenous methylprednisolone for an acute exacerbation, and he was alert and oriented at that time. He received the diagnosis of asthma 2 years ago and has been admitted to the hospital for acute exacerbations eight times since then. Current medications include albuterol and montelukast. He appears pale and gasps and moans as he attempts to breathe. He responds to voice. His temperature is 36°C (96.8°F), pulse is 160/min and thready, respirations are 18/min, and blood pressure is 50/20 mm Hg. The skin is cold to the touch. Pulmonary examination shows poor air movement, especially on the left. No wheezes are heard. The point of maximal impulse is 2 cm to the left of the midclavicular line in the sixth intercostal space. A chest x-ray is shown. Which of the following is the most likely underlying cause of this patient's hypotension?
- (A) Adverse effect of albuterol
 - (B) Adverse effect of methylprednisolone
 - (C) Atelectasis of the left lung
 - (D) Decrease in cardiac output
 - (E) Severe bronchospasm
-
114. An 18-year-old man is brought to the emergency department 45 minutes after his car slid off an icy road into a telephone pole at approximately 35 miles per hour. He was the restrained driver, and the air bag inflated. Examination shows multiple contusions over the chest bilaterally; there is tenderness to palpation over the right lower chest wall. The abdomen is flat, soft, and nontender. A complete blood count and serum concentrations of electrolytes, urea nitrogen, and creatinine are within the reference range. Toxicology screening is negative. His urine is pink; urinalysis shows 80 RBC/hpf but no WBCs. Which of the following is the most appropriate next step in management?
- (A) CT scan of the abdomen and pelvis with contrast
 - (B) Magnetic resonance arteriography of the renal arteries
 - (C) Intravenous administration of antibiotics
 - (D) Exploratory laparotomy
 - (E) No further studies are indicated

115. During abdominal closure after a right hemicolectomy for colon cancer, a medical student accidentally receives a solid needlestick. The patient's status for hepatitis B, hepatitis C, and HIV is unknown. The student has received hepatitis B vaccine and tetanus toxoid within the past 10 years. Examination of the student's hand shows a single bleeding puncture wound of the right index finger. Which of the following is the most appropriate pharmacotherapy?
- (A) Administration of tetanus immune globulin
 - (B) Intravenous immune globulin therapy
 - (C) Pegylated interferon alfa and ribavirin therapy
 - (D) Reverse transcriptase inhibitor therapy
 - (E) No pharmacotherapy is indicated at this time
116. A 28-year-old woman has palpitations that occur approximately once a week, last 1–5 minutes, and consist of rapid, regular heart pounding. The episodes start and stop suddenly and have not been associated with chest discomfort or dyspnea. There is no history of heart problems. She drinks two to three cups of coffee daily. She rarely drinks alcohol and does not smoke. Her pulse is 96/min and regular, and blood pressure is 120/88 mm Hg. A stare and lid lag are noted. The thyroid gland is firm and 1.5 times larger than normal. There is a midsystolic click at the apex and a grade 2/6, early systolic murmur at the left upper sternal border. An ECG is normal except for evidence of sinus tachycardia. Which of the following is the most appropriate next step in diagnosis?
- (A) Ambulatory ECG monitoring
 - (B) Measurement of serum thyroid-stimulating hormone concentration
 - (C) Measurement of urine catecholamine concentration
 - (D) MUGA scan
 - (E) Echocardiography
117. A 22-year-old man comes to the physician for a routine health maintenance examination. He feels well. He has had a painless left scrotal mass since childhood. Examination shows a 6-cm, soft, nontender left scrotal mass that transilluminates; there are no bowel sounds in the mass. Examination of the testis shows no abnormalities. Which of the following is the most likely cause of the mass?
- (A) Accumulation of scrotal adipose tissue
 - (B) Cryptorchidism of the left testis
 - (C) Dilatation of the pampiniform plexus of veins around the testis
 - (D) Persistence of a patent processus vaginalis
 - (E) Torsion of the left testis
118. A previously healthy 17-year-old girl is brought to the physician for evaluation because of loss of appetite, sleeplessness, and extreme irritability for 3 weeks. After missing many practices, she quit the softball team that she previously enjoyed. She often feels tired and has difficulty sitting still and concentrating on schoolwork. Her menses occur at regular intervals. She is 168 cm (5 ft 6 in) tall and weighs 50 kg (110 lb); BMI is 18 kg/m². Her pulse is 74/min, respirations are 16/min, and blood pressure is 110/70 mm Hg. Which of the following is the most likely diagnosis?
- (A) Adjustment disorder with mixed disturbance of emotions and conduct
 - (B) Anorexia nervosa
 - (C) Attention-deficit/hyperactivity disorder
 - (D) Dysthymic disorder
 - (E) Major depressive disorder

