ABIM-UPDATE IN
HOSPITAL MEDICINE

October 19-21, 2017
Optional Pre-Course ABIM MOC Sessions on October 18, 2017
Disney’s Contemporary Resort | Lake Buena Vista, Florida
Updates in Internal Medicine 2017
Maintenance of Certification Learning Session

Updates in Internal Medicine 2017 will host a Maintenance of Certification Learning Session that will feature the American Board of Internal Medicine (ABIM) 2017 – 2018 Update in Hospital Medicine knowledge module.

The Learning Sessions will be held on
Wednesday, October 18, 2017, Disney’s Contemporary Resort, Lake Buena Vista, FL
10:15 am - 12:15 pm: 2017 – 2018 Update in Hospital Medicine

The primary purpose of the Learning Sessions is to facilitate completion of ABIM medical knowledge modules by board-certified internists and subspecialists of internal medicine in order for them to receive Maintenance of Certification credit. Learning Sessions are conducted in an interactive group setting with educational support, and are led by ABIM-certified physicians.

Participants who are enrolled in ABIM’s Maintenance of Certification program can order a copy of the 2017 – 2018 Update in Hospital Medicine from ABIM’s website, www.abim.org, and transfer and submit the answers discussed during the Learning Session to ABIM for scoring. Participants will have access to a score report that confirms whether or not the module was completed successfully. Those who complete the module successfully will receive 10 points for completing a 30 -question module toward ABIM’s Self-Evaluation of Medical Knowledge requirement for Maintenance of Certification. You must be enrolled in ABIM’s Maintenance of Certification program to submit completed medical knowledge modules for scoring, feedback reports, and eligibility to receive Maintenance of Certification points and AMA PRA Category 1 Credit™.

For additional information about the ABIM Maintenance of Certification program requirements, visit ABIM’s website, www.abim.org or call ABIM Customer Service, 800-441-ABIM. To enroll in Maintenance of Certification go to your password-protected “Home Page” in the Physician Login section of www.abim.org. Once enrolled, you will be able to order an ABIM medical knowledge module from your home page.

For those not enrolled in ABIM’s Maintenance of Certification program, the Learning Session provides an excellent opportunity to earn AMA PRA Category 1 Credit™ credit directly from Mayo Clinic College of Medicine and Science.
REGISTRATION INFORMATION

To participate in the Learning Session:

1) Register with Updates in Internal Medicine 2017 to take the ABIM Learning Session. The registration fees for this ABIM Learning Session covers the costs for the educational support provided at the session and will be paid directly to Updates in Internal Medicine 2017. The registration fee structure is online at gimeducation.mayo.edu/imupdate2017.

2) Updates in Internal Medicine 2017 will provide you with a “Learner’s Copy” of the 2017 – 2018 Update in Hospital Medicine module at the session on October 18, 2017.

3) In addition to the learner’s copy you will receive at the session, you must order an “Official” copy of the knowledge modules directly from ABIM. Modules can be ordered via your password-protected home page in the Physician Login section of www.abim.org. Modules will immediately become available to you on your home page.

You may order this official module copy either before or after you take the Maintenance of Certification learning session on October 18, 2017.

NOTE:

If you are already enrolled in the ABIM MOC program there is no additional fee for ordering version of the “Official” module. If you order before coming to the session, you may bring your laptop with you.

If you are not enrolled in the ABIM MOC Program you may attend the learning session; however you must enroll in the MOC program prior to receiving MOC credit for the knowledge module. To enroll in the MOC Program go to your password-protected “Home Page” in the Physician Login section of www.abim.org.

5) After the learning session on October 18, 2017, please submit your answers to ABIM as soon as possible for MOC credit by completing and submitting your “official” internet copy (you must be connected to the internet in order for your answers to be successfully transmitted to ABIM). If you need assistance submitting your answers please call 800.441.ABIM.

For more information about attending the ABIM Maintenance of Certification Learning Session at Updates in Internal Medicine 2017 please visit gimeducation.mayo.edu/imupdate2017 or contact Deb Blomberg, rstgimcme@mayo.edu.
Common Abbreviations

The following abbreviations may be used in this examination:

- ALT: Alanine transaminase
- AST: Aspartate transaminase
- BMI: Body mass index
- CSF: Cerebrospinal fluid
- HIV: Human immunodeficiency virus
- INR: International normalized ratio
Introduction

Please read the following information carefully.

On successful completion of this module, you will receive 10 points of self-evaluation of medical knowledge credit in the Maintenance of Certification Program; credit remains valid for 10 years.

Instructions
Read each one-best-answer question in the module and indicate your answer by clicking in the appropriate box. You should use educational resources (e.g., online medical references, textbooks, journal articles) to assist in answering the questions. Suggested resources are listed in the Education Resources section of the CME information.

