



AHRQ Safety Program for Improving Antibiotic Use



Making Effective Behavior Changes Around Antibiotic Prescribing Acute Care

Slide Title and Commentary	Slide Number and Slide
<p>Making Effective Behavior Changes Around Antibiotic Prescribing Acute Care</p> <p>SAY:</p> <p>This talk is titled “Making Effective Behavior Changes Around Antibiotic Prescribing.”</p>	<p>Slide 1</p>
<p>Objectives</p> <p>SAY:</p> <p>By the end of this talk, participants will be able to—</p> <ol style="list-style-type: none"> 1. Examine what motivates health care providers to prescribe antibiotics. 2. Review basic theories regarding implementation science to implement antibiotic stewardship or AS interventions and to change prescribing habits. and 3. Describe successful AS behavioral interventions in the acute care setting. 	<p>Slide 2</p>



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<p>Diffusion of Innovations</p> <p>SAY:</p> <p>Everett Rodgers was a sociologist who spent his career studying how innovations, defined as an idea, practice, or object perceived as new by an individual or other group, are adopted, or diffused, over time throughout a social system. He began his career studying the diffusion of use of hybrid seed corn among farmers in two Iowa communities in the 1950s, and developed a framework to describe the spread of use of this corn through the farming community. It is useful to consider this concept as it relates to how clinicians integrate antibiotic stewardship into their prescribing practices.</p>	<p>Slide 3</p> <p>Diffusion of Innovations</p> <ul style="list-style-type: none"> • “Diffusion is the process in which an innovation is communicated through certain channels over time among the members of a social system.” –Everett Rogers¹  <p>AHRQ Safety Program for Improving Antibiotic Use – Acute Care</p> <p>Behavior Changes 3</p>
<p>Attributes of Innovations That Help Spread</p> <p>SAY:</p> <p>Dr. Rodgers identified five attributes of innovations that help them to spread. As you develop stewardship interventions, consider whether they would be perceived by the end user as meeting these attributes:</p> <p>Relative advantage Is it better than what we already have according to the users (not the observer)?</p> <p>Compatibility Is it consistent with existing values and practices?</p> <p>Simplicity/ease of use Is it easy to understand/adopt?</p> <p>Trialability Can the innovation be experimented with on a limited basis?</p> <p>Observability Can users see the results of the innovation?</p>	<p>Slide 4</p> <p>Attributes of Innovations That Help Spread</p> <ul style="list-style-type: none"> Relative advantage <ul style="list-style-type: none"> • Is it better than what we already have according to the users (not you)? Compatibility <ul style="list-style-type: none"> • Is it consistent with existing values and practices? Simplicity/ease of use <ul style="list-style-type: none"> • Is it easy to understand/adopt? Trialability <ul style="list-style-type: none"> • Can the innovation be experimented with on a limited basis? Observability <ul style="list-style-type: none"> • Can users see the results of the innovation?  <p>AHRQ Safety Program for Improving Antibiotic Use – Acute Care</p> <p>Behavior Changes 4</p>

Slide Title and Commentary

Diffusion of Innovation—Categories of Adopters

SAY:

Dr. Rodgers also described categories of adopters. Starting on the far left of the curve are the innovators who develop an innovation and are highly likely to adopt it. Next are the early adopters, followed by the early majority and late majority. At the far right of the curve are the laggards—these individuals have a high propensity to resist adoption of a new innovation regardless of how beneficial it may be. For stewardship leaders, the good news is that once an innovation is adopted by some of the early majority, it is likely to ultimately be adopted by most of the group. However, stewardship teams have a propensity to focus on the laggards, which are usually their most challenging prescribers. While it is worthwhile to try to change the minds of this group (and we will discuss some approaches in the next few slides), remember that this group makes up a small proportion of the entire social system.

Managing the Majority (and Some Laggards)

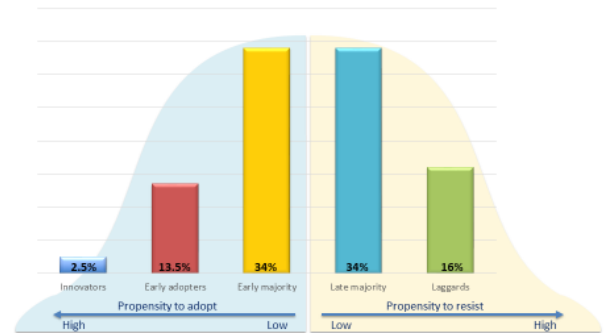
SAY:

When developing interventions and approaches to improve antibiotic prescribing among the majority, understanding what drives prescribing behavior and how to modify it based on that understanding is of great importance. In the next few slides, we will discuss drivers of prescribing behavior and approaches to reach certain problem prescribers. However, it is also important to be self-reflective and ensure that you are providing clear and valuable messages to prescribers.

