

Stamping Out Superbugs

A Clear and Present Danger

Bacteria are found nearly everywhere. They're in your food, recreational waters, and even the air. Some bacteria help keep you healthy. But some can make you very sick.

If you're healthy, your body may fight off harmful bacteria on its own. But sometimes you need antibiotics. These are drugs that kill bacteria or stop them from growing. They can be critical for preventing or fighting a life-threatening disease. But over time, bacteria can become resistant to drugs that are misused or overused. That means that the drug will no longer stop them.

In the U.S., drug-resistant bacteria infect nearly 3 million people and kill more than 35,000 every year. These "superbugs" have evolved to

protect themselves against drugs. This can happen through changes in their **genes**. Sometimes antibiotics don't stop all the bacteria in an infection. Any bacteria that survive will continue to multiply. They may gain further drug resistance.

This makes it even more difficult to control them with antibiotics.

Drug-resistant infections pose many dangers. Bacteria that are resistant to one drug may still be treatable with stronger drugs. But these backup drugs can have more serious side effects. Bacteria that become resistant to too many drugs may be untreatable. Some medical procedures that carry a high risk of infection, like organ transplants, may become more dangerous without effective antibiotics.

Researchers are studying new ways to fight superbugs. Some are working on novel antibiotics. Another strategy uses phages, which are viruses that attack bacteria.

A team led by Dr. Vance Fowler, an infectious disease expert at Duke University, is leading a study of a phage mixture that attacks *Pseudomonas aeruginosa* bacteria. These bacteria tend to spread in hospitals and other health care settings. They're often resistant to many antibiotics. Fowler's team is testing whether phages can be used to treat people with the infection.

They're also working on a rapid test that can tell the difference between infections caused by bacteria and those caused by viruses. Doctors could use the test to decide how to treat the infection. That could help avoid unnecessary antibiotic prescriptions.



Antibiotics don't work against viruses. Viruses cause common colds and the flu, but some bacteria can cause similar symptoms. Sometimes, doctors must prescribe antibiotics before they have the test results that confirm a bacterial infection.

"When you have a critically ill patient in front of you, and you are not going to know what you're treating for several days, you have to make a decision," Fowler explains. Not starting treatment immediately can lead to life-threatening infections. But giving antibiotics to a patient who doesn't need them can also cause problems. They can cause side effects and lead to superbugs.

There are ways people can help guard against superbugs. Use antibiotics only when they're needed. If a doctor doesn't prescribe antibiotics, don't pressure them to change their mind. And when you do get antibiotics, take them exactly as prescribed.

The best way to protect yourself and your family against harmful bacteria is to avoid infection in the first place. See the Wise Choices box for tips. ■



Wise Choices

Guard Against Bacteria

- Maintain a healthy lifestyle, including proper diet and exercise. This can help prevent illnesses.
- Get all recommended vaccinations. To learn more, visit www.cdc.gov/vaccines/schedules.
- Wash your hands with soap and water regularly.
- Cover your mouth when you cough or sneeze. Stay home when you're sick.
- If you're prescribed an antibiotic, take it exactly as instructed by your doctor. Don't share your antibiotics with others or save them for future use.
- Don't pressure your doctor to prescribe an antibiotic or take antibiotics prescribed for someone else. Overuse and misuse of antibiotics can create drug-resistant bacteria.

Adapted from the U.S. Centers for Disease Control and Prevention (CDC).



Definitions

Genes

Stretches of DNA that define an organism's characteristics.



Web Links

For more about antibiotic resistance and an online-only Q&A, see "Links" in the online article: newsinhealth.nih.gov/2023/10/stamping-out-superbugs