As you review the Aquifer cases, you will find that there are 36 cases.
Listed below are the learning objectives from these cases. We ask that you review these as part of the Medicine curriculum.

Learning Objectives:

Chest Pain, Case 1

1. **Organize and prioritize a differential diagnosis of acute chest pain based on specific physical historical and exam findings.**
2. **Student will be able to define and discuss the pathogenesis, signs, and symptoms of the acute coronary syndromes.**
3. **List the cardiovascular risk factors and the primary and secondary prevention of ischemic heart disease.**
4. **Student should be able to develop an appropriate diagnostic and treatment plan—including recommended lifestyle modifications—for a patient presenting with acute coronary syndrome.**

Chest Pain, Case 2

1. **Identify the symptoms and signs of chest pain characteristics of angina pectoris.**
2. **Categorize the patients' symptoms as angina pectoris, atypical angina, or non-cardiac chest pain.**
3. **Order appropriate laboratory and diagnostic studies based on patient demographics and the most likely etiologies of chest pain.**
4. **Recommend primary and secondary prevention of ischemic heart disease through the reduction of cardiovascular risk factors (e.g. controlling hypertension and dyslipidemia, aggressive diabetes management, avoiding tobacco, and aspirin prophylaxis).**
5. **Prescribe appropriate anti-anginal medications when indicated and identify potential adverse reactions.**

Chest Pain, Case 3

1. **List the common causes of syncope.**
2. **Recognize the important aspects of the history and physical exam in a patient with syncope.**
3. **Explain the approach to the evaluation and treatment of a patient with syncope.**
4. **Identify atrial fibrillation on an electrocardiogram.**
5. **List the common causes of atrial fibrillation.**
6. **Explain the approach to the evaluation and treatment of a patient with atrial fibrillation.**
7. **Explain how atrial fibrillation and mitral stenosis may lead to syncope.**

Chest Pain, Case 4

1. **Identify and translate auscultatory findings of the heart including rate, rhythm, S3/S4, and murmurs.**
2. **List the major pathologic states which cause dyspnea.**
3. **Compare the differing etiologies and signs of left-sided vs. right-sided heart failure.**
4. **Utilize the staging system for heart failure.**
5. **Identify and explain the factors leading to symptomatic exacerbation of HF, including ischemia, arrhythmias, anemia, hypertension, thyroid disorders, non-compliance with medications and dietary restrictions, and use of nonsteroidal anti-inflammatory drugs.**
6. **Interpret B-type natriuretic peptide results.**
7. **Recommend pharmacologic management of heart failure.**

Substance Abuse/Abdominal Pain, Case 9

1. **Recognize the clinical presentations of substance abuse and recommend treatment.**
2. **Recommend basic prevention and treatment for alcohol withdrawal.**
3. **Describe the pathophysiology of the principle types of abdominal pain: parietal, visceral, vascular, referred.**

GI Bleed, Case 10

1. **Identify the common causes for and symptoms of upper and lower gastrointestinal blood loss, including recognizing the distinguishing features of each.**
2. **Define hematemesis, melena, and hematochezia.**
3. **Identify the role of contributing factors in gastrointestinal bleeding such as Helicobacter pylori infection, non-steroidal anti-inflammatory drugs, alcohol, coagulopathies, and chronic liver disease.**
4. **Discuss the common causes for and symptoms of lower gastrointestinal blood loss including: gastrointestinal tumors, diverticulosis, and ischemic colitis.**
5. **Recommend laboratory and diagnostic tests to evaluate GI bleeding which include (when appropriate): stool and gastric fluid tests for occult blood, CBC, PT/PTT, and colonoscopy.**
6. **Develop an appropriate evaluation and treatment plan for patients with a gastrointestinal bleed that includes:**
    a. **Establishing adequate venous access**
    b. **Administering crystalloid fluid resuscitation**
    c. **Ordering blood and blood product transfusion**
    d. **Determining when to obtain consultation from a gastroenterologist for upper endoscopy**

Liver disease, Case 11

1. **Understand pathophysiology of conjugated and unconjugated hyperbilirubinemia.**
2. **Describe the common types of liver diseases and their risk factors (including inherited and acquired).**
3. **Obtain an appropriate history to elicit risk factors for viral hepatitis.**
4. **Know the CAGE screening tool for alcohol abuse.**
5. **Know when to order laboratory tests for evaluation of liver disease and when a liver biopsy might be indicated.**

