

# Step 2 Clinical Knowledge (CK)



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The following are strategies for answering one-best-answer items:

- 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 response option list.
- Alternatively, read each response option carefully, eliminating those that are clearly incorrect.
- Of the remaining response 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.

### Patient Scenario Formats

Patient scenarios for any Single Item or Sequential Item Set may be provided in either Vignette (paragraph) format, or in Chart/Tabular format. Questions written in Chart/Tabular format will contain relevant patient information in list form, organized in clearly marked sections for ease of review. Familiar medical abbreviations may be used within Chart/Tabular format questions.

### Single-Item Questions

A single patient-centered vignette is associated with one question followed by four or more response options. The response options are lettered (ie, A, B, C, D, E). A portion of the questions involves interpretation of graphic or pictorial materials. You are required to select the best answer to the question. Other options may be partially correct, but there is only ONE BEST answer. This is the traditional, most frequently used multiple-choice question format on the examination.

#### **Example Question 1**

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

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

(Answer: D)

## Example Question 2

### Patient Information

**Age:** 18 years

**Gender:** F, self-identified

**Ethnicity:** unspecified

**Site of Care:** emergency department

### History

**Chief Complaint:** "My roommate took a lot of pills and said she wanted to die."

#### **History of Present Illness:**

- patient brought by ambulance 2 hours after a suspected acetaminophen overdose
- roommate had returned to their dorm and found the patient distraught; patient was holding an empty bottle of acetaminophen and said, "I just want to die."
- roommate estimates patient consumed 20 to 30 tablets of 500-mg acetaminophen

#### **Past Medical History:**

- generalized anxiety disorder
- major depressive disorder

#### **Medications:**

- citalopram

#### **Allergies:**

- no known drug allergies

#### **Family History:**

- noncontributory

#### **Psychosocial History:**

- college freshman; parents live 8 hours away

### Physical Examination

Temp	Pulse	Resp	BP	O <sub>2</sub> Sat	Ht	Wt	BMI
36.8°C (98.2°F)	89/min	16/min	108/59 mm Hg	99% on RA	170 cm (5 ft 7 in)	63 kg (140 lb)	22 kg/m <sup>2</sup>

- Appearance: awake and alert but distraught and fearful; patient says, "This was totally stupid."
- Pulmonary: clear lung fields
- Cardiac: regular rhythm; S<sub>1</sub> and S<sub>2</sub>, with an early systolic murmur
- Abdominal: soft and nontender; liver and spleen cannot be palpated
- Neurologic: no abnormalities; fully oriented

**Question:** In addition to obtaining serum acetaminophen concentration, which of the following is the most appropriate next step in management?

- (A) Administer N-acetylcysteine
- (B) Arrange hemodialysis
- (C) Gastric lavage
- (D) Initiate sodium bicarbonate infusion

(Answer: A)

## Sequential Item Sets

A single patient-centered vignette may be associated with two or three consecutive questions about the information presented. Each question is associated with the initial patient vignette but is testing a different point. You are required to select the ONE BEST answer to each question. These questions are designed to be answered in sequential order. You must click "Proceed to Next Item" to view the next item in the set; once you click on this button, the next question will be displayed, and you will not be able to change the answer to the previous question.

### **Example Sequential Question**

A 35-year-old woman is brought to the emergency department because of worsening pain and swelling of her right knee for the past 2 days. She has been taking acetaminophen for the knee pain during the past 2 days, but the pain is worse today. She has not had any trauma to the knee or any previous problems with her joints. She is otherwise healthy and she currently takes an oral contraceptive. She is sexually active and has a 10-year-old son who lives with her. She is a receptionist at a local hotel and she tells you she must stand often while working. She is 160 cm (5 ft 3 in) tall and weighs 52 kg (115 lb); BMI is 20 kg/m<sup>2</sup>. Temperature is 37.9°C (98.9°F). The right knee is erythematous, swollen, and tender; there is pain on movement. No other joints are affected. X-ray of the knee shows an effusion but no structural abnormalities of the joint.

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

- (A) Arthrocentesis of the knee
- (B) Blood cultures
- (C) Complete blood count
- (D) MRI of the knee
- (E) Urine cultures

(Answer: A)

Arthrocentesis is done. The synovial fluid is cloudy. Gram stain is negative. Analysis of the synovial fluid shows a leukocyte count of 120,000/mm<sup>3</sup> and 90% neutrophils. Which of the following is the most appropriate additional test on the synovial fluid?

- (A) Culture for bacteria
- (B) Glucose measurement
- (C) Polarized light microscopy
- (D) Protein level

(Answer: A)

## Abstract Set Format

The abstract item format includes a summary of an experiment or clinical investigation presented in a manner commonly encountered by a physician, eg, as an abstract that accompanies a research report in a medical journal. Examinees must interpret the abstract in order to answer questions on various topics, including

- Decisions about care of an individual patient
- Biostatistics/epidemiology
- Pharmacology/therapeutics
- Use of diagnostic studies

### ***Example Abstract Set***

#### **Question**

In children with type 1 diabetes mellitus, what factors are associated with increased risk for microalbuminuria and macroalbuminuria?

#### **Methods**

**Design:** Inception cohort followed for a mean of 9.8 years.

**Setting:** St. Bartholomew's Oxford Diabetes Register, Oxford, England, UK.

**Patients:** 527 children < 16 years of age (mean age 9 years) who were diagnosed with type 1 diabetes mellitus and included in the Diabetes Register from 1986 to 1997 (90% follow-up).

**Prognostic factors:** Mean glycosylated hemoglobin concentration (HbA<sub>1c</sub>), female sex, mean blood pressure, history of smoking, and age at diagnosis.

**Outcomes:** Microalbuminuria (albumin-to-creatinine ratio 3.5 to 35 mg/mmol in boys and 4.0 to 47 mg/mmol in girls, in 2 annual, consecutive, early morning urine samples), and macroalbuminuria (albumin-to-creatinine ratio > 35 mg/mmol in boys and > 47 mg/mmol in girls).

#### **Main results**

135 patients (26%) developed microalbuminuria, with a cumulative prevalence of 25.7% (95% CI 21 to 30) after 10 years and 51% (CI 41 to 61) after 19 years. Of the 135 patients with microalbuminuria, there was a cumulative prevalence of regression to the normoalbuminuric range of 52% (CI 42 to 62) after 4.9 years from the onset of microalbuminuria. 18 patients (3%) developed macroalbuminuria, with a cumulative prevalence of 14% (CI 13 to 15) after 3.2 years from onset of microalbuminuria. HbA<sub>1c</sub> and female sex were associated with increased risk for microalbuminuria (Table). HbA<sub>1c</sub> and persistent and intermittent microalbuminuria were associated with increased risk for macroalbuminuria (Table).

#### **Conclusions**

In children with type 1 diabetes mellitus, poor glycemic control and female sex were associated with development of microalbuminuria. About half of patients with microalbuminuria regressed to normoalbuminuria. Poor glycemic control and persistent or intermittent microalbuminuria were associated with development of macroalbuminuria.

**Sources of funding:** Diabetes UK; Juvenile Diabetes Research Foundation; Wellcome Trust; NIHR Cambridge Biomedical Research Centre.

**Structured abstract based on:** Amin R, Widmer B, Prevost AT, et al. **Risk of microalbuminuria and progression to macroalbuminuria in a cohort with childhood onset type 1 diabetes: prospective observational study.** BMJ. 2008;336:697-701. 18349042

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### Factors associated with renal outcomes in children with type 1 diabetes mellitus\*

Outcomes	Prognostic factors	At a mean 9.8 years of follow-up
		Hazard ratio (95% CI)
Microalbuminuria	HbA <sub>1c</sub> (per % increase)	1.4 (1.3 to 1.5)
	Female sex	1.4 (1.02 to 2.1)
	Diastolic blood pressure	1.0 (1.0 to 1.0)
	Systolic blood pressure	1.0 (1.0 to 1.0)
	History of smoking	1.3 (0.9 to 2.0)
	Younger age at diagnosis	1.0 (1.0 to 1.1)
Macroalbuminuria	HbA <sub>1c</sub> (per % increase)	1.4 (1.2 to 1.8)
	Persistent microalbuminuria†	28 (8.0 to 96)
	Intermittent microalbuminuria‡	8.8 (2.4 to 31)
	Female sex	1.3 (0.5 to 3.3)
	Diastolic blood pressure	1.1 (0.9 to 1.1)
	Systolic blood pressure	1.1 (0.9 to 1.1)
	History of smoking	1.3 (0.4 to 4.1)
	Younger age at diagnosis	1.0 (1.0 to 1.1)

\*HbA<sub>1c</sub> = glycated haemoglobin.

†Presence of microalbuminuria at every annual visit after first detection.

‡Positive microalbuminuria followed by regression to normoalbuminuria, then recurrence to microalbuminuria at a later date.

A 12-year-old girl is brought to the office for a follow-up examination 6 months after being diagnosed with type 1 diabetes mellitus. The patient feels well. She says she smokes cigarettes occasionally when with friends. She is not sexually active. She is at the 60th percentile for BMI. Her temperature is 37.0°C (98.6°F), pulse is 80/min, respirations are 16/min, and blood pressure is 108/72 mm Hg. Physical examination shows no other abnormalities. Results of urinalysis are within the reference ranges. Her father, who has type 1 diabetes mellitus and chronic renal disease, asks what markers will be followed to determine his daughter's risk for developing chronic renal disease. Which of the following patient characteristics most increases her risk for developing microalbuminuria over the next 10 years?

- (A) Age at diagnosis
- (B) BMI
- (C) Diastolic blood pressure
- (D) Gender
- (E) Smoking history

Answer: D

Which of the following current or potential future findings is most likely to increase the patient's risk for developing macroalbuminuria?

- (A) Age at diagnosis
- (B) Cigarette use
- (C) Elevated systolic blood pressure
- (D) Gender
- (E) Poor glycemic control

Answer: E

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One year later, the patient's urinalysis shows microalbuminuria for the first time. In a population of children of a similar age who have type 1 diabetes mellitus and had microalbuminuria detected for the first time, which of the following outcomes is most likely?

- (A) Hemoglobin A<sub>1c</sub> will normalize within 10 years
- (B) Hypertension will be diagnosed within 2 years
- (C) Macroalbuminuria will be detected within 1 year
- (D) Microalbuminuria will resolve within 5 years

Answer: D

**NOTE:** When additional question formats are added to the examination, notice will be provided on the USMLE website ([www.usmle.org](http://www.usmle.org)). You must monitor the website to stay informed about the types of questions that occur in the examination, and you must practice with the downloadable sample test questions available on the USMLE website in order to be fully prepared for the examination.

## INTRODUCTION TO USMLE STEP 2 CK SAMPLE TEST QUESTIONS

The following pages include 120 sample test questions. Most of these practice questions are the same as those on the USMLE website.

### ONLINE:

Please note that reviewing the sample questions as they appear on pages 13–56 is **not a substitute for practicing on the website**.

1. You should run the Step 2 CK examination tutorial and practice test questions that are provided on the USMLE website well before your test date.
2. The sample materials available on the USMLE website include additional questions and formats that do not appear in this booklet, such as items with associated audio.

### CONTENT:

You should become familiar with all test question formats that will be used in the actual examination.

Although the sample questions exemplify content on the examination, they may not reflect the content coverage on individual examinations.

In the actual examination, questions will be presented in random order. The questions will be presented one at a time in a format designed for easy on-screen reading, including a Normal Laboratory Values button (Table included here on pages 10–12). Photographs, charts, and x-rays in this booklet are not of the same quality as the pictorials used in the actual examination. In addition, you will be able to adjust the brightness and contrast of the computer screen.

### TIMING:

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 form for recording answers for this practice is provided on page 57. An answer key is provided on page 58. In the actual examination, answers will be selected on the screen; no answer form will be provided.

## USMLE LABORATORY VALUES

SERUM	<u>Reference Range</u>	<u>SI Reference Intervals</u>
<b>General Chemistry:</b>		
Electrolytes		
Sodium (Na <sup>+</sup> )	136–146 mEq/L	136–146 mmol/L
Potassium (K <sup>+</sup> )	3.5–5.0 mEq/L	3.5–5.0 mmol/L
Chloride (Cl <sup>-</sup> )	95–105 mEq/L	95–105 mmol/L
Bicarbonate (HCO <sub>3</sub> <sup>-</sup> )	22–28 mEq/L	22–28 mmol/L
Urea nitrogen	7–18 mg/dL	2.5–6.4 mmol/L
Creatinine	0.6–1.2 mg/dL	53–106 μmol/L
Glucose	Fasting: 70–100 mg/dL Random, non-fasting: <140 mg/dL	3.8–5.6 mmol/L <7.77 mmol/L
Calcium	8.4–10.2 mg/dL	2.1–2.6 mmol/L
Magnesium (Mg <sup>2+</sup> )	1.5–2.0 mg/dL	0.75–1.0 mmol/L
Phosphorus (inorganic)	3.0–4.5 mg/dL	1.0–1.5 mmol/L
<b>Hepatic:</b>		
Alanine aminotransferase (ALT)	10–40 U/L	10–40 U/L
Aspartate aminotransferase (AST)	12–38 U/L	12–38 U/L
Alkaline phosphatase	25–100 U/L	25–100 U/L
Amylase	25–125 U/L	25–125 U/L
Bilirubin, Total // Direct	0.1–1.0 mg/dL // 0.0–0.3 mg/dL	2–17 μmol/L // 0–5 μmol/L
Proteins, total	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
<b>Lipids:</b>		
Cholesterol		
Total	Normal: <200 mg/dL High: >240 mg/dL	<5.2 mmol/L >6.2 mmol/L
HDL	40–60 mg/dL	1.0–1.6 mmol/L
LDL	<160 mg/dL	<4.2 mmol/L
Triglycerides	Normal: <150 mg/dL Borderline: 151–199 mg/dL	<1.70 mmol/L 1.71–2.25 mmol/L
<b>Iron Studies:</b>		
Ferritin	Male: 20–250 ng/mL Female: 10–120 ng/mL	20–250 μg/L 10–120 μg/L
Iron	Male: 65–175 μg/dL Female: 50–170 μg/dL	11.6–31.3 μmol/L 9.0–30.4 μmol/L
Total iron-binding capacity	250–400 μg/dL	44.8–71.6 μmol/L
Transferrin	200–360 mg/dL	2.0–3.6 g/L

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## USMLE LABORATORY VALUES (continued)

	<u>Reference Range</u>	<u>SI Reference Intervals</u>
<b>Endocrine:</b>		
Follicle-stimulating hormone	Male: 4–25 mIU/mL Female: premenopause 4–30 mIU/mL midcycle peak 10–90 mIU/mL postmenopause 40–250 mIU/mL	4–25 IU/L 4–30 IU/L 10–90 IU/L 40–250 IU/L
Luteinizing hormone	Male: 6–23 mIU/mL Female: follicular phase 5–30 mIU/mL midcycle 75–150 mIU/mL postmenopause 30–200 mIU/mL	6–23 IU/L 5–30 IU/L 75–150 IU/L 30–200 IU/L
Growth hormone - arginine stimulation	Fasting: <5 ng/mL Provocative stimuli: >7 ng/mL	<5 µg/L >7 µg/L
Prolactin (hPRL)	Male: <17 ng/mL Female: <25 ng/mL	<17 µg/L <25 µg/L
Cortisol	0800 h: 5–23 µg/dL 1600 h: 3–15 µg/dL 2000 h: <50% of 0800 h	138–635 nmol/L 82–413 nmol/L Fraction of 0800 h: <0.50
TSH	0.4–4.0 µU/mL	0.4–4.0 mIU/L
Triiodothyronine (T <sub>3</sub> ) (RIA)	100–200 ng/dL	1.5–3.1 nmol/L
Triiodothyronine (T <sub>3</sub> ) resin uptake	25%–35%	0.25–0.35
Thyroxine (T <sub>4</sub> )	5–12 µg/dL	64–155 nmol/L
Free T <sub>4</sub>	0.9–1.7 ng/dL	12.0–21.9 pmol/L
Thyroidal iodine ( <sup>123</sup> I) uptake	8%–30% of administered dose/24 h	0.08–0.30/24 h
Intact PTH	10–60 pg/mL	10–60 ng/L
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
<b>Immunoglobulins:</b>		
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	6.5–15.0 g/L
IgM	50–300 mg/dL	0.5–3.0 g/L
<b>Other, serum:</b>		
Creatinine clearance	Male: 97–137 mL/min Female: 88–128 mL/min	97–137 mL/min 88–128 mL/min
Creatine kinase	Male: 25–90 U/L Female: 10–70 U/L	25–90 U/L 10–70 U/L
Lactate dehydrogenase	45–200 U/L	45–200 U/L
Osmolality	275–295 mOsmol/kg H <sub>2</sub> O	275–295 mOsmol/kg H <sub>2</sub> O
Uric acid	3.0–8.2 mg/dL	0.18–0.48 mmol/L
<b>GASES, ARTERIAL BLOOD (ROOM AIR)</b>		
PO <sub>2</sub>	75–105 mm Hg	10.0–14.0 kPa
PCO <sub>2</sub>	33–45 mm Hg	4.4–5.9 kPa
pH	7.35–7.45	[H <sup>+</sup> ] 36–44 nmol/L
<b>CEREBROSPINAL FLUID</b>		
Cell count	0–5/mm <sup>3</sup>	0–5 × 10 <sup>6</sup> /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 <sub>2</sub> O	70–180 mm H <sub>2</sub> O
Proteins, total	<40 mg/dL	<0.40 g/L

## USMLE LABORATORY VALUES (continued)

	<u>Reference Range</u>	<u>SI Reference Intervals</u>
<b>HEMATOLOGIC</b>		
<b><i>Complete Blood Count:</i></b>		
Hematocrit	Male: 41%–53% Female: 36%–46%	0.41–0.53 0.36–0.46
Hemoglobin, blood	Male: 13.5–17.5 g/dL Female: 12.0–16.0 g/dL	135–175 g/L 120–160 g/L
Mean corpuscular hemoglobin (MCH)	25–35 pg/cell	0.39–0.54 fmol/cell
Mean corpuscular hemoglobin conc. (MCHC)	31%–36% Hb/cell	4.8–5.6 mmol Hb/L
Mean corpuscular volume (MCV)	80–100 $\mu\text{m}^3$	80–100 fL
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
Leukocyte count (WBC)	4500–11,000/mm <sup>3</sup>	$4.5\text{--}11.0 \times 10^9/\text{L}$
Neutrophils, segmented	54%–62%	0.54–0.62
Neutrophils, bands	3%–5%	0.03–0.05
Lymphocytes	25%–33%	0.25–0.33
Monocytes	3%–7%	0.03–0.07
Eosinophils	1%–3%	0.01–0.03
Basophils	0%–0.75%	0.00–0.0075
Platelet count	150,000–400,000/mm <sup>3</sup>	$150\text{--}400 \times 10^9/\text{L}$
<b><i>Coagulation:</i></b>		
Partial thromboplastin time (PTT) (activated)	25–40 seconds	25–40 seconds
Prothrombin time (PT)	11–15 seconds	11–15 seconds
D-Dimer	$\leq 250 \text{ ng/mL}$	$\leq 1.4 \text{ nmol/L}$
<b><i>Other, Hematologic:</i></b>		
Reticulocyte count	0.5%–1.5%	0.005–0.015
Erythrocyte count	Male: 4.3–5.9 million/mm <sup>3</sup> Female: 3.5–5.5 million/mm <sup>3</sup>	$4.3\text{--}5.9 \times 10^{12}/\text{L}$ $3.5\text{--}5.5 \times 10^{12}/\text{L}$
Erythrocyte sedimentation rate (Westergren)	Male: 0–15 mm/h Female: 0–20 mm/h	0–15 mm/h 0–20 mm/h
CD4+ T-lymphocyte count	$\geq 500/\text{mm}^3$	$\geq 0.5 \times 10^9/\text{L}$
Troponin I	$\leq 0.04 \text{ ng/mL}$	$\leq 0.04 \mu\text{g/L}$
<b><i>Endocrine:</i></b>		
Hemoglobin A <sub>1c</sub>	$\leq 6\%$	$\leq 42 \text{ mmol/mol}$
<b>URINE</b>		
Calcium	100–300 mg/24 h	2.5–7.5 mmol/24 h
Osmolality	50–1200 mOsmol/kg H <sub>2</sub> O	50–1200 mOsmol/kg H <sub>2</sub> O
Oxalate	8–40 $\mu\text{g/mL}$	90–445 $\mu\text{mol/L}$
Proteins, total	$< 150 \text{ mg/24 h}$	$< 0.15 \text{ g/24 h}$
<b>BODY MASS INDEX (BMI)</b>		
	Adult: 19–25 kg/m <sup>2</sup>	