119. A 5-year-old boy is brought to the physician because of a 2-day history of fever and painful swelling of the left ankle. He has had recurrent cervical lymphadenitis and pneumonia since infancy. Two years ago, a culture from an abscess in the cervical region grew *Staphylococcus aureus*. His temperature is 38°C (100.4°F). Examination shows a tender, erythematous, edematous left ankle; there is point tenderness over the medial malleolus. A bone scan shows increased uptake in the left lower tibial metaphysis. Culture of bone aspirate grows *Serratia marcescens*. Nitroblue tetrazolium test shows no color change. Which of the following is the most likely mechanism for these findings?
- (A) Adenosine deaminase deficiency
 (B) Consumption of complement
 (C) Defective opsonization
 (D) Destruction of CD4+ T lymphocytes
 (E) Developmental arrest of maturation of B lymphocytes
 (F) Dysmorphogenesis of the third and fourth pharyngeal pouches
 (G) Impaired chemotaxis
 (H) Impaired phagocytic oxidative metabolism
120. A 9-month-old boy is brought to the physician because of discharge from the left ear for 1 day. He has had frequent infections since the age of 4 months. He had *Streptococcus pneumoniae* bacteremia at 4 months of age, *Haemophilus influenzae* meningitis at 5½ months of age, and *S. pneumoniae* pneumonia at 7 months of age. He also has had two episodes of otitis media during this period. He is an only child, and there is no family history of frequent infections. His immunizations are up-to-date. He is at the 20th percentile for length and 3rd percentile for weight. He is not in acute distress. Examination shows no abnormalities other than a purulent drainage from the left ear canal. Which of the following is the most likely diagnosis?
- (A) Chronic granulomatous disease of childhood
 (B) Severe combined immunodeficiency
 (C) Thymic-parathyroid dysplasia (DiGeorge syndrome)
 (D) Transient hypogammaglobulinemia of infancy
 (E) X-linked agammaglobulinemia

121. A 15-year-old boy is brought to the physician because of fatigue since starting his freshman year of high school 3 months ago. He often falls asleep during class. He urinates four to five times nightly and often has difficulty falling asleep again. He has no history of serious illness and takes no medications. He is at the 20th percentile for height and above the 95th percentile for weight and BMI. Vital signs are within normal limits. Examination shows a velvety, hyperpigmented, macular rash over the neck and axillae. The remainder of the examination shows no abnormalities. Results of a complete blood count and serum electrolyte concentrations show no abnormalities. Additional laboratory studies show:

Serum glucose	134 mg/dL
Urine	
pH	5.5
Specific gravity	1.028
Glucose	1+
Ketones	negative

In addition to dietary counseling, which of the following is the most appropriate initial treatment?

- (A) Exercise program
 (B) Increased fluid intake
 (C) Cyclosporine therapy
 (D) Insulin therapy
 (E) Oral hypoglycemic agent

122. A hospitalized 57-year-old man has had severe progressive pain in his left knee since awakening 2 hours ago. He was admitted to the hospital 2 days ago for an acute myocardial infarction. Cardiac catheterization showed occlusion of the left anterior descending artery, and he underwent placement of a stent. Current medications include aspirin, metoprolol, lisinopril, simvastatin, clopidogrel, and heparin. Vital signs are within normal limits. Examination of the knee shows a large effusion. The knee is hot to touch and erythematous. He holds the knee in 30 degrees of flexion; the pain is exacerbated with further flexion or extension. Laboratory studies show:

Hematocrit	40%
Leukocyte count	13,000/mm ³
Serum	
Ca ²⁺	9.2 mg/dL
Urea nitrogen	15 mg/dL
Creatinine	1.0 mg/dL
Albumin	3.6 g/dL

An x-ray of the left knee shows calcification of the synovium. Which of the following is the most likely diagnosis?

- (A) Deep venous thrombosis
- (B) Gonorrhea
- (C) Gout
- (D) Hemarthrosis
- (E) Pseudogout
- (F) Septic arthritis

123. During the past month, a 37-year-old woman has had epigastric pain 2 to 3 hours after eating and at night; she has a feeling of fullness and bloating even when she eats small amounts. For 2 days, she has been unable to keep any food "down" and has had repetitive vomiting between meals. Six months ago, she was diagnosed with a peptic ulcer and was treated with a proton pump inhibitor and antibiotics. After 2 weeks of treatment, her symptoms were alleviated, and she discontinued the medication due to the quantity of pills she had to take. Placement of a Foley catheter yields no urine. This patient is most likely to have which of the following electrolyte profiles?

