

# Spotlight on Health

## Antibiotic Stewardship

Antibiotic stewardship is the responsible use of antibiotics. This means using the right dose for the right amount of time; it also means using antibiotics only when they are needed to treat or prevent infectious disease.<sup>1</sup> (Antimicrobial stewardship is a broader term that includes drugs used to treat all microbes, and healthcare providers should also be aware of resistance to drugs used to treat viruses, fungi, and parasites. However, this newsletter focuses on antibiotics because most threats are resistant bacteria.<sup>1</sup>)

The Centers for Disease Control and Prevention (CDC) considers stewardship a national priority.<sup>2</sup> They believe that proper use of antibiotics will limit antibiotic resistance and adverse events in patients. Healthcare providers can help improve patient safety and extend the effectiveness of these critical drugs through their proper use.

### Misuse of Antibiotics

Over 30% of prescriptions for antibiotics are not needed or could be improved.<sup>3,4</sup> This widespread misuse has contributed to the rise of resistance.<sup>2</sup> Since penicillin was widely introduced in 1943, many bacteria have become resistant to antibiotics. Some are even resistant to more than 1 class of antibiotic.<sup>1</sup> Misuse also puts patients at unneeded risk of drug-drug interactions, side effects, and adverse events.

Each year in the United States, antibiotic resistance and adverse events cause substantial morbidity and mortality.

- *Antibiotic-resistant bacteria*, such as methicillin-resistant *Staphylococcus aureus* (MRSA), infect an estimated 2 million people. These infections are estimated to kill over 20,000 people.<sup>1</sup>
- *Allergic reactions* to antibiotics cause more than 110,000 visits to the emergency department. Allergies also make the drug useless for the patient in the future, even if the bacterial strain is sensitive to it.<sup>1</sup>
- Clostridium difficile infections (CDIs), which are usually related to antibiotics, occur in almost a quarter of a million people. An estimated 14,000 people die from these opportunistic infections.<sup>1</sup>

### Antibiotic Stewardship Has a Proven Impact

Studies show that hospital antibiotic stewardship programs improve the safety and quality of patient care by:

- Reducing antibiotic resistance<sup>5,6</sup>
- Reducing adverse events,<sup>5</sup> including CDI<sup>3,7</sup>
- Reducing costs<sup>8</sup>



### Resistance-associated Threats<sup>1</sup>

#### Urgent Threats

- *C. difficile*<sup>a</sup>
- Carbapenem-resistant Enterobacteriaceae (CRE)
- *Neisseria gonorrhoeae*

#### Serious Threats

- *Acinetobacter*
- *Campylobacter*
- *Candida*
- Enterobacteriaceae (ESBLs<sup>b</sup>)
- *Enterococcus*
- *Pseudomonas aeruginosa*
- Non-typhoidal *Salmonella*
- *Salmonella* Typhi
- *Shigella*
- *Staphylococcus aureus*
- *Streptococcus pneumoniae*
- *Mycobacterium tuberculosis*

#### Concerning Threats

- *Staphylococcus aureus*
- Group A *Streptococcus*
- Group B *Streptococcus*

<sup>a</sup> Not resistant but included because directly related to antibiotic use.

<sup>b</sup> ESBL, extended spectrum  $\beta$ -lactamase producing.

## What You Can Do

The CDC recommends a review of antibiotics 2 to 3 days after they are started. The review allows a physician to reassess the choice of antibiotics when more clinical and diagnostic information is available.<sup>1,2</sup> Part of the review should include culture and test results that were ordered before antibiotics were started.

The CDC also suggests handling some common prescribing scenarios as follows<sup>9</sup>:

- *MRSA*: Test to confirm the presence of MRSA in clinically relevant specimens. Use methicillin to treat susceptible staph infections; reserve vancomycin to treat resistant infections.
- *Pneumonia*: Test to confirm that the symptoms are caused by bacteria. Do not treat for longer than recommended. Post-hospital treatment plans should factor in antibiotics received during the hospital stay.
- *Urinary tract infections (UTI)*: Confirm that positive culture results are caused by bacterial infection, not colonization: check patient for signs and symptoms of UTI and do a urinalysis with all cultures. Do not treat for longer than recommended. Post-hospital treatment plans should factor in antibiotics received during the hospital stay.

## How Laboratory Testing Can Help

Laboratory testing plays an important role in stewardship. Cultures, antibody tests, and nucleic acid-based tests can help determine the<sup>2</sup>.

- *Cause of illness (bacteria vs virus)*: A physician can test for viruses or bacteria to determine if antibiotics or only supportive therapy is the best choice.
- *Susceptibility to prescribed (or potential) antibiotic*: A physician can test the susceptibility of bacteria to different antibiotics in order to ensure the patient receives the most effective therapy.
- *Resistant strains (eg, MRSA)*: A physician can test for resistant strains to ensure the patient receives the correct treatment; the physician can then take the precautions necessary to minimize spread of the strain.

## References

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