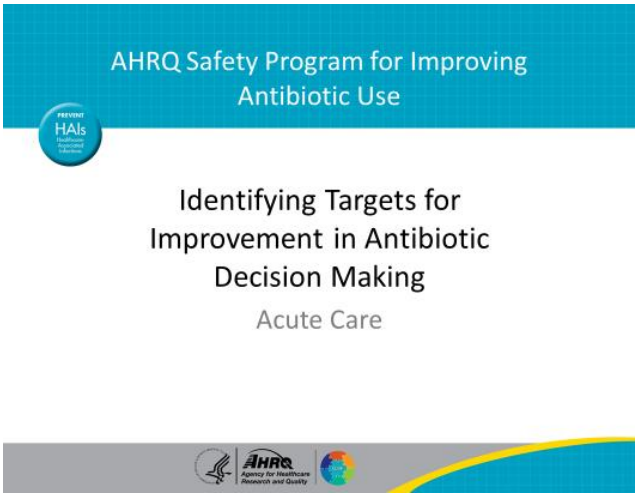
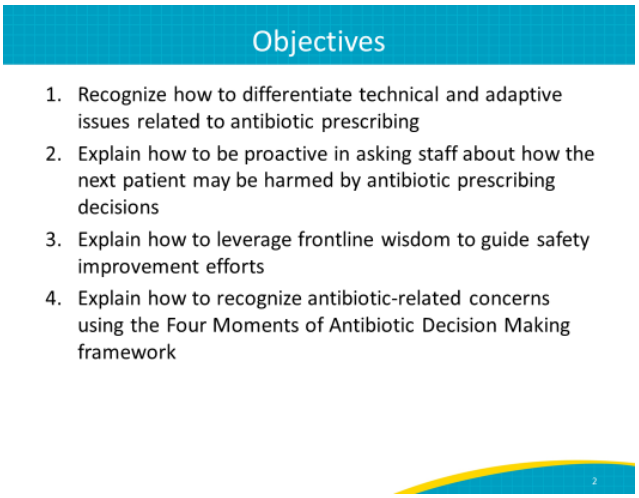
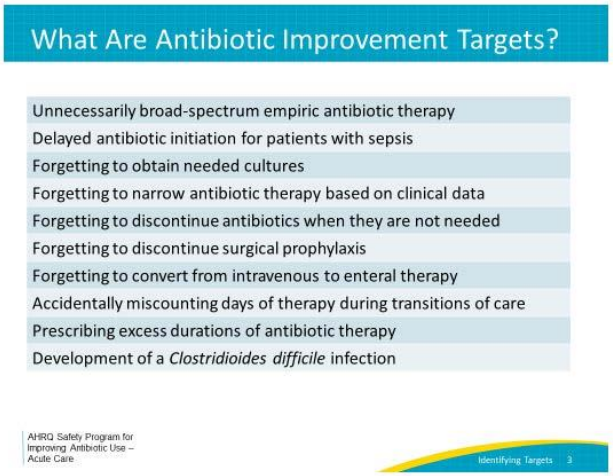
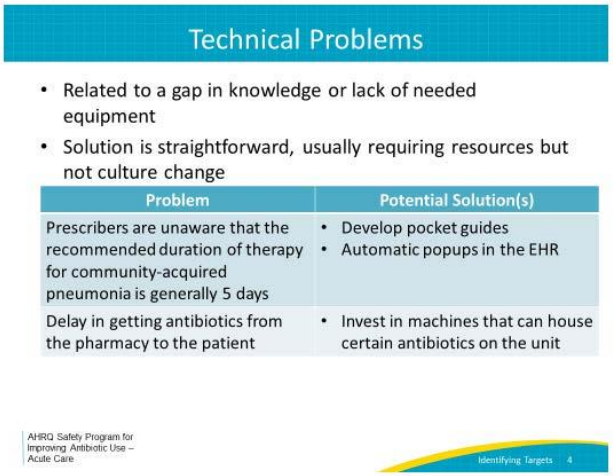
Identifying Targets for Improvement in Antibiotic Decision Making