On each question screen, the Help button will provide you with technical information and instructions on how to navigate through the module, including submitting your completed module. For common abbreviations that may appear in this module, click the "Resources" button on the right side of the screen.

CME information for this module, including CME expiration date, may be reviewed by clicking the “CME Credit for the ABIM Maintenance of Certification Program” link in the left-hand column.

Laboratory Studies and Reference Ranges
Reference ranges for laboratory test reports are included in the text of the ABIM exam questions. As is true in practice, interpretation of a particular patient’s test result in relation to the reference range depends on the clinical context. For example, reference ranges for tests assessing lipid or glucose metabolism may not be applicable in certain clinical settings; ABIM reference ranges should not be confused with patient-specific targets for such tests.

Information on specific studies
The National Cancer Institute advises that there is no specific normal or abnormal level of prostate-specific antigen (PSA) in the blood. Therefore, ABIM is reporting “no specific normal or abnormal level” in place of the reference range for PSA.

The comprehensive metabolic panel contains the following assays: Albumin, alanine and aspartate aminotransferases (ALT and AST), alkaline phosphatase, total bilirubin, blood urea nitrogen, calcium, creatinine, electrolytes (sodium, potassium, chloride, and bicarbonate); glucose, and total protein.

Unless noted otherwise in examination questions:
- Arterial blood gas studies are done at sea level with the patient breathing room air
- Reticulocyte counts are uncorrected
- Tuberculin skin tests are done with purified protein derivative (PPD) at intermediate strength (5 TU)
- Electrocardiograms are recorded at normal standard and speed
- Lung volumes are determined by body plethysmography
Illustrations and Multimedia (if applicable)
Some questions are accompanied by illustrations, such as radiographs, electrocardiograms, photographs of physical or histologic findings, videos, and charts. All electrocardiograms are recorded at normal standard and speed unless otherwise specified.

Criteria for successful completion
In order to successfully complete this module and receive Maintenance of Certification credit, you must answer every question. Submission of this module will not be accepted until answers have been provided for every question.
A 48-year-old homeless man presents to the emergency department with dyspnea. Medical history is unremarkable, and he takes no medications. Temperature is 39.1°C (102.3°F), pulse rate is 75 per minute, respirations are 20 per minute, and blood pressure is 116/88 mm Hg. Oxygen saturation by pulse oximetry is 96%. He has evidence of left lower lobe consolidation on physical examination. No leg swelling or tenderness is noted. Leukocyte count is 15,100/µL (4000–11,000), and serum creatinine is 1.3 mg/dL (0.7–1.5). Chest radiograph reveals an opacity in the left lower lung. Community-acquired pneumonia is diagnosed, and antibiotics are started. The emergency physician is concerned that the patient may not be able to afford antibiotics, and you are asked to help assess whether he should be admitted or can be managed as an outpatient.

While evaluating the patient, he has the sudden onset of moderate, left-sided pleuritic chest pain. At the time of your assessment, pulse rate is up to 95 per minute, respirations are 22 per minute, blood pressure is 122/86 mm Hg, and oxygen saturation remains at 96% on room air. With the acute onset of chest pain, you consider the diagnosis of pulmonary embolus.

Which of the following is the most appropriate next step to exclude the diagnosis of pulmonary embolus?

(A) Plasma D-dimer
(B) Computed tomography angiography of the chest
(C) Ventilation-perfusion lung scan
(D) No further testing is indicated
An active, 87-year-old woman is brought to the emergency department because of severe exertional chest pain. A non–ST-segment elevation myocardial infarction is diagnosed. Medical history is significant for hypertension and hyperlipidemia. Home medications include lisinopril, atorvastatin, and aspirin. On optimal medical therapy, she is now stable and pain free. She does not have dyspnea. Vital signs are stable, and she has no evidence of heart failure. Electrocardiogram from admission revealed 1-mm ST depression in the anterior leads. Serum cardiac troponin peaked at 4.37 ng/mL \([0–0.1]\) and then started to trend down. Serum creatinine is 0.9 mg/dL \([0.7–1.5]\).

Which of the following is the best management step?

(A) No additional imaging
(B) Noninvasive stress testing as an outpatient
(C) Inpatient coronary angiography
(D) Echocardiography prior to discharge
A previously healthy 70-year-old woman is admitted to the hospital with community-acquired pneumonia. The patient is alert and oriented to person, place, and time. Temperature is 38.2°C (100.8°F), pulse rate is 96 per minute, respirations are 25 per minute, and blood pressure is 126/72 mm Hg. Oxygen saturation on room air is 94%. Pulmonary examination is significant for right lower lung crackles and egophony. Leukocyte count is 13,400/μL (4000–11,000), blood urea nitrogen is 24 mg/dL (8–20), and serum creatinine is 1.2 mg/dL (0.7–1.5). Polymerase chain reaction assay for influenza is negative. Chest radiograph shows right lower lobe consolidation. The patient is started on appropriate antibiotic therapy.

