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Can a "Super Bacteria" Be Stopped?

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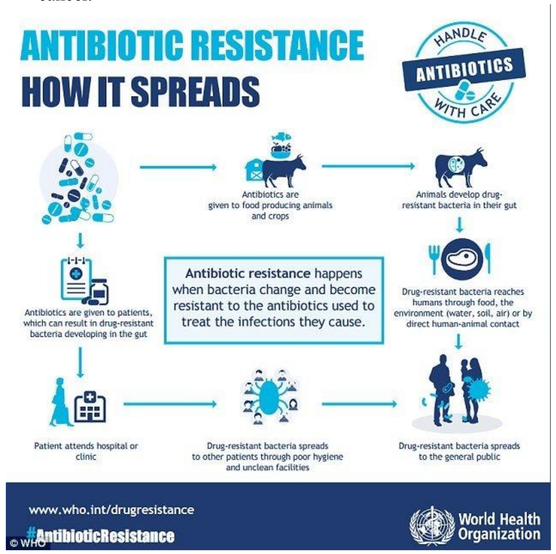
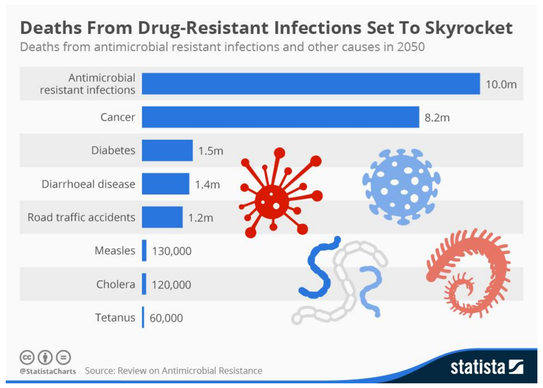
Background

- Superbugs are strains of bacteria that are resistant to several types of antibiotics. Each year these drug-resistant bacteria infect more than 2 million people nationwide and kill at least 23,000, according to the U.S. Centers for Disease Control and Prevention (CDC).
- Antibiotic resistance is now widespread in almost every country.
- Superbugs are strains of bacteria, viruses, parasites, and fungi resistant to several types of antibiotics commonly used to treat the infections.
- By 2050, antibiotic-resistant bugs could kill an estimated 10 million people each year. This would surpass even cancer.

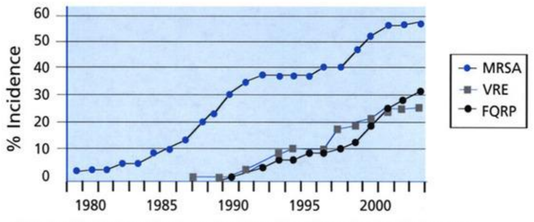


Why do cases of antibiotic resistance cause great concern?

- New resistance mechanisms and methods are emerging, and their global spread threatens our ability to treat common infectious diseases, which leads to prolonged illness and death, and even the inability to treat this disease as a result of this phenomenon.
- Medical procedures like organ transplants and chemical treatments for cancer, management of diabetes and major surgeries such as cesarean section or hip replacement) is going to be dangerous without successful antibiotics to prevent, treat and eliminate infections.
- The increase of antibiotic resistance will increase healthcare costs due to the long periods of hospital stay and the need for intensive care.



This chart puts the numbers of people predicted to die of antibiotic-resistant infections by 2050 into terrifying perspective. Antibiotic-resistant bugs could kill an estimated 10 million people each year. Shockingly, this would surpass even cancer.
The chart below shows the rise of antibiotic resistance in different common infections.



MRSA = methicillin-resistant *Staphylococcus aureus*; VRE = Vancomycin-resistant *enteroccoci*
FQRP = Fluoroquinolone-resistant *Pseudomonas aeruginosa*

source:The Atlantic How Superbugs Will Affect Our Health Care Costs.

Study Objectives

This research will help inform the general public of antibiotic resistance bacteria by reviewing how the bacteria can cause an infection, highlighting the latest effort to control it, and showing why it has become one of the world's most pressing public health concerns. I used the secondary study research method which utilizes already existing data to summarize and collate the information to increase the overall effectiveness of the research.