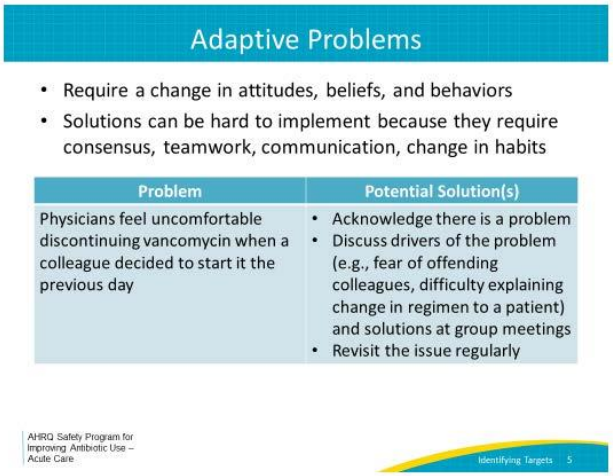
Acute Care

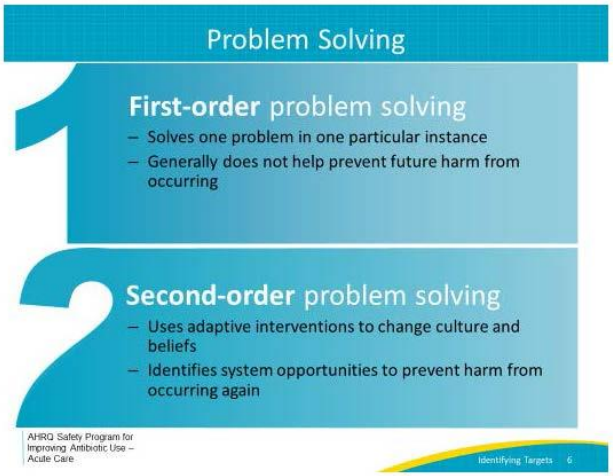
Slide Title and Commentary	Slide Number and Slide
AHRQ Safety Program for Improving Antibiotic Use **Identifying Targets for Improvement in Antibiotic Decision Making** **Acute Care** SAY: This presentation is titled "Identifying Targets for Improvement in Antibiotic Decision Making."	**Slide 1** 
Objectives SAY: By the end of this presentation, participants will be able to— • Recognize how to differentiate technical and adaptive issues related to antibiotic prescribing • Explain how to be proactive in asking staff about how the next patient may be harmed by antibiotic prescribing decisions • Explain how to leverage frontline wisdom to guide safety improvement efforts • Explain how to recognize antibiotic-related concerns using the Four Moments of Antibiotic Decision Making framework.	**Slide 2** 

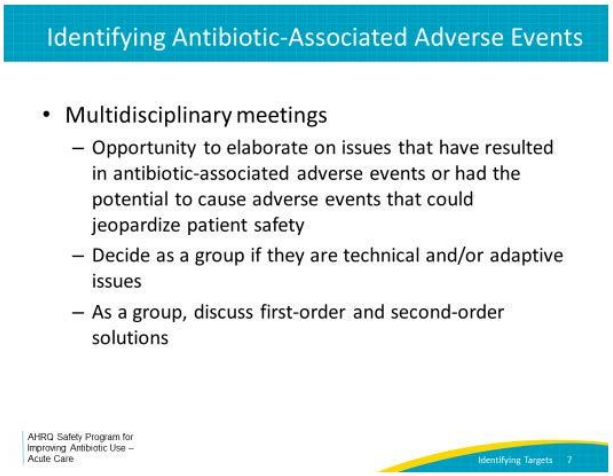
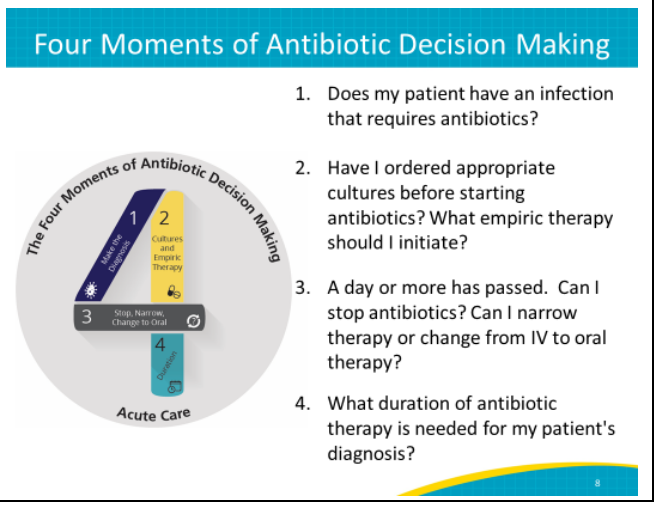
AHRQ Pub. No. 17(20)-0028-EF
November 2019