The addition of systemic corticosteroids can be expected to have which of the following effects?

(A) Reduction in hospital length of stay
(B) Reduction in rehospitalization
(C) Increase in mortality
(D) Increase in risk of gastrointestinal bleeding
An 83-year-old woman is brought to the hospital after a mechanical fall event during which she hit her head and was unresponsive for several minutes. She has hypertension and stage 3 chronic kidney disease; she was placed on warfarin one year ago after she had a cardioembolic stroke from atrial fibrillation.

On examination, the patient has a contusion on her forehead. Neurologic examination is nonfocal. Computed tomography of the head shows a soft swelling on the forehead but is otherwise negative. The etiology of the fall is determined to be noncardiogenic. Electroencephalography is negative for epileptiform activity. The patient’s family asks you about the safety of warfarin resumption upon discharge.

Which of the following is the best management strategy on discharge for this patient?

(A) Do not resume warfarin or any antiplatelet agents
(B) Discontinue warfarin and start aspirin, 325 mg daily
(C) Resume warfarin within 14 days after discharge
(D) Resume warfarin 30 days after discharge
A 50-year-old woman has had worsening lumbosacral back pain since a fall three weeks ago. She is
admitted to observation status. Neurologic examination is unremarkable, and careful evaluation for
non-musculoskeletal etiologies of pain has been negative. Non-pharmacologic and non-opioid analgesics
have been unsuccessful, and she is unable to sleep through the night due to pain. She has no history of past
opioid use, which you confirmed by reviewing data from your state’s prescription-drug monitoring program.
Urine screening for opioids is negative. You have reviewed the potential risks and expected effects with
your patient and, after careful consideration, decide to start opioid therapy.

Which of the following is the most reasonable opioid treatment option at this time?

(A) Fentanyl transdermal patch, 12.5 mcg/hr
(B) Oral morphine, 10 mg every six hours as needed
(C) Oral oxycodone, 20 mg every six hours as needed
(D) Oral extended-release oxycodone, 10 mg every 12 hours; and oral
   hydrocodone–acetaminophen, 5 mg–325 mg every six hours as needed
(E) Oral methadone, 10 mg every 12 hours
A 65-year-old man who has a 40-pack-year history of cigarette smoking is brought to the emergency department (ED) because of low-grade fever, dyspnea, and cough productive of thick yellow sputum for two days.

Temperature is 38.0°C (100.8°F), pulse rate is 95 per minute, respirations are 20 per minute, and blood pressure is 118/66 mm Hg. Oxygen saturation by pulse oximetry is 89%. Coarse rhonchi are heard in the left lower lobe with mild diffuse wheezing but no dullness to percussion or egophony. Radiograph of the chest reveals a hazy opacity in the left base, consistent with consolidation versus atelectasis. Leukocyte count is 12,800/µL (4,000–11,000). Serum procalcitonin is 1.2 ng/mL (less than 0.15). Community-acquired pneumonia is diagnosed, and treatment with ceftriaxone and azithromycin is started. The patient is admitted to the hospitalist service.

Use of a procalcitonin algorithm in this patient is expected to have which of the following effects?

- (A) No change in clinical outcomes
- (B) Reduction in mortality
- (C) Reduction in antibiotic exposure
- (D) Increase in treatment failure
A 62-year-old man who has insulin-dependent diabetes mellitus, diabetic neuropathy, and stage 3 chronic kidney disease comes to the emergency department because of worsening, foul-smelling discharge from a nonhealing ulcer on his left great toe that has been present for several weeks. He is admitted for further management.

On physical examination, temperature is normal, pulse rate is 70 per minute, and blood pressure is 135/85 mm Hg. Leukocyte count is 12,000/μL [4000-11,000]. The left great toe has purulent discharge, with erythema extending to the dorsum of the foot. The wound probes to the bone. Magnetic resonance imaging of the foot confirms evidence of osteomyelitis. He is started on empiric parenteral antibiotics with vancomycin and piperacillin–tazobactam. The patient undergoes debridement with findings of persistent osteomyelitis. Intraoperative cultures are positive for methicillin-sensitive *Staphylococcus aureus*. The patient wishes to maximize his chances of cure with conservative therapy and avoid amputation of the foot.

In addition to local wound care and off-loading pressure on the foot, which of the following oral antimicrobial treatment regimens is indicated at this time?