Slide Number and Slide

Slide 5

Diffusion of Innovation — Categories of Adopters¹



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Behavior Changes 5

Slide 6

Reaching the Majority (and Some Laggards)¹






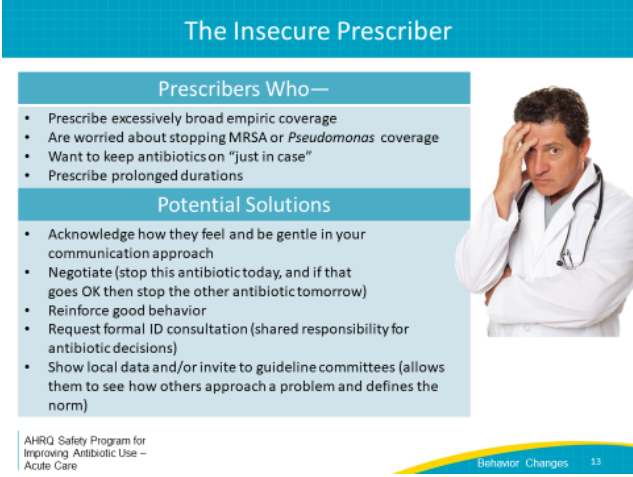
AHRQ Safety Program for Improving Antibiotic Use – Acute Care

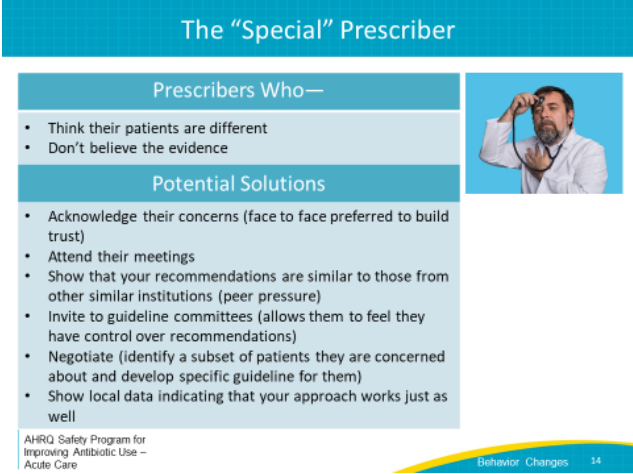
Behavior Changes 6

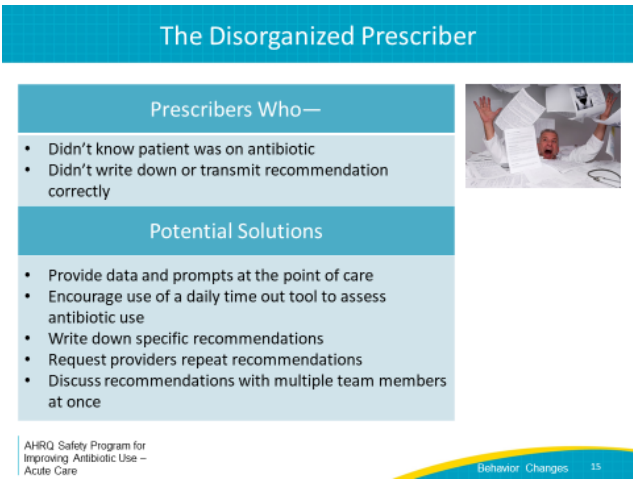
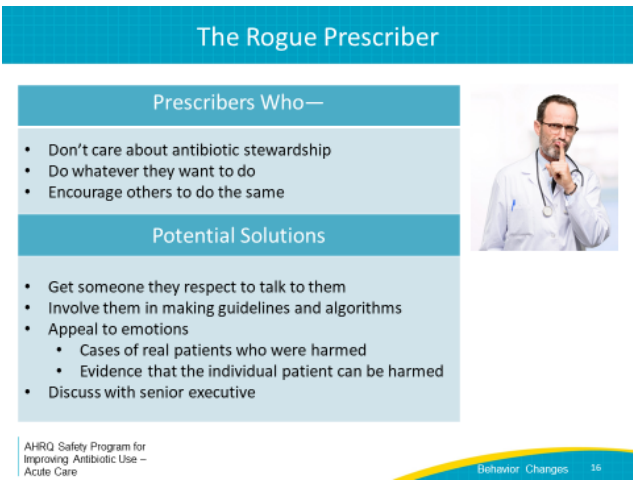
Slide Title and Commentary	Slide Number and Slide
<p>Drivers of Suboptimal Antibiotic Prescribing</p> <p>SAY:</p> <p>This slide lists some of the reasons that antibiotics are prescribed for suboptimal reasons: Prescribers may fear “failing” to cover certain organisms may lead to adverse outcomes, medico-legal risk, or criticism by peers, and thus they elect to provide broad-spectrum coverage regardless of the clinical situation.</p> <p>Prescribers may be hesitant to change antibiotics that other prescribers have started both because they believe it is safer or they are concerned they may offend the original prescriber; this latter situation has been called “prescriber etiquette.”</p> <p>Prescribers may feel that their patients are different and thus refuse to follow standard guidelines.</p> <p>Prescribers may feel that external recommendations about antibiotic use impinge upon their autonomy.</p> <p>Prescribers may believe that antibiotics are always safe because of a difficulty in perceiving the association between antibiotic use and adverse events, which may occur after they are no longer caring for the patient.</p> <p>Prescribers may be much more interested in other patient care activities besides optimizing antibiotic therapy, which can be perceived as boring or less important. There may be systems challenges that interfere with optimal prescribing such as inadequate communication among prescribers or difficulty in getting accurate data from the electronic health record or EHR.</p> <p>Finally, prescribers may have incomplete knowledge of antibiotic spectrum or new data regarding acceptable durations of therapy.</p>	<p>Slide 7</p> <p>Drivers of Suboptimal Antibiotic Prescribing</p> <ul style="list-style-type: none"> • Fear of inadequate antibiotic coverage leading to patient harm (or legal harm) • Fear of judgment by peers and superiors (deviation from the norm) • Not wanting to change what other prescribers have started (“prescribing etiquette”)² • Feeling that one’s patients are different • Desire for autonomy • Difficulty perceiving the association between antibiotic use and adverse events • Not paying attention or not interested • System challenges: inadequate communication, difficulty getting accurate data from EHR • Incomplete knowledge of antibiotic spectrum or new data <p>AHRQ Safety Program for Improving Antibiotic Use – Acute Care</p> <p>Behavior Changes 7</p>