Abdominal Pain, Case 12

1. **List symptoms and signs indicative of an acute/surgical abdomen.**
2. **Generate a prioritized differential of the most important and likely causes of a patient's abdominal pain and recognize specific history, physical exam, and laboratory findings that distinguish between the various conditions.**
3. **Recommend a basic management plan for diverticulitis.**

Anemia, Case 19

1. **Classify the causes of anemia based on red blood cell size.**
2. **Understand the meaning and utility of various components of the hemogram (e.g., hemoglobin, hematocrit, mean corpuscular volume, and random distribution width).**
3. **Classify anemia into hypoproliferative and hyperproliferative categories using the reticulocyte count/index.**
4. **Use information regarding the diagnostic utility of the various tests for iron deficiency (e.g., serum iron, total iron binding capacity, transferring saturation, ferritin) when selecting a lab evaluation for iron deficiency.**
5. **Identify key historical and physical exam findings in the anemia patient.**
6. **Recognize common morphologic changes on a peripheral blood smear.**
7. **Develop a further evaluation and management plan for a patient with anemia.**

HIV, Case 20

1. **Distinguish between common etiologies of fever of unknown origin (FUO) in immunocompetent patients and those infected with the human immunodeficiency virus (HIV).**
2. **Identify the Centers for Disease Control's (CDC's) criteria for diagnosis of acquired immunodeficiency syndrome (AIDS).**
3. **Discuss principles of antiretroviral therapy, including importance of regimen adherence.**
4. **Describe relationship between the CD4+ lymphocyte count and risk of opportunistic infection.**

5. **Be able to list and recognize common HIV-associated infections.**
6. **List appropriate diagnostic tests for HIV-positive patient presenting with fever.**

ID Basics, Case 21

1. **Describe clinical presentation of sepsis syndromes.**
2. **Recommend appropriate empiric therapy based on an understanding of urinary tract infection pathogenesis and resistance patterns.**
3. **Interpret a urinalysis.**
4. **Develop appropriate treatment plan for patients with fever including the selection of an initial, empiric treatment regimen for patients with life threatening sepsis.**

Pneumonia, Case 22

1. **Discuss the common causes of acute dyspnea, their pathophysiology, symptoms, and signs.**
2. **List the common pneumonia pathogens (viral, bacterial, mycobacterial, and fungal) in immunocompetent and immunocompromised hosts.**
3. **Know and be able to recognize bronchial breath sounds, rales (crackles), rhonchi, and wheezes, signs of pulmonary consolidation, and pleural effusion on physical exam.**
4. **Recognize the most common complications of pneumonia.**
5. **Recommend when to order diagnostic laboratory tests—including complete blood counts, sputum gram stain and culture, blood cultures, and arterial blood gases—how to interpret those test, and how to recommend treatment based on these interpretations.**
6. **Select an appropriate empiric antibiotic regimen for community-acquired, nosocomial, immunocompromised-host, and aspiration pneumonia, taking into account pertinent patient features.**

Renal Insufficiency, Case 23

1. **List the most common causes of chronic kidney disease (CKD).**
2. **Describe pathophysiology and clinical signs of uremia.**
3. **Understand and be able to explain the pathophysiology of hyperkalemia, hypocalcemia, and hyperphosphatemia in the setting of chronic kidney disease.**
4. **Recommend the use of ACE-Inhibitors and ARBs in the management of CKD.**
5. **Summarize the staging of CKD based on GFR.**

ID Basics, Case 24

1. **Demonstrate knowledge of cerebrospinal fluid analysis and its interpretation.**

2. **List risk factors for and precautions against the acquisition of nosocomial infection.**

Mental Status Changes, Case 25

1. **Differentiate between delirium, dementia, and depression.**
2. **Identify the risk factors for developing altered mental status, including:**
    a. **Dementia**
    b. **Advanced age**
    c. **Substance abuse**
    d. **Comorbid physical problems such as sleep deprivation, immobility, dehydration, pain, and sensory impairment**
3. **Recognize the symptoms and signs of the most common and most serious causes of altered mental status, including metabolic causes, such as hyponatremia.**
4. **Manage the most common causes of altered mental status.**
5. **Describe the pathophysiology, presenting signs and symptoms, laboratory interpretation, and the management of hyponatremia, including the risk of too rapid or too delayed therapy of hyponatremia.**