**BLOCK 1, ITEMS 1–40**

1. A 68-year-old man is brought to the emergency department because of a 2-day history of progressive lethargy and tremors. He has alcoholism and opiate, cocaine, and amphetamine use disorder, but he has abstained from alcohol and illicit substances during the past 2 weeks. He also has alcoholic cirrhosis. His only medication is a daily multivitamin. He previously drank six 12-oz beers daily. He appears chronically ill and is somnolent. Temperature is 36.8°C (98.2°F), pulse is 100/min, respirations are 18/min, and blood pressure is 100/60 mm Hg. Pulse oximetry on room air shows an oxygen saturation of 94%. Examination shows conjunctival icterus, ascites, and 2+ edema of the lower extremities. Cranial nerves are intact. Muscle strength is 4/5 throughout. When he is awake, there is a postural and action tremor of the forearms and hands that is accompanied by a sudden, brief loss of muscle strength. His speech is normal, and he is able to follow simple commands. Serum total bilirubin concentration is 3 mg/dL. Blood and urine cultures grow no pathogens. Which of the following is most likely to improve this patient's cognition and movement disorder?
  - (A) Intravenous vancomycin and cefepime therapy
  - (B) Intravenous vitamin B<sub>1</sub> (thiamine) therapy
  - (C) Oral lactulose therapy
  - (D) Oral lorazepam therapy
  
2. A 45-year-old woman comes to the emergency department because of a 3-day history of progressive shortness of breath, cough productive of blood-tinged sputum, and fever. She also has a 3-month history of numbness of her left leg and tingling in her right arm. She has not had chills. She was diagnosed with asthma 6 months ago; it is well controlled with inhaled budesonide and albuterol as needed. She has no other history of serious illness and takes no other medications. She appears to be in mild respiratory distress. Temperature is 38.1°C (100.6°F), pulse is 105/min and regular, respirations are 24/min, and blood pressure is 145/95 mm Hg. Pulse oximetry on room air shows an oxygen saturation of 92%. Crackles are heard at the right lung base, and there are occasional diffuse wheezes. Cardiac examination shows no abnormalities. On neurologic examination, sensation to pinprick is decreased over the lateral aspect of the left lower extremity and right upper extremity. Muscle strength is 5/5 throughout. Babinski sign is absent. Deep tendon reflexes are 2+ and symmetric. Which of the following is the most appropriate next step in diagnosis?
  - (A) CT angiography of the chest
  - (B) Determination of serum angiotensin-converting enzyme activity
  - (C) Measurement of serum IgE concentration
  - (D) Mesenteric angiography
  - (E) Serum antiglomerular basement membrane assay
  - (F) Serum antineutrophil cytoplasmic autoantibody assay
  - (G) Sweat chloride testing
  
3. An 87-year-old woman, gravida 6, para 6, is brought to the emergency department because of a 24-hour history of severe abdominal pain and an inability to void. She notes that for the past 2 months, she has had difficulty emptying her bladder, especially at the end of the day. Twenty years ago, she underwent mastectomy for breast cancer; she has been cancer-free since then. She has a 10-year history of osteoporosis. All of her children were delivered vaginally without complications. Her only medication is alendronate. Examination shows the cervix protruding 7.5 cm from the vagina. After the cervix is replaced into the vagina, a urinary catheter drains 700 mL of urine. Urinalysis shows no abnormalities. Which of the following is the most likely diagnosis?
  - (A) Overactive bladder
  - (B) Overflow incontinence
  - (C) Stress incontinence
  - (D) Urinary retention
  - (E) Urinary tract infection

4. A 25-year-old woman is admitted to the hospital because of a 2-day history of fever, dizziness, light-headedness, chills, and shaking. She has hyperthyroidism, gastroesophageal reflux disease, and asthma. Her medications are oral methimazole and omeprazole, and inhaled fluticasone, and she has been on the same dosages for 1 year. She is in the military reserve and will be deployed overseas next week. She began atovaquone-proguanil therapy 1 week ago and received the hepatitis A and yellow fever vaccines 2 weeks ago. She is not sexually active. She does not smoke cigarettes or drink alcohol. She appears ill but is not in acute distress. Temperature is 38.6°C (101.5°F), pulse is 110/min, respirations are 22/min, and blood pressure is 90/60 mm Hg. No wheezing is heard on auscultation. Cardiac examination shows no abnormalities. Laboratory studies show:

Hemoglobin	13.8 g/dL
Leukocyte count	1100/mm <sup>3</sup>
Segmented neutrophils	10%
Eosinophils	10%
Lymphocytes	40%
Monocytes	40%
Platelet count	320,000/mm <sup>3</sup>

Results of other laboratory studies are within the reference ranges. Which of the following is the most likely cause of this patient's hematologic abnormality?

- (A) Atovaquone-proguanil
  - (B) Fluticasone
  - (C) Hepatitis A vaccine
  - (D) Methimazole
  - (E) Omeprazole
  - (F) Yellow fever vaccine
5. A 16-year-old boy is brought to the emergency department because of a 2-day history of fever, nausea, vomiting, headache, chills, and fatigue. He has not had any sick contacts. He underwent splenectomy for traumatic injury at the age of 13 years. He has no other history of serious illness and takes no medications. He appears ill. His temperature is 39.2°C (102.5°F), pulse is 130/min, respirations are 14/min, and blood pressure is 110/60 mm Hg. On pulmonary examination, scattered crackles are heard bilaterally. Abdominal examination shows a well-healed midline scar and mild, diffuse tenderness to palpation. Which of the following is the most appropriate next step in management?
- (A) Antibiotic therapy
  - (B) Antiemetic therapy
  - (C) CT scan of the chest
  - (D) X-ray of the abdomen
  - (E) Reassurance
6. A previously healthy 29-year-old woman is admitted to the hospital because of a 1-day history of moderate headache, fever, and lethargy. Two days ago, she underwent wisdom tooth extraction. She takes no medications. She cannot remember her vaccination history. She does not smoke cigarettes, drink alcohol, or use illicit drugs. She is a college student, lives in an apartment complex with other students, and eats all her meals in the campus dining hall. She says her study partner had a "really bad fever" during the past week. The patient appears sleepy. Temperature is 40.0°C (104.0°F), pulse is 140/min, and blood pressure is 90/40 mm Hg. Examination shows a diffuse purpuric rash over the trunk and all extremities. There is nuchal rigidity. Lungs are clear to auscultation. Heart sounds are normal. Neurologic examination shows no other focal findings. Which of the following is most likely to have prevented this patient's current condition?
- (A) Adherence to immunization guidelines
  - (B) Avoidance of eating meals in the campus dining hall
  - (C) Consistent hand washing
  - (D) Isolation of other students on campus with febrile illness
  - (E) Prophylactic antibiotic therapy

7. A 27-year-old primigravid woman comes to the physician for her first prenatal visit 10 weeks after a home pregnancy test was positive. She feels well, and her pregnancy has been uncomplicated. She previously used an oral contraceptive but discontinued it 3 months ago. She has no history of sexually transmitted diseases. She is sexually active in a monogamous relationship with a male partner who is the father. She has had five lifetime sexual partners. She has a pet cat. Examination shows a uterus consistent in size with a 10-week gestation. Testing for which of the following infectious conditions is the most appropriate recommendation for this patient?
- (A) Bacterial vaginosis
  - (B) Cytomegalovirus
  - (C) Epstein-Barr virus
  - (D) HIV
  - (E) Human papillomavirus
8. An investigator would like to decrease the incidence of type 2 diabetes mellitus among adult patients with risk factors including obesity, decreased physical activity, and family history of diabetes mellitus. A total of 200 men and women aged 30 to 64 years will be enrolled in a regular exercise program for 6 months. A nurse reviews the details of the study with each participant, and each participant signs an informed consent form. One month after the study begins, one of the participants asks to drop out of the study. Which of the following represents the most appropriate next step by this study participant?
- (A) Complete the study because she signed the consent form
  - (B) Discuss withdrawal with the institutional review board
  - (C) Negotiate her withdrawal with the principal investigator
  - (D) Wait to withdraw until after the investigator consults with an ethics team
  - (E) Withdraw from the study now
9. A 70-year-old man comes to the clinic because of a 3-day history of fatigue, dark urine, decreased urine output, mild pain with urination, and a low-grade fever. He has gout, hypertension, and osteoarthritis. His medications are allopurinol, hydrochlorothiazide, and acetaminophen. Temperature is 37.9°C (100.2°F), pulse is 88/min, respirations are 24/min, and blood pressure is 160/95 mm Hg. Pulse oximetry on room air shows an oxygen saturation of 97%. Jugular venous pressure is 7 cm H<sub>2</sub>O (N=5–9). Cardiopulmonary examination shows no abnormalities. Which of the following is the most appropriate next step in management?
- (A) Discontinuation of acetaminophen therapy
  - (B) Intravenous administration of fluids
  - (C) Measurement of postvoid residual volume
  - (D) Oral trimethoprim-sulfamethoxazole therapy
  - (E) Renal biopsy
10. A 52-year-old woman comes to the physician because of a 2-day history of severe pain and markedly decreased range of motion in her right elbow. She has rheumatoid arthritis in her elbows, wrists, and hands. She reports episodes of moderate pain approximately four times yearly. Previous treatment with naproxen, methotrexate, and hydroxychloroquine has provided moderate relief. Treatment with prednisone was begun after her most recent episode 9 weeks ago. She has not had generalized fatigue or muscle aches. She has no other history of serious illness. Her other medications are naproxen, prednisone, and omeprazole. Temperature is 38.4°C (101.1°F), pulse is 90/min, respirations are 12/min, and blood pressure is 110/76 mm Hg. Range of motion of the wrists and ankles is decreased; the right elbow is more severely limited by pain than the left elbow. There is warmth, tenderness, erythema, and edema of the right elbow. Fine-needle aspiration of the right elbow is performed. Gram stain of the fluid shows a leukocyte count of 60,000/mm<sup>3</sup> and no organisms. Which of the following is the most appropriate pharmacotherapy?
- (A) Colchicine
  - (B) Infliximab
  - (C) Ketorolac
  - (D) Methylprednisolone
  - (E) Vancomycin



## Question

In patients with cirrhosis and acute bleeding esophageal varices, how do endoscopic sclerotherapy and emergency portacaval shunt compare for control of bleeding and survival?

## Methods

**Design:** Randomized controlled trial (San Diego Bleeding Esophageal Varices Study). ClinicalTrials.gov NCT00690027.

**Allocation:** Concealed.

**Blinding:** Blinded (gastroenterologist who evaluated patients for portal-systemic encephalopathy).

**Follow-up period:** Up to 17 years.

**Setting:** University of California San Diego Medical Center.

**Patients:** 211 patients (mean age 49 years, 77% men) with acute bleeding esophageal varices resulting from cirrhosis, who required a transfusion of  $\geq 2$  units of blood and, for patients transferred from other hospitals, observation of upper gastrointestinal bleeding within 48 hours of transfer. Exclusion criterion was  $> 1$  previous session of endoscopic sclerotherapy.

**Intervention:** Endoscopic sclerotherapy ( $n = 106$ ) or emergency portacaval shunt ( $n = 105$ ). Emergency portacaval shunt comprised a direct side-to-side or direct end-to-side portacaval shunt done within 8 hours of initial contact.

**Outcomes:** Control of bleeding at  $> 30$  days, survival, readmissions for variceal or nonvariceal bleeding requiring transfusion of packed red blood cells, and recurrent portal-systemic encephalopathy.

**Patient follow-up:** 100% (minimum follow-up until death or 9.4 years).

## Main results

15-year survival was lower with endoscopic sclerotherapy than with emergency portacaval shunt (10/106 vs 48/105, relative benefit reduction 79%, 95% CI 62 to 89; number needed to harm 3, CI 2 to 4). Other main results are shown in the Table.

## Endoscopic sclerotherapy (EST) vs emergency portacaval shunt (EPCS) in patients with cirrhosis and acute bleeding esophageal varices

Outcomes	Child-Pugh risk class	EST	EPCS	P value
Control of bleeding at $> 30$ days*		20%	100%	$<.001$
Median survival (years)	A	4.62	10.43	.003
	B	2.61	6.19	$<.001$
	C	0.58	5.30	.005
Mean number of readmissions for variceal bleeding requiring packed red blood cell transfusion		6.8	0.4	$<.001$
Recurrent portal-systemic encephalopathy†		35%	15%	.001
*Excluding indeterminate deaths at 14 days from nonbleeding causes.				
†In patients who survived 30 days and left hospital.				

## Conclusion

In patients with cirrhosis and acute bleeding esophageal varices, emergency portacaval shunt was better than endoscopic sclerotherapy for control of bleeding, recurrent encephalopathy, and survival.

**Sources of funding:** National Institutes of Health and Surgical Education and Research Foundation.

**Structured abstract based on:** Orloff MJ, Isenberg JI, Wheeler HO, et al. **Randomized trial of emergency endoscopic sclerotherapy versus emergency portacaval shunt for acutely bleeding esophageal varices in cirrhosis.** J Am Coll Surg. 2009;209:25-40. 19651060

11. A 52-year-old man with hepatic cirrhosis comes to the emergency department because of a 3-hour history of vomiting blood. Esophagogastroduodenoscopy confirms actively bleeding esophageal varices. Based on the abstract shown, the physician is considering an emergency portacaval shunt (EPCS) procedure rather than endoscopic sclerotherapy (EST). According to the results in the abstract, approximately how many patients must be treated with EPCS rather than EST to prevent one case of recurrent portal-systemic encephalopathy?
- (A) 1
  - (B) 3
  - (C) 5
  - (D) 10
  - (E) 16
12. Which of the following most strongly limits the generalizability of this study's findings?
- (A) The allocation was concealed
  - (B) EPCS is available only at specialty centers
  - (C) The follow-up period was too short
  - (D) The patients were not blinded
  - (E) Unmeasured confounders were not controlled by the study design
13. Which of the following conclusions is most appropriate based on the results presented in the table?
- (A) The 95% confidence interval for the difference in survival between EPCS and EST for Child-Pugh class A patients includes 0 years
  - (B) EPCS is more effective than EST in decreasing hospital readmissions for variceal bleeding requiring transfusion
  - (C) The median survival after EPCS is statistically significantly less for Child-Pugh class C than for Child-Pugh class B
  - (D) The randomization procedure was ineffective in decreasing bias in this study

**END OF SET**

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14. A 42-year-old man comes to the office as a new patient. Three weeks ago, he was hospitalized for treatment of community-acquired pneumonia and diagnosed with HIV infection. He has no other history of serious illness and takes no medications. Vital signs are within normal limits. Examination shows no abnormalities. CD4<sup>+</sup> T-lymphocyte count is 490/mm<sup>3</sup>, and plasma HIV viral load is 45,000 copies/mL. Results of other laboratory studies are within the reference ranges. Test results for syphilis and hepatitis B and C are negative. The patient agrees to begin antiretroviral therapy. He asks what his long-term prognosis will be. With adherence to the medication regimen, this patient is at greatest risk of death from which of the following?
- (A) Cardiovascular disease
  - (B) Chronic kidney disease
  - (C) HIV-related malignancy
  - (D) Non-HIV-related malignancy
  - (E) Opportunistic infection

15. A 40-year-old divorced woman comes to the office because of a 1-year history of difficulty sleeping. She says she sometimes does not fall asleep before 2 AM and does not feel rested at 6:30 AM when she has to get up and get her children ready for school. Sometimes she wakes after 1 to 2 hours of sleep and cannot fall back to sleep. On these occasions, she typically gets up for about 30 minutes, does some housework, and smokes a cigarette. She smokes one pack of cigarettes every three to four days. She works in a customer service call center and says she enjoys helping people resolve their problems. She now finds her job much harder and less enjoyable because she feels tired and sleepy. She says she would take a nap if she could, but she picks her children up as soon as she leaves work and spends the evening doing homework with them, making their dinner, and preparing lunches for the following day. By 9 PM, the children are in bed so she eats her own dinner and does some housework. She says that after 9 PM is when she smokes most of her cigarettes. She has not had depressed mood, excessive worry, or change in weight. Vital signs are within normal limits. Examination shows dark circles under the eyes and injected conjunctivae. Which of the following is the most appropriate initial step in management?
- (A) Education on sleep hygiene
  - (B) Mirtazapine therapy
  - (C) Sertraline therapy
  - (D) Setting a date for smoking cessation
  - (E) Zolpidem therapy
16. A 58-year-old woman is brought to the office by her husband because of a 6-week history of increasing confusion. Her husband says that, initially, she had difficulty doing “normal” things, such as preparing meals. Since then, she has become progressively less able to care for herself or even use a telephone. During this time, she also has had increased anxiety and restlessness. She has type 2 diabetes mellitus well controlled with an oral hypoglycemic agent. She is alert and appears anxious. She is oriented to person but not to place or time. She startles when the door to the examination room is slammed shut. Her temperature is 36.8°C (98.2°F), pulse is 78/min and regular, and blood pressure is 132/94 mm Hg. Physical examination shows no other abnormalities. On neurologic examination, she can repeat three objects immediately but is unable to recall them after 3 minutes. She is unable to copy a drawing of a cube. Results of a complete blood count and serum electrolyte concentrations are within the reference ranges. Her serum glucose concentration is 155 mg/dL. CT scan of the head shows no abnormalities. Which of the following is the most appropriate next step in diagnosis?
- (A) Determination of hemoglobin A<sub>1c</sub>
  - (B) Measurement of cerebrospinal fluid 14-3-3 protein concentration
  - (C) Measurement of cerebrospinal fluid beta amyloid concentration
  - (D) Measurement of cerebrospinal fluid methylmalonic acid concentration
  - (E) Measurement of serum angiotensin-converting enzyme activity
  - (F) Serum protein electrophoresis
17. A 38-year-old woman is brought to the emergency department by paramedics 90 minutes after she fell through ice into a stream while hiking. She was stuck in the ice until emergency responders rescued her. On arrival, she has severe pain in her feet. She has no history of serious illness and takes no medications. Temperature is 34.8°C (94.6°F); other vital signs are within normal limits. Examination shows blue discoloration over the toes bilaterally, and the feet are cold to touch. Which of the following is the most appropriate next step in management?
- (A) Place the feet in front of a dry space heater
  - (B) Rub the feet with a steaming hot towel
  - (C) Submerge the feet in a moderately warm whirlpool
  - (D) Wrap the feet in a room-temperature wet-to-dry dressing
  - (E) Observation only