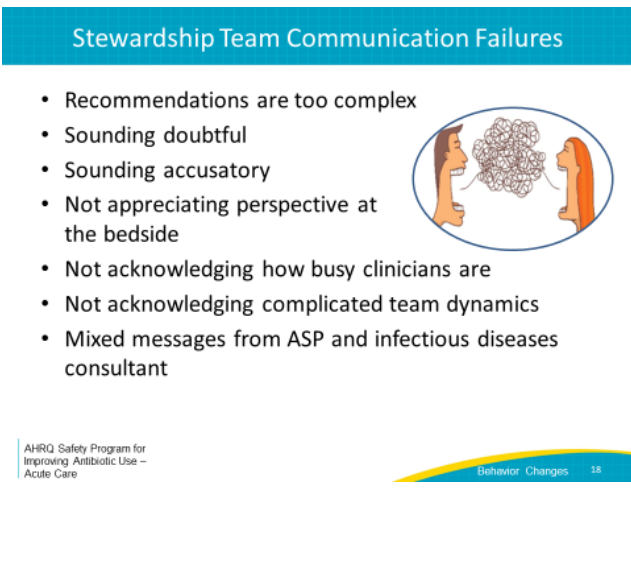
Slide Title and Commentary	Slide Number and Slide
<p>Drivers of Suboptimal Antibiotic Prescribing</p> <p>SAY:</p> <p>It is important to note that most of these reasons, the first seven indicated in blue, are primarily related to feelings and attitudes rather than lack of knowledge about antibiotics or new data about their use. However, many stewardship interventions focus on delivery of knowledge rather than approaches to change prescribing behavior. The eighth reason, shown in gray, refers to work system challenges such as inadequate communication regarding reasons and plans for antibiotic therapy among providers and difficulty getting data from the HER such as how long a patient has been on antibiotics. The ninth reason, incomplete knowledge of antibiotics or emerging scientific data, shown in red, is often over-estimated as a cause of suboptimal prescribing.</p>	<p>Slide 8</p> <p>Drivers of Suboptimal Antibiotic Prescribing</p> <ul style="list-style-type: none"> • Fear of inadequate antibiotic coverage leading to patient harm (or legal harm) • Fear of judgment by peers and superiors (deviation from the norm) • Not wanting to change what other prescribers have started (“prescribing etiquette”) • Feeling that one’s patients are different² • Desire for autonomy • Difficulty perceiving the association between antibiotic use and adverse events • Not paying attention or not interested • System challenges: inadequate communication, difficulty getting accurate data from EHR • Incomplete knowledge of antibiotic spectrum or new data <p>AHRQ Safety Program for Improving Antibiotic Use – Acute Care</p> <p>Behavior Changes 8</p>
<p>How To Change When Change Is Hard</p> <p>SAY:</p> <p>In a book titled “Switch: How to Change Things When Change is Hard,” Chip and Dan Heath observed that the biggest error we make in trying to change behavior is assuming that knowledge will change behavior. We believe, particularly in medical fields where our training often centers on didactic lectures, that if we get our audience to analyze and think about a situation, that they will then change practice. However, you can’t fix ingrained antibiotic prescribing practices with lectures alone. Instead, the more effective way to change behavior is to have prescribers see and feel why suboptimal antibiotic prescribing can hurt patients and to own the problem themselves and create change.</p>	<p>Slide 9</p> <p>How To Change When Change Is Hard</p> <p>The biggest error we make in trying to change behavior is assuming that knowledge changes behavior³</p> <p>Our instinct to create change (esp. in medicine) is to</p> <p>Analyze → Think → Change</p> <p>The more effective way to create change is to</p> <p>See → Feel → Change</p> <p>AHRQ Safety Program for Improving Antibiotic Use – Acute Care</p> <p>Behavior Changes 9</p>




Slide Title and Commentary	Slide Number and Slide
<p>The St. Lucia Parrot</p> <p>SAY:</p> <p>In the 1970s, the St. Lucia parrot, found only on this small island in the eastern Caribbean, was close to extinction both because of deforestation and because hunters captured the birds and sold them as exotic pets. Paul Butler, an English biologist, took on saving this endangered bird upon completion of his Ph.D. He found only 100 remaining parrots, wrote a dire report, and began the challenge of putting his written recommendations into practice.</p>	<p>Slide 10</p> <p>The St. Lucia Parrot^{4,5}</p>  <p><small>AHRQ Safety Program for Improving Antibiotic Use – Acute Care</small></p> <p><small>Arizona Petcare Institute, Tulsa Zoo, Oklahoma, 2018 Image: Christopher and Angela Goodwin/ESA, Aracelis Ayala, DDMR, Tulsa Zoo, Tulsa, November 4th & 5, 2018. Copyright Christopher Goodwin</small></p> <p><small>Behavior Changes 10</small></p>
<p>The St. Lucia Parrot Intervention</p> <p>SAY:</p> <p>Because he was trained as an academician, his instinct was to educate residents on the science of conservation, but conservation was not of great interest to St. Lucia residents at the time. When this approach failed, he took a different approach and developed a marketing campaign to make the parrot a symbol of the newly independent nation. The parrot was made the national bird, forest reserves were developed, and hunters were harshly penalized. Pop songs celebrated the parrot and its image was placed on phone covers, T-shirts, and pacifiers. The St. Lucia parrot population is now more than 1,500.</p>	<p>Slide 11</p> <p>The St. Lucia Parrot Intervention^{6,7,8}</p> <ul style="list-style-type: none"> • Academic impulse: Educate on the science of conservation • Problem: St. Lucia residents were not interested • Solution: Marketing campaign to make the parrot a symbol of the newly independent nation  <p><small>AHRQ Safety Program for Improving Antibiotic Use – Acute Care</small></p> <p><small>St. Lucia parrot, Joel Santos, HD Images Collection. Photo Credit: Paul Butler and Dale. http://www.klbum.com/PhotoLibrary/stlucia-parrot. Both photos used with permission.</small></p> <p><small>Behavior Changes 11</small></p>