Slide Title and Commentary	Slide Number and Slide
What Are Antibiotic Improvement Targets? SAY: There is usually room for improvement regarding antibiotic decision making. Some examples of possible targets for improving antibiotic use include— • Unnecessarily broad-spectrum empiric antibiotic therapy • Delayed antibiotic initiation in patients with sepsis • Forgetting to obtain needed cultures before prescribing antibiotic therapy • Forgetting to narrow antibiotic therapy based on clinical data or culture data • Forgetting to discontinue antibiotics when they are not needed • Forgetting to discontinue surgical prophylaxis • Forgetting to convert from intravenous or IV to enteral therapy • Accidentally miscounting days of therapy during transitions of care—for example, from the hospital to the ambulatory setting or from hospitals to nursing homes or even within the hospital from one clinical service or floor to another • Prescribing excess durations of antibiotic therapy when shorter durations should be just as effective • Development of a *Clostridioides difficile* infection	**Slide 3** 

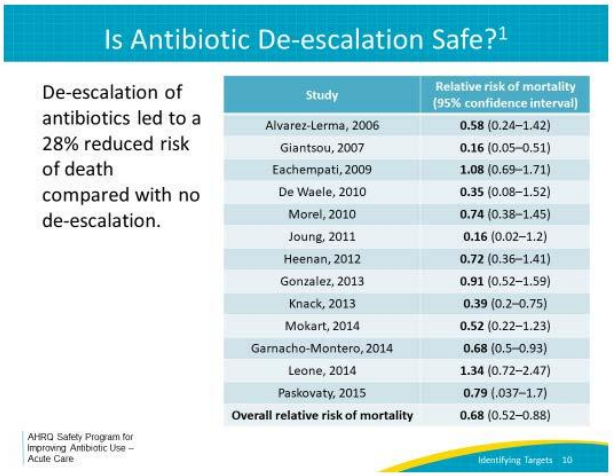
Slide Title and Commentary	Slide Number and Slide
Technical Problems SAY: Errors associated with antibiotic prescribing can be the result of technical or adaptive issues. Being able to classify problems related to antibiotic prescribing into those that are technical, those that are adaptive, or those that have elements of both is valuable in crafting approaches to improving antibiotic use. Technical problems can be related to a gap in knowledge that is not controversial or may be due to a lack of needed equipment. They are generally easy to address because their solutions are usually straightforward and not difficult to implement, as long as you have the right resources. For example, if the problem is that prescribers are unaware that the recommended duration of antibiotic therapy for community-acquired pneumonia or CAP is 5 days and instead are prescribing longer courses of therapy, potential solutions include developing pocket guides or automatic popups in the electronic health record or EHR when a diagnosis of CAP is entered. In this example, it is important to determine that the primary issue is a technical issue – lack of knowledge about appropriate CAP treatment duration. This can be addressed with a technical solution. If the problem is that prescribers know that the treatment duration should be 5 days but do not believe the recommendation, this is no longer a technical problem, and thus a technical solution is unlikely to work. Another example of a technical problem would be failure to administer needed antibiotics to septic patients in a timely fashion because of a delay in getting antibiotics from the pharmacy to the unit. Having some antibiotics available on the floor that a nurse can access after verification of the order by pharmacy is a potential technical solution—it requires financial resources to obtain machines in which to house the antibiotics and education of staff about how to use the machine. When considering possible technical solutions to a problem, it is important to assess their ease of use, cost, and prior evidence that they have been successful.	**Slide 4** 