Results

- Antibiotics should only be used when prescribed by health professionals. Unfortunately, health professionals themselves are not equipped with adequate knowledge to prescribe antibiotics.
- Officials have included 18 bacteria in the list of threats against antibiotics, divided into three categories: emergency, dangerous and disturbing. Some of the drug-resistant bacteria or superbugs are methicillin-resistant Staphylococcus aureus(MRSA),vancomycin-resistant S. aureus (VRSA), extended-spectrum beta-lactamase (ESBL), multidrug-resistant A. baumannii (MRAB).

It is estimated that superbugs cause about 700,000 deaths worldwide each year, and if this problem is left unresolved, this number is expected to rise to 10 million by 2050, while the cumulative costs of both patients and systems are expected to reach Health worldwide to $100 trillion.

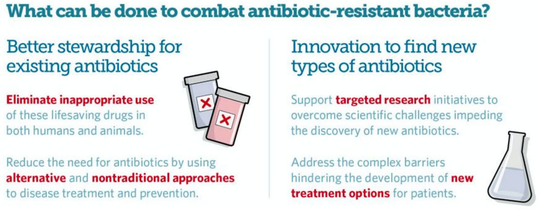
Conclusion

Source: the Pew Charitable Trusts, 2019

A new report issued by the American Centers for Disease Control (CDC) revealed more people are infected with antibiotic-resistant bacteria than ever before. The research shows that germs have become particularly adept at teaching each other how to get rid of antibiotics, although the number of hospital infections has decreased, some infections are increasingly being discovered elsewhere. And anyone can catch this bacteria anywhere, which are difficult to treat, are a big problem in the medical world, as many of these bacteria that cause diseases no longer respond to the drugs available at the present time.

The researchers pointed out bacteria that are resistant to antibiotics and their genes resistant to these antibiotics are spread globally among people, in food commodities, animals and plants, and in the environment (in soil, water, and air).

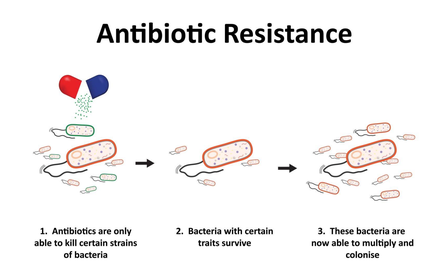
- Antibiotic resistance occurs naturally over time, and this is usually a very slow process. However, the overuse of antibiotics has led to a sharp increase in resistant bacteria, which can be challenging to eliminate.
- . Bacteria can become resistant to antibiotics in two ways; they either possess antibiotic resistance properties, or they gain the ability to resist antibiotics.
- Many antibiotics prescribed to people and to animals are unnecessary. And the overuse and misuse of antibiotics helps to create drug-resistant bacteria.
- A study showed that antibiotics may be less effective for treating a common type of sinus infection. This kind of research can help prevent the misuse and overuse of antibiotics.
- Scientists know little about how the genes resistant to antibiotics develop in the environment.
- In 2000, a stronger strain of the bacteria emerged. This strain is resistant to fluoroquinolone antibiotics, which are commonly used to treat other infections. This strain has spread throughout North America and Europe, infecting and killing more people wherever it spreads.



Current antibiotic status:

- Antibiotic resistance is now widespread in almost every country.
- Patients with infections caused by drug-resistant germs are more exposed, and these patients require more health care compared to patients with non-resistant strains of the same strain of germs.

Future Implications



Source: samnewslink.com/worrisome-antibiotic-resistant-infections-could-be-taking-more-lives

- Bacteria can lose antibiotic-resistant traits, but this reverse process occurs more slowly. If the use of antibiotics that gave rise to bacterial resistance is stopped, bacteria can respond to this antibiotic again.
- In the next phase scientists plan to study whether the resistance is occurring in more bacteria, and they are also planning to examine antibiotic combinations that can be effectively treated as life threatening infections without enhancing resistance.
- A rapid diagnostic tool for superbug bacteria is developmenting to diagnose, and determine the type of infection in three to four hours compared to three days, which will lead to a faster treatment, thus reducing mortality.

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