(A) Levofloxacin for six weeks  
(B) Levofloxacin for 12 weeks  
(C) Amoxicillin–clavulanate for six weeks  
(D) Amoxicillin–clavulanate for 12 weeks
The Cardiology division at your institution has formed a process improvement team to improve follow-up scheduling for patients with heart failure who have been hospitalized. Many of these patients have been unable to see a provider within the defined follow-up period of seven days. This is the second time in four years that a process improvement team has formed to improve follow-up appointment accessibility for these patients. At the end of the previous project, 100% of discharged patients were able to see a provider within the defined period. However, in the current year, repeat analysis shows only 65% of the patients are able to see a provider within prespecified seven days, which has led to increased readmissions.

The current process improvement team needs to carefully develop which particular aspect of the Six Sigma quality improvement process tool DMAIC (Define, Measure, Analyze, Improve, Control) in their project to prevent future lapses?

(A) Define
(B) Measure
(C) Analyze
(D) Improve
(E) Control
You are caring for a 55-year-old woman who has acute sepsis and severe dehydration. She has stage 3B chronic kidney disease and may require hemodialysis in the next year. She is receiving vancomycin and piperacillin–tazobactam infusions for the next five days. Because her oral intake has been minimal, you believe that she would benefit from continuous intravenous infusion to support hydration for the next 12 days. She requires phlebotomy three times daily for the next six days. Your patient had previous positive experiences with central venous access and asks you whether she can have a peripherally inserted central catheter (PICC) placed for her medical needs.

According to the Michigan Appropriateness Guide for Intravenous Catheters (MAGIC) consensus statement, which of the following is the most appropriate indication for PICC placement in this patient?

(A) Stage 3B chronic kidney disease
(B) Required phlebotomy three times daily for the next six days
(C) Required intravenous infusion of two different antibiotics for the next five days
(D) Required continuous intravenous infusion for the next 12 days
A 36-year-old woman is brought to the emergency department because of confusion, increasing abdominal distention, and yellow skin for the past week. Her friends report that she drinks six bottles of beer daily.

The patient has jaundice on examination. The abdomen is distended, firm, and nontender with a fluid wave.

Laboratory studies:

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
<th>Reference Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>INR</td>
<td>2.18</td>
<td></td>
</tr>
<tr>
<td>Plasma prothrombin time</td>
<td>23 seconds</td>
<td>11–13</td>
</tr>
<tr>
<td>Serum albumin</td>
<td>2.3 g/dL</td>
<td>3.5–5.5</td>
</tr>
<tr>
<td>Serum creatinine</td>
<td>0.6 mg/dL</td>
<td>0.7–1.5</td>
</tr>
<tr>
<td>Serum total bilirubin</td>
<td>8.0 mg/dL</td>
<td>0.3–1.0</td>
</tr>
<tr>
<td>Serum alkaline phosphatase</td>
<td>156 U/L</td>
<td>30–120</td>
</tr>
<tr>
<td>Serum aminotransferases:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ALT</td>
<td>100 U/L</td>
<td>10–40</td>
</tr>
<tr>
<td>AST</td>
<td>317 U/L</td>
<td>10–40</td>
</tr>
<tr>
<td>Blood ammonia</td>
<td>40 µg/dL</td>
<td>40–70</td>
</tr>
</tbody>
</table>

In addition to supportive care, which of the following has been shown to decrease 28-day mortality for patients such as these?

(A) Prednisolone, 40 mg
(B) Pentoxifylline, 400 mg three times daily
(C) Prednisolone, 40 mg; and pentoxifylline, 400 mg three times daily
(D) Neither prednisolone nor pentoxifylline
A 34-year-old woman who has a recent history of biliary colic is admitted because of acute abdominal pain. Mild acute gallstone pancreatitis is diagnosed. Two days later, she is tolerating a regular diet, and pain is controlled without opioid analgesics. Surgery is consulted and recommends cholecystectomy.

Which of the following management plans is associated with the lowest risk of complications?

(A) Perform cholecystectomy during the current hospitalization  
(B) Discharge and schedule elective cholecystectomy in one to two weeks  
(C) Discharge and schedule elective cholecystectomy in two to three weeks  
(D) Discharge and schedule elective cholecystectomy in four to six weeks
A 68-year-old Asian woman is admitted to the hospital because of an exacerbation of heart failure with symptoms of increasing edema and dyspnea. She has a reduced ejection fraction of 35%. Home medications are enalapril (10 mg twice daily), carvedilol (25 mg twice daily), spironolactone (50 mg daily), and furosemide (40 mg daily). The patient is treated with intravenous diuresis and improves with resolution of her acute symptoms at rest but with some residual dyspnea with exertion. Oral diuretics are resumed with good urine output. You anticipate discharge within the next two days.