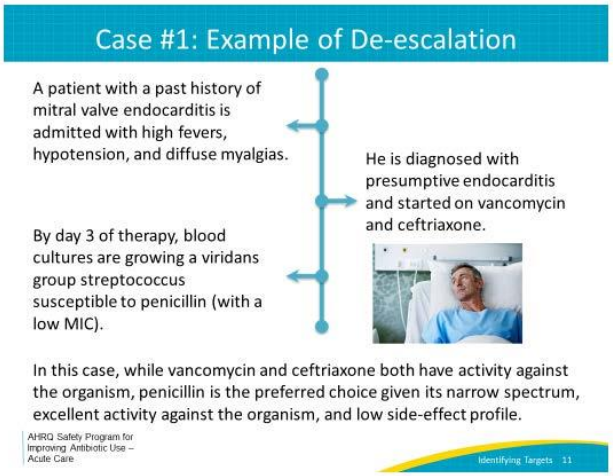
Slide Title and Commentary	Slide Number and Slide
Adaptive Problems SAY: Adaptive problems are those that require a change in attitudes, beliefs, and behaviors to resolve. Thus, adaptive problems are generally harder to address and require more communication and teamwork to develop successful solutions. For example, imagine a situation in which a prescriber does not discontinue vancomycin because she does not want to offend the colleague who started it the day before, even though objectively, vancomycin is no longer needed to treat the patient. In this example, education about indications for vancomycin use is not going to alter the prescriber's decision because a knowledge gap is not responsible for the prescriber's action. Instead, there needs to be a "meeting of the minds" of all clinical providers on approaches to change treatment plans that were initiated by a colleague so that colleagues no longer fear that they will offend each other. In addition, the group should consider how to communicate changes in antibiotic plans with patients and families. Adaptive solutions require consistent and repeated work to change behavior and attitudes around antibiotic prescribing. It is unlikely that there is a pocket guide or machine that can be purchased to enact this kind of change. The goals of the AHRQ Safety Program for Improving Antibiotic Use are to use both technical and adaptive approaches to improve antibiotic prescribing and enhance patient safety.	**Slide 5** 

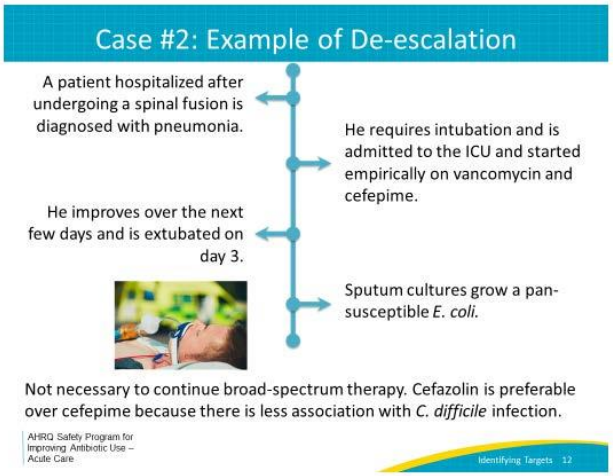
Slide Title and Commentary	Slide Number and Slide
Problem Solving SAY: When working as a team to identify solutions to problems, it can also be helpful to classify the solutions as first order and second order. First-order problem solving involves solving one problem at a time. The focus is on solving one particular instance of the problem, and it generally does not help prevent future harm from occurring. An example of first-order problem solving is calling a physician who ordered vancomycin and recommending that it can be discontinued. A stewardship team can make this same intervention over and over with different physicians and still not get to a point where the physicians were empowered or learned to make such a change independently. Second-order problem solving uses both technical and adaptive interventions. It identifies issues in the system and aims to prevent them from occurring again. For example, a second-order solution to addressing vancomycin prescribing would be implementation of an antibiotic time out that allows review of antibiotic therapy, including vancomycin, on a daily basis by frontline clinicians. This allows for a feeling of ownership of antibiotic decision making and ensures that antibiotics are reviewed without a phone call from the stewardship team. If frontline clinicians are not confident about the decision to continue or discontinue antibiotics, they can involve the antibiotic stewardship team or request an infectious diseases consultation, if available, for further guidance. This approach allows for sustained change and optimal use of available resources. Second-order problem solving or systematic changes are often needed to decrease the harm associated with unnecessary antibiotic use. Whenever possible, consider second-order problem solving as it is likely to result in more sustainable change than first-order problem solving.	**Slide 6** 