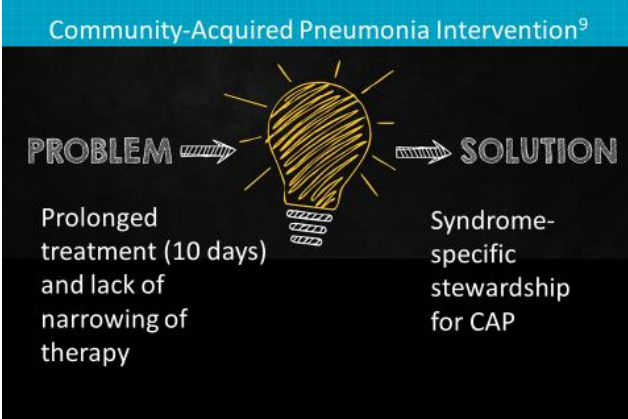

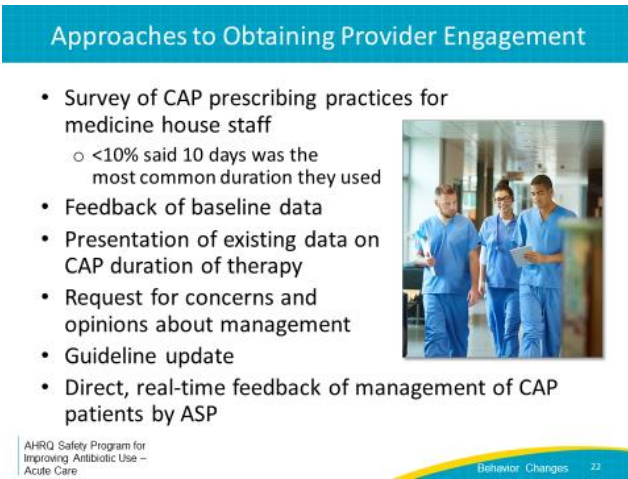
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<p>Antibiotics Are Our Parrot</p> <p>SAY:</p> <p>Antibiotics are our parrot. We must motivate prescribers to preserve them by not using them when they are not needed. In turn, optimal prescribing will decrease harm to their patients.</p> <p>In the next few slides, we will discuss some prescriber behavioral types and approaches to working with them to improve antibiotic use. Keep in mind these “types” are a bit exaggerated for educational purposes, and that most prescribers exhibit at least some of these behaviors from time to time. After we go through these behavioral types, we will review an intervention that engaged prescribers to change longstanding practice.</p>	<p>Slide 12</p> 
<p>The Insecure Prescriber</p> <p>SAY:</p> <p>The insecure prescriber is usually risk averse and nervous—nervous about missing a diagnosis, nervous about not covering an organism that is highly unlikely to be present, and nervous about what others will think. They tend to treat with broad-spectrum antibiotics for long periods. The most important approach you can take is to acknowledge their worries and be gentle in your communication—they will not respond well to aggressively delivered advice. Negotiation can be a successful strategy—slow removal of antibiotics one at a time with demonstration that the patient is not harmed. They may be responsive to formal infectious diseases or ID consultation that assists with this process and provides reassurance. Some may also respond well to seeing local data or working with peers on a guideline so they can see the practice of others in the institution and feel that they are following the norm.</p>	<p>Slide 13</p>  <p>The Insecure Prescriber</p> <p>Prescribers Who—</p> <ul style="list-style-type: none"> • Prescribe excessively broad empiric coverage • Are worried about stopping MRSA or <i>Pseudomonas</i> coverage • Want to keep antibiotics on “just in case” • Prescribe prolonged durations <p>Potential Solutions</p> <ul style="list-style-type: none"> • Acknowledge how they feel and be gentle in your communication approach • Negotiate (stop this antibiotic today, and if that goes OK then stop the other antibiotic tomorrow) • Reinforce good behavior • Request formal ID consultation (shared responsibility for antibiotic decisions) • Show local data and/or invite to guideline committees (allows them to see how others approach a problem and defines the norm)