Temperature is normal, pulse rate is 60 per minute, respirations are 14 per minute, and blood pressure is 110/70 mm Hg. Oxygen saturation by pulse oximetry is 95%. Estimated central venous pressure is normal. No crackles are heard on pulmonary examination. She has minimal edema in the legs.

Laboratory studies:

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
<th>Normal Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serum creatinine</td>
<td>1.1 mg/dL</td>
<td>(0.7–1.5)</td>
</tr>
<tr>
<td>Serum potassium</td>
<td>4.2 mEq/L</td>
<td>(3.5–5.0)</td>
</tr>
<tr>
<td>Plasma B-type natriuretic peptide</td>
<td>150 pg/mL</td>
<td>(less than 100)</td>
</tr>
</tbody>
</table>

Which of the following is the best next pharmacological step to reduce the risk of hospitalization and mortality from heart failure in this patient?

(A) Discontinuation of enalapril and initiation of sacubitril–valsartan after 36 hours
(B) Discontinuation of enalapril and initiation of valsartan after 36 hours
(C) Addition of ivabradine to the medication regimen
(D) Addition of sacubitril–valsartan to the medication regimen
(E) Addition of hydralazine–isosorbide to the medication regimen
A 55-year-old man who has type 2 diabetes mellitus and chronic obstructive pulmonary disease is admitted to the hospital with cough, dyspnea, fever, and presumed pneumonia. Current outpatient medications are metoprolol (25 mg twice daily), metformin (500 mg three times daily), and albuterol (as needed).

Temperature is 38.3 °C (101.0 °F), respirations are 22 per minute, and blood pressure is 95/60 mm Hg. The patient is alert and oriented to person, place, and time; neurologic examination is nonfocal. Leukocyte count is 9000/µL [4000–11,000], and serum lactate is 2.0 mmol/L [0.7–2.1].

Your hospital has recently started using the quick sepsis-related organ failure assessment (qSOFA) score in patients who have suspected infection; this patient’s qSOFA score is 2.

Which of the following is the most appropriate use of the qSOFA score in this patient?

(A) Identification of higher risk of in-hospital mortality
(B) Exclusion of the diagnosis of sepsis
(C) Confirmation of the diagnosis of sepsis
(D) Stratification of the severity of sepsis
A 70-year-old man was recently treated with a five-day course of amoxicillin for a superficial skin infection and now presents with acute diarrhea and low-grade fever. He has had two watery, non-bloody stools in the past 24 hours, anorexia, and crampy lower abdominal pain.

The patient appears nontoxic on physical examination. Temperature is 38.0°C (98.6°F), pulse rate is 90 per minute, respirations are 20 per minute, and blood pressure is 135/75 mm Hg. The abdomen is mildly tender, but examination is otherwise unremarkable.

Laboratory studies:

- Leukocyte count: 15,500/μL [4000–11,000]
- Serum albumin: 3.0 g/dL [3.5–5.5]
- Serum creatinine: 1.1 mg/dL [0.7–1.5]
- Enzyme immunoassay for Clostridium difficile glutamate dehydrogenase: Negative
- Enzyme immunoassay for Clostridium difficile toxin A and B: Negative
- Polymerase chain reaction test for Clostridium difficile: Positive

Which of the following should you do next in the management of this patient?

(A) Start oral vancomycin, 125 mg four times daily
(B) Start intravenous metronidazole, 500 mg three times daily
(C) Start oral metronidazole, 500 mg three times daily
(D) Do not start antibiotics at this time
An 80-year-old woman is transferred to your service after a three-day stay in the intensive care unit for pneumonia, during which she was intubated. She has a history of coronary artery disease, cerebrovascular accident, and mild dementia. She has improved on the floor and returned to her baseline mental status. Bedside swallowing test using single small sips of water (less than 5 mL) elicited coughing. The previous hospitalist ordered nothing by mouth and started nasogastric tube feedings. The patient’s family reports that she was eating and drinking without concern prior to her hospital stay. As she improves, you are planning discharge; the family has concerns regarding feeding. You are asked whether you are confident that she is aspirating when she is eating and drinking. Vital signs are normal. Serum albumin is 3.5 g/dL [3.5–5.5].

Based on current evidence, which of the following is the most appropriate statement regarding the diagnostic accuracy of bedside swallow evaluation in this patient?

(A) It has very high positive likelihood ratio for aspiration but only when repeated with consecutive sips of water
(B) It has very high positive likelihood ratio for aspiration and can safely exclude false positive results
(C) It has modest positive likelihood ratio for aspiration but it is not high enough to definitely exclude false positive results
(D) It has neither a high positive likelihood ratio or low negative likelihood ratio for aspiration
A 23-year-old man who has a history of injection drug use is admitted to the hospital after unintentional opioid overdose. He was briefly intubated for airway protection but is now waking up and has been extubated. He has no known medication allergies.