18. A 52-year-old woman comes to the emergency department because of a 1-day history of bleeding gums and moderate pain in her knees. She first noticed the gum bleeding while brushing her teeth this morning; she has been unable to stop the bleeding. She has systemic lupus erythematosus with inflammatory arthritis and Raynaud disease. Medications are tramadol and hydroxychloroquine. Vital signs are within normal limits. Examination shows bleeding, friable gums. There are multiple ecchymoses and petechiae over the upper extremities. Cardiac and abdominal examinations show no abnormalities. The knees are cool to the touch; there are effusions, and range of motion is limited by pain. Neurologic examination shows no focal findings. Laboratory studies show:

Hemoglobin	11 g/dL
Hematocrit	33%
Erythrocyte count	$4.2 \times 10^{12}/L$
Mean corpuscular volume	$90 \mu m^3$
Leukocyte count	$9000/mm^3$
Segmented neutrophils	60%
Bands	3%
Eosinophils	2%
Basophils	1%
Lymphocytes	30%
Monocytes	4%
Platelet count	$20,000/mm^3$
Serum	
Creatinine	0.9 mg/dL
Ferritin	10 ng/mL

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

- (A) Factor replacement therapy
  - (B) Methotrexate therapy
  - (C) Plasmapheresis
  - (D) Prednisone therapy
  - (E) Splenectomy
19. A 13-year-old boy is brought to the emergency department because of a 3-day history of progressive fatigue, shortness of breath, and difficulty walking up stairs. He had been well until 1 week ago, when he developed rhinorrhea, cough, and a sore throat. These symptoms resolved spontaneously 2 days ago. He has no history of serious illness and takes no medications. On arrival, he is pale and in moderate respiratory distress. Pulse is 120/min, respirations are 25/min, and blood pressure is 80/40 mm Hg. Pulse oximetry on room air shows an oxygen saturation of 91%. On pulmonary examination, crackles are heard throughout the lung fields. On cardiac examination, a gallop is heard. S<sub>1</sub> is soft. A grade 2/6, high-pitched holosystolic murmur is heard best at the apex. The remainder of the examination shows no abnormalities. Which of the following is the most likely diagnosis?
- (A) Glomerulonephritis
  - (B) Myocarditis
  - (C) Pneumonia
  - (D) Rheumatic fever
  - (E) Systemic lupus erythematosus
20. A 10-day-old female newborn is brought to the emergency department because of a 2-day history of bilious vomiting. She was born at term following an uncomplicated pregnancy and spontaneous vaginal delivery. She was 50.8 cm (20 in) in length and weighed 3260 g (7 lb 3 oz) at birth. Examination following delivery showed no abnormalities, and she was discharged at the age of 2 days. She is exclusively breast-fed. She appears ill. Today, she is 50.8 cm (20 in) in length and weighs 3062 g (6 lb 12 oz). Temperature is 38.3°C (100.9°F), pulse is 180/min, and respirations are 52/min. The abdomen is distended; the patient cries on palpation of the abdomen. Which of the following is the most likely diagnosis?
- (A) Duodenal atresia
  - (B) Intussusception
  - (C) Meconium ileus
  - (D) Necrotizing enterocolitis
  - (E) Volvulus

21. An 85-year-old man with severe dementia, Alzheimer type, is admitted to the hospital because of a nonhealing ulcer on his right second toe. He lives in a nursing care facility and has been bedridden for the past 3 years. He has type 2 diabetes mellitus, hypertension, and peripheral vascular disease. His medications are metformin, amlodipine, and aspirin. Noninvasive vascular studies of the lower extremities show marked bilateral vascular disease. Subsequent peripheral angiography shows severe stenoses of the right superficial femoral and the left common iliac arteries. The patient undergoes uncomplicated placement of two sequential vascular stents in the superficial femoral artery and placement of an additional stent in the left common iliac artery. The type of stents used was recently approved by the US Food and Drug Administration and has been heavily marketed as a long-lasting solution to restenosis. Each stent costs the hospital \$15,000. Alternatives to this approach include amputation of the toe, balloon angioplasty, and use of less expensive stents. Which of the following best describes the public policy implications of this scenario?
- (A) Absence of resource stewardship
  - (B) Ageism
  - (C) Health care disparities
  - (D) Health care fraud and abuse
  - (E) Lack of access to care
22. A 62-year-old woman with myasthenia gravis comes to the office because of a 2-week history of falling. She says her legs "give out" once daily; she falls to the ground but does not hit her head. She took pyridostigmine until 2 weeks ago when she decided that it no longer worked. Respirations are 30/min. Examination shows a hypophonic nasal voice and ptosis bilaterally. Muscle strength is 2/5 in all extremities. The patient is told that she is in imminent danger of respiratory compromise and that she should be admitted to the hospital. She says she knows her breathing could pose a problem, but she hates hospitals and does not want to undergo more tests or therapy. She asks if she can have a prescription for her former medication and if she can go home. Which of the following is the most appropriate next step in management?
- (A) Assessment of medical decision-making capacity
  - (B) Electromyography and nerve conduction studies
  - (C) Involuntary hospital admission
  - (D) Oxygen therapy by nasal canula
  - (E) Pulmonary function testing
23. A 55-year-old man is brought to the emergency department by paramedics 45 minutes after his daughter found him unresponsive in his apartment. Paramedics initiated intravenous fluid warming and resuscitation at the scene. The patient has major depressive disorder, hypertension, and alcoholism. His medications are chlorthalidone, fluoxetine, and lisinopril. On arrival, he is arousable but confused. Temperature is 34.0°C (93.2°F), pulse is 64/min, respirations are 14/min, and blood pressure is 94/62 mm Hg. Physical examination shows no sign of trauma or prolonged immobilization. On mental status examination, he is oriented to person but not to place or time. His speech is verbose and nonsensical. Serum glucose concentration is 44 mg/dL, and blood alcohol concentration is 312 mg/dL. Urine toxicology screening is positive for alcohol and benzodiazepines. The most appropriate next step in management is administration of which of the following?
- (A) 50% Dextrose
  - (B) Flumazenil
  - (C) Lorazepam
  - (D) Naloxone
  - (E) Vitamin B<sub>1</sub> (thiamine)

24. A 16-year-old boy is brought to the emergency department because of a 6-hour history of severe right-sided scrotal pain. He has not had penile discharge, fever, abdominal pain, vomiting, or diarrhea. He has no history of similar pain or any trauma to the region. He is sexually active with one female partner and uses condoms inconsistently. Vital signs are within normal limits. Abdominal examination shows no abnormalities. Genitourinary examination shows moderate edema and diffuse tenderness to palpation of the right scrotum; there is mild erythema. Lifting the right testicle does not relieve the pain. The left testicle is lower than the right testicle. Cremasteric reflex is present on the left and absent on the right. Which of the following is the most likely diagnosis?
- (A) Epididymitis
  - (B) Testicular torsion
  - (C) Testicular tumor
  - (D) Torsion of the appendix testis
  - (E) Urinary tract infection
  - (F) Varicocele
- 



25. A 5-year-old boy is brought to the emergency department because of a 5-day history of right-sided facial droop, difficulty walking, and double vision. During this time, he also has had headache. He appears well developed and well nourished. Vital signs are within normal limits. Examination shows bilateral palsies of the abducens and facial cranial nerves. He has an ataxic gait. MRI of the brain is shown. After discussing the implications of this diagnosis and poor prognosis with the patient's parents, which of the following is the most appropriate next step in management?
- (A) Comfort measures only
  - (B) CT scan of the chest, abdomen, and pelvis
  - (C) Discuss the family's goals for the patient
  - (D) Operative resection of the tumor
  - (E) Recommendation for participation in an investigational clinical trial



26. A 50-year-old woman comes to the office because of a 3-month history of a facial rash that has increased in size despite use of over-the-counter corticosteroid cream. She also has a 6-month history of shortness of breath with exertion and nonproductive cough, which she attributes to a sedentary lifestyle. She has no history of serious illness, takes no medications, and has no known drug allergies. She has no history of trauma or operative procedures to the face. She does not smoke cigarettes or drink alcohol. Vital signs are within normal limits. A photograph of the face and x-rays of the chest are shown. Examination shows no other abnormalities. Which of the following is the most likely diagnosis?
- (A) Rosacea
  - (B) Sarcoidosis
  - (C) Seborrheic dermatitis
  - (D) Systemic lupus erythematosus
  - (E) Systemic sclerosis (scleroderma)
- 
27. A 64-year-old man comes to the clinic because of a 2-week history of severe pain and generalized muscle weakness. He has hypercholesterolemia and hypertension. Three months ago, he had a myocardial infarction. At that time, he began atorvastatin therapy. Other medications are clopidogrel, lisinopril, and amiodarone. He is 178 cm (5 ft 10 in) tall and weighs 82 kg (180 lb); BMI is 26 kg/m<sup>2</sup>. Pulse is 80/min and blood pressure is 125/67 mm Hg. Muscle strength is 4/5 on abduction of the shoulders and flexion of the hips. Deep tendon reflexes are 2+ throughout. No other abnormalities are noted. Measurement of which of the following is the most appropriate initial step in diagnosis?
- (A) Erythrocyte sedimentation rate
  - (B) Serum ALT activity
  - (C) Serum calcium concentration
  - (D) Serum C-reactive protein concentration
  - (E) Serum creatine kinase activity
28. A 23-year-old man who is on active duty in the US Army comes to the clinic 1 hour after sustaining a bee sting to his right cheek. The patient reports continued pain at the site of the sting, but he has not had shortness of breath, throat tightness, loss of vision, or other neurologic symptoms. Medical history is unremarkable. He takes no medications. The patient has no known allergies. He is 178 cm (5 ft 10 in) tall and weighs 64 kg (140 lb); BMI is 20 kg/m<sup>2</sup>. Temperature is 37.0°C (98.6°F), pulse is 86/min, respirations are 10/min, and blood pressure is 120/70 mm Hg. Examination of the right cheek shows an erythematous, swollen area of induration surrounding a central clear area with the stinger in situ. The swelling encroaches on the lower aspect of the patient's right orbit, which appears puffy and mildly dusky. After the stinger is removed, which of the following is the most appropriate next step in management?
- (A) Administer an injection of epinephrine
  - (B) Admit the patient to the hospital for intravenous vancomycin therapy
  - (C) Cleanse the site and apply ice
  - (D) Obtain an ophthalmologist consultation
  - (E) Prescribe oral clindamycin

29. A 32-year-old man is brought to the emergency department after being found by his wife in their bedroom with a gun in his hands. His wife reports that the patient “has not been himself” since their son was stillborn 6 months ago. She says that during the past month, he hardly has slept and has not showered or shaved; he sits in the dark and refuses to eat. He began fluoxetine therapy 3 months ago, but his symptoms have continued to worsen. He appears disheveled. He is 175 cm (5 ft 9 in) tall and weighs 52 kg (115 lb); BMI is 17 kg/m<sup>2</sup>. His pulse is 90/min, and blood pressure is 100/60 mm Hg. Physical examination shows decreased skin turgor and dry mucous membranes. When asked about his mood, he says, “I don’t know.” He has a tearful affect. He responds to most questions with one-word answers in a soft voice. He says he hears a voice telling him that he is a failure and says he wants to join his son in heaven. He refuses to answer questions about suicide. After removing all firearms from the patient’s house and admitting him to a psychiatric facility, which of the following is the most appropriate next step in management?
- (A) Electroconvulsive therapy
  - (B) Imipramine therapy
  - (C) Mirtazapine therapy
  - (D) Sertraline therapy
  - (E) Transcranial magnetic stimulation
30. A 60-year-old woman comes to the office as a new patient. She recently moved to the area. She feels well. She has hypertension treated with amlodipine and asthma well controlled with inhaled fluticasone and inhaled albuterol as needed. According to the medical records she brought with her, a mammography 6 months ago showed no abnormalities, results of laboratory studies 1 year ago were within the reference ranges, and colonoscopy 5 years ago showed no abnormalities. Her past three Pap smears have shown no abnormalities; the most recent Pap smear was 1 year ago. Her mother has type 2 diabetes mellitus, and her maternal aunt had breast cancer at the age of 55 years. The patient does not smoke cigarettes. She drinks two glasses of wine weekly. She works as a nurse. She has been monogamous with her husband for 30 years. Pulse is 76/min, respirations are 16/min, and blood pressure is 132/86 mm Hg. Examination shows no abnormalities. Screening for which of the following is the most appropriate next step in management?
- (A) Abdominal aortic aneurysm
  - (B) Breast cancer
  - (C) Chlamydia trachomatis infection
  - (D) Colon cancer
  - (E) Hepatitis C
31. A 12-year-old girl is brought to the physician for a follow-up examination 8 days after starting a course of oral penicillin for streptococcal pharyngitis. Temperature is 38.6°C (101.5°F). Examination shows an erythematous morbilliform rash, urticaria, mild swelling of the hands and feet, arthralgias, and lymphadenopathy. Leukocyte count is 13,000/mm<sup>3</sup> (62% segmented neutrophils, 10% eosinophils, and 28% lymphocytes). Urinalysis shows 2+ protein. Which of the following is most appropriate to prevent recurrence of these symptoms if the patient is diagnosed with streptococcal pharyngitis again?
- (A) Pretreatment with an antihistamine
  - (B) Pretreatment with a corticosteroid
  - (C) Skin testing with benzylpenicilloyl polylysine prior to treatment
  - (D) Use of a nonpenicillin antibiotic to treat the pharyngitis
  - (E) Use of a single injection of benzathine penicillin to treat the pharyngitis



32. A 45-year-old woman is hospitalized for management of *Staphylococcus aureus* endocarditis with persistent bacteremia. The patient is discussed during interdisciplinary rounds, which includes physicians, nurses, pharmacists, and social workers. During rounds, a pharmacy student notices that the patient missed two doses of her scheduled antibiotic last week but is unsure why. The physician and nurse are unaware of these missed doses, and the student does not mention her observation. Which of the following measures is most likely to improve communication within this interdisciplinary health care team?
- (A) Conduct interdisciplinary rounds in a quieter location
  - (B) Encourage questions from all team members
  - (C) Implement a checklist for standardizing patient rounds
  - (D) Use computers during rounds to review medications
- 



33. An 82-year-old man comes to the physician 1 month after he noticed a rough, painless lesion on his right hand. The lesion has increased rapidly in size during this time. He has no history of serious illness and takes no medications. He works on a farm. Examination of the right upper extremity shows a solitary 2-cm lesion on the dorsum of the hand; a photograph of the lesion is shown. The remainder of the examination shows no abnormalities. Which of the following is the most likely diagnosis?
- (A) Acrochordon
  - (B) Common wart
  - (C) Dermatofibroma
  - (D) Keratoacanthoma
  - (E) Sebaceous cyst
- 
34. A 37-year-old man comes to the physician for a routine health maintenance examination. He has no history of serious illness and takes no medications. He does not smoke cigarettes, and he exercises four times weekly. His mother died of colon cancer at the age of 76 years. He is 183 cm (6 ft 0 in) tall and weighs 100 kg (220 lb); BMI is 30 kg/m<sup>2</sup>. Pulse is 68/min and blood pressure is 138/74 mm Hg. The remainder of the examination shows no abnormalities. Which of the following is the most appropriate next step?
- (A) Test of the stool for occult blood
  - (B) Complete blood count
  - (C) Measurement of serum thyroid-stimulating hormone concentration
  - (D) Serum lipid studies
  - (E) No further evaluation is necessary

35. A 35-year-old woman is evaluated for a persistent fever 4 days after admission to the hospital for treatment of pyelonephritis. She has type 2 diabetes mellitus poorly controlled with insulin. She has received ciprofloxacin since admission. Results of initial blood cultures are pending. Temperature is 40.0°C (104.0°F), pulse is 110/min, respirations are 20/min, and blood pressure is 100/60 mm Hg. Examination shows marked right costovertebral angle tenderness. Which of the following is the most appropriate next step in management?

- (A) Addition of clindamycin to the medication regimen
- (B) Addition of vancomycin to the medication regimen
- (C) CT scan of the abdomen
- (D) Doppler ultrasonography of the lower extremities
- (E) Repeat blood cultures and fungal cultures

36. A 23-year-old man is being evaluated in the intensive care unit because of steadily decreasing blood pressure since he was admitted 2 hours ago for treatment of septic shock caused by pneumonia. Medical history is remarkable for cystic fibrosis and severe obstructive lung disease. In the emergency department, the patient was intubated, had three peripheral intravenous catheters placed, and was treated empirically with broad-spectrum antibiotics, bronchodilators, a continuous infusion of propofol and fentanyl, and 4 L of 0.9% saline. Immediately after administration of fluids, the patient's pulse was 105/min and blood pressure was 100/50 mm Hg. The patient is 173 cm (5 ft 8 in) tall and weighs 59 kg (130 lb); BMI is 20 kg/m<sup>2</sup>. Pulse is 135/min and blood pressure is 79/43 mm Hg. Auscultation of the lungs discloses diffuse rhonchi and inspiratory crackles with low-pitched bilateral expiratory wheezes. Cardiac examination discloses no murmurs, rubs, or gallops. Bedside ultrasonography of the abdomen shows the inferior vena cava is 1.8 cm in diameter with minimum respirophasic collapsibility, and cardiac ultrasonography shows that the left ventricular ejection fraction is approximately 0.65. Results of laboratory studies obtained on admission and now are shown:

	On Admission	Now
Blood		
WBC	21,000/mm <sup>3</sup>	19,000/mm <sup>3</sup>
Lactic acid	5.2 mg/dL	4.0 mg/dL

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

- (A) Administer an additional 1-L bolus of 0.9% saline
- (B) Administer intravenous hydrocortisone
- (C) Administer intravenous voriconazole
- (D) Begin a continuous infusion of norepinephrine
- (E) Order CT scan of the head

37. A 32-year-old nulligravid woman comes to the office for counseling prior to conception. Menses occur at irregular 40- and 60-day intervals. She has impaired glucose tolerance controlled by diet. She takes no medications. She is 165 cm (5 ft 5 cm) tall and weighs 84 kg (185 lb); BMI is 31 kg/m<sup>2</sup>. Vital signs are within normal limits. Examination shows no abnormalities. Her fasting serum glucose concentration is 120 mg/dL. This patient is at greatest risk for developing which of the following?