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<p>The “Special” Prescriber</p> <p>SAY:</p> <p>The special prescriber thinks his or her patients are different from other patients in the hospital and thus doesn’t believe that guidelines apply. They tend to treat with broad regimens based on “how it was done at their previous institution” or “what they learned at a conference recently” rather than using hospital guidelines and formulary agents. It is important for the stewardship team to build a working relationship with these prescribers by acknowledging their concerns, ideally with face-to-face conversations and reminders. If you make the effort to attend their team meetings to make your case about a certain recommendation, they may be more inclined to follow it. You can show them that what you are recommending is similar to that of other comparable institutions and patient populations. It can be very helpful to invite them to your committee meetings and to assist with guidelines so that they feel they have input into recommendations, as they may feel that their autonomy is threatened by antibiotic stewardship activities. Some may respond to data that they are outliers or that your approach does not lead to harm. Of course, sometimes patient populations are truly unique. It is useful to address these patient populations when they are brought up. You can develop specific guidelines for circumstances that occur commonly enough to warrant guidelines.</p>	<p>Slide 14</p> <div data-bbox="899 260 1528 730">  <p>The “Special” Prescriber</p> <p>Prescribers Who—</p> <ul style="list-style-type: none"> • Think their patients are different • Don’t believe the evidence <p>Potential Solutions</p> <ul style="list-style-type: none"> • Acknowledge their concerns (face to face preferred to build trust) • Attend their meetings • Show that your recommendations are similar to those from other similar institutions (peer pressure) • Invite to guideline committees (allows them to feel they have control over recommendations) • Negotiate (identify a subset of patients they are concerned about and develop specific guideline for them) • Show local data indicating that your approach works just as well <p>AHRQ Safety Program for Improving Antibiotic Use – Acute Care</p> <p>Behavior Changes 14</p> </div>

Slide Title and Commentary	Slide Number and Slide
<p>The Disorganized Prescriber</p> <p>SAY:</p> <p>The disorganized prescriber is well meaning but can't seem to remember that his or her patient is receiving antibiotics or can't reliably execute recommendations from the stewardship team. This behavior is easier to address as it can often be solved by using tools and approaches to help the prescriber be more organized. Approaches to remind the prescriber to evaluate antibiotic use such as prompts on a daily goals sheet or use of a time out tool may be helpful. These prescribers may benefit from seeing your recommendations in writing or at least being asked to repeat your recommendation back to you. If delivering recommendations in person, it may be best to deliver them to an entire team at once so that team members can be "on the same page" regarding what you are recommending.</p>	<p>Slide 15</p> 
<p>The Rogue Prescriber</p> <p>SAY:</p> <p>Rogue prescribers are the hardest for a stewardship team to manage as they often feel that institutional guidelines about antibiotic prescribing to not apply to them. They don't care about antibiotic stewardship and often encourage others to behave the same way. Some rogue prescribers may respond to conversation with a peer they respect; if this can be arranged, it is likely the most effective management approach. Sometimes, they will respond to engagement in being included in making guidelines and algorithms. If not, then an in-person meeting with evidence that their patients have been harmed may be helpful if available. This meeting should be called by the most senior member of the stewardship team. If a rogue prescriber is unable to change his or her ways, a senior executive may have to intervene.</p>	<p>Slide 16</p> 

Slide Title and Commentary	Slide Number and Slide
<p>It's Not You, It's Me...</p> <p>SAY:</p> <p>We can't blame everything on prescribers. Sometimes the problem is in how we as the stewardship team communicate with them.</p>	<p>Slide 17</p> 
<p>Stewardship Team Communication Failures</p> <p>SAY:</p> <p>Some common stewardship team communication failures include:</p> <ul style="list-style-type: none"> • Recommendations are too complex • Sounding doubtful • Sounding accusatory • Not appreciating perspective at the bedside • Not acknowledging how busy clinicians are • Not acknowledging complicated team dynamics • There are mixed messages from the antibiotic stewardship program, or ASP, and infectious diseases consultant 	<p>Slide 18</p>  <ul style="list-style-type: none"> • Recommendations are too complex • Sounding doubtful • Sounding accusatory • Not appreciating perspective at the bedside • Not acknowledging how busy clinicians are • Not acknowledging complicated team dynamics • Mixed messages from ASP and infectious diseases consultant

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<p>Communication Solutions</p> <p>SAY:</p> <p>Some approaches to improve how we communicate include:</p> <ul style="list-style-type: none"> • Always lead with a respectful and nonjudgmental tone. • Make a single recommendation or provide no more than two options • Be confident • Acknowledgement. This might be acknowledgement of what they did well, or it might be acknowledgement that stewardship may not be their priority at the moment • Don't use bad messages, such as prioritizing cost above all else • Discuss ID consult patients with ID consult physician(s) 	<p>Slide 19</p> <p>Communication Solutions</p> <ul style="list-style-type: none"> • Be respectful • Be nonjudgmental • Make a single recommendation or provide no more than two options • Be confident • Acknowledge: what they did well, stewardship may not be their priority at the moment • Don't use bad messages (prioritizing cost above all else) • Discuss ID consult patients with ID consult physician(s)  <p>AHRQ Safety Program for Improving Antibiotic Use – Acute Care</p> <p>Behavior Changes 19</p>
<p>A Multifaceted Intervention To Improve the Management of Community-Acquired Pneumonia</p> <p>SAY:</p> <p>Next, we will discuss an example of an intervention that demonstrates some approaches to take into consideration from the viewpoint of the prescriber when developing interventions to improve antibiotic use.</p>	<p>Slide 20</p>  <p>A MULTIFACETED INTERVENTION TO IMPROVE THE MANAGEMENT OF COMMUNITY-ACQUIRED PNEUMONIA</p> 