	Na ⁺ (mEq/L)	K ⁺ (mEq/L)	Cl ⁻ (mEq/L)	HCO ₃ ⁻ (mEq/L)
(A)	130	2.8	88	32
(B)	130	4.2	100	24
(C)	130	4.4	100	14
(D)	148	2.3	96	24
(E)	148	4.8	110	24

124. A 16-year-old girl is brought to the physician because of intermittent pain and swelling of both ankles over the past month. She is currently not in pain. When the pain occurs, it is so severe that she is unable to walk. There is no associated fever or chills. She is sexually active and has had one sexual partner for 12 months. Her temperature is 37°C (98.6°F), pulse is 80/min, and blood pressure is 145/87 mm Hg. Examination shows no abnormalities or tenderness of the ankle joints. There is a nonpainful ulcer on the oral buccal mucosa. The lungs are clear to auscultation. Cardiac examination shows no abnormalities. Laboratory studies show:

Leukocyte count	4000/mm ³
Segmented neutrophils	65%
Eosinophils	3%
Lymphocytes	25%
Monocytes	7%
Platelet count	60,000/mm ³
Erythrocyte sedimentation rate	100 mm/h
Serum	
Antinuclear antibodies	1:320
Anti-DNA antibodies	positive
Rapid plasma reagin	1:16
Rheumatoid factor	negative
Urine	
Protein	3+
RBC casts	negative
RBC	none
WBC	10–20/hpf

X-rays of the ankles show no abnormalities other than tissue swelling. Which of the following is the most likely diagnosis?

- (A) Disseminated gonococcal disease
- (B) Polyarticular arthritis
- (C) Reactive arthritis
- (D) Secondary syphilis
- (E) Systemic lupus erythematosus

125. A 62-year-old white man comes to the physician because of an 8-month history of progressive pain and stiffness of his hands. The stiffness is worse at the end of the day. He has a 1-year history of fatigue and increased urination. He has no history of serious illness and takes no medications. His last visit to a physician was 10 years ago. He does not smoke or drink alcohol. He is 185 cm (6 ft 1 in) tall and weighs 82 kg (180 lb); BMI is 24 kg/m². His pulse is 84/min, and blood pressure is 136/82 mm Hg. Examination shows dark brown skin. S₁ and S₂ are normal. An S₃ is heard at the apex. There is mild tenderness over the second and third metacarpophalangeal joints bilaterally without synovial thickening. Heberden nodes are present over the distal interphalangeal joints of the index and ring fingers bilaterally. Laboratory studies show:

Hemoglobin	16 g/dL
Leukocyte count	7700/mm ³
Platelet count	332,000/mm ³
Serum	
Glucose	182 mg/dL
Albumin	3.4 g/dL
Total bilirubin	1.1 mg/dL
Alkaline phosphatase	52 U/L
AST	55 U/L
ALT	68 U/L
Hepatitis B surface antigen	negative
Hepatitis C antibody	negative
Rheumatoid factor	negative

Which of the following is most likely to have prevented this patient's condition?

- (A) Calcium supplementation
- (B) Enalapril therapy
- (C) Metformin therapy
- (D) Methotrexate therapy
- (E) Phlebotomy

126. A 27-year-old nulligravid woman comes to the physician because of a 1-year history of irregular heavy menstrual bleeding. She has been otherwise healthy. Menses occur at irregular 15- to 45-day intervals and last 3 to 7 days; menses had previously occurred at regular 28-day intervals with moderate flow. Her last menstrual period was 4 weeks ago. She is sexually active and does not use contraception. Her temperature is 37°C (98.6°F), pulse is 80/min, respirations are 20/min, and blood pressure is 120/80 mm Hg. Physical examination shows no abnormalities. Pelvic examination shows clear cervical mucus. Serum studies show:

Thyroid-stimulating hormone	3 μU/mL
Follicle-stimulating hormone	5 mIU/mL
Prolactin	18 ng/mL
Progesterone	0.5 ng/mL (menstrual cycle day 30: follicular N<3; luteal N>3–5)

Pelvic ultrasonography shows no abnormalities. Which of the following is the most likely diagnosis?