Temperature is 36.5°C (97.7°F), pulse rate is 94 per minute, respiration is 20 per minute, and blood pressure is 108/64 mm Hg. Oxygen saturation by pulse oximetry is 98%. Physical examination on admission was notable only for a 2.5-cm area of fluctuance over the right forearm, with erythema extending 2 cm beyond the fluctuance. Leukocyte count is 12,600/µL [4000–11,000].

In addition to incision and drainage, which of the following empiric antibiotics should be initiated while awaiting Gram stain and culture results?

(A) No additional therapy
(B) Intravenous vancomycin
(C) Oral cephalaxin
(D) Oral trimethoprim–sulfamethoxazole
An 85-year-old woman is admitted to the hospital with acute biliary colic. Her clinical condition is improving, but oral intake is still inadequate. You decide that she requires maintenance intravenous fluids. Medical history is notable for chronic obstructive pulmonary disease.

Laboratory studies:

- **Plasma glucose**: 90 mg/dL [70–99]
- **Blood urea nitrogen**: 17 mg/dL [8–20]
- **Serum creatinine**: 1.0 mg/dL [0.7–1.5]
- **Sodium**: 134 mEq/L [136–145]
- **Potassium**: 4.0 mEq/L [3.5–5.0]
- **Chloride**: 101 mEq/L [98–106]
- **Bicarbonate**: 30 mEq/L [23–28]

Administration of which of the following is most associated with risk for hyponatremic encephalopathy?

(A) Lactated Ringer's solution  
(B) 0.9% Saline  
(C) 5% dextrose in 0.45% saline  
(D) Multiple electrolytes injection, type 1, USP
A 60-year-old retired man is admitted to the hospital because of increasing confusion and memory loss for the past three months. He has not had fevers, chills, or headaches. He lives in the upper Midwest region; he has not traveled recently and denies any tick bites. He has not eaten raw seafood or undercooked meats. He is in a monogamous relationship with his wife. Medical history is significant for chronic lymphocytic leukemia; chemotherapy with cladribine was started four months ago. He also has hypertension, non–insulin-dependent diabetes mellitus, and benign prostatic hyperplasia. He has not had any recent surgeries.

Vital signs and cardiopulmonary examination are normal. Neurologic examination reveals disorientation to date, inability to recall three items, and difficulty with naming. Deep tendon reflexes are preserved, and no evidence of clonus is noted. Gait is normal.

Laboratory studies:

- **Hemoglobin**: 10 g/dL [14–18]
- **Leukocyte count**: 3000/µL [4000–11,000]; 76% neutrophils [50–70], 10% lymphocytes [30–45]
- **Platelet count**: 130,000/µL [150,000–450,000]
- **CSF analysis**: 82 nucleated cells (predominately lymphocytes)/µL [0–5]
- **Glucose**: 30 mg/dL [50–75]
- **Total protein**: 140 mg/dL [15–45]
- **Acid-fast bacilli testing**: Negative
- **Cytology**: Negative for malignancy
- **Serologic test for HIV**: Negative
- **Interferon-gamma release assay for Mycobacterium tuberculosis**: Negative

Chest radiograph is normal. Magnetic resonance imaging of the brain shows some nonspecific white matter changes and some T2 hyperintense lesions in the right globus pallidus.

Which of the following additional CSF tests is most likely to be positive?

- (A) Lyme disease serology
- (B) Polymerase chain reaction for Exserohilum rostratum
- (C) Coccidioidomycosis complement fixation titer
- (D) Cryptococcus antigen
A 53-year-old man is admitted for partial small bowel obstruction. Medical history is significant for cholecystectomy 10 years ago. He has no recent antibiotic use or hospitalization. A nasogastric tube is placed for suction, and he is ordered to be given nothing by mouth. On hospital day 3, the patient develops a fever and increasing oxygen requirements; hospital-acquired pneumonia is diagnosed.

Temperature is 38.2 °C (100.8 °F), pulse rate is 88 per minute, respirations are 24 per minute, and blood pressure is 118/76 mm Hg. Oxygen saturation is 94% with the patient breathing oxygen (3 L via nasal cannula). Physical examination is consistent with left lower lobe consolidation, which is confirmed on chest radiograph. Your hospital’s most recent antibiogram, reflecting local antibiotic resistance patterns, is shown.

Which of the following is the best empiric antibiotic regimen for this patient?

(A) Vancomycin, piperacillin–tazobactam, and levofloxacin
(B) Vancomycin and meropenem
(C) Ceftriaxone and azithromycin
(D) Cefepime
Your hospital identifies an elevated number of adverse medication events occurring in the past 12 months. A multidisciplinary team is organized to look for all the potential contributing causes of these events.