Slide Title and Commentary	Slide Number and Slide
<p>Community-Acquired Pneumonia Intervention</p> <p>SAY:</p> <p>Despite a longstanding ASP and local treatment guidelines, one hospital observed that patients with community-acquired pneumonia or CAP were being treated for a median of 10 days and did not have therapy narrowed based on microbiology and clinical data. The ASP developed an intervention around all components of diagnosis and treatment of CAP. They found that it was easier to rally a group around messages pertaining to a syndrome than an antibiotic because it was more oriented to patient care, viewed as educational rather than restrictive, and allowed the ASP and prescribers to address care at different time points (empiric therapy, narrowing therapy, discharge therapy).</p>	<p>Slide 21</p>  <p>Community-Acquired Pneumonia Intervention⁹</p> <p>PROBLEM →  → SOLUTION</p> <p>Prolonged treatment (10 days) and lack of narrowing of therapy</p> <p>Syndrome-specific stewardship for CAP</p> <p>AHRQ Safety Program for Improving Antibiotic Use – Acute Care</p> <p>Behavior Changes 21</p>
<p>Approaches to Obtaining Provider Engagement</p> <p>SAY:</p> <p>Several approaches were used to engage prescribers in improving CAP management. A survey of CAP prescribing practices was administered to medicine house staff with the goal of encouraging them to think about how they practice and how they make decisions. Despite data that most patients with CAP were treated for 10 or more days, less than 10 percent of house staff said 10 days was the most common duration they used. The survey results and actual baseline data were presented to house staff along with literature on CAP therapy. The ASP requested feedback about their questions and concerns regarding the management of CAP. Existing treatment guidelines were modified to be more specific and succinct. Finally, the ASP provided direct, real-time feedback of management of CAP patients for a five-month period.</p>	<p>Slide 22</p>  <p>Approaches to Obtaining Provider Engagement</p> <ul style="list-style-type: none"> • Survey of CAP prescribing practices for medicine house staff <ul style="list-style-type: none"> ◦ <10% said 10 days was the most common duration they used • Feedback of baseline data • Presentation of existing data on CAP duration of therapy • Request for concerns and opinions about management • Guideline update • Direct, real-time feedback of management of CAP patients by ASP <p>AHRQ Safety Program for Improving Antibiotic Use – Acute Care</p> <p>Behavior Changes 22</p>

Slide Title and Commentary	Slide Number and Slide												
<p>Research – BMJ</p> <p>SAY:</p> <p>Review of existing literature included the results of a randomized trial of patients with mild to moderate-severe community acquired pneumonia. Patients were randomized to stop treatment after 3 days or to continue therapy for 8 days if they were clinically improved by day 3. Clinical cure rates were the same in both groups, but patients who received the longer course were twice as likely to experience an adverse event.</p>	<p>Slide 23</p> <p style="text-align: center;">Research – BMJ</p> <ul style="list-style-type: none"> All patients received IV amoxicillin for 3 days, then randomized to oral therapy if improving¹⁰ <table border="1" data-bbox="943 422 1482 590"> <thead> <tr> <th></th> <th>3 Days (n=56)</th> <th>8 Days (n=64)</th> </tr> </thead> <tbody> <tr> <td>Clinical cure per protocol at 10 days The same!</td> <td>93%</td> <td>93%</td> </tr> <tr> <td>Clinical cure per protocol at 28 days The same!</td> <td>90%</td> <td>88%</td> </tr> <tr> <td>Adverse events More adverse events with longer therapy!</td> <td>11%</td> <td>21%</td> </tr> </tbody> </table> <p>AHRQ Safety Program for Improving Antibiotic Use – Acute Care Behavior Changes 23</p>		3 Days (n=56)	8 Days (n=64)	Clinical cure per protocol at 10 days The same!	93%	93%	Clinical cure per protocol at 28 days The same!	90%	88%	Adverse events More adverse events with longer therapy!	11%	21%
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<p>Improving Local Guidelines</p> <p>SAY:</p> <p>Existing treatment guidelines were found to provide inadequate guidance to prescribers regarding how to narrow therapy. Too many antibiotic choices were provided without direction about how to choose an agent. In addition, day ranges suggested for length of therapy were broad and without guidance about choosing a duration. In evaluating the ranges provided in red, it is easy to understand why most patients received 10 or more days of therapy as clinicians are likely to pick the longer duration of therapy offered.</p>	<p>Slide 24</p> <p style="text-align: center;">Improving Local Guidelines</p> <p>Before</p> <p><u>Pathogen-specific treatments and duration</u></p> <ul style="list-style-type: none"> Susceptibility results should be considered when choosing an agent <i>S. pneumoniae</i>: IV: penicillin G OR cefuroxime OR ceftriaxone; PO: amoxicillin OR cefpodoxime OR azithromycin. Treatment for 5–10 days based on clinical stability <i>H. influenzae</i>: doxycycline OR amoxicillin/clavulanate OR cefuroxime are preferred. Other options include ceftriaxone OR cefpodoxime OR moxifloxacin. Treat for 5–10 days. <p>AHRQ Safety Program for Improving Antibiotic Use – Acute Care Behavior Changes 24</p>												
<p>Decision Paralysis</p> <p>SAY:</p> <p>When people are given too many choices, they often have difficulty in making a choice. It is not surprising that prescribers elected not to narrow therapy for CAP when faced with too many choices. This is known as decision paralysis. You may have experienced this before when faced with too many choices, such as at a dessert buffet. When developing guidelines and making recommendations, ASPs should make efforts to minimize choices and be as specific as possible.</p>	<p>Slide 25</p> <p style="text-align: center;">Decision Paralysis</p>  <p>AHRQ Safety Program for Improving Antibiotic Use – Acute Care Behavior Changes 25</p>												