- (A) Gestational diabetes
- (B) Hypothyroidism
- (C) Intrauterine growth restriction
- (D) Placenta previa
- (E) Preterm labor

38. A 17-year-old girl is brought to the physician by her parents because they are concerned she is using illicit drugs. They report that, “she just isn’t herself anymore.” She has no history of serious illness and takes no medications. She is upset about being “tricked” to come to the doctor. Physical examination shows no abnormalities. On mental status examination, she has an angry mood and anxious affect. The patient’s parents privately request a toxicology screening for their daughter but ask that she be told that her blood will be taken to “check her thyroid gland.” After discussing the parents’ wish for secrecy, which of the following is the most appropriate next step in management?
- (A) Comply with the parents’ wishes
  - (B) Inform the parents that everything the patient tells the physician is confidential
  - (C) Inform the parents that if the patient’s toxicology screening is positive, it must be reported to the police
  - (D) Inform the parents that the physician cannot deceive the patient

39. A 52-year-old woman with type 2 diabetes mellitus comes to the office for a follow-up examination. Two weeks ago, she was treated with amoxicillin for a urinary tract infection. At that time, her blood pressure was 165/98 mm Hg, and serum creatinine concentration was 1.2 mg/dL; lisinopril therapy was also begun. During the past week, she has had increased swelling of the lower extremities and shortness of breath. Her dysuria has resolved. She appears anxious. Temperature is 36.8°C (98.2°F), pulse is 110/min, respirations are 20/min, and blood pressure is 185/105 mm Hg. Diffuse bilateral crackles are heard on pulmonary examination. An S<sub>3</sub> gallop is heard. There is 3+ pitting bilateral pretibial edema. Results of laboratory studies are shown:

Serum	
Urea nitrogen	45 mg/dL
Creatinine	4 mg/dL
Urine	
Specific gravity	1.010
Blood	none
Hyaline casts	moderate numbers

Which of the following is the most likely diagnosis?

- (A) Acute glomerulonephritis
  - (B) Acute interstitial nephritis
  - (C) Acute kidney injury
  - (D) Acute obstructive uropathy
  - (E) Intravascular volume depletion
40. A 15-year-old girl is brought to the emergency department by her father because of a 2-hour history of right leg pain that began after she fell from her bicycle. Medical history is remarkable for bilateral hearing loss, a fracture of the humerus at age 8 years, and multiple rib fractures. She takes no medications. Family history is remarkable for kyphoscoliosis, hearing loss, and early onset osteoporosis in her mother; the mother died from complications related to a hip fracture at age 44 years. The patient is a refugee who has recently immigrated. The patient appears to be in distress. She is below the 5th percentile for height, at the 70th percentile for weight, and above the 95th percentile for BMI. Her temperature is 37.0°C (98.6°F), pulse is 118/min, respirations are 12/min, and blood pressure is 130/68 mm Hg. Examination shows kyphosis and hypermobile joints of the hands, wrists, and feet. Examination of the right lower extremity shows superficial abrasions and ecchymoses; there is tenderness to palpation and movement of the extremity. Which of the following is the most likely underlying diagnosis?
- (A) Idiopathic juvenile osteoporosis
  - (B) Juvenile Paget disease
  - (C) Osteogenesis imperfecta
  - (D) Osteomalacia
  - (E) Rickets

BLOCK 2, ITEMS 41–80

41. A 22-year-old primigravid woman at 10 weeks' gestation comes to the emergency department (ED) because of a 3-day history of persistent vomiting. She is treated with intravenous hydration, pyridoxine, and doxylamine. As the resident physician prepares the patient for discharge, he asks who will be picking her up from the ED. She says her husband will be arriving soon and asks if the hospital staff can refer to her symptoms as a "stomach flu." She does not want anyone to mention to her husband that she is pregnant because the pregnancy resulted from an oral contraceptive failure and "he is not expecting this." Which of the following is the most appropriate next question to ask this patient?
- (A) "Are finances tight at home?"
  - (B) "How do you think he will react?"
  - (C) "Is there somebody else who can pick you up?"
  - (D) "Was there a problem with your birth control?"
  - (E) "Will he try to force you to do something you aren't comfortable with?"
42. Five days after admission to the hospital for management of an ST-elevation myocardial infarction, a 59-year-old man has the sudden onset of severe abdominal and bilateral lower extremity pain, cyanosis of the lower body, and paresthesias. On hospital days 1 and 2, he received vasopressor and inotropic therapy. On hospital day 2, echocardiography showed extensive anterolateral akinesis of the left ventricle. He has no history of serious illness. His medications are metoprolol, lisinopril, simvastatin, and dalteparin. He appears to be in acute distress. Pulse is 105/min and regular, respirations are 24/min, and blood pressure is 80/60 mm Hg. Examination shows lower body cyanosis to the level of the costal margins. Crackles are heard over the lower lung fields bilaterally. Distant heart sounds but no murmurs are heard. The abdomen is nondistended and nontender. Pulses are 1+ in the upper extremities and absent in the lower extremities. Muscle strength is 3/5 in the lower extremities. Sensation to touch and temperature is decreased over the lower extremities. ECG shows sinus tachycardia. Which of the following is the most likely explanation for this patient's clinical findings?
- (A) Aortic dissection
  - (B) Aortic embolism
  - (C) Pericardial tamponade
  - (D) Right ventricular failure
  - (E) Ventricular rupture
43. A 75-year-old man comes to the clinic because of a 2-year history of progressive shortness of breath. He also has had an occasional dry cough for the past 6 months. He has not had chest pain, palpitations, or swelling of his legs. Medical history is unremarkable, and the patient takes no medications. He has smoked one pack of cigarettes daily for 57 years. He does not drink alcoholic beverages. Vital signs are temperature 37.0°C (98.6°F), pulse 92/min, respirations 18/min, and blood pressure 122/76 mm Hg. Pulse oximetry on room air shows an oxygen saturation of 89%. The patient has mild dyspnea when he speaks. Auscultation of the lungs discloses fine and dry crackles in the bases of both lungs. Cardiac examination discloses a normal S<sub>1</sub> and S<sub>2</sub>. No extra heart sounds are heard. Jugular venous pulsation is measured at 2 cm above the sternal angle with the head of the bed elevated at 30 degrees. Examination of the extremities shows clubbing of the digits of both hands. Results of complete blood count, serum chemistry profile, and urinalysis are within the reference ranges. Chest x-ray shows scattered reticular opacities in both lung bases. There is no hilar lymphadenopathy. Which of the following is the most appropriate next step in evaluation?
- (A) Echocardiography
  - (B) High-resolution CT scan of the chest
  - (C) Lung biopsy
  - (D) Serum antiglomerular basement membrane antibody assay
  - (E) Thoracic PET scan

44. A previously healthy 20-year-old woman, who is a sophomore in college, is brought to the emergency department by her roommates because of an 8-hour history of weakness and vomiting blood and a 2-day history of dizziness. She has no history of similar symptoms. She says she overeats in response to the stress of her classes. She induces vomiting after consuming a significant amount of food because she feels "too full" and "out of control." She now vomits almost daily. She feels she is slightly overweight. She is physically active and exercises moderately two to three times weekly. She does not use laxatives or diuretics. She has many friends and enjoys going out socially. She takes no medications. She drinks three to four beers on weekends and does not use illicit drugs. She appears uncomfortable and is tearful and mildly diaphoretic. She is 157 cm (5 ft 2 in) tall and weighs 59 kg (130 lb); BMI is 24 kg/m<sup>2</sup>. Temperature is 37.5°C (99.5°F), pulse is 115/min and regular, and blood pressure is 100/68 mm Hg. Examination shows tender parotid glands bilaterally and poor dentition. Results of laboratory studies are most likely to show which of the following in this patient?

	<b>K<sup>+</sup></b>	<b>Cl<sup>-</sup></b>	<b>HCO<sub>3</sub><sup>-</sup></b>
(A)	Decreased	decreased	decreased
(B)	Decreased	decreased	increased
(C)	Decreased	increased	decreased
(D)	Increased	decreased	increased
(E)	Increased	increased	decreased
(F)	Increased	increased	increased

45. A 58-year-old man comes to the clinic for a follow-up examination 3 months after beginning warfarin therapy for deep venous thrombosis. He noted blood in his urine 1 week ago but has not seen any since that time. He has not had pain, fever, or increased urinary frequency. He has not sustained any recent trauma. His prothrombin time and INR have been within the therapeutic ranges during his previous measurements. He has hypertension and benign prostatic hyperplasia. Medications are warfarin and hydrochlorothiazide. He smoked one pack of cigarettes daily for 40 years but quit when diagnosed with deep venous thrombosis. Temperature is 35.9°C (96.6°F), pulse is 88/min, respirations are 18/min, and blood pressure is 135/87 mm Hg. The prostate is moderately enlarged; no nodules are noted. Laboratory studies show:

Prothrombin time	19 sec (INR=2.5)
Serum	
Urea nitrogen	18 mg/dL
Creatinine	1 mg/dL
Prostate-specific antigen	3.8 ng/mL (N<4)
Urine	
Blood	3+
Protein	1+
RBC	too numerous to count
WBC	2/hpf
Casts	none
Nitrites	negative
Leukocyte esterase	negative

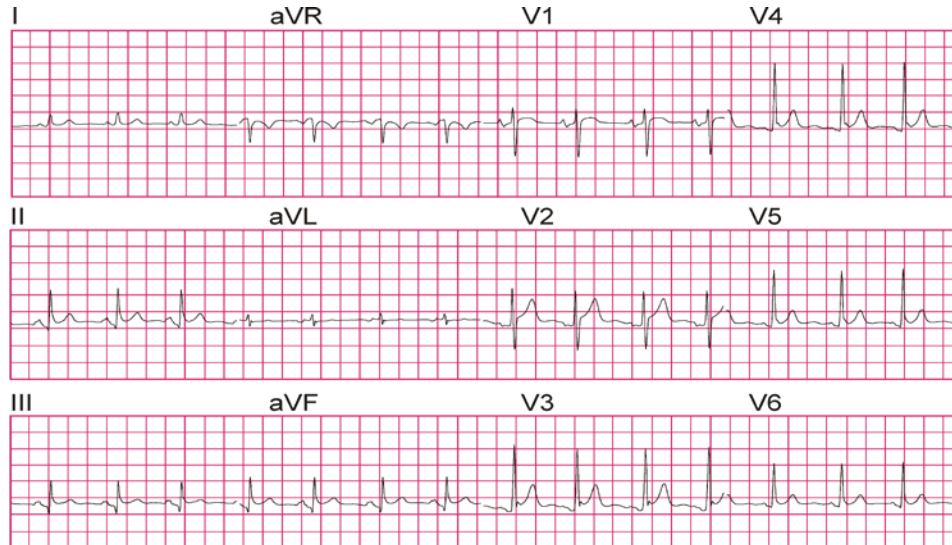
In addition to a CT scan of the abdomen, which of the following is the most appropriate next step in management?

- (A) Adjustment of the warfarin dosage to maintain an INR between 1.5 and 2.0
- (B) Ciprofloxacin therapy
- (C) Cystoscopy
- (D) Discontinuation of hydrochlorothiazide therapy
- (E) Finasteride therapy

46. A 32-year-old woman is brought to the emergency department immediately after being involved in a motor vehicle collision. She was the unrestrained driver. On arrival, she says she has severe pain in her right groin. On examination, any movement of the right hip produces pain. An x-ray of the pelvis shows a completely displaced fracture of the femoral neck. In addition to intravenous morphine, which of the following is the most appropriate management?
- (A) Bed rest
  - (B) Closed reduction followed by traction
  - (C) Hip spica hinge brace
  - (D) Limited weight bearing with use of crutches
  - (E) Operative reduction and internal fixation
47. A 57-year-old man comes to the physician 1 week after he had a 45-minute episode of slurred speech and clumsiness of his right hand. The episode occurred during his daily walk; the symptoms resolved during the next 24 hours. He has no history of similar symptoms. He has a 20-year history of hypertension and a 15-year history of hypercholesterolemia controlled with a low-cholesterol diet and daily exercise. He takes no medications. He has smoked one pack of cigarettes daily for 40 years and drinks one to two glasses of wine nightly with dinner. He is alert and fully oriented. He is 178 cm (5 ft 10 in) tall and weighs 86 kg (190 lb); BMI is 27 kg/m<sup>2</sup>. His temperature is 37.0°C (98.6°F), pulse is 88/min, respirations are 10/min, and blood pressure is 170/90 mm Hg. Examination, including neurologic examination, shows no other abnormalities. Daily enteric-coated aspirin therapy is begun. Which of the following is the most appropriate next step to decrease this patient's risk for subsequent cerebral infarction?
- (A) Alcohol cessation
  - (B) Smoking cessation
  - (C) Weight loss program
  - (D) Antihypertensive therapy
  - (E) Cholesterol-lowering therapy
48. A 27-year-old primigravid woman at 21 weeks' gestation comes to the emergency department because of a 2-day history of moderate headache, shortness of breath, nausea, vomiting, muscle aches, and malaise. She also has had cough occasionally productive of sputum. Pregnancy had been uncomplicated. She has no history of serious illness, and her only medication is a prenatal vitamin. She immigrated to the USA from India 6 months ago. Temperature is 38.3°C (100.9°F), pulse is 100/min, respirations are 18/min, and blood pressure is 100/60 mm Hg. On examination, breath sounds are decreased at the right lung base. Fundal height is 22 cm. Fetal heart rate is 160/min. Chest x-ray shows right-sided interstitial infiltrates. Which of the following is the most likely infectious agent?
- (A) Haemophilus influenzae
  - (B) Influenza A virus
  - (C) Legionella pneumophila
  - (D) Mycobacterium tuberculosis
  - (E) Pseudomonas aeruginosa
  - (F) Streptococcus pneumoniae
49. A 7-year-old boy is brought to the physician because of a 1-year history of poor performance in school. His parents say that he is bright, has many friends, and seems to want to do well in school. His teachers report that he seems frustrated with his own progress and his inability to meet the expectations of his parents. Speech fluency and articulation and motor skills are appropriate for age. Physical examination shows no abnormalities. When asked to read during the examination, he has significant difficulty sounding out words he is unfamiliar with. Visual acuity test and audiometry show no abnormalities. Which of the following is the most likely diagnosis?
- (A) Attention-deficit/hyperactivity disorder
  - (B) Expressive language disorder
  - (C) Intellectual developmental disorder
  - (D) Learning disorder
  - (E) Social anxiety disorder (social phobia)
  - (F) Normal behavior

50. A 23-year-old woman who is an active-duty enlisted airman in the US Air Force comes to the base clinic because of a 4-week history of an itchy sensation in her right ear. She has not had ringing in her ears or hearing loss. She works as a fuel specialist and at first attributed her symptom to the earplugs she uses when she is on the flight line. The symptom has not improved despite the patient's wearing headphones instead of the earplugs during the past 2 weeks. She has no history of serious illness and takes no medications. Vital signs are within normal limits. During examination, pulling of the right pinna inferiorly to examine the ear canal produces pain. The right ear canal appears erythematous and edematous. The tympanic membrane cannot be fully visualized because of the presence of cerumen. Examination of the left ear shows no abnormalities. Which of the following is the most likely diagnosis?
- (A) Cerumen impaction
  - (B) Ear canal trauma
  - (C) Otitis externa
  - (D) Polychondritis
  - (E) Seborrheic dermatitis
51. A 34-year-old woman who is on active duty in the US Army comes to the military urgent care clinic because of a 4-day history of headache, purulent nasal discharge, and left facial pain. She has not had fever or chills. She has chronic bilateral knee pain, which she attributes to multiple parachute jumps while she was assigned to an airborne unit 7 years ago. The knee pain is exacerbated by long-distance running on pavement. Her only medication is occasional ibuprofen for the knee pain. The patient has no known medication allergies. Temperature is 37.1°C (98.8°F), pulse is 60/min, respirations are 14/min, and blood pressure is 122/80 mm Hg. Cervical lymph nodes are not palpable. There is tenderness to palpation over the left maxillary sinus. Nasal examination shows inflamed turbinates and purulent discharge. The patient needs to blow her nose twice during the examination. Bilateral otoscopic examination discloses no abnormalities. Examination of the oropharynx shows scant purulent discharge posteriorly. The remainder of the examination discloses no abnormalities. Which of the following is the most appropriate next step in management?
- (A) CT scan of the sinuses
  - (B) Gram stain and culture of nasal discharge
  - (C) Ibuprofen and decongestant therapy
  - (D) Trimethoprim-sulfamethoxazole therapy
  - (E) X-ray of the sinuses
52. A 16-year-old boy with VATER syndrome is brought to the physician because of 2-week history of harsh cough that began with a common cold. He receives no medications. Temperature is 37°C (98.6°F), pulse is 70/min, respirations are 20/min, and blood pressure is 112/64 mm Hg. Examination shows a harsh vibratory sound in the mid anterior chest with forced expiration. A systolic murmur is heard best at the lower left sternal border. There is mild scoliosis. Spirometry shows an FVC of 2.54 L (78% of predicted) and a slow vital capacity of 2.88 L (85% of predicted). A flow volume loop shows scooping on the expiratory limb. Which of the following is the most likely cause of the discrepancy between this patient's forced and slow vital capacity measurements?
- (A) Bronchospasm
  - (B) Laryngeal braking
  - (C) Subglottic mass
  - (D) Tracheal collapse
  - (E) Upper airway compression

**Items #53–54 are part of a sequential item set. In the actual examination environment, you will not be able to view the second item until you click "Proceed to Next Item." After navigating to the second item, you will not be able to add or change an answer to the first item.**



A 44-year-old man comes to the emergency department 6 hours after the onset of increasingly severe substernal chest pain this morning. He says the pain increases when he lies down or coughs. He also has a 3-day history of chills, muscle aches, and fatigue. He has hypertension and gastroesophageal reflux disease. Medications are hydrochlorothiazide and omeprazole. He does not smoke cigarettes or drink alcohol. Temperature is 38.0°C (100.4°F), pulse is 90/min, respirations are 18/min, and blood pressure is 110/72 mm Hg. There is no jugular venous distention, rash, or organomegaly. On cardiac examination, a scratchy sound is heard over the left sternal border; there is a regular rate and rhythm and no murmurs. Results of laboratory studies are shown:

Leukocyte count	11,500/mm <sup>3</sup>
Segmented neutrophils	52%
Bands	2%
Eosinophils	1%
Lymphocytes	40%
Monocytes	5%
Erythrocyte sedimentation rate	45 mm/h
Serum troponin I	0.02 ng/mL

ECG is shown. Chest x-ray shows no abnormalities.