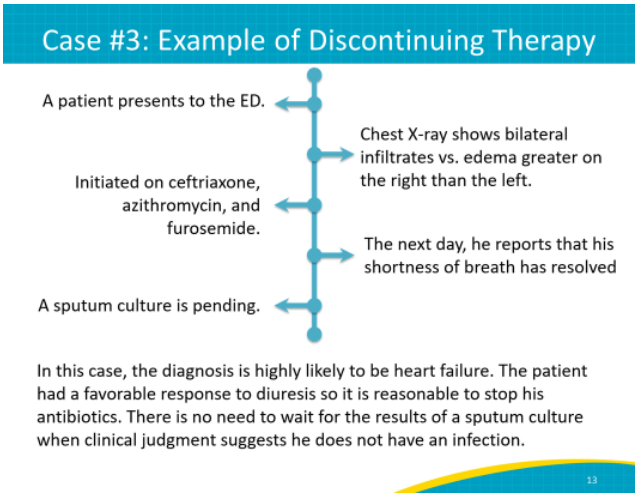
Slide Title and Commentary	Slide Number and Slide
How Can You Identify Antibiotic-Associated Adverse Events? SAY: It is important to request input from a diverse group of health care workers about their concerns related to antibiotic prescribing. It is possible that some health care workers have observed issues in their daily work that the antibiotic stewardship team has not considered. Leveraging this wisdom can lead to identifying problems and developing long-term solutions. During multidisciplinary meetings, request input from a diverse group of health care workers about issues that have resulted in antibiotic-associated adverse events or had the potential to cause adverse events that could jeopardize patient safety. As a group, decide if they are technical and/or adaptive issues and discuss first-order and second-order solutions.	**Slide 7** 
Four Moments of Antibiotic Decision Making SAY: A major focus of this collaborative is implementation of the Four Moments of Antibiotic Decision Making. Not addressing the Four Moments each time an antibiotic course is prescribed is one example of an antibiotic-associated adverse event that has the potential to cause harm. We encourage prescribers to use this framework every time they are considering antibiotics for their patients or for patients already receiving antibiotics.	**Slide 8** 

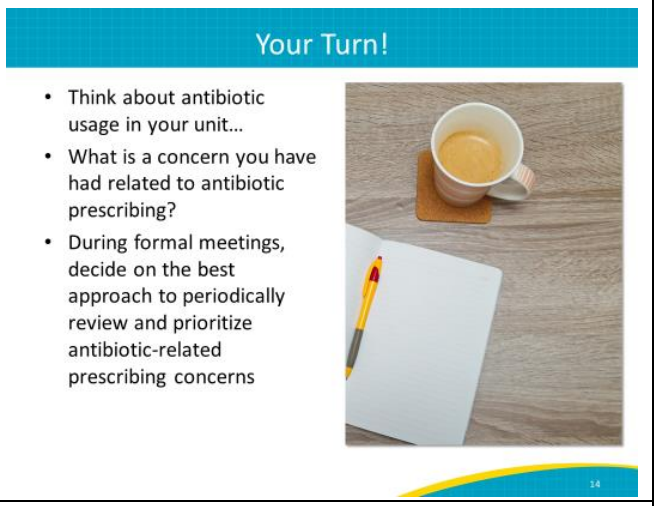
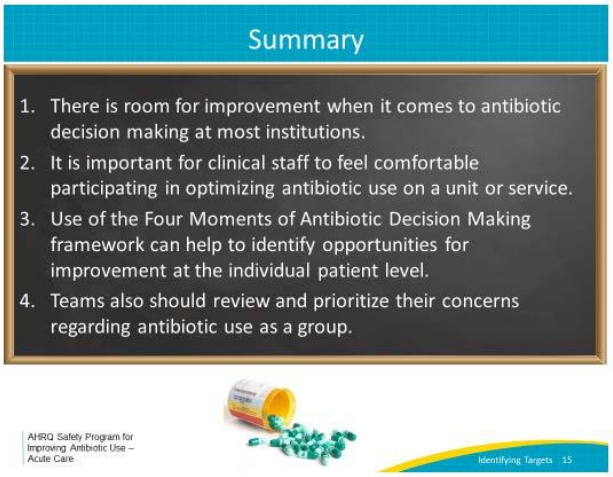
Slide Title and Commentary	Slide Number and Slide
Moment 3: Narrow or Stop Therapy SAY: A common antibiotic prescribing error that should be a target for improvement is failure to re-evaluate antibiotic therapy on a daily basis after it is begun. This issue is addressed by Moment 3, which focuses on the decision to stop, narrow, or change antibiotics from the intravenous to oral route. Narrowing antibiotic therapy is often referred to as de-escalation. This includes modifying antibiotic therapy to agents considered to have a narrower spectrum of activity than the initial antibiotic regimen or stopping antibiotics altogether, in the event that a patient is found to have an alternative, noninfectious (or nonbacterial) etiology for his or her symptoms. Narrowing can be guided by microbiology data when an organism is recovered that is susceptible to a narrower-spectrum antibiotic. Narrowing is also acceptable when certain organisms are not detected in specimens, for example stopping vancomycin when methicillin resistant *Staphylococcus aureus* or MRSA is not present. De-escalation can also be guided by the clinical status of the patient. The goals of narrowing or de-escalation are to optimize therapy AND to select agents that minimize side effects.	**Slide 9** 