Which of the following is the most appropriate tool to identify and categorize all the potential causes of the adverse medication events?

(A) Affinity diagram
(B) Fishbone diagram
(C) Run charts
(D) Histogram
A 67-year-old man who has chronic obstructive pulmonary disease is admitted to the intensive care unit (ICU) with sepsis and respiratory failure secondary to community-acquired pneumonia. He is placed on mechanical ventilation, and broad-spectrum antibiotics are started. One day after admission, the patient is persistently febrile, with temperature to 38.9°C (102.0°F). His nurse requests scheduled intravenous acetaminophen (1 g every six hours) as an antipyretic for discomfort. He has no known history of liver disease.

Laboratory studies:

<table>
<thead>
<tr>
<th>Test</th>
<th>Result</th>
<th>Reference Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serum total bilirubin</td>
<td>0.8 mg/dL</td>
<td>0.3–1.0</td>
</tr>
<tr>
<td>Serum aminotransferases</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ALT</td>
<td>47 U/L</td>
<td>10–40</td>
</tr>
<tr>
<td>AST</td>
<td>56 U/L</td>
<td>10–40</td>
</tr>
</tbody>
</table>

Which of the following is the most likely outcome of scheduled acetaminophen use in this patient?

(A) Unchanged number of days spent in the ICU
(B) Increased liver dysfunction (serum ALT and AST greater than five times the upper limit of normal and serum total bilirubin greater than twice the upper limit of normal)
(C) Decreased mortality
(D) Decreased vasopressor usage
A 64-year-old woman was discharged seven days ago after a hospitalization for an exacerbation of chronic obstructive pulmonary disease. Today, she has fever and confusion; she is readmitted to your service with a diagnosis of early sepsis due to a urinary tract infection. The patient had been compliant with her medication regimen and had followed up with her primary care provider three days after discharge; she was doing well at that time.

Which of the following statements most accurately states the current evidence on 30-day readmissions among general medical patients?

(A) The majority of 30-day readmissions are not preventable
(B) Hospital-acquired infection is the most common reason for preventable 30-day readmission
(C) Early post-discharge follow-up has no impact on 30-day admission
(D) Medication-related issues are the most common reason for 30-day readmission
A 60-year-old man who has hypertension is brought to the hospital within 60 minutes of sudden severe headache and a fall. On physical examination, he has sensory deficits of the right arm and leg and right-sided motor weakness. His speech is slurred, and Glasgow Coma Scale score is 14. Emergent magnetic resonance imaging of the brain shows a 1-cm acute intracerebral hemorrhage of the left thalamus. Systolic blood pressure has been ranging between 150 and 220 mm Hg. The neurosurgical service requests your assistance with medical management of this patient’s blood pressure.

Which of the following is the most appropriate recommendation for the management of this patient’s blood pressure?

(A) Maintain systolic blood pressure above 200 mm Hg
(B) Maintain systolic blood pressure above 180 mm Hg
(C) Lower systolic blood pressure to 140 mm Hg
(D) Lower systolic blood pressure to 110 mm Hg
A 69-year-old woman undergoes elective total hip arthroplasty for osteoarthritis. Despite appropriate prophylaxis, she develops a proximal lower extremity deep vein thrombosis three days postoperatively. She is otherwise healthy and has no history of cancer. She takes no chronic medications. You plan to treat her thrombosis with three months of anticoagulation therapy.

Which of the following is the best anticoagulation regimen to initiate for this patient?

(A) Dabigatran  
(B) Enoxaparin  
(C) Apixaban  
(D) Edoxaban
A 58-year-old man is admitted to the hospital for pain control. He has widely metastatic pancreatic cancer that has progressed despite first-, second-, and third-line chemotherapy. He is treated appropriately and is due to be discharged. The patient and his family are concerned that he is too weak to be discharged home and would like for him to be admitted to a rehabilitation facility so that “he can get stronger and get more chemotherapy because he is a fighter and does not want to die.” His baseline function prior to admission has been such that he has been able to perform activities of daily living, but he has not been very active (Eastern Cooperative Oncology Group Performance Status grade 1).

Using the outcomes on palliative chemotherapy at the end of life, how should you frame your response regarding the impact of chemotherapy on quality of life?

(A) It has been shown to worsen quality of life for patients with good performance status and not improve quality of life for patients with poor performance status

(B) It has been shown to improve quality of life for patients with good performance status, but worsen quality of life in those with poor performance status

(C) It has been shown to improve quality of life for all patients but decrease survival

(D) It has been shown to worsen the quality of life for all patients but increase survival
You are called to the hospital floor to evaluate a 55-year-old man who recently received chemotherapy and is now febrile and hypotensive. Relevant laboratory studies include borderline neutropenia, normal hemoglobin, and normal platelet counts. The patient is not coagulopathic. He has two peripheral intravenous catheters in place and is receiving fluids and antibiotic therapy.