53. Which of the following is the most appropriate next step in management?
- (A) Cardiac catheterization
  - (B) Cardiac MRI
  - (C) CT pulmonary angiography
  - (D) Echocardiography
  - (E) Exercise treadmill stress test
54. Echocardiography shows a small pericardial effusion with no tamponade. On examination an hour later, the patient's symptoms and examination are unchanged. Vital signs are within normal limits. Which of the following is the most appropriate next step in management?
- (A) Clopidogrel and aspirin therapy
  - (B) Ibuprofen and colchicine therapy
  - (C) Oseltamivir and acetaminophen therapy
  - (D) Pericardiocentesis and pericardial biopsy
  - (E) Prednisone and tramadol therapy

**END OF SET**



55. A chief medical officer at a hospital has received several reports that one of her colleagues, a 64-year-old male surgeon, has “not been acting like himself” recently. An administrative assistant says that during the past 6 months, the surgeon’s dictations have become hard to follow and appear to be missing information; previously, they were comprehensive and easy to transcribe. The assistant adds that after the surgeon missed three meetings in a row during the past 2 months, he asked her to send him a text message 5 minutes before the next meeting to let him know its location. Previously, he was always in attendance and on time for meetings. A senior resident also has noted unusual behavior by the surgeon; the resident says that while on rounds 3 days ago, the surgeon listed incorrect indications for a specific surgical procedure. A scrub nurse reported that the surgeon used unsterile practices three times during a 2-hour procedure today. The chief medical officer meets with the surgeon and asks him about these reported incidents. The surgeon says that “nothing is wrong” and the people who reported him are angry with him for various reasons and “are trying to stir up trouble.” Which of the following is the most appropriate action for the chief medical officer to take?
- (A) Accept the surgeon’s answer and only pursue further action if there is another complaint
  - (B) Determine whether other staff have noticed anything different about the surgeon’s behavior
  - (C) Inform the surgeon that he should consider retirement
  - (D) Instruct the surgeon to take a temporary leave of absence and undergo a medical evaluation
56. A 33-year-old woman is admitted to the hospital because of visual field loss following a 48-hour history of acute eye pain. She also has a 3-week history of numbness and a feeling of "heaviness" in both legs. She has no history of serious illness and takes no medications. Six weeks ago, she returned from a hiking expedition in the northeastern USA; she has no recent history of international travel. Vital signs are within normal limits. Muscle strength is 5/5 in the upper extremities, 3/5 in the hip flexors and knee extensors, and 4/5 in the knee flexors and ankle dorsiflexors. Patellar and ankle reflexes are 3+ bilaterally, and there is nonsustained ankle clonus bilaterally. Sensation to pinprick is absent throughout the lower extremities. Ophthalmologic examination discloses optic neuritis and reconfirms the visual field loss. Which of the following studies is most likely to confirm the diagnosis?
- (A) CT scan of the cervical spine
  - (B) Electromyography and nerve conduction studies
  - (C) Lumbar puncture for examination of cerebrospinal fluid
  - (D) Measurement of serum Lyme (*Borrelia burgdorferi*) antibody concentration
  - (E) MRI of the brain
57. A 68-year-old woman comes to the office because she is concerned about developing Alzheimer disease. She says she has had increasing difficulty recalling names of people and objects during the past 6 months. She has not had difficulty with her activities of daily living, finances, or shopping. She teaches part-time at a local community college. She has no history of serious illness and takes no medications. She does not smoke cigarettes. She drinks one 5-oz glass of wine daily. Her mother developed dementia, Alzheimer type, in her mid 70s. Physical and neurologic examinations of the patient show no abnormalities. On cognitive testing, she has delayed recall of three of five words. She is able to perform serial sevens, knows similarities, is fully oriented, and has intact executive, visuospatial, and attention abilities. Which of the following is the most appropriate next step in management?
- (A) Amyloid plaque imaging
  - (B) Determination of ApoE allele status
  - (C) Measurement of beta-amyloid in the cerebrospinal fluid
  - (D) MRI of the brain with volumetric analysis
  - (E) No additional diagnostic studies are indicated

58. A 55-year-old man with major depressive disorder is brought to the emergency department 1 1/2 hours after he was found by his brother in his home acting strangely. On arrival, he is babbling incoherently and cannot answer questions. There are two empty pill bottles in his pockets; one is for paroxetine and the other is for duloxetine. He is restless, diaphoretic, and says he has a severe headache. Temperature is 38.5°C (101.3°F), pulse is 130/min, and blood pressure is 145/105 mm Hg. The pupils are 8 mm and reactive to light. Deep tendon reflexes are 4+ and symmetric in all extremities. There is spontaneous myoclonus in the upper extremities. Results of laboratory studies, including a complete blood count, serum electrolyte concentrations, creatine phosphokinase activity, and thyroid function tests, are within the reference ranges. After admitting the patient to the hospital for observation and supportive care, which of the following is the most appropriate next step in pharmacotherapy?
- (A) Add carbamazepine to the medication regimen
  - (B) Add dantrolene to the medication regimen
  - (C) Add haloperidol to the medication regimen
  - (D) Discontinue paroxetine and duloxetine
  - (E) Switch from duloxetine to olanzapine
59. A 32-year-old man comes to the office for a follow-up examination 2 months after he was diagnosed with hypertension. He arrives late for the appointment, stating that he had to make sure no one followed him here because some "drug dealers" are after him. He insists that he be seen in an examination room with no windows. He says he is "fine" but is reluctant to answer questions because "doctors hold everything against me." He doubts his diagnosis and says, "Doctors and drug companies are in cahoots trying to get my money." He refuses to speak with the office manager about his bill because he thinks "she looks at me funny and makes nasty remarks about me behind my back." He says he has no history of psychiatric illness; his medical record indicates that he has made similar statements during the past 7 years concerning doctors and office staff but he always refused to elaborate on his statements. His medications are metoprolol and hydrochlorothiazide. He does not drink alcohol or use illicit drugs. Vital signs are within normal limits. Physical and neurologic examinations show no abnormalities. Results of screening laboratory studies are within the reference ranges. Which of the following is the most appropriate next step in management?
- (A) Begin clonazepam therapy
  - (B) Begin risperidone therapy
  - (C) Begin sertraline therapy
  - (D) Determine whether the patient has friends or family who can monitor him at home
  - (E) Determine whether the patient has had thoughts of harming others
  - (F) Determine whether the patient is adherent to his medication



60. A 40-year-old woman is admitted to the hospital 12 hours after the onset of mild right upper abdominal pain and a pruritic rash over the face, chest, and back. She also has a 2-day history of temperatures to 38.3°C (101°F), fatigue, malaise, and headache. She has polycystic kidney disease and underwent renal transplant 2 years ago. Her medications are mycophenolate and tacrolimus. Her temperature is 38.5°C (101.3°F), pulse is 90/min, respirations are 18/min, and blood pressure is 130/80 mm Hg. Pulse oximetry on room air shows an oxygen saturation of 96%. A photograph of the patient's rash is shown; it appears over the face, scalp, chest, and back. Several vesicles contain clear, yellow fluid. The abdomen is soft, and there is mild right upper quadrant tenderness to palpation; there is no guarding or rebound. Laboratory studies show a leukocyte count of 13,000/mm<sup>3</sup>, AST activity of 60 U/L, and ALT activity of 75 U/L. Which of the following is the most appropriate next step in pharmacotherapy?
- (A) Acyclovir therapy
  - (B) Dicloxacillin therapy
  - (C) Discontinuation of tacrolimus
  - (D) Permethrin therapy
  - (E) Prednisone therapy
- 
61. An 87-year-old woman, gravida 2, para 2, is brought to the emergency department from a skilled nursing care facility because of profuse vaginal bleeding for 2 days. At the age of 41 years, she underwent a cold knife cone biopsy for cervical dysplasia. Annual follow-up Pap smears until the age of 65 years showed no abnormalities. She is in moderate distress. Temperature is 36.1°C (97.0°F), pulse is 84/min, respirations are 30/min, and blood pressure is 140/90 mm Hg. Abdominal examination shows mild distention and tenderness; no masses are palpated. Pelvic examination shows a large verrucous lesion on the perineum partially covering the anal verge. Speculum examination shows atrophic changes on the vagina and cervix. Which of the following is the most likely explanation for these findings?
- (A) Cervical carcinoma
  - (B) External hemorrhoids
  - (C) Rectal carcinoma
  - (D) Rectal polyps
  - (E) Vulvar carcinoma

62. A 47-year-old woman comes to the office for a routine health maintenance examination. She feels well and has no history of serious illness. Examination shows a 2-cm, soft, nontender nodule in the right lobe of the thyroid gland. There is no lymphadenopathy. Her serum thyroid-stimulating hormone concentration is within the reference range. Which of the following is the most appropriate initial step in management?
- (A) CT scan of the neck
  - (B) Fine-needle aspiration biopsy
  - (C) Reexamination in 3 months
  - (D) Surgical excision
  - (E) Ultrasonography of the thyroid gland
63. A 1-hour-old male newborn is examined in the hospital nursery. He was born at term to a 22-year-old woman, gravida 1, para 1, with HIV infection. The mother took antiretroviral therapy throughout her pregnancy, and her HIV viral load was consistently <1000 copies/mL. She received intravenous zidovudine (AZT) during labor. The patient's Apgar scores were 8 and 9 at 1 and 5 minutes, respectively. He is at the 50th percentile for length, weight, and head circumference. He appears well. Examination shows no abnormalities. In addition to administration of the hepatitis B vaccine, which of the following is the most appropriate pharmacotherapy for this newborn?
- (A) Lopinavir-ritonavir and trimethoprim-sulfamethoxazole
  - (B) Lopinavir-ritonavir only
  - (C) Penicillin
  - (D) Trimethoprim-sulfamethoxazole only
  - (E) Zidovudine (AZT)
64. A 25-year-old woman comes to the office because she has not had a menstrual period for 6 months. Previously, menses occurred at regular 28-day intervals. She has not had blurred or double vision. She has no history of serious illness and takes no medications. Temperature is 37.0°C (98.6°F), pulse is 72/min, and blood pressure is 108/60 mm Hg. The pupils are equal and reactive to light; extraocular muscles are intact. Fundoscopic examination shows no abnormalities. Visual field testing shows bitemporal hemianopia. Milky discharge can be expressed from the nipples. Pelvic examination shows no abnormalities. Serum studies show a thyroid-stimulating hormone concentration of 2.0  $\mu$ U/mL and a prolactin concentration of 100 ng/mL. A urine pregnancy test is negative. MRI of the pituitary gland shows a 1.2  $\times$  1.5-cm mass compressing the optic chiasm. Which of the following is the most appropriate next step in management?
- (A) Biopsy of the pituitary gland
  - (B) Cabergoline therapy
  - (C) Gamma knife radiation to the pituitary gland
  - (D) Oral contraceptive therapy
  - (E) Transsphenoidal pituitary surgery
65. A 2-week-old boy is evaluated in the neonatal intensive care unit because of temperature instability and decreased activity. He was born by cesarean delivery at 30 weeks' gestation because of premature rupture of membranes. Since birth, he has been fed breast milk by orogastric tube. He was feeding and growing appropriately until today, when his axillary temperature was 36.5°C (97.7°F) and he had decreased activity. During the past 4 hours, gastric residue has been noted in the orogastric tube when it is aspirated prior to feedings. Temperature is now 37.0°C (98.6°F), pulse is 160/min, respirations are 50/min, and blood pressure is 70/40 mm Hg. The anterior fontanel is soft. Cardiopulmonary examination shows no abnormalities. The abdomen is mildly distended, and there is mild tenderness to palpation diffusely; there are no masses. Bowel sounds are decreased. There is a small amount of blood-streaked stool in the diaper. The remainder of the examination shows no abnormalities. Leukocyte count is 18,000/mm<sup>3</sup> (N=5000–34,000) (80% segmented neutrophils, 5% bands, 10% lymphocytes, and 5% monocytes), and platelet count is 100,000/mm<sup>3</sup>. Blood culture results are pending. Which of the following is most likely to confirm the diagnosis?
- (A) Measurement of prothrombin time and partial thromboplastin time
  - (B) Measurement of stool reducing substances
  - (C) Stool culture
  - (D) Upper gastrointestinal series
  - (E) X-ray of the abdomen

66. A 13-month-old boy is brought to a small rural emergency department (ED) near his family's community because of an erythematous, edematous mass in his perianal area that is hot to touch. He has no history of serious illness and receives no medications. Growth and development are appropriate for age. Vaccinations are up-to-date. He is at the 50th percentile for length and weight. Temperature is 39.4°C (103.0°F), pulse is 160/min, and respirations are 36/min. Examination shows fluctuance and exquisite tenderness to palpation of the perianal mass. Oral acetaminophen and a dose of oral cephalexin are administered, and the parents are told that their child's case is beyond the capabilities of the hospital. They are referred to the nearest hospital with a pediatric service, a suburban hospital 50 miles away. The suburban hospital is contacted regarding the referral and a pediatric surgeon accepts transfer of the patient. When the patient is brought to the ED of the suburban hospital, a triage nurse obtains his oral temperature of 37.7°C (99.8°F) and pulse of 126/min. The nurse notes that the family has no health insurance and states that the case is beyond the capabilities of the hospital. The nurse recommends taking the patient to the ED of a downtown university hospital 4 miles away. The parents follow this recommendation, and the patient undergoes incision and drainage of the abscess at the downtown hospital later that day. Which of the following is the most accurate characterization of this patient's pattern of care?
- (A) The patient received appropriate care under the circumstances
  - (B) The pediatric surgeon at the suburban hospital should have insisted on personally examining the patient and draining the abscess
  - (C) The rural hospital should have sent the patient directly to the downtown university hospital
  - (D) The suburban hospital executed unethical but legal conduct in this case
  - (E) The suburban hospital violated the Emergency Medical Treatment and Active Labor Act (EMTALA)
67. A 25-year-old woman is brought to the emergency department by paramedics because of a seizure that began 45 minutes ago at home. Intravenous antiepileptic therapy begun en route to the hospital has not stopped her seizure. Her parents report that she initially began crying, then fell to the floor and exhibited asymmetric kicking and thrashing of all extremities. Fifteen years ago, she was diagnosed with a seizure disorder. Her seizures had been well controlled with oral antiepileptic therapy until this morning. Today, while the physician is in the patient's room, the movements of her extremities gradually subside. The patient then sits up and asks the physician what happened. She is fully oriented. Vital signs are within normal limits. Examination shows no evidence of tongue biting, urinary incontinence, or other abnormalities. Which of the following is most likely to confirm this patient's diagnosis?
- (A) Interview following amobarbital administration
  - (B) Measurement of serum antiepileptic concentration
  - (C) Measurement of serum creatine kinase activity
  - (D) Neuropsychological testing
  - (E) Video EEG monitoring
68. A 32-year-old woman comes to the emergency department because of a 1-day history of sharp, right-sided chest pain that worsens with coughing and sneezing. Four days ago, she had a mild sore throat and runny nose followed by nonproductive cough 1 day later. Over-the-counter decongestant and aspirin mildly relieved the symptoms. She has not had shortness of breath, blood-tinged sputum, fever, or chills. She has a long-standing history of recurrent aphthous ulcers. Her only medication is an oral contraceptive. Temperature is 37.2°C (99.0°F), pulse is 65/min, and respirations are 14/min. Pulse oximetry on room air shows an oxygen saturation of 99%. Splinting is observed over the right hemithorax with deep breathing. On cardiac examination, no abnormalities are heard. The remainder of the examination shows no abnormalities. Chest x-ray shows no abnormalities. Which of the following is the most appropriate next step in management?
- (A) Azithromycin therapy
  - (B) CT angiography
  - (C) Electrocardiography
  - (D) Ibuprofen therapy
  - (E) Prednisone therapy
  - (F) Transthoracic echocardiography

69. A 30-year-old nulligravid woman, who is a military veteran, comes to the office because she has not had a menstrual period for the past year. She has not had nausea, vomiting, or night sweats. Menses previously occurred at regular 28-day intervals. She is sexually active with one male partner and uses condoms consistently. Three weeks ago, she returned from a 1-year deployment in the Middle East, where she worked as an army combat medic. She resumed work as a teacher 2 weeks ago. She appears tearful but otherwise in no distress. Temperature is 37.1°C (98.7°F), pulse is 88/min, respirations are 16/min, and blood pressure is 116/72 mm Hg. Physical examination, including pelvic examination, shows no abnormalities. Serum studies show:

Thyroid-stimulating hormone	2 $\mu$ U/mL
Follicle-stimulating hormone	7 mIU/mL
Luteinizing hormone	10 mIU/mL
Prolactin	10 ng/mL
$\beta$ -hCG	negative

Which of the following is the most likely cause of this patient's amenorrhea?

- (A) Gonadal dysgenesis 45,X (Turner syndrome)  
(B) Hypothalamic hypogonadism  
(C) Polycystic ovarian syndrome  
(D) Premature ovarian failure  
(E) Prolactinoma
70. A 45-year-old woman comes to the office because she has not had a menstrual period for 1 year. Menses previously occurred at regular 30-day intervals. She feels well, has no history of serious illness, and takes no medications. She has smoked one-half pack of cigarettes daily for 20 years. She is sexually active with one male partner and uses condoms consistently. She is 163 cm (5 ft 4 in) tall and weighs 63 kg (140 lb); BMI is 24 kg/m<sup>2</sup>. Vital signs are within normal limits. Physical examination, including pelvic examination, shows no abnormalities. Measurement of which of the following serum concentrations is most likely to confirm the diagnosis?
- (A) Estradiol  
(B) Follicle-stimulating hormone  
(C)  $\beta$ -hCG  
(D) Luteinizing hormone  
(E) Progesterone
71. A 2-month-old girl is brought to the office by her mother for a routine examination. Newborn screening electrophoresis showed hemoglobin FS. The mother says her daughter has not had fever or pallor. The patient is feeding well and gaining weight appropriately. She receives no medications. She appears well. She is at the 35th percentile for length and weight. Temperature is 37.0°C (98.6°F), pulse is 158/min, and respirations are 28/min. Examination shows no abnormalities. All routine immunizations are administered. In addition to routine anticipatory guidance about feeding and development, the mother is instructed to observe the patient for pallor and fever and to palpate for an enlarged spleen. Which of the following is most appropriate to prevent complications in this patient?
- (A) Amoxicillin as needed for febrile illness  
(B) Instructions for the parents to palpate the long bones routinely  
(C) Instructions for the parents to take and record the patient's pulse daily  
(D) Low-dose aspirin therapy  
(E) Oral prophylactic penicillin therapy

72. A 3-week-old boy is brought to the physician by his mother because of a 5-day history of yellow eyes and skin and white stools. Pregnancy and delivery were uncomplicated. The patient's temperature is 37.1°C (98.8°F), pulse is 160/min, respirations are 40/min, and blood pressure is 85/50 mm Hg. Examination shows diffuse jaundice. Cardiopulmonary examination shows no abnormalities. The abdomen is nontender. The liver edge is palpated 4 cm below the right costal margin. The spleen tip is palpated 3 cm below the left costal margin. Laboratory studies show:

Leukocyte count	10,000/mm <sup>3</sup>
Serum	
Bilirubin, total	16 mg/dL
Direct	12 mg/dL
AST	800 U/L
ALT	500 U/L
Amylase	100 U/L

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

- (A) Air-contrast enema
  - (B) Ultrasonography of the abdomen
  - (C) Upper gastrointestinal series
  - (D) Colonoscopy
  - (E) Esophagogastroduodenoscopy
73. A 52-year-old woman comes to the physician for a follow-up examination. She received the diagnosis of hypertension 3 weeks ago, and lisinopril therapy was begun at that time. She has had a constant, nonproductive, hacking cough for 2 weeks but has not had any other problems. She has no history of serious illness and takes no other medications. She does not smoke. She drinks one to two glasses of wine daily. She does aerobic exercise for 30 minutes four to five times weekly. Her blood pressure has decreased from 164/92 mm Hg 3 weeks ago to 140/84 mm Hg today. Lungs are clear to auscultation. Which of the following is the most appropriate next step in management of this patient's cough?
- (A) Pulmonary function tests
  - (B) CT scan of the chest
  - (C) Course of prednisone
  - (D) Discontinuation of lisinopril
  - (E) Use of a cough suppressant
  - (F) No change in management is indicated at this time
74. A 27-year-old primigravid woman at 41 weeks' gestation is admitted to the hospital for induction of labor. She has received cervical ripening agents and is now receiving oxytocin. The cervix is 9 cm dilated and 100% effaced; the vertex is at 0 station. Fetal monitoring shows contractions every 3 minutes and a reassuring heart rate. She requests pain medication. Which of the following is the most likely adverse effect of an intravenous opioid in this patient?
- (A) Maternal fever
  - (B) Maternal tachycardia
  - (C) Neonatal acidosis
  - (D) Neonatal arrhythmia
  - (E) Neonatal respiratory depression