Slide Title and Commentary	Slide Number and Slide																								
<p>Improving Local Guidelines</p> <p>SAY:</p> <p>The panel on the right shows the modified guidelines developed as part of the syndrome-specific intervention. Specific recommendations are provided for choosing a duration of therapy based on clinical status and host status.</p>	<p>Slide 26</p> <p>Improved Local Guidelines</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%; background-color: #f0f0f0; padding: 5px;"> <p>Before</p> <p>Pathogen-specific treatments and duration</p> <ul style="list-style-type: none"> • Susceptibility results should be considered when choosing an agent • <i>S. pneumoniae</i>: IV: penicillin G OR cefuroxime OR ceftriaxone; PO: amoxicillin OR cefpodoxime OR azithromycin. Treatment for 5–10 days based on clinical stability • <i>H. influenzae</i>: doxycycline OR amoxicillin/clavulanate OR cefuroxime are preferred. Other options include ceftriaxone OR cefpodoxime OR moxifloxacin. Treat for 5–10 days. </div> <div style="width: 45%; background-color: #fff9c4; padding: 5px;"> <p>After</p> <p>Therapy can be stopped after the patient is:</p> <ul style="list-style-type: none"> • Afebrile for 48–72 hours and • Has no more than one of the following signs and symptoms: HR > 100 beats/min, RR > 24 breaths/min, BP < 90 mmHg, O2 sat < 90%, altered mental status <p>Suggested duration of therapy based on patient specific factors:</p> <ul style="list-style-type: none"> • 5 days: Patient without immunocompromise or structural lung disease • 7 days: Patients with moderate immunocompromise and/or structural lung disease • 10–14 days: Patients with poor clinical response, who received initial inappropriate therapy, or who are significantly immunocompromised </div> </div> <p style="font-size: small; margin-top: 5px;">AHRQ Safety Program for Improving Antibiotic Use – Acute Care Behavior Changes 26</p>																								
<p>Pathogen-Specific Local Guidelines</p> <p>SAY:</p> <p>In addition, specific guidance was developed for step-down therapy based on specific organisms that were identified. Only one intravenous or IV and one oral option were provided.</p>	<p>Slide 27</p> <p>Pathogen-Specific Local Guidelines</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%; background-color: #f0f0f0; padding: 5px;"> <p>Before</p> <p>Pathogen-specific treatments and duration</p> <ul style="list-style-type: none"> • Susceptibility results should be considered when choosing an agent • <i>S. pneumoniae</i>: IV: penicillin G OR cefuroxime OR ceftriaxone; PO: amoxicillin OR cefpodoxime OR azithromycin. Treatment for 5–10 days based on clinical stability • <i>H. influenzae</i>: doxycycline OR amoxicillin/clavulanate OR cefuroxime are preferred. Other options include ceftriaxone OR cefpodoxime OR moxifloxacin. Treat for 5–10 days. </div> <div style="width: 45%; padding: 5px;"> <table border="1" style="width: 100%; border-collapse: collapse; font-size: x-small;"> <thead> <tr> <th style="background-color: #e0e0e0;">Pathogen-specific and step-down therapy</th> <th style="background-color: #e0e0e0;">Preferred therapy</th> </tr> </thead> <tbody> <tr> <td><i>S. pneumoniae</i> PCN susceptible</td> <td>Penicillin G 1 million units IV Q6H OR Amoxicillin 500 mg PO TID</td> </tr> <tr> <td><i>S. pneumoniae</i> PCN intermediate or urine antigen positive</td> <td>Penicillin G 1 million units IV Q6H OR Amoxicillin 1g PO TID</td> </tr> <tr> <td><i>S. pneumoniae</i> PCN resistant, cephalosporin susceptible</td> <td>Ceftriaxone 1 g IV Q24 OR Cefpodoxime 200 mg PO BID</td> </tr> <tr> <td><i>H. influenzae</i> non-beta-lactamase producing (ampicillin susceptible)</td> <td>Ampicillin 1 g IV Q6H OR Amoxicillin 500mg PO TID</td> </tr> </tbody> </table> </div> </div> <p style="font-size: small; margin-top: 5px;">AHRQ Safety Program for Improving Antibiotic Use – Acute Care Behavior Changes 27</p>	Pathogen-specific and step-down therapy	Preferred therapy	<i>S. pneumoniae</i> PCN susceptible	Penicillin G 1 million units IV Q6H OR Amoxicillin 500 mg PO TID	<i>S. pneumoniae</i> PCN intermediate or urine antigen positive	Penicillin G 1 million units IV Q6H OR Amoxicillin 1g PO TID	<i>S. pneumoniae</i> PCN resistant, cephalosporin susceptible	Ceftriaxone 1 g IV Q24 OR Cefpodoxime 200 mg PO BID	<i>H. influenzae</i> non-beta-lactamase producing (ampicillin susceptible)	Ampicillin 1 g IV Q6H OR Amoxicillin 500mg PO TID														
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<p>Initial Results</p> <p>SAY:</p> <p>The intervention resulted in a reduction in median duration of therapy to 7 days, a reduction in excess days of therapy and an increase in cases where therapy was narrowed. There were nonsignificant reductions in 30-day readmissions and <i>Clostridioides difficile</i> infections.