Substance Abuse/Acid Base Balance/Mental Status Changes, Case 26

1. **Identify the presenting signs and symptoms of intoxication and overdose of common substances of abuse.**
2. **Discuss the pathophysiology of simple and mixed acid-base disorders.**
3. **Calculate the anion gap and explain its relevance to determining the cause of a metabolic acidosis.**
4. **Recognize the presenting signs and symptoms and list the differential diagnosis of hypernatremia.**
5. **Describe the pathophysiology of ethylene glycol toxicity.**
6. **Evaluate for calcium oxalate crystalluria and relate the presence to ethylene glycol toxicity and other disorders.**
7. **List the differential of anion-gap metabolic acidosis.**
8. **List the differential of hypernatremia.**
9. **Describe how to correct hypernatremia.**

Pulmonary Tests/COPD, Case 28

1. **Accurately interpret arterial blood gas.**
2. **Interpret PFT results and use them to recommend appropriate therapy.**
3. **List major pathologic states causing dyspnea.**
4. **Relate the utility of supplemental oxygen and the potential dangers of overly aggressive oxygen supplementation.**
5. **Describe the indications for, benefits of, and side effects of therapies for COPD including: beta-agonists, anticholinergics, methylxanthines, and inhales and systemic corticosteroids.**

6. **Recommend appropriate laboratory evaluation for suspected COPD exacerbation.**
7. **Describe the benefits of immunizing adults with COPD against influenza and pneumococcal infection.**

Dyspnea/TB, Case 29

1. Describe the common causes of tachypnea.
2. Accurately record a respiratory rate.
3. List indications for thoracentesis.
4. Know laboratory findings of transudative and exudative effusions.
5. Demonstrate understanding of indications for performing a purified protein derivative (PPD) test and how results should be interpreted given a range of clinical scenarios and patient histories.
6. Understand principles of treatment of tuberculosis.

DVT/PE, Case 30

1. List risk factors for the development of a deep vein thrombosis (DVT).
2. Recognize the signs and symptoms of DVT and pulmonary embolism (PE).
3. Generate a prioritized differential diagnosis of DVT/PE based on specific physical findings using pre-test probability tools
4. Understand the indications for and utility of various diagnostic tests and describe their interpretation including but not limited to spiral CT, V/Q, lower extremity dopplers, D-dimer.
5. Develop an appropriate management plan for DVT/PE, including appropriate use and monitoring of heparin and warfarin.
6. Describe indications for and methods of deep vein thrombosis prophylaxis.

Rheumatologic Disease, Case 32

1. Know the approach to patients with possible rheumatologic disease.
2. Know typical clinical and laboratory findings of rheumatoid arthritis, systemic lupus erythematosus (SLE), dermatomyositis, and systemic vasculitis.
3. Compare and contrast the various causes of inflammatory polyarthritis.

Acute Renal Failure, Case 33

1. Compare the pathophysiology of major etiologies of acute renal failure including decreased renal perfusion (pre-renal), intrinsic renal disease, and acute renal obstruction (post renal).
2. Calculate fractional excretion of sodium and apply it to distinguish between pre-renal and intrinsic renal disease.
3. Develop appropriate initial management plan for acute renal failure including volume management, dietary recommendations, drug dosage alterations, electrolyte monitoring, and indications for dialysis.

4. Identify risk factors for contrast-induced nephropathy and recommend steps to prevent this complication.
5. Interpret a urinalysis, including microscopic examination for casts, red blood cells, white blood cells, and crystals.
6. Calculate the anion gap and generate a differential diagnosis for metabolic acidosis.

Fever, Case 35

1. Become familiar with the definition of fever of known origin (FUO).
2. Consider etiologies of fever in normal hosts and in special populations (e.g., patients with human immunodeficiency virus {HIV}, recent travel or immigration, intravenous drug use).
3. Obtain and present an age-appropriate patient history that helps differentiate among likely etiologies for fever.
4. Understand when to obtain diagnostic and laboratory tests for fever.
5. Develop an appropriate treatment plan for patient with FUO.

Liver Disease, Case 36

1. Know the signs, symptoms, and complications of portal hypertension.
2. Describe the presenting signs and symptoms of spontaneous bacterial peritonitis (SBP).
3. Complete an abdominal exam, including evaluation for presence of ascites.