AN ERA OF ANTIMICROBIAL RESISTANCE

The Rising Threat of Superbugs

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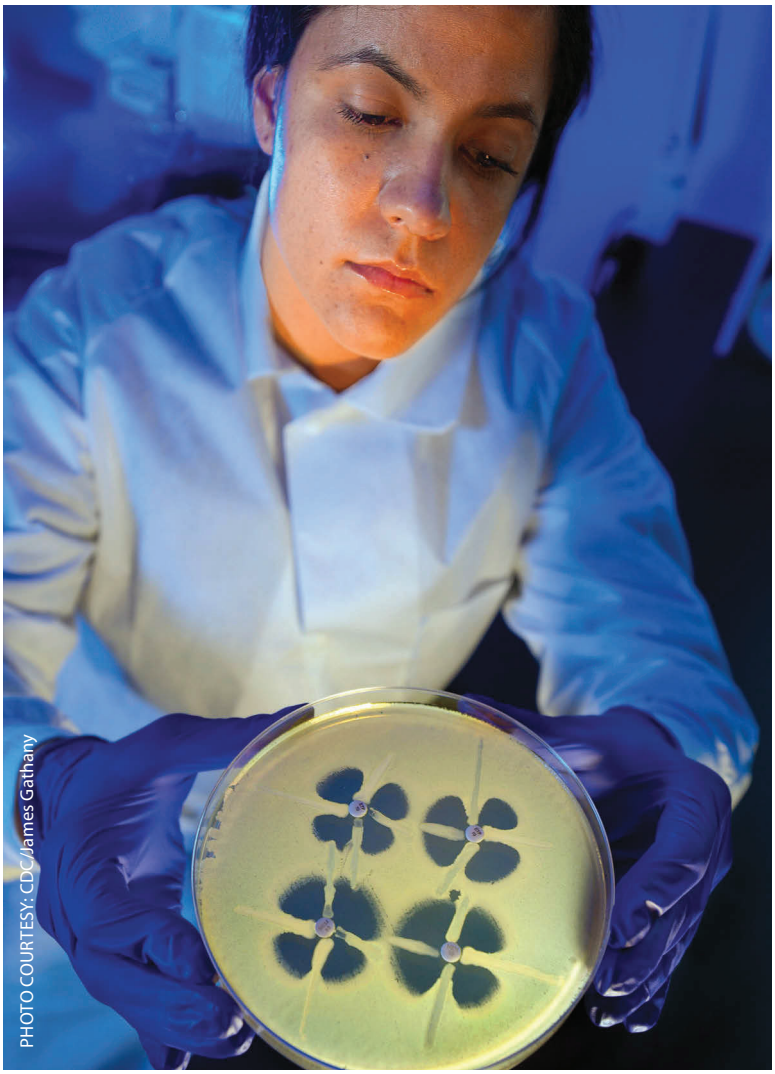

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This image depicts a CDC microbiologist holding an opened Petri dish culture plate, demonstrating the results of a modified Hodge test (MHT), which is used to identify resistance in bacteria known as **Enterobacteriaceae**. *Bacteria that are resistant to carbapenems, which are considered "last resort" antibiotics, produce a distinctive clover-leaf shaped growth pattern, as seen in this case.*

Each year, the U.S. Centers for Disease Control and Prevention (CDC) estimates that over 722,000 hospitalized patients contract a healthcare associated infection (HAI), resulting in over 75,000 deaths. In September 2013, the CDC released new evidence of emergent antimicrobial resistance threats and categorized them into categories of urgency. According to the new report, at least 2 million people become infected with bacteria that are resistant to antibiotics and at least 23,000 people die each year as a direct result of these infections.[1] Most HAIs are caused by one or more of the three common sources of contamination: the contaminated hands of the healthcare provider or patient, the contaminated environment and finally the contaminated skin of the patient. Each of these sources of contamination can be directly impacted by the daily work of the environmental services (EVS) team.