After evaluation, you decide that he should be transferred to the intensive care unit for closer hemodynamic monitoring and recommend obtaining central venous access.

Assuming all options are equally available at this time, which of the following is most reasonable to insert in this patient?

(A) Subclavian vein central venous catheter
(B) Femoral vein central venous catheter
(C) Internal jugular vein central venous catheter
(D) Peripheral inserted central catheter
A 65-year-old woman who has diffuse B-cell lymphoma and is undergoing chemotherapy is seen in the emergency department (ED) because of right-leg edema for the past six hours. On evaluation in the ED, the patient appears chronically ill; she is in no acute cardiopulmonary distress. Temperature is 37.0°C (98.6°F), pulse rate is 90 per minute, respirations are 14 per minute, and blood pressure is 110/70 mm Hg. Imaging with duplex ultrasound and computed tomography of the right leg reveals extensive thrombus burden extending from the popliteal vein up to the renal vein.

The patient is admitted to the hospital, started on unfractionated heparin, and taken to the operating room for thrombectomy due to risk of renal failure from obstruction. She receives clindamycin periprocedurally because the family has reported a historical allergy to penicillin. She also receives propofol, lidocaine, rocuronium, and dexmedetomidine for anesthesia and sedation. After the procedure, temperature is 38.8°C (101.8°F), pulse rate is 110 per minute, and blood pressure is 100/60 mm Hg. The patient is somnolent, and the extremities appear to be somewhat rigid. Neurologic examination reveals reactive pupils, and 1+ and symmetric reflexes bilaterally.

Laboratory studies:

- Hemoglobin: 7.0 g/dL [12–16]
- Leukocyte count: 1000/µL [4000–11,000]; 20% neutrophils [50–70]
- Platelet count: 52,000/µL [150,000–450,000]
- Serum creatinine: 0.8 mg/dL [0.7–1.5]
- Serum electrolytes: Normal
- Serum lactate: 3.1 mmol/L [0.7–2.1]

Arterial blood gas studies:

- pH: 7.46 [7.38–7.44]
- \(\text{PaCO}_2\): 25 mm Hg [38–42]
- \(\text{PaO}_2\): 89 mm Hg [75–100]
- Bicarbonate: 17 mEq/L [23–26]
- Methemoglobin: Normal

In addition to transferring the patient to the intensive care unit, which of the following is the most appropriate treatment course for this patient?

(A) Measurement of creatinine kinase levels and administration of a single dose of dantrolene
(B) Initiation of lorazepam and emergent electroencephalography
(C) Blood cultures, initiation of meropenem, and addition of levofloxacin and vancomycin
(D) Blood cultures, continuation of clindamycin, and addition of levofloxacin and vancomycin
A 59-year-old man who has type 2 diabetes mellitus and hypertension is seen in preoperative clinic prior to planned aortic valve replacement for aortic stenosis due to congenital bicuspid valve. His surgeon has asked you to optimize his medical conditions prior to surgery. The patient recalls reading about the use of statin therapy to reduce perioperative risk and asks whether he should start rosuvastatin prior to surgery.

Which of the following most accurately reflects the anticipated outcomes of perioperative statin therapy in this patient?

(A) No clinical benefit  
(B) Increased risk of stroke  
(C) Reduction in postoperative atrial fibrillation  
(D) Reduction in postoperative myocardial injury
Which of the following equations provides the most accurate estimate of glomerular filtration rate across the majority of patient populations?

(A) Cockcroft-Gault
(B) Chronic Kidney Disease Epidemiology Collaboration (CKD-EPI)
(C) Modification of Diet in Renal Disease (MDRD)
This morning, a 52-year-old man who has type 2 diabetes mellitus and osteoarthritis underwent total knee arthroplasty and subsequently developed postoperative urinary retention. He has no history of urinary problems. Despite opioid-sparing analgesia and early postoperative mobilization, he has not voided since the surgery. Per protocol, bladder scans have been performed every two hours since surgery. As the hospitalist, you are co-managing the patient; the nurse tells you that bladder volume is 550 mL on the most recent bladder scan. The patient is asymptomatic with respect to his urinary retention.

Which of the following is the best next step for management of this patient’s urinary retention?

(A) Repeat bladder scan in two hours if he does not void spontaneously
(B) Place an indwelling bladder catheter now
(C) Initiate intermittent bladder catheterization now and as needed for bladder volume greater than 500 mL.
(D) Initiate intermittent bladder catheterization now and as needed for bladder volume greater than 300 mL.