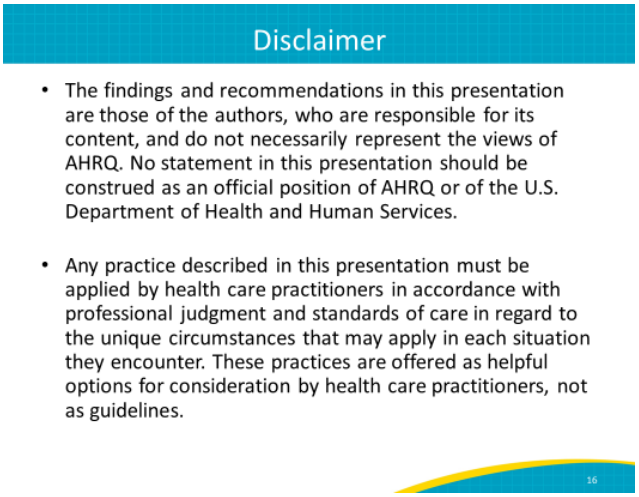
Slide Title and Commentary	Slide Number and Slide
Is Antibiotic De-escalation Safe? SAY: These are the results from a meta-analysis reviewing 13 studies and showing that narrowing or de-escalation of antibiotic therapy is safe. The patients included in these studies were ICU patients and did not have worse outcomes after the decision was made to de-escalate therapy. In fact, the analysis shows that overall, patients were spared from adverse events associated with broad-spectrum antibiotic use. This meta-analysis shows that patients who undergo antibiotic de-escalation have a 28 percent reduced risk of death compared to patients who remain on broad-spectrum antibiotic therapy. Remember: just because antibiotics are broader spectrum does not mean they will be more effective for treating a patient's infection. In some cases the opposite has been shown. This presentation will finish with three examples of de-escalation.	**Slide 10** 

Slide Title and Commentary	Slide Number and Slide
Case #1: Example of De-escalation SAY: In the first case, you are taking care of a patient with a past history of mitral valve endocarditis. He is admitted to the hospital with high fevers, hypotension, and diffuse myalgias. He is diagnosed with presumptive endocarditis and is started on vancomycin and ceftriaxone. By day 3 of therapy, blood cultures are growing a viridans group streptococcus, which is highly susceptible to penicillin. In this case, while vancomycin and ceftriaxone both have activity against the organism, penicillin is the preferred choice given its narrow spectrum, excellent activity against the organism, and low side-effect profile. It would both be appropriate and safer for your patient for the combination of vancomycin and ceftriaxone to be narrowed to penicillin therapy. Often, the observation that a patient has "responded" to an initial empiric regimen becomes a strong driver for continuing that regimen even when culture data clearly show that a narrower regimen can be used. We should work to remind each other that picking the optimal agent is best for the patient.	**Slide 11** 