It is standard practice for many surgical procedures to administer antibiotic prophylaxis to reduce the risk for a surgical site infection (SSI). With this routine practice comes the potential risk for antimicrobial resistance. Some physicians may over-prescribe antibiotics, many of which are thought to be unnecessary such as those used to "treat" viral infections or blood culture contaminants. This threat combined with a potentially unsanitary environment can serve as a recipe of HAI transmission and also a breeding ground for antimicrobial resistance.

The CDC has identified three bacteria that have reached critical threat level: *Clostridium difficile* (*C. difficile*), Carbapenem-resistant *Enterobacteriaceae* (CRE), and drug-resistant *Neisseria gonorrhoeae*. Several other multi-drug resistant organisms (MDROs) such as MRSA were also identified as serious threats to society. In addition, almost 250,000 people each year require hospital care for *C. difficile* infections. In most of these infections, the use of antibiotics was a major contributing

factor leading to the illness. At least 14,000 people die each year in the United States from *C. difficile* infections, and many could have been prevented thereby mitigating potential antimicrobial resistance.

Antibiotic-resistant infections add considerable and avoidable costs to the already overburdened U.S. healthcare system. In most cases, antibiotic-resistant infections require prolonged and/or costlier treatments, extend hospital stays, necessitate additional doctor visits and healthcare use, and result in greater disability and death compared with infections that are easily treatable with antibiotics. The total economic cost of antibiotic resistance to the U.S. economy has been difficult to calculate to date. Estimates vary but have ranged as high as $20 billion in excess direct healthcare costs, with additional costs to society for lost productivity as high as $35 billion a year (2008 dollars). EVS plays a unique and evolving role by maintaining a clean and sanitary environment, but also in appropriately using cleaning and disinfectant agents according to the manufacturer's instructions for use. Appropriate use of disinfectants for both general disinfection and more pathogen specific indications (i.e., *C. difficile* or Norovirus) will minimize the risk for potential contamination.

The use of antibiotics is the single most important factor leading to antibiotic resistance around the world. Antibiotics are among the most commonly prescribed drugs used in human medicine; however, up to 50 percent of all the antibiotics prescribed for people are not needed or are not optimally effective as prescribed. Antibiotics are also commonly used in food-producing animals to prevent, control and treat disease, and to promote the growth of these animals. The use of antibiotics for promoting growth is not necessary, and the practice should be phased out.

Because of the overlap of the use of antibiotics in both medical and consumer settings, physicians as well as healthcare facilities must be even more judicious with the use of these powerful pharmaceuticals. Many facilities establish a restrictive protocol of available antibiotics that is closely based on the facility's antibiogram. This practice effectively limits the inappropriate use of drugs known to cause resistance at the specific institution. Additionally, EVS should have a consistent seat at this table and represent the interest of the healthcare environment. Facility antibiograms can be closely examined to ensure the healthcare disinfectant has the relevant efficacy claims.

The other major factor in the growth of antibiotic resistance is transmission of the resistant strains of bacteria from person to person, or from the non-human sources in the environment, including food.

There are four core actions that the CDC has identified to fight these deadly infections:[2]

- Preventing infections and preventing the spread of resistance.
- Tracking resistant bacteria through the electronic medical record and also the duration of the patient's stay.
- Improving the use of today's antibiotics. This includes a comprehensive antimicrobial stewardship campaign that is hard-wired into the culture of the hospital.
- Promoting the development of new antibiotics and developing new diagnostic tests for resistant bacteria. In addition, healthcare facilities must also implement rapid identification technologies for quickly identifying these high-risk microorganisms, and then placing the affected patients into the appropriate type of isolation.

Bacteria will inevitably find ways of resisting the antibiotics that are developed, which is why aggressive action is needed now to keep new resistance from developing and to prevent the resistance that already exists from spreading.

EVS leaders should collaborate with the facility's clinical pharmacy department, infection preventionists, and pharmacy and therapeutics committees to closely monitor trends and take action as necessary to reduce the risk for resistance. As experts in the care of the environment, EVS is able to offer a unique perspective on decreasing potential resistant organisms in the environment and ensuring the appropriate use of EVS "antibiotics" otherwise known as disinfectants. ●

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REFERENCES

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