- (A) Adenomyosis
- (B) Anovulation
- (C) Endometrial polyp
- (D) Leiomyoma uteri
- (E) Pregnancy

-
127. A previously healthy 17-year-old boy comes to the physician because of moderate upper abdominal pain for 24 hours. He appears jaundiced. His temperature is 37.9°C (100.2°F), pulse is 90/min, respirations are 14/min, and blood pressure is 110/60 mm Hg. Abdominal examination shows right upper quadrant tenderness. The spleen tip is palpated 3 cm below the left costal margin. Laboratory studies show:

Hematocrit	32%
Leukocyte count	9800/mm ³
Mean corpuscular volume	78 μm ³
Serum bilirubin, total	4.1 mg/dL
Direct	3.6 mg/dL

A blood smear shows spherocytes. Ultrasonography of the abdomen shows gallstones and splenomegaly. Which of the following is the most likely underlying mechanism of these laboratory findings?

- (A) Activation of factor XII
- (B) Cytoskeletal protein deficiency
- (C) Defective iron absorption
- (D) Presence of an IgM antibody
- (E) Pyruvate kinase deficiency

128. A 57-year-old woman comes to the physician 24 hours after the onset of nausea and vomiting. She has vomited five times during this period. She has had mild epigastric pain for 3 days. She has not had any other symptoms. Her last bowel movement 2 days ago was normal. She has type 2 diabetes mellitus and hypertension. Ten years ago, she underwent abdominal hysterectomy for leiomyomata uteri. Current medications include metformin, lisinopril, and 81-mg aspirin. She is 165 cm (5 ft 5 in) tall and weighs 95 kg (210 lb); BMI is 35 kg/m². Her temperature is 37.4°C (99.4°F), pulse is 112/min, and blood pressure is 140/70 mm Hg. Examination shows a mildly distended, tympanitic abdomen with mild epigastric tenderness. Bowel sounds are increased and high pitched. The remainder of the examination shows no abnormalities. Test of the stool for occult blood is negative. Laboratory studies show:

Hematocrit	43%
Leukocyte count	18,000/mm ³
Platelet count	450,000/mm ³
Serum	
Na ⁺	132 mEq/L
K ⁺	4.5 mEq/L
Cl ⁻	98 mEq/L
HCO ₃ ⁻	20 mEq/L
Urea nitrogen	18 mg/dL
Glucose	220 mg/dL
Creatinine	1 mg/dL

Abdominal x-rays show dilated loops of small bowel with air-fluid levels. There is air in the rectum. Which of the following is the most likely diagnosis?

- (A) Acute gastroenteritis
- (B) Ileus
- (C) Mesenteric ischemia
- (D) Partial small-bowel obstruction
- (E) Sigmoid volvulus

129. A 37-year-old primigravid woman at 28 weeks' gestation is admitted to the hospital 2 hours after the onset of moderate vaginal bleeding and irregular cramps. She has a 7-year history of myasthenia gravis. Pregnancy had been uncomplicated. Her temperature is 37°C (98.6°F), pulse is 100/min, respirations are 18/min, and blood pressure is 110/70 mm Hg. On monitoring, contractions occur every 5 to 6 minutes and last 45 seconds. The fetus is in a breech presentation. Fetal heart tones are 130/min and reassuring. The cervix is 80% effaced, 4 cm dilated, soft, and 2 cm in length. Abdominal examination shows a nontender uterus consistent in size with a 28-week gestation. Ultrasonography shows a posterior fundal placenta and an amniotic fluid index of 15.6 cm (N=9–31). Speculum examination shows no pooling of amniotic fluid or ferning. Vaginal swabs for fetal fibronectin and group B streptococcus are positive. The distal placental edge is 3.5 cm from the internal cervical os. Which of the following is the most likely explanation for these findings?

- (A) Abruptio placentae
- (B) Mixed connective tissue disease
- (C) Preterm labor
- (D) Prodromal contractions
- (E) Rupture of membranes

130. A 6-week-old boy is brought to the physician because of poor feeding and a nonproductive cough for 1 week. He has been breast-fed exclusively since birth; he sweats profusely during feeding and frequently stops to catch his breath. His temperature is 36.8°C (98.2°F), pulse is 140/min, respirations are 48/min, and blood pressure is 70/48 mm Hg in the left leg. Examination shows no cyanosis. Crackles are heard at both lung bases. A splitting S₂ varies with respirations. A grade 3/6 holosystolic murmur is heard best at the left midsternal border. The liver edge is palpated 3 cm below the right costal margin. Which of the following is the most likely diagnosis?