Slide Title and Commentary	Slide Number and Slide
Case #2: Example of De-Escalation SAY: In the second case, you are taking care of a patient hospitalized after undergoing a spinal fusion. He is diagnosed with hospital-acquired pneumonia. He requires intubation and is admitted to the intensive care unit or ICU and started empirically on vancomycin and cefepime. Your patient improves over the next few days and is extubated on day 3. Sputum cultures grow a pan-susceptible *E. coli*. It is not necessary to continue broad-spectrum therapy when cultures have grown *E. coli* susceptible to cefazolin and have not grown organisms such as MRSA or *Pseudomonas aeruginosa*. MRSA and *Pseudomonas aeruginosa* generally grow easily in culture. Their absence from culture provides strong evidence that they are not the causative organisms. Cefazolin is preferable to other agents such as cefepime and ciprofloxacin because there is less association with *C. difficile* infection with cefazolin compared with these agents. If this patient's isolate were susceptible to ampicillin, this would also be an appropriate agent to narrow to. Ampicillin and cefazolin are not generally recommended as empiric therapy for hospital-acquired pneumonia because over the years many organisms that are likely to cause hospital-acquired pneumonia have become resistant. However, if susceptibility testing shows the organism is susceptible, it is appropriate and preferred to transition to these narrower spectrum agents.	**Slide 12** 

Slide Title and Commentary	Slide Number and Slide
Case #3: Example of Discontinuing Therapy SAY: In the third case, you are taking care of a patient who presented to the emergency department or ED with shortness of breath, increased lower extremity edema, a temperature of 100.9 degrees Fahrenheit and a white blood cell count of 13,000 cells per cubic millimeter. His chest x ray shows bilateral infiltrates versus pulmonary edema greater on the right than the left side of the lungs. He is started on ceftriaxone and azithromycin for possible community-acquired pneumonia and furosemide for possible heart failure. The next day, he reports that his shortness of breath has resolved. A sputum culture is pending. In this case, the diagnosis is highly likely to be heart failure, which can be associated with low-grade fevers and a mildly elevated white cell count. The patient had a favorable response to diuresis. At this point it is reasonable to stop his antibiotics given his relatively rapid improvement over the past day. There is no reason to wait for the results of a sputum culture when clinical judgment suggests he does not have an infection. Taking this one step further, what would you do in this case if the sputum culture ultimately grew *Streptococcus pneumoniae*? *S. pneumoniae* is a normal inhabitant of the oropharynx and its growth alone does not mean that the patient has pneumococcal pneumonia if clinically he does not appear to have this syndrome. Thus, restarting antibiotics would not be indicated unless you identify a clinical reason that makes you think he has pneumonia.	**Slide 13** 

Slide Title and Commentary	Slide Number and Slide
Your Turn! SAY: Think about antibiotic usage in your unit. What is a concern you have had related to antibiotic prescribing? As a group, decide on the best approach to periodically review and prioritize antibiotic-related prescribing concerns that have been raised. To be most effective, you may want to consider tackling one concern at a time. Potential solutions to concerns identified are discussed in the presentation titled, "Making Effective Changes in Antibiotic Decision Making."	**Slide 14** 
Summary SAY: In summary, there is room for improvement when it comes to antibiotic decision making at most institutions. It is important for clinical staff to feel comfortable participating in optimizing antibiotic use on a unit or service. Use of the Four Moments of Antibiotic Decision Making framework can help to identify opportunities for improvement at the individual patient level and should be implemented as routine practice. Teams should work as a multidisciplinary group to implement the Four Moments framework and to review and prioritize concerns that arise periodically regarding antibiotic use using the forum that works best for the team or unit.	**Slide 15** 

Slide Title and Commentary	Slide Number and Slide
Disclaimer SAY: The findings and recommendations in this presentation are those of the authors, who are responsible for its content, and do not necessarily represent the views of AHRQ. No statement in this presentation should be construed as an official position of AHRQ or of the U.S. Department of Health and Human Services. Any practice described in this presentation must be applied by health care practitioners in accordance with professional judgment and standards of care in regard to the unique circumstances that may apply in each situation they encounter. These practices are offered as helpful options for consideration by health care practitioners, not as guidelines.	**Slide 16** 
Reference	**Slide 17**