75. A 7-year-old girl is brought to the clinic by her father because of behavior problems at school since she started second grade 6 months ago. Her teacher is concerned because she cannot sit still or complete tasks and is not learning at the same pace as her classmates. Psychoeducational testing shows normal intelligence. The father says his daughter's behavior problems have worsened since last year. She snores at night and wets the bed several nights weekly. She has no history of serious illness and receives no medications. She has been at the 25th percentile for height and weight for the past 3 years. Pulse is 105/min and regular, respirations are 22/min, and blood pressure is 105/65 mm Hg. The tonsils are 3+. Cardiopulmonary and abdominal examinations show no abnormalities. On neurologic examination, cranial nerves are intact. Deep tendon reflexes are 2+ in all extremities. Finger-nose testing shows no abnormalities. Romberg sign is absent. Her gait is normal. Which of the following is the most appropriate next step in diagnosis?
- (A) EEG
  - (B) Karyotype analysis
  - (C) MRI of the brain
  - (D) Polysomnography
  - (E) Thyroid function tests
- 



76. A 52-year-old man comes to the emergency department because of increasingly severe pain and swelling of his right foot since he tripped over a rug 2 days ago; he did not fall. The next morning, he had redness and dull pain of the foot. He has type 2 diabetes mellitus and hypertension. Medications are insulin, metoprolol, and enalapril. He is 168 cm (5 ft 6 in) tall and weighs 118 kg (260 lb); BMI is 42 kg/m<sup>2</sup>. Temperature is 37.2°C (99.0°F), pulse is 90/min, respirations are 15/min, and blood pressure is 145/90 mm Hg. Pulse oximetry on room air shows an oxygen saturation of 98%. The skin over the lower extremities is intact. Dorsalis pedis pulses are 1+ bilaterally. Homans sign is negative bilaterally. The right foot and ankle are warm and edematous; there is rubor that decreases with elevation of the extremity. The right midfoot is tender to palpation. Motor examination of the lower extremities shows no abnormalities. Semmes-Weinstein 5.07 monofilament testing shows decreased sensation over both feet. An x-ray of the right foot is shown. Which of the following is the most appropriate next step in management?
- (A) Measurement of serum uric acid concentration
  - (B) Venous duplex ultrasonography of the right lower extremity
  - (C) Intravenous vancomycin therapy
  - (D) Immobilization of the right foot in a posterior splint
  - (E) Surgical reconstruction of the right foot



77. An 8-year-old boy is brought to the emergency department (ED) by ambulance 45 minutes after he was struck by a car while riding his bicycle. He did not lose consciousness but has multiple rib fractures with depression of the left anterior chest wall. His parents have been notified and are on their way to the hospital. On the patient's arrival to the ED, his temperature is 37.2°C (99.0°F), pulse is 180/min, respirations are 36/min, and blood pressure is 65/30 mm Hg. The abdomen is distended with exquisite tenderness to palpation. A rapid intravenous infusion of 0.9% saline is begun. CT scans are quickly obtained and show a disrupted spleen and an abdominal cavity filled with free fluid. The parents arrive at the hospital and are informed that their son needs an emergency laparotomy and splenectomy to control the internal bleeding. A saline infusion is continued to support the patient's blood pressure. The parents provide consent to proceed with the operation but refuse to consent to transfusion of blood or blood products, regardless of consequences, because of their religious beliefs. As the patient is transferred to the operating room, his pulse is 210/min and blood pressure is 50/20 mm Hg. Hemoglobin concentration is 3.8 g/dL. The surgeon agrees with the anesthesiologist that the patient will die without transfusion of blood and plasma. Which of the following is the most appropriate action?

- (A) Contact the national organization of the parents' religion and insist that the parents speak with a representative on the phone regarding the matter
- (B) Contact the parents' religious advisor to request help in acquiring consent for blood transfusion
- (C) Proceed with the blood transfusion while obtaining an emergency telephone court order
- (D) Proceed with the operation and abide by the parents' wishes that no blood products be used
- (E) Transfer the patient by ambulance immediately to a bloodless surgical center

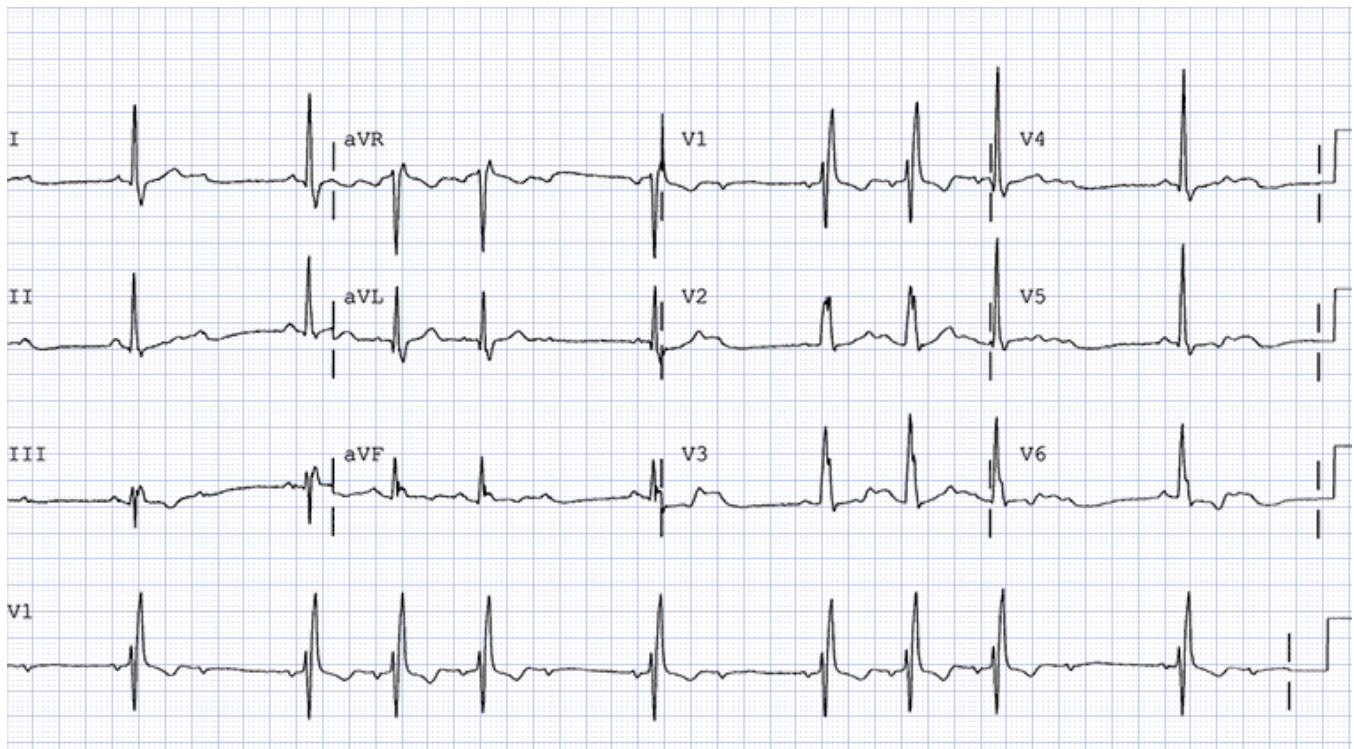
78. A female newborn has the onset of tachypnea 4 hours after birth. She was delivered at term to a 24-year-old woman following an uncomplicated pregnancy and delivery. Apgar scores were 9 and 9 at 1 and 5 minutes, respectively. Her parents had refused prenatal screening. The patient's temperature is 37.2°C (99.0°F), pulse is 150/min, respirations are 60/min, and blood pressure is 55/35 mm Hg. On cardiac examination, a single, loud S<sub>2</sub> is heard. The liver edge is palpated 3 cm below the right costal margin. Capillary refill time is 6 seconds. Peripheral pulses are difficult to palpate in all extremities. Arterial blood gas analysis on room air shows:

pH	7.24
PCO <sub>2</sub>	35 mm Hg (N=27–40)
PO <sub>2</sub>	68 mm Hg
HCO <sub>3</sub> <sup>-</sup>	15 mEq/L

Chest x-ray shows increased pulmonary haziness and vascular markings suggestive of bilateral pulmonary edema. The most appropriate next step in management is administration of which of the following?

- (A) Bolus of 0.9% saline
- (B) Bolus of sodium bicarbonate
- (C) Intravenous alprostadil (prostaglandin E<sub>1</sub>)
- (D) Intravenous digoxin
- (E) Intravenous dopamine

79. A 43-year-old woman comes to the office for a follow-up examination 1 week after she was discharged from the hospital following an overnight admission for an episode of crushing, aching chest pain. The pain was located behind her sternum and radiated to her left jaw and shoulder. She also had shortness of breath, palpitations, and nausea. Initial ECG obtained on admission showed ST-segment depressions in leads V<sub>3</sub> through V<sub>6</sub>. Nitroglycerin was administered, and the chest pain resolved. Follow-up serial ECGs disclosed no abnormalities and serum troponin concentrations were within the reference ranges. Cardiac catheterization obtained the next morning showed no substantial narrowing of the coronary arteries. At discharge, the patient declined medication to prevent recurrence of pain. The patient reports that since discharge, she has had two episodes of chest discomfort lasting 2 to 4 minutes, similar in location and quality to the pain precipitating her hospitalization. Medical history otherwise is unremarkable and she takes no routine medications. Vital signs are within normal limits. Physical examination discloses no abnormalities. Which of the following is the most appropriate pharmacotherapy to prescribe at this time?
- (A) Diltiazem
  - (B) Lisinopril
  - (C) Propranolol
  - (D) Warfarin
  - (E) No pharmacotherapy is indicated at this time
- 



80. A 67-year-old man is brought to the emergency department by his wife 1 hour after he fainted while getting the morning newspaper. His wife says that he was unconscious for approximately 1 minute; he did not have urinary incontinence or seizure activity during the episode. During the past 2 days, he also has had episodes of dizziness. He has not had chest pain or shortness of breath. He has hypertension treated with lisinopril and hyperlipidemia treated with atorvastatin. Pulse is 60/min, respirations are 18/min, and blood pressure is 100/62 mm Hg. Lungs are clear to auscultation. On cardiac examination, no murmurs or gallops are heard. ECG is shown. Which of the following is the most likely diagnosis?
- (A) Atrial flutter
  - (B) First-degree atrioventricular block
  - (C) Mobitz type I atrioventricular block
  - (D) Mobitz type II (second-degree) atrioventricular block
  - (E) Sick sinus syndrome
  - (F) Third-degree atrioventricular block

**BLOCK 3, ITEMS 81–120**

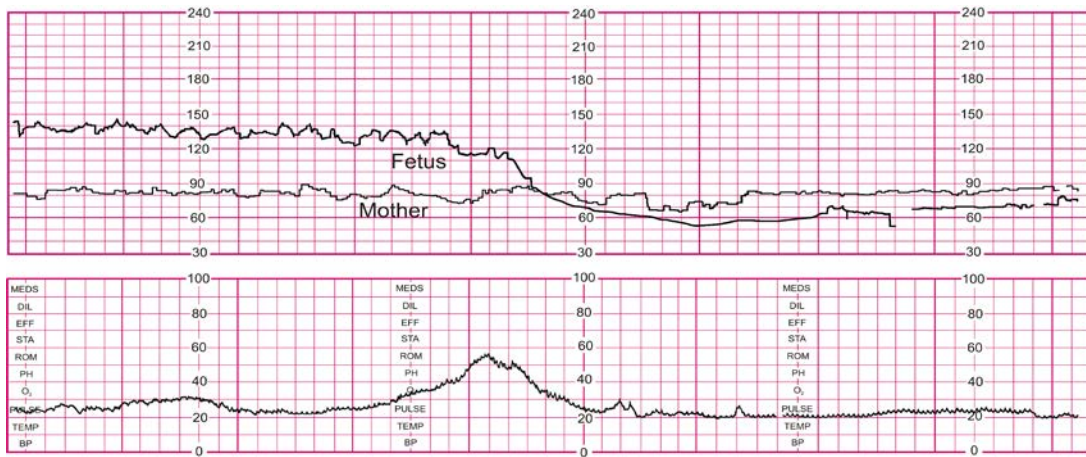
81. A 35-year-old woman is brought to the emergency department by police after they found her wandering the streets and appearing intoxicated. On arrival, she is tremulous and appears distressed. She says she moved out of her abusive boyfriend's apartment 1 week ago because she was afraid he would kill her. She has no financial or emotional family support. She worked at a grocery store until 1 month ago when she was fired for missing four shifts during the course of 1 week. During the past week, she has slept less than 4 hours nightly because she has slept on the streets or in shelters. She has panic disorder treated with fluoxetine. She takes no other medications. Ten years ago, she underwent 6 months of psychotherapy for dependent personality disorder. During the past year, she has drunk four or more glasses of wine and other alcoholic beverages nightly. She tried to quit drinking alcohol twice during the past year but was unsuccessful. Her last alcoholic drink was 24 hours ago. Pulse is 90/min and blood pressure is 140/90 mm Hg. Physical examination shows resting hand tremors and delayed reflexes. Mental status examination shows slurred speech. She has an irritable mood and anxious affect. Blood alcohol concentration is 140 mg/dL. Which of the following is the strongest predisposing risk factor for suicide in this patient?
- (A) Adjustment disorder with depressed mood
  - (B) Alcohol use disorder
  - (C) Dependent personality disorder
  - (D) History of physical abuse
  - (E) Panic disorder
82. A 76-year-old woman, who is receiving home hospice care because of end-stage metastatic lung cancer diagnosed 1 month ago, is examined at home at the request of her family because of a 3-hour history of labored breathing despite receiving 100% oxygen at 5 L/min via face mask. Pulse is 92/min, respirations are 18/min, and blood pressure is 105/62 mm Hg. Pulse oximetry on 100% oxygen via face mask shows an oxygen saturation of 85%. The patient appears cachectic and is in mild distress, showing increased work of breathing with prominent sternocleidomastoid muscles and intermittent agonal respirations. Which of the following is the most appropriate next step in management?
- (A) Administer intravenous morphine
  - (B) Admit the patient to the hospital for further evaluation
  - (C) Initiate a propofol infusion
  - (D) Transition the patient to noninvasive positive pressure ventilation
  - (E) No further action is indicated
83. A 42-year-old woman comes to the physician because of a 1-month history of moderate constant abdominal pain. She was evaluated in the emergency department 6 weeks ago for renal calculi and was told that her serum calcium concentration was increased. She has labile hypertension treated with hydrochlorothiazide and enalapril. Two brothers have hyperparathyroidism, and one sister has an adrenal tumor. The patient's temperature is 37.0°C (98.6°F), pulse is 80/min, respirations are 12/min, and blood pressure is 182/98 mm Hg. Funduscopic examination shows arteriovenous nicking. There is mild, diffuse tenderness to palpation of the abdomen. The remainder of the examination shows no abnormalities. Serum calcium concentration is 13.2 mg/dL. Urine metanephrine concentration is 4000 µg/24 h (N=140–785). This patient is most likely at risk for which of the following conditions?
- (A) Carcinoid syndrome
  - (B) Chronic autoimmune (Hashimoto) thyroiditis
  - (C) Familial hypocalciuric hypercalcemia
  - (D) Medullary thyroid carcinoma
  - (E) Parathyroid carcinoma

84. A 26-year-old woman with common variable immunodeficiency comes to the office because of a 2-month history of night sweats. She also has had a 10-kg (22-lb) weight loss during the past 3 months despite no change in appetite. She has a 15-year history of recurrent sinusitis and otitis media. Her only medication is intravenous immune globulin. She is 163 cm (5 ft 4 in) tall and weighs 54 kg (120 lb); BMI is 21 kg/m<sup>2</sup>. Vital signs are within normal limits. Examination shows cervical and epitrochlear lymphadenopathy. Which of the following is the most appropriate next step in management?
- (A) Lymph node biopsy
  - (B) Methylprednisolone therapy
  - (C) Penicillin therapy
  - (D) Plasmapheresis
  - (E) Trimethoprim-sulfamethoxazole therapy
85. A 9-month-old boy is brought to the office by his mother because of a 6-hour history of persistent fussiness and decreased appetite. Two weeks ago, he was diagnosed with an upper respiratory tract infection. The symptoms have since resolved. He lives with his parents and a pet lizard. His diet consists of cow milk-based formula, baby food, and some solid foods. He has no history of serious illness and receives no medications. Immunizations are up-to-date. Today, he is inconsolable. He is at the 50th percentile for length and weight. Examination shows multiple flaccid bullae on an erythematous base over the buttocks. The mother says she had no knowledge of these findings. Which of the following is the most appropriate next step in management?
- (A) Abdominal ultrasonography
  - (B) Anti-*Saccharomyces cerevisiae* antibody testing
  - (C) Nitroblue tetrazolium testing
  - (D) Rectal swab for group B streptococcus
  - (E) Skeletal survey
  - (F) Stool culture for *Salmonella enteritidis*
86. A 62-year-old woman is admitted to the hospital because of an 8-hour history of severe right upper abdominal pain, nausea, and fever that began after she ate fried fish and potatoes. During the past 3 years, she has had 12 episodes of similar pain after meals, but it has not lasted as long or been as severe as this episode. She has hypertension, hyperlipidemia, and alcohol use disorder. Her medications are amlodipine, benazepril, and simvastatin. She drinks one 12-oz beer daily. She is 163 cm (5 ft 4 in) tall and weighs 86 kg (190 lb); BMI is 33 kg/m<sup>2</sup>. Temperature is 38.5°C (101.3°F), pulse is 120/min, respirations are 28/min, and blood pressure is 100/68 mm Hg. Pulse oximetry on room air shows an oxygen saturation of 98%. On abdominal examination, there is diffuse tenderness to palpation, rebound, and guarding. Bowel sounds are decreased. Laboratory studies show:

Hematocrit	35%
Leukocyte count	16,000/mm <sup>3</sup>
Serum	
Ca <sup>2+</sup>	7.9 mg/dL
Urea nitrogen	26 mg/dL
Glucose	200 mg/dL
Creatinine	2 mg/dL
Triglycerides	180 mg/dL
AST	162 U/L
ALT	98 U/L
Amylase	682 U/L
Lipase	515 U/L (N=14–280)

Serum electrolyte concentrations and lactate dehydrogenase activities are within the reference ranges. Which of the following is the most appropriate next step in diagnosis?

- (A) CT scan of the abdomen
- (B) Endoscopic retrograde cholangiopancreatography
- (C) MR cholangiopancreatography
- (D) MRI of the pancreas
- (E) Ultrasonography of the right upper abdominal quadrant



87. A 28-year-old woman, gravida 2, para 1, at 39 weeks' gestation with an intrauterine pregnancy, is admitted to the hospital for induction of labor. Her pregnancy has been complicated by gestational diabetes treated with insulin during the third trimester and polyhydramnios. Her first pregnancy ended in spontaneous vaginal delivery of a healthy 3600-g (7-lb 15-oz) newborn at term. Leopold maneuvers estimate a fetal weight of 4000 g (8 lb 13 oz). The cervix is 2 cm dilated and 80% effaced; the vertex is at -3 station. Ultrasonography shows the fetus in a cephalic presentation. The amniotic fluid index is 30 cm (N=10-20). Intravenous administration of oxytocin is begun. Four hours later, the patient has regular, painful contractions that occur every 2 minutes and last 60 seconds. The cervix is 4 cm dilated and 100% effaced; the vertex is at -2 station. Artificial rupture of membranes is performed, and there is copious clear amniotic fluid. Fetal heart tracing 10 minutes later is shown. Which of the following is the most likely explanation for the fetal heart tracing findings?