- (A) Aortic insufficiency
- (B) Aortic stenosis
- (C) Atrial septal defect
- (D) Coarctation of the aorta
- (E) Ebstein anomaly
- (F) Hypoplastic left heart syndrome
- (G) Mitral insufficiency
- (H) Mitral stenosis
- (I) Patent ductus arteriosus
- (J) Pulmonary stenosis
- (K) Tetralogy of Fallot
- (L) Total anomalous pulmonary venous connection
- (M) Transposition of the great arteries
- (N) Tricuspid atresia
- (O) Ventricular septal defect

131. A 47-year-old woman comes to the emergency department because of a 3-day history of nausea and vomiting and a 2-day history of decreased urine output. Over the past 6 months, she has also had intermittent vaginal spotting. She has not seen a physician since she underwent a tubal ligation 20 years ago. Her last menstrual period was 2 weeks ago. On arrival, she appears ill. Her blood pressure is 90/50 mm Hg while standing and 110/70 mm Hg while supine. Examination shows a flat abdomen; there are no masses. Speculum examination shows a necrotic ulcer at the apex of the vagina. Bimanual examination shows a parametrial induration. Serum studies show a potassium concentration of 6.2 mEq/L, urea nitrogen concentration of 100 mg/dL, and creatinine concentration of 12 mg/dL. Ultrasonography shows bilateral hydronephrosis. Which of the following types of cancer is the most likely cause of this patient's urinary symptoms?

- (A) Bladder
- (B) Cervical
- (C) Metastatic gastric
- (D) Ovarian
- (E) Rectal
- (F) Renal

132. A 47-year-old man is brought to the emergency department 2 hours after the sudden onset of shortness of breath, severe chest pain, and sweating. He has no history of similar symptoms. He has hypertension treated with hydrochlorothiazide. He has smoked one pack of cigarettes daily for 30 years. His pulse is 110/min, respirations are 24/min, and blood pressure is 110/50 mm Hg. A grade 3/6, diastolic blowing murmur is heard over the left sternal border and radiates to the right sternal border. Femoral pulses are decreased bilaterally. An ECG shows left ventricular hypertrophy. Which of the following is the most likely diagnosis?

- (A) Acute myocardial infarction
- (B) Aortic dissection
- (C) Esophageal rupture
- (D) Mitral valve prolapse
- (E) Pulmonary embolism

The response options for the next 2 items are the same. Select one answer for each item in the set.

- | | | | |
|-----|----------------------------|-----|--|
| (A) | Acute blood loss | (G) | Folic acid deficiency |
| (B) | Acute lymphocytic leukemia | (H) | Iron deficiency |
| (C) | Acute myelogenous leukemia | (I) | Sickle cell-thalassemia |
| (D) | Anemia of chronic disease | (J) | Sideroblastic anemia |
| (E) | Aplastic anemia | (K) | β -Thalassemia minor |
| (F) | Autoimmune hemolysis | (L) | Vitamin B ₁₂ (cobalamin) deficiency |

For each patient with anemia, select the most likely diagnosis.

133. A 22-year-old woman with schizophrenia has had fatigue and decreased energy for 6 months. She has a good appetite but has refused to eat fresh vegetables for 1 year because she hears voices saying that vegetables will poison her. Her temperature is 37°C (98.6°F), pulse is 76/min, respirations are 18/min, and blood pressure is 122/70 mm Hg. She appears pale. Physical and neurologic examinations are otherwise normal. Her hemoglobin concentration is 9.8 g/dL, and leukocyte count is 6000/mm³.
134. An 18-year-old African American man comes to the emergency department 6 hours after the onset of severe back, chest, and bilateral thigh pain; the symptoms occurred while he was skiing at an altitude of 8000 feet. He lives in New York City and had one previous episode 3 years ago while visiting Aspen, Colorado. He is in obvious pain. His temperature is 38°C (100.4°F), pulse is 110/min, respirations are 24/min, and blood pressure is 136/84 mm Hg. There is no tenderness to palpation over the vertebrae or thighs. Pulmonary and cardiovascular examinations show no abnormalities. Laboratory studies show:

Hemoglobin	10.5 g/dL
Leukocyte count	16,000/mm ³
Reticulocyte count	20%

The response options for the next 2 items are the same. Select one answer for each item in the set.