</p>	<p>Slide 28</p> <p>Initial Results</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th></th> <th>Baseline n=56</th> <th>Intervention n=63</th> <th>P-value</th> </tr> </thead> <tbody> <tr> <td>Median duration of therapy</td> <td>10 days</td> <td>7 days</td> <td><0.001</td> </tr> <tr> <td>Median excess antibiotic days</td> <td>4 days</td> <td>1 day</td> <td><0.001</td> </tr> <tr> <td>Narrowing of therapy</td> <td>19%</td> <td>67%</td> <td><0.001</td> </tr> <tr> <td>30-day readmissions</td> <td>14.5%</td> <td>7.7%</td> <td>0.22</td> </tr> <tr> <td><i>C. difficile</i> infections</td> <td>4.8%</td> <td>1.5%</td> <td>0.28</td> </tr> </tbody> </table> <p style="margin-top: 10px;">Patient characteristics were similar between the two periods⁹</p> <p style="font-size: x-small; margin-top: 5px;">Table adapted from Avdic E, Cashette LA, Hughes AM, et al. Impact of an antimicrobial stewardship intervention on shortening the duration of therapy for community-acquired pneumonia. Clin Infect Dis. 2012 Jun;54(11):1581-7. PMID: 22492072.</p> <p style="font-size: small; margin-top: 5px;">AHRQ Safety Program for Improving Antibiotic Use – Acute Care Behavior Changes 28</p>		Baseline n=56	Intervention n=63	P-value	Median duration of therapy	10 days	7 days	<0.001	Median excess antibiotic days	4 days	1 day	<0.001	Narrowing of therapy	19%	67%	<0.001	30-day readmissions	14.5%	7.7%	0.22	<i>C. difficile</i> infections	4.8%	1.5%	0.28
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<p>Followup Results SAY:</p> <p>Three years after the intervention treatment of CAP was reassessed. No additional interventions had occurred in the intervening years. Three years after the intervention, the median duration of therapy remained 7 days, there were few to no excess antibiotic days and the house staff narrowed therapy in even more cases. 30-day readmissions and <i>C. difficile</i> infections remained low. A multifaceted syndrome-specific intervention that specifically aimed to integrate house staff into the decision-making process led to sustained improvement in CAP management.</p>	<p>Slide 29</p> <p style="text-align: center;">Followup Results</p> <table border="1" data-bbox="919 352 1495 562"> <thead> <tr> <th></th> <th>Baseline n=56</th> <th>Intervention n=63</th> <th>3 years later n=72</th> </tr> </thead> <tbody> <tr> <td>Median duration of therapy</td> <td>10 days</td> <td>7 days</td> <td>7 days</td> </tr> <tr> <td>Median excess antibiotic days</td> <td>4 days</td> <td>1 day</td> <td>0 days</td> </tr> <tr> <td>Narrowing of therapy</td> <td>19%</td> <td>67%</td> <td>80%</td> </tr> <tr> <td>30-day readmissions</td> <td>14.5%</td> <td>7.7%</td> <td>8%</td> </tr> <tr> <td><i>C. difficile</i> infections</td> <td>4.8%</td> <td>1.5%</td> <td>1%</td> </tr> </tbody> </table> <p>Patient characteristics were similar among the three periods¹¹</p> <p><small>Table adapted from L.Dix, Ferrata RA, Avdic E, et al. Sustained Impact of an Antibiotic Stewardship Intervention for Community-Acquired Pneumonia. Infect Control Hosp Epidemiol. 2016 Oct;137(10):1242-6. PMID: 27488511</small></p> <p>AHRQ Safety Program for Improving Antibiotic Use – Acute Care Behavior Changes 29</p>		Baseline n=56	Intervention n=63	3 years later n=72	Median duration of therapy	10 days	7 days	7 days	Median excess antibiotic days	4 days	1 day	0 days	Narrowing of therapy	19%	67%	80%	30-day readmissions	14.5%	7.7%	8%	<i>C. difficile</i> infections	4.8%	1.5%	1%
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<p>Summary SAY:</p> <p>In summary, understanding theories of diffusion of innovation and behavior change can help in designing successful stewardship interventions. ASPs should tailor their messages and interventions based on the audience. ASPs should work to engage both the minds and hearts of prescribers.</p>	<p>Slide 30</p> <p style="text-align: center;">Summary</p> <ul style="list-style-type: none"> • ASPs should understand how theories of diffusion of innovation and behavior change can help in designing successful stewardship interventions. • ASPs should tailor their messages and interventions based on the audience. • ASPs should work to engage both the minds and hearts of prescribers. <p>AHRQ Safety Program for Improving Antibiotic Use – Acute Care Behavior Changes 30</p>																								
<p>Disclaimer SAY:</p> <p>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.</p> <p>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.</p>	<p>Slide 31</p> <p style="text-align: center;">Disclaimer</p> <ul style="list-style-type: none"> • 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. <p>AHRQ Safety Program for Improving Antibiotic Use – Acute Care Behavior Changes</p>																								

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<p>References</p>	<p>Slide 33</p> <p style="text-align: center;">References</p> <ol style="list-style-type: none"> 8. Durrell G. St Lucia parrot. Durrell Wildlife Conservation Trust. URL:http://wildlife.durrell.org/animals/birds/st-lucia-parrot/. Accessed June 7, 2017. 9. Avdic E, Cushinotto LA, Hughes AH, et al. Impact of an antimicrobial stewardship intervention on shortening the duration of therapy for community-acquired pneumonia. Clin Infect Dis. 2012 Jun;54(11):1581-7. PMID: 22495073. 10. el Moussaoui R, de Borgie CA, van den Broek P, et al. Effectiveness of discontinuing antibiotic treatment after three days versus eight days in mild to moderate-severe community acquired pneumonia: randomised, double blind study. BMJ. 2006 Jun 10;332(7554):1355. PMID: 16763247. 11. Li DX, Ferrada MA, Avdic E, et al. Sustained impact of an antibiotic stewardship intervention for community-acquired pneumonia. Infect Control Hosp Epidemiol. 2016 Oct;37(10):1243-6. PMID: 27498601. <p>AHRQ Safety Program for Improving Antibiotic Use – Acute Care Behavior Changes 33</p>