- (A) Occult shoulder dystocia
- (B) Umbilical cord prolapse
- (C) Uterine hyperstimulation
- (D) Uterine rupture
- (E) Uteroplacental insufficiency

88. A 63-year-old man with chronic obstructive pulmonary disease comes to the urgent treatment center because of a 4-day history of worsening shortness of breath. Use of his albuterol rescue inhaler has provided no improvement in his symptoms. Medical history otherwise is unremarkable. Additional medications are formoterol, budesonide, and tiotropium. The patient smoked two packs of cigarettes daily for 45 years but currently smokes only three to four cigarettes daily and says he is trying hard to quit. He appears anxious. He is 175 cm (5 ft 9 in) tall and weighs 100 kg (220 lb); BMI is 33 kg/m<sup>2</sup>. Temperature is 37.2°C (99.0°F), pulse is 96/min, respirations are 26/min, and blood pressure is 128/76 mm Hg. Pulse oximetry on room air discloses an oxygen saturation of 85%. Mild cyanosis is noted, but there is no clubbing or edema of the extremities. Auscultation of the lungs discloses diffuse expiratory wheezes. Cardiac examination discloses distant but regular heart sounds. Results of arterial blood gas analysis on room air are shown:

PO <sub>2</sub>	48 mm Hg
PCO <sub>2</sub>	55 mm Hg
pH	7.36

After an albuterol nebulizer treatment is administered, the patient reports feeling somewhat better but says he is feeling "jittery" and is starting to have a mild tremor. In addition to providing smoking cessation counseling and prescribing antibiotic and corticosteroid therapy, which of the following is the most appropriate next step in management?

- (A) Continuous nebulized albuterol therapy
- (B) CT scan of the chest without contrast
- (C) Intravenous aminophylline therapy
- (D) Pulmonary function testing
- (E) Pulmonary rehabilitation
- (F) Titrated oxygen therapy

89. A 49-year-old man returns to the office for follow-up 2 weeks after he was evaluated for a 4-month history of intermittent diarrhea associated with cramping abdominal pain, urgency, and fecal incontinence. Since the onset of these symptoms, he has had four to five bowel movements daily that contain blood and mucus. Endoscopy done 1 week ago showed erythematous, inflamed mucosa of the rectum and sigmoid colon; there were no abnormalities of the ileum. He also had an episode of uveitis treated with intraocular corticosteroids 3 months ago. He takes no routine medications. He is 185 cm (6 ft 1 in) tall and weighs 77 kg (170 lb); BMI is 22 kg/m<sup>2</sup>. Vital signs are temperature 37.3°C (99.2°F), pulse 88/min, respirations 18/min, and blood pressure 128/80 mm Hg. Skin examination shows raised, tender nodules that are 2 to 3 cm in diameter on the anterior surfaces of both lower extremities. Palpation of the abdomen discloses mild tenderness. Rectal examination discloses no fissures or ulcers. Test of the stool for occult blood is trace positive. This patient should be counseled that he is at greatest risk for which of the following?

- (A) Adenocarcinoma of the colon
- (B) Cholelithiasis
- (C) Nephrolithiasis
- (D) Primary biliary cirrhosis
- (E) Spontaneous bacterial peritonitis

90. A 27-year-old man is examined in the intensive care unit 1 day after he sustained a closed head injury, liver laceration, and pelvic fracture in a motor vehicle collision. He is intubated and mechanically ventilated. He is receiving intravenous midazolam and 5% dextrose in lactated Ringer solution. Temperature is 37.8°C (100.0°F), pulse is 95/min, and blood pressure is 100/70 mm Hg. Cardiopulmonary examination shows no abnormalities. The abdomen is soft. He withdraws appropriately to painful stimuli. Laboratory studies show:

Hematocrit	28%
Leukocyte count	13,000/mm <sup>3</sup>
Serum	
Na <sup>+</sup>	138 mEq/L
K <sup>+</sup>	3.5 mEq/L
Cl <sup>-</sup>	102 mEq/L
HCO <sub>3</sub> <sup>-</sup>	24 mEq/L
Urea nitrogen	20 mg/dL
Glucose	220 mg/dL
Creatinine	1 mg/dL

Which of the following is the most likely mechanism of these laboratory findings?

- (A) Decreased uptake of glucose by insulin-sensitive tissues
- (B) Exogenous production of glucose by bacteria
- (C) Impaired excretion of glucose by the kidneys
- (D) Increased infusion of intravenous glucose
- (E) Insulin deficiency

91. A 72-year-old woman is evaluated in the acute rehabilitation facility where she has been receiving physical therapy since sustaining a stroke 2 weeks ago that resulted in moderate left hemiparesis. A swallowing study obtained on admission to the facility showed no abnormalities and she has been progressing well with her rehabilitation. She is able to walk with the aid of a walker and assistant, has no speech impairment, and tolerates a regular diet. Medical history also is notable for well-controlled hypertension and hyperlipidemia. Medications are lisinopril, simvastatin, and daily aspirin. Temperature is 37.0°C (98.6°F), pulse is 72/min and regular, respirations are 12/min, and blood pressure is 130/80 mm Hg. Cardiopulmonary examination shows no abnormalities. Cranial nerves are intact. Muscle strength in the extremities is 4/5 on the left and 5/5 on the right. Sensation is intact bilaterally. Standardized assessment of cognitive function shows no abnormalities. For the past 2 days, the patient has insisted that she is well enough to go home despite not being fully cleared to do so by her physical therapist and physiatrist, who want her to stay for 1 more week to try to advance from the walker to a cane. The patient lives with her daughter, son-in-law, and grandson, and has a bedroom on the main floor of the house with no need to use stairs. The daughter works as a stay-at-home mother. Which of the following is the most appropriate next step in management?

- (A) Discharge the patient with a plan for home health care and physical therapy
- (B) Inform the patient that she would need to sign out against medical advice
- (C) Inform the patient that transfer to a long-term care facility is most suitable for her
- (D) Request psychiatric evaluation of the patient's decision-making capacity

92. A 46-year-old woman comes to the office for an annual health maintenance examination. She reports a 6-week history of fatigue, which she attributes to working full time and caring for her three children. Her blood pressure has been consistently high as measured at home with her husband's automated cuff, with many readings greater than 150/90 mm Hg. Medical history is unremarkable and routine preventive screenings, including mammography and Pap smear, have shown no abnormalities. Her only medications are a daily multivitamin and ibuprofen as needed. She is 165 cm (5 ft 5 in) tall and weighs 72 kg (158 lb); BMI is 26 kg/m<sup>2</sup>. Pulse is 84/min, and blood pressure is 152/98 mm Hg. Physical examination shows trace edema of the ankles but no other abnormalities. Results of serum studies are shown:

Urea nitrogen	12 mg/dL
Creatinine	0.9 mg/dL
Na <sup>+</sup>	141 mEq/L
K <sup>+</sup>	3.1 mEq/L
Cl <sup>-</sup>	100 mEq/L
HCO <sub>3</sub> <sup>-</sup>	23 mEq/L

Which of the following is the most likely explanation for this patient's increased blood pressure?

- (A) Cushing syndrome
- (B) Fibromuscular dysplasia
- (C) Hyperaldosteronism
- (D) Hypothyroidism
- (E) Obstructive sleep apnea

93. A 50-year-old woman is brought to the emergency department because of a 3-day history of severely painful lesions over her right leg and temperatures to 38.7°C (101.7°F). She has a 12-year history of type 2 diabetes mellitus. Her only medication is insulin. On arrival, temperature is 39.3°C (102.8°F). Examination of the right lower extremity shows exquisite tenderness to palpation, edema, and warmth. The extremity appears shiny and diffusely erythematous without sharp margins. The subcutaneous tissue is firm, and there are areas of notable skin breakdown with bullae containing thick purple fluid. Examination of the left lower extremity shows no abnormalities. Which of the following is the most likely diagnosis?

- (A) Cellulitis
- (B) Dermatophytosis
- (C) Erysipelas
- (D) Erythema nodosum
- (E) Herpes zoster
- (F) Necrotizing fasciitis

94. A 37-year-old woman comes to the office for a routine health maintenance examination. For the past 6 years, she has worked in a paper mill factory that uses liquid chlorine to bleach the paper. The patient is concerned about her exposure to toxic substances. Vital signs are within normal limits. Examination shows no abnormalities. Which of the following is the most appropriate recommendation to address this patient's concerns?
- (A) Corticosteroid therapy
  - (B) Taking frequent breaks from the paper-bleaching area
  - (C) Undergoing monthly pulmonary function testing
  - (D) Using a respirator at work
  - (E) Washing daily after work with a chlorhexidine-based solution
95. A 57-year-old man with alcohol use disorder comes to the emergency department because of a 3-day history of worsening abdominal pain and distention. Medical history is remarkable for alcoholic cirrhosis, hypertension, hyperlipidemia, and a laparoscopic cholecystectomy 10 years ago. The patient also has had several previous hospital admissions for similar episodes of abdominal pain and distention. The patient takes no medications but has been prescribed medications for hypertension in the past. He recently participated in an alcohol rehabilitation program but began drinking alcohol again 1 week ago. During the past 5 days, he has drunk 1 L of vodka daily. Pulse is 100/min, respirations are 16/min, and blood pressure is 165/85 mm Hg. Pulse oximetry on room air shows an oxygen saturation of 100%. The patient appears jaundiced. Cardiopulmonary examination discloses no abnormalities. The abdomen is large, distended, and tense; a fluid wave is present. Palpation of the abdomen discloses a 2-cm-wide reducible umbilical hernia and diffuse tenderness without guarding. There is no tenderness to percussion. In addition to large-volume paracentesis and furosemide therapy, initiation of which of the following pharmacotherapies is most appropriate?
- (A) Enalapril
  - (B) Metoprolol
  - (C) Propranolol
  - (D) Spironolactone
  - (E) Valsartan
96. A 48-year-old man is admitted to the hospital 2 hours after the onset of severe abdominal pain, nausea, and vomiting. The pain radiates to the back but improves when he bends forward. He has no history of serious illness and takes no medications. He does not smoke cigarettes. He drinks two 12-oz beers weekly. He appears restless. He is 173 cm (5 ft 8 in) tall and weighs 90 kg (198 lb); BMI is 30 kg/m<sup>2</sup>. Temperature is 38.0°C (100.4°F), pulse is 110/min, respirations are 20/min, and blood pressure is 110/60 mm Hg. On pulmonary examination, decreased breath sounds are heard at the lung bases; there is dullness to percussion. Abdominal examination shows distention and severe tenderness to palpation of the epigastrium and left upper quadrant. Laboratory studies show:

Hemoglobin	13.5 g/dL
Serum	
Urea nitrogen	30 mg/dL
Glucose	120 mg/dL
Creatinine	1.2 mg/dL
Cholesterol	300 mg/dL
Triglycerides	1500 mg/dL
Total bilirubin	1.1 mg/dL
Amylase	300 U/L

Administration of intravenous fluids and analgesics is begun. The patient's abdominal pain, nausea, and vomiting decrease. Which of the following is the most appropriate next step in management?

- (A) Apheresis
- (B) Ezetimibe therapy
- (C) Gemfibrozil therapy
- (D) Metformin therapy
- (E) Recommendation for weight loss



97. A 57-year-old man is admitted to the hospital 30 minutes after he was found wandering in the streets. Fingertick blood glucose concentration obtained by paramedics prior to transport was 68 mg/dL. The patient's medical history is unknown. Temperature is 35.8°C (96.5°F), pulse is 80/min, respirations are 16/min, and blood pressure is 106/70 mm Hg. The patient appears disheveled and is not oriented to person, place, or time. Physical examination shows mild conjunctival icterus. Cardiopulmonary examination discloses no abnormalities. Abdominal examination discloses a small fluid wave. There is palmar erythema and 1+ pitting edema of the lower extremities. Gait is broad based and ataxic. The patient is unable to cooperate with ocular or neurologic examinations. ECG shows a regular sinus rhythm and no acute abnormalities. Results of toxicology screening are pending. The most appropriate initial step in management is to administer which of the following?
- (A) Glucose
  - (B) Vitamin B<sub>1</sub> (thiamine)
  - (C) Vitamin B<sub>2</sub> (riboflavin)
  - (D) Vitamin B<sub>6</sub> (pyridoxine)
  - (E) Vitamin B<sub>12</sub> (cyanocobalamin)
98. Three days after an operation for uterine cancer, a hospitalized 67-year-old woman develops edema of the right lower extremity. Doppler ultrasonography shows a deep venous thrombosis (DVT). Review of the patient's record indicates that no DVT prophylaxis was initiated perioperatively. Which of the following is the best approach to prevent a similar adverse event in the future?
- (A) Conduct a nursing in-service regarding DVT prophylaxis
  - (B) Develop an institutional policy with standardized orders for DVT prophylaxis
  - (C) Encourage early ambulation during the postoperative period
  - (D) Prescribe low-molecular-weight heparin for all postoperative patients
  - (E) No intervention indicated because this is an isolated case and does not occur frequently
99. A clinical trial is performed to assess the efficacy of aspirin in decreasing the risk for myocardial infarction. Twenty-two thousand male physicians with no history of coronary artery disease are randomly assigned to receive aspirin (325 mg/d) or a placebo. After following the subjects for 5 years, results show that the incidence of myocardial infarction is 1.2% in the aspirin group and 2.2% in the placebo group. The reduction in incidence is statistically significant. Which of the following is the most accurate interpretation of these results?
- (A) Absolute risk reduction is 1%
  - (B) Absolute risk reduction is 10%
  - (C) Number needed to treat is 4
  - (D) Number needed to treat is 25
  - (E) Relative risk reduction is 25%
  - (F) Relative risk reduction is 75%
100. An 18-year-old man is being prepared to undergo left temporal craniotomy for meningioma. General anesthesia has been administered. The surgeon reviews the patient's most recent MRI findings, which are hanging on a view box in the operating room, and prepares to clip the hair from the patient's right scalp. The circulating nurse is concerned because the signed operative consent form indicates a left temporal craniotomy. Which of the following is the most appropriate course of action for the circulating nurse?
- (A) No action is required
  - (B) Review the MRI to determine the correct operative site
  - (C) Ask the surgeon to continue the operation only after the discrepancy is resolved
  - (D) Change the operative consent to match the surgeon's actions
  - (E) Call the waiting room to confirm the correct operative site with the patient's parents
  - (F) Write a postoperative incident report only

101. A 52-year-old man is brought to the emergency department because of a 2-day history of severe, progressive shortness of breath associated with exacerbation of his chronic cough. He has a 6-week history of pneumonia, which has responded slowly to treatment. Prior to the onset of his current symptoms, he had minimally productive cough and mild shortness of breath after walking one or two blocks. He also has had a low-grade fever for 6 days. He has no other history of serious illness. Current medications are erythromycin and an over-the-counter cough suppressant. He has smoked one pack of cigarettes daily for 20 years. On arrival, he appears ill. He is diaphoretic and in severe respiratory distress. Temperature is 38.1°C (100.6°F), pulse is 110/min, respirations are 36/min and shallow, and blood pressure is 70/50 mm Hg. Pulse oximetry on room air shows an oxygen saturation of 83%. Examination shows perioral cyanosis. There is no jugular venous distention. Diffuse crackles and wheezes are heard throughout the lungs. Heart sounds are normal. While a blood sample is being taken, the patient's blood pressure decreases, and he stops breathing. He is intubated, and mechanical ventilation is begun. Laboratory studies show:

Hematocrit	42%
Leukocyte count	16,000/mm <sup>3</sup>
Segmented neutrophils	85%
Lymphocytes	15%
Platelet count	200,000/mm <sup>3</sup>

Arterial blood gas analysis on an FiO<sub>2</sub> of 1.0 shows:

pH	7.35
PCO <sub>2</sub>	42 mm Hg
PO <sub>2</sub>	55 mm Hg

Chest x-ray shows diffuse alveolar infiltrates bilaterally and no cardiomegaly. Following intravenous administration of fluids, his blood pressure increases to 118/80 mm Hg. Which of the following is the most appropriate next step in management?

- (A) Continuation of mechanical ventilation at the current setting
  - (B) Administration of cyclophosphamide
  - (C) Administration of dexamethasone
  - (D) Extracorporeal membrane oxygenation
  - (E) Application of positive end-expiratory pressure
102. A 14-year-old boy is brought to the emergency department by his parents 30 minutes after the sudden onset of confusion, sweating, and pallor. He has enuresis treated with imipramine. His parents refilled his prescription for imipramine 3 days ago and noted today that the bottle is empty. On arrival, the patient is awake but confused. Temperature is 37.0°C (98.6°F), pulse is 80/min, respirations are 8/min, and blood pressure is 100/60 mm Hg. Examination shows dilated pupils and flushed skin. In addition to ensuring an adequate airway and establishing intravenous access, which of the following is the most appropriate initial step in management?
- (A) Cardiac monitoring
  - (B) Chest x-ray
  - (C) Echocardiography
  - (D) EEG
  - (E) Measurement of serum imipramine concentration

103. A 65-year-old man with mild hypertension comes to the veterans' administration outpatient clinic because he is concerned about having an abdominal aortic aneurysm. He says he feels well. His medications are metoprolol and lisinopril. His older brother, who was "seemingly in good health," recently underwent emergency repair of a ruptured abdominal aortic aneurysm that had not been diagnosed previously. The patient retired from the military 15 years ago. He smoked one-half pack of cigarettes daily for 20 years but quit 20 years ago. He is 183 cm (6 ft 0 in) tall and weighs 84 kg (185 lb); BMI is 25 kg/m<sup>2</sup>. Pulse is 72/min and regular, and blood pressure is 140/85 mm Hg. Abdominal examination shows no organomegaly or tenderness to palpation. The aortic pulsation is estimated at 3 cm in width. A midepigastric bruit is heard. The remainder of the examination shows no abnormalities. Which of the following is the most appropriate next step in diagnosis?

- (A) CT scan of the abdomen and pelvis
- (B) Digital angiography of the aorta
- (C) Duplex ultrasonography of the abdomen
- (D) X-ray of the abdomen
- (E) No diagnostic imaging is indicated

104. A 57-year-old man comes to the physician because of a 1-month history of fatigue and moderate low back pain. He also has had a mildly decreased appetite resulting in a 1.8-kg (4-lb) weight loss during this period. He has a 1-week history of headache. He has had no fever, sweating, or chills. He has hypertension well controlled with triamterene-hydrochlorothiazide. Other medications include 81-mg aspirin, ibuprofen, and a daily multivitamin. He appears tired. Examination shows slightly pale conjunctivae. A grade 2/6 systolic flow murmur is heard best at the lower left sternal border. The remainder of the examination shows no abnormalities. Test of the stool for occult blood is negative. Laboratory studies show:

Hematocrit	32%
Mean corpuscular volume	102 $\mu\text{m}^3$
Leukocyte count	9200/mm <sup>3</sup>
Segmented neutrophils	66%
Bands	3%
Lymphocytes	31%
Platelet count	325,000/mm <sup>3</sup>
Red cell distribution width	15.6% (N=13%–15%)
Serum	
Ca <sup>2+</sup>	10.8 mg/dL
Urea nitrogen	18 mg/dL
Glucose	108 mg/dL
Creatinine	1.5 mg/dL
Albumin	3 g/dL

X-rays of the lumbosacral spine show mild osteopenia. Which of the following is the most appropriate next step in diagnosis?