- | | |
|-------------------------------|------------------------------------|
| (A) Alcohol withdrawal | (G) Paroxysmal atrial tachycardia |
| (B) Coronary insufficiency | (H) Pheochromocytoma |
| (C) Hyperthyroidism | (I) Post-traumatic stress disorder |
| (D) Hypoglycemia | (J) Pulmonary embolus |
| (E) Major depressive disorder | (K) Somatization disorder |
| (F) Panic disorder | |

For each patient with anxiety, select the most likely diagnosis.

135. A 33-year-old woman comes to the emergency department 30 minutes after the sudden onset of chest pain, palpitations, shortness of breath, numbness and tingling in both arms, and fear of going crazy. She has visited local emergency departments several times over the past 3 months for similar symptoms that resolved within 1 hour. She uses an oral contraceptive. She drinks two beers daily and six beers on the weekend. She has no history of medical problems. Her mother and sisters have a history of anxiety. Her pulse is 90/min, respirations are 18/min, and blood pressure is 130/90 mm Hg. Physical examination, laboratory studies, and an ECG show no abnormalities.
136. A 35-year-old woman comes to the physician because of nervousness, tremors, emotional lability, and excessive sweating for 3 weeks; she has had a 4.5-kg (10-lb) weight loss during this period. She has no personal or family history of psychiatric disorders. Her pulse is 95/min, respirations are 12/min, and blood pressure is 120/80 mm Hg. Examination shows warm and moist skin, a fine tremor of the fingers and tongue, and hyperreflexia.

The response options for the next 2 items are the same. Select one answer for each item in the set.

- | | |
|--|------------------------------|
| (A) Acute pericarditis | (F) Pericardial tamponade |
| (B) Cardiogenic shock | (G) Pleuritis |
| (C) Chronic constrictive pericardiopathy | (H) Pulmonary embolism |
| (D) Mitral valve disease | (I) Rheumatic fever |
| (E) Myocarditis | (J) Spontaneous pneumothorax |

For each patient with chest pain, select the most likely mechanism causing the symptoms.

137. A previously healthy 18-year-old man comes to the emergency department 12 hours after the onset of chest pain in the area of the trapezius muscle. He has had an upper respiratory tract infection for 9 days. A friction rub is heard over the precordium. An ECG shows an increase in the J point of all leads except aVR and V₁. After administration of aspirin, the pain subsides.
138. A 42-year-old woman comes to the emergency department 1 hour after the sudden onset of chest pain, cough, dyspnea, tachypnea, and marked anxiety. Two days ago, she underwent right hemicolectomy for cancer of the ascending colon. An accentuated pulmonary S₂ is heard on auscultation. An ECG shows nonspecific ST-segment and T-wave changes. Leukocyte count is 12,000/mm³. An x-ray of the chest shows no pulmonary infiltrates or pleural effusions. Arterial blood gas analysis on room air shows a PCO₂ of 30 mm Hg and a PO₂ of 55 mm Hg.

Answer Key for Step 2 CK Sample Questions

Block 1 (Questions 1-46)

1. E	11. C	21. A	31. B	41. A
2. D	12. A	22. C	32. A	42. A
3. A	13. D	23. D	33. F	43. C
4. E	14. A	24. A	34. F	44. F
5. A	15. A	25. E	35. B	45. H
6. D	16. E	26. A	36. B	46. G
7. A	17. D	27. A	37. C	
8. D	18. E	28. A	38. C	
9. D	19. C	29. B	39. E	
10. E	20. D	30. F	40. A	

Block 2 (Questions 47-92)

47. B	57. C	67. E	77. A	87. E
48. E	58. C	68. C	78. J	88. E
49. E	59. E	69. E	79. D	89. C
50. D	60. D	70. A	80. E	90. B
51. B	61. A	71. D	81. C	91. J
52. E	62. A	72. A	82. B	92. G
53. D	63. D	73. I	83. B	
54. B	64. C	74. E	84. D	
55. E	65. C	75. D	85. B	
56. D	66. C	76. F	86. C	

Block 3 (Questions 93-138)

93. C	103. G	113. D	123. A	133. G
94. A	104. C	114. A	124. E	134. I
95. A	105. B	115. D	125. E	135. F
96. D	106. B	116. B	126. B	136. C
97. D	107. C	117. D	127. B	137. A
98. D	108. C	118. E	128. D	138. H
99. C	109. B	119. H	129. C	
100. E	110. A	120. E	130. O	
101. D	111. C	121. A	131. B	
102. D	112. C	122. E	132. B	