- (A) Serum protein electrophoresis
- (B) Echocardiography
- (C) Bone scan
- (D) Colonoscopy
- (E) Esophagogastroduodenoscopy

105. A 38-year-old woman, gravida 1, para 1, comes to the office because she has been unable to conceive for the past year. She and her husband have had unprotected sexual intercourse three times weekly during this time. They have a 6-year-old daughter. During the past year, menses have occurred at irregular 90- to 120-day intervals. Her last menstrual period was 2 months ago. Menses previously occurred at regular 30-day intervals. She used an oral contraceptive for 4 years after the birth of her daughter but discontinued it 14 months ago. She has no history of serious illness and takes no medications. The patient appears well. She is 163 cm (5 ft 4 in) tall and weighs 63 kg (140 lb); BMI is 24 kg/m<sup>2</sup>. Vital signs are within normal limits. Examination shows no abnormalities. Results of serum studies are shown:

Thyroid-stimulating hormone	3 $\mu$ U/mL
Follicle-stimulating hormone	100 mIU/mL
Prolactin	10 ng/mL
$\beta$ -hCG	negative

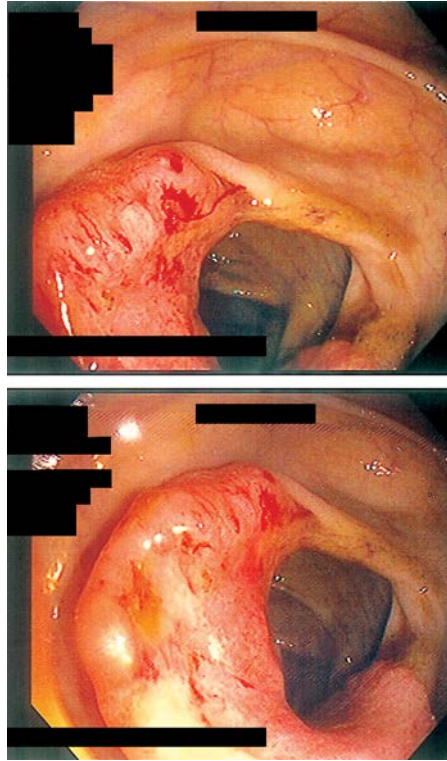
This patient's diagnosis puts her at risk for which of the following?

- (A) Breast cancer
  - (B) Endometrial cancer
  - (C) Obesity
  - (D) Osteoporosis
  - (E) Unplanned pregnancy
106. A 27-year-old man comes to the physician because of a 1-month history of progressive fatigue and episodes of moderate abdominal pain. He has a 4-year history of recurrent nosebleeds that have increased in frequency despite undergoing cauterization of the nasal mucosa 6 months ago. He takes no medications. His sister has anemia associated with recurrent nosebleeds and heavy menstrual periods; she also had postpartum hemorrhage that required transfusion. The patient's vital signs are within normal limits. Examination shows pallor; no other abnormalities are noted. Laboratory studies show:

Hemoglobin	7.1 g/dL
Erythrocyte count	2.1 million/mm <sup>3</sup>
Leukocyte count	13,500/mm <sup>3</sup>
Platelet count	250,000/mm <sup>3</sup>
Prothrombin time	12 sec (INR=1)
Partial thromboplastin time	45 sec

Which of the following is the most likely diagnosis?

- (A) Bernard-Soulier syndrome
- (B) Glanzmann thrombasthenia
- (C) Hemophilia A
- (D) Hereditary hemorrhagic telangiectasia
- (E) von Willebrand disease



107. A previously healthy 57-year-old woman comes to the physician because of a 2-month history of mild right lower abdominal pain and generalized fatigue. Her only medication is a daily multivitamin. Her father received the diagnosis of prostate cancer at the age of 70 years. The patient is 160 cm (5 ft 3 in) tall and weighs 58 kg (128 lb); BMI is 23 kg/m<sup>2</sup>. Temperature is 37.0°C (98.6°F), pulse is 98/min, respirations are 14/min, and blood pressure is 110/84 mm Hg. Abdominal examination shows no abnormalities. Test of the stool for occult blood is positive. Hemoglobin concentration is 9 g/dL and hematocrit is 27%. Colonoscopic findings are shown. A biopsy specimen of the mass in the ascending colon shows a moderately differentiated adenocarcinoma. Which of the following is the most appropriate next step in management?
- (A) Chemotherapy only
  - (B) Radiation therapy only
  - (C) Chemotherapy and radiation therapy
  - (D) Colonoscopic excision of the mass
  - (E) Right hemicolectomy
- 
108. A 37-year-old woman comes to the office for a follow-up examination 3 weeks after testing confirmed a mass in her left breast to be benign. She says that despite the test results, she has had anxiety, insomnia, and a preoccupation with cancer since noticing the lump. Two weeks ago, she had a 20-minute episode of markedly intense anxiety characterized by heart palpitations and the fear that she was dying. She says she has always been a tense, nervous person and is uncomfortable in social situations. She says she frequently worries and is fearful of the future and apprehensive of dying. She has no other history of panic episodes, traumatic events, or serious illness and takes no medications. She does not drink alcohol or use illicit drugs. Physical examination shows a 2-cm mass in the left breast. On mental status examination, she is cooperative but worried. Her thought processes are linear, and content focuses on possible negative eventualities. Which of the following is the most likely diagnosis?
- (A) Avoidant personality disorder
  - (B) Generalized anxiety disorder
  - (C) Illness anxiety disorder (hypochondriasis)
  - (D) Persistent depressive disorder (dysthymia)
  - (E) Social anxiety disorder (social phobia)

109. A 55-year-old man comes to the emergency department because of a 6-hour history of diffuse abdominal pain and subjective fever. His most recent bowel movement 4 hours ago was loose but not bloody. He reports no chills or urinary symptoms. Medical history is remarkable for gastroesophageal reflux disease and alcoholic cirrhosis. Medications are furosemide, spironolactone, lactulose, and pantoprazole. The patient appears uncomfortable. Temperature is 37.8°C (100.0°F), pulse is 88/min, respirations are 14/min, and blood pressure is 104/66 mm Hg. Physical examination shows conjunctival icterus and abdominal distention. Bowel sounds are normal. There is moderate diffuse abdominal tenderness with mild guarding but no rebound tenderness. Results of laboratory studies are shown:

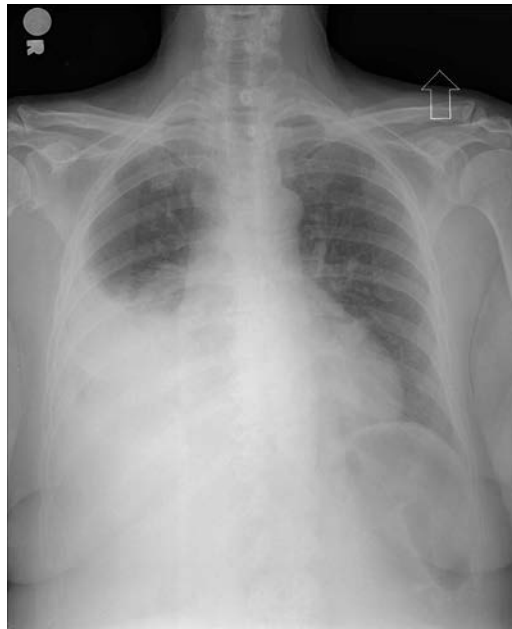
Serum		Blood	
ALT	70 U/L	Hematocrit	39%
AST	85 U/L	Hemoglobin	13.0 g/dL
Alkaline phosphatase	66 U/L	Leukocyte count	11,300/mm <sup>3</sup>
Total bilirubin	3.5 mg/dL	Platelet count	66,000/mm <sup>3</sup>
Creatinine	0.6 mg/dL	Partial thromboplastin time	39 seconds
		Prothrombin time	17.2 seconds

Abdominal paracentesis is done, and analysis of the ascitic fluid shows a segmented neutrophil cell count of 288 cells/mm<sup>3</sup>. Results of blood and ascitic fluid cultures are pending. Which of the following is the most appropriate pharmacotherapy at this time?

- (A) Cefotaxime
  - (B) Clindamycin
  - (C) Metronidazole
  - (D) Oxacillin
  - (E) Vancomycin
  - (F) No pharmacotherapy is indicated at this time
110. A 45-year-old man is brought to the emergency department because of moderate chest pain after a generalized tonic-clonic seizure 30 minutes ago. He has seizure disorder for which he has taken carbamazepine and phenobarbital for the past 20 years. X-ray of the chest shows generalized osteopenia with several rib fractures. Which of the following is the most likely nutritional deficiency?
- (A) Folic acid
  - (B) Iron
  - (C) Magnesium
  - (D) Vitamin B<sub>2</sub> (riboflavin)
  - (E) Vitamin D
  - (F) Zinc
111. A 32-year-old man comes to the office because of a 2-day history of redness of the right eye. He has not had sensitivity to light or the sensation of a foreign body in the eye. He has no history of serious illness and takes no medications. Examination of the right eye shows erythema and clear discharge. Examination of the left eye shows no abnormalities. The physician prescribes ketorolac ophthalmic solution. Which of the following is the most appropriate way for the physician to write the prescription?
- (A) Ketorolac 0.5% solution, 1 drop in right eye, four times daily
  - (B) Ketorolac .5% solution, 1 drop in right eye QID
  - (C) Ketorolac 0.5% solution, 1 drop OD four times daily
  - (D) Ketorolac 0.5% solution, 1 drop OD, QID
112. A 14-year-old girl is brought to the physician by her mother for a well-child examination. Vital signs are within normal limits. On breast examination, the areolae are 3 cm in diameter and form a secondary mound bilaterally. Cardiopulmonary and abdominal examinations show no abnormalities. Pelvic examination shows dark, curly, coarse hair that spreads sparsely over the pubic area but not over the thighs. Which of the following is the most accurate assessment of this patient's development?

	Pubic Hair Development	Breast Development
(A)	Delayed	delayed
(B)	Delayed	normal
(C)	Normal	delayed
(D)	Normal	normal

113. A healthy 19-year-old woman comes to the clinic requesting advice regarding contraception. Menses occur at regular 28-day intervals with heavy flow. She is sexually active and has had three lifetime male partners. She has smoked one-half pack of cigarettes daily for 2 years. She lives in a college dormitory and says that she often does not sleep in her own room and has trouble remembering to take medications regularly. Her only medication is a daily multivitamin. She is 163 cm (5 ft 4 in) tall and weighs 58 kg (128 lb); BMI is 22 kg/m<sup>2</sup>. Vital signs are within normal limits. Physical examination shows no abnormalities. Which of the following is the most appropriate recommendation regarding contraception for this patient?
- (A) Condoms with spermicidal foam
  - (B) Diaphragm with spermicidal foam
  - (C) Oral contraceptive therapy
  - (D) Subdermal contraceptive implant
  - (E) Vaginal contraceptive ring
- 



114. A 56-year-old man with adenocarcinoma of the lung comes to the physician because of a 1-week history of shortness of breath with exertion. The cancer was diagnosed 6 months ago, and he completed a course of chemotherapy 2 months ago. He has hypertension treated with hydrochlorothiazide. Temperature is 37.0°C (98.6°F), pulse is 88/min, respirations are 18/min, and blood pressure is 114/64 mm Hg. Pulse oximetry on room air shows an oxygen saturation of 94%. There is dullness to percussion of the right lung base; decreased breath sounds are heard. Chest x-ray is shown. Results of thoracentesis are most likely to show which of the following?
- (A) Decreased glucose concentration
  - (B) Decreased total protein concentration
  - (C) Increased eosinophil count
  - (D) Increased glucose concentration
  - (E) Increased segmented neutrophil count
  - (F) Increased total protein concentration

115. A previously healthy 17-year-old girl comes to the emergency department because of a 3-day history of moderate right lower quadrant pain, fever, and loss of appetite. She has not had abnormal vaginal discharge. Four months ago, she was treated with oral antibiotics for cystitis. She currently takes no medications. Menses occur at regular 28-day intervals. Her last menstrual period was 10 days ago. She has been sexually active with two male partners during the past 6 months and uses condoms inconsistently. Temperature is 38.5°C (101.3°F), pulse is 105/min, respirations are 14/min, and blood pressure is 127/82 mm Hg. Abdominal examination shows tenderness to palpation of the lower quadrants with rebound in the right lower quadrant; there is no distention. Bowel sounds are decreased. Pelvic examination shows blood-tinged discharge from the cervical os and cervical motion tenderness. There is a 5-cm mass in the right adnexal region. Which of the following is the most likely diagnosis?
- (A) Appendicitis
  - (B) Ectopic pregnancy
  - (C) Ovarian torsion
  - (D) Pyelonephritis
  - (E) Tubo-ovarian abscess
116. A 15-year-old girl is brought to the office because she has never had a menstrual period. She has no history of serious illness and receives no medications. Growth and development are appropriate for age. Breast development began at the age of 10 years. She has never been sexually active. She is at the 90th percentile for height, 75th percentile for weight, and 69th percentile for BMI. Sexual maturity rating is 4 for breast development. Pelvic examination shows a normal-appearing vagina; the cervix and uterus cannot be palpated. Her serum testosterone concentration is 340 ng/dL (N=5–40). Serum concentrations of luteinizing hormone, follicle-stimulating hormone, thyroid-stimulating hormone, 17 $\alpha$ -hydroxyprogesterone, and prolactin are within the reference ranges. Serum  $\beta$ -hCG testing is negative. Pelvic ultrasonography shows no uterus. Her karyotype is 46,XY. Which of the following is the most appropriate next step in management?
- (A) Estrogen and progestin therapy
  - (B) Gonadectomy
  - (C) Gonadotropin-releasing hormone agonist therapy
  - (D) Progestin therapy only
  - (E) No further management is indicated
117. A 50-year-old man returns to the office for a follow-up examination. During the past 2 months, he has had increased blood pressure readings during several checks at the office and at home. He says he has felt well. He has major depressive disorder and gout. Medications are fluoxetine and allopurinol. His maternal grandfather had congestive heart failure and the patient's older brother has hypertension. The patient has smoked one-half pack of cigarettes daily for 32 years. He is 180 cm (5 ft 11 in) tall and weighs 95 kg (210 lb); BMI is 29 kg/m<sup>2</sup>. Pulse is 70/min and blood pressure is 152/90 mm Hg. Physical examination discloses no abnormalities. Which of the following medications is contraindicated in this patient?
- (A) Amlodipine
  - (B) Doxazosin
  - (C) Hydrochlorothiazide
  - (D) Lisinopril
  - (E) Metoprolol



118. A 23-year-old woman is brought to the emergency department by her friends 30 minutes after the sudden onset of nausea, facial flushing, and chest pressure while eating at a Thai restaurant. She does not have any known allergies to foods or medications. She had asthma during childhood but has not required treatment for 5 years. On arrival, she is diaphoretic and appears anxious. Temperature is 37.1°C (98.8°F), pulse is 92/min, respirations are 20/min, and blood pressure is 126/68 mm Hg. Pulse oximetry on room air shows an oxygen saturation of 99%. Examination of the neck shows erythema; no masses or nodules are palpated. Cardiopulmonary examination shows no abnormalities. Which of the following is the most likely diagnosis?
- (A) Asthma exacerbation
  - (B) Carcinoid syndrome
  - (C) Panic attack
  - (D) Reaction to food additive
  - (E) Systemic mastocytosis
  - (F) Thyrotoxicosis
119. A 45-year-old woman returns to the office to discuss results of a fine-needle aspiration biopsy of a 0.5-cm right breast mass obtained 1 week ago. She is unaccompanied. Medical history is unremarkable and she takes no medications. Her mother and maternal aunt were diagnosed with breast cancer at the ages of 45 and 52 years, respectively. Physical examination discloses no palpable axillary nodes. The biopsy specimen showed malignant cells. The patient is counseled that she has an excellent chance of cure with lumpectomy and radiation therapy. She adamantly refuses this treatment plan and states that she will try natural therapies, including megavitamins and herbal remedies instead. After exploring the reasons behind the patient's decision, which of the following is the most appropriate response?
- (A) Advise the patient that there is no proof that these alternative therapies work and that she is essentially throwing her life away
  - (B) Agree to the alternative therapies and schedule a follow-up visit in 6 months
  - (C) Ask the patient if she would be willing to return to the office in 2 weeks to discuss treatment options again
  - (D) Inform the patient that she will be referred to another physician based on her treatment decision
120. A 47-year-old woman comes to the office because of a 2-month history of progressive weakness and numbness of her right leg. She has a 3-year history of type 2 diabetes mellitus treated with metformin. She has worked as a stock person in a storeroom for 12 years; she often moves and lifts heavy objects and sometimes crawls into tight spaces. On neurologic examination, muscle strength is 5–/5 in the hip extensor, thigh abductor, hamstring, and gastrocnemius muscles on the right and intact on the left. Muscle strength is intact in the iliopsoas, thigh adductor, quadriceps, and tibial anterior muscles bilaterally. Deep tendon reflexes are 1+ in the right ankle and 2+ in the left ankle. Sensation to light touch is mildly decreased over the lateral and inferior aspects of the right foot. Sensation otherwise is intact. Which of the following is the most likely diagnosis?
- (A) Common peroneal neuropathy
  - (B) Femoral neuropathy
  - (C) L2 radiculopathy
  - (D) L4 radiculopathy
  - (E) Obturator neuropathy
  - (F) S1 radiculopathy

## ANSWER FORM FOR USMLE STEP 2 CK SAMPLE TEST QUESTIONS

### Block 1 (Questions 1–40)

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

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### Block 2 (Questions 41–80)

41. _____	49. _____	57. _____	65. _____	73. _____
42. _____	50. _____	58. _____	66. _____	74. _____
43. _____	51. _____	59. _____	67. _____	75. _____
44. _____	52. _____	60. _____	68. _____	76. _____
45. _____	53. _____	61. _____	69. _____	77. _____
46. _____	54. _____	62. _____	70. _____	78. _____
47. _____	55. _____	63. _____	71. _____	79. _____
48. _____	56. _____	64. _____	72. _____	80. _____

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### Block 3 (Questions 81–120)

81. _____	89. _____	97. _____	105. _____	113. _____
82. _____	90. _____	98. _____	106. _____	114. _____
83. _____	91. _____	99. _____	107. _____	115. _____
84. _____	92. _____	100. _____	108. _____	116. _____
85. _____	93. _____	101. _____	109. _____	117. _____
86. _____	94. _____	102. _____	110. _____	118. _____
87. _____	95. _____	103. _____	111. _____	119. _____
88. _____	96. _____	104. _____	112. _____	120. _____

## Answer Key for USMLE Step 2 CK Sample Test Questions

### Block 1 (Questions 1–40)

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

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### Block 2 (Questions 41–80)

41. B	49. D	57. E	65. E	73. D
42. B	50. C	58. D	66. E	74. E
43. B	51. C	59. E	67. E	75. D
44. B	52. D	60. A	68. D	76. D
45. C	53. D	61. E	69. B	77. C
46. E	54. B	62. E	70. B	78. C
47. D	55. D	63. E	71. E	79. A
48. B	56. E	64. B	72. B	80. D

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### Block 3 (Questions 81–120)

81. B	89. A	97. B	105. D	113. D
82. A	90. A	98. B	106. E	114. F
83. D	91. A	99. A	107. E	115. E
84. A	92. C	100. C	108. B	116. B
85. E	93. F	101. E	109. A	117. C
86. E	94. D	102. A	110. E	118. D
87. B	95. D	103. C	111. A	119. C
88. F	96. C	104. A	112. D	120. F