Will we really die from minor scratches in the future? Q&A with antibiotic resistance expert

June 17 2024, by James P. O'Gara

Credit: Unsplash/CC0 Public Domain

According to a new report from the World Health Organization (WHO), the number of antibacterial agents, including antibiotics, has increased from 80 in 2021 to 97 in 2023. However, the health agency says there is a "pressing need for new, innovative agents for serious infections and to

replace those becoming ineffective due to widespread use."

The Conversation spoke to James P. O'Gara, a professor of microbiology, about the problem of antimicrobial resistance, or AMR.

Is the 'in the future you'll get a scratch and die from the infection' argument overdone? Most people get cuts and scrapes yet don't need antibiotics.

Most cuts and scratches do not cause life-threatening infections. Many people with infections can recover on their own, although antibiotics can speed up this recovery.

But for some people, including people with weakened immune systems, infections can be more serious and antibiotic treatment is essential. Our grandparents and great-grandparents who had no access to antibiotics always worried about infections. The risk now is that, as bacteria become more and more resistant to antibiotics, these life-saving drugs will stop working.

How many people are dying from superbug infections, and is the situation getting worse?

A UK government study published in 2014 estimated that, globally, 700,000 people die every year from resistant infections, including malaria and HIV. A more recent study estimated the number of deaths from bacterial resistance alone, globally, to be 1.27 million in 2019. These estimates indicate that the problem of resistance is getting worse, which is in keeping with increased antibiotic use in humans between 2000 and 2018

Who are the biggest culprits of antibiotic overuse: farmers? Hospital doctors? GPs?

More than half of all antibiotics are used **administered to animals?** on farms. Most of these are used to enhance weight gain and prevent infection rather than treat sick animals.

How many so-called 'superbugs' are there and where do most of these infections occur?

There are 15 antibiotic-resistant bacteria on the priority list of the World Health Organization. Six of these can be called superbugs that are resistant to multiple antibiotics. Superbug infections are mainly a problem in hospitals, but they can also occur in our communities.

Is antibiotic drug development an arms race with no end? Surely, whatever new drug we develop will just spur the evolution of the bug it's designed to kill?

This may well be true. Up to now, resistance has emerged to all licensed antibiotics. This is hardly surprising. Microorganisms are the most abundant life form on Earth and predate humans by billions of years. They haven't made it this far, and for this long, without remarkable endurance. We have no choice but to continue searching for better ways to prevent and treat infections that they cause.

Should you really take the whole course of antibiotics?

Several studies show that shorter courses of antibiotics can be as effective as longer courses. But it would be unwise for patients to make

their own decisions about this. It is important that an adequate dose of antibiotic is used to treat an infection, and the duration of treatment is important to achieve this.

Why don't GPs just say 'no' when patients ask for antibiotics? Why are patients blamed and shamed?

I agree that patients should not feel shamed for taking antibiotics. After all, they only take antibiotics that have been prescribed by their doctor.

Using antibiotics to treat bacterial infections can be important. But most infections are caused by viruses for which antibiotics don't work. Of course, when we are sick we are not thinking about what type of infection we have, we just want to feel better.

Parents worried about a young child are not concerned about antibiotic resistance when they go to their GP. Ultimately, GPs have a responsibility to only prescribe antibiotics when they are needed and patients need to trust their GP to make this decision.

Pharmaceutical companies famously don't want to develop new antibiotics because there's no money in it for them. If this issue is an existential threat, why don't governments fund labs to develop new antibiotics?

Governments do recognize this problem. Pharmaceutical companies have a crucial role to play. The US, UK and EU are using several mechanisms to financially reward companies for new antibiotic development.

However, the WHO has warned that there are not enough new antibiotics being developed. It's a long and arduous process to bring a new antibiotic to patients.

The Wellcome Trust, a charitable foundation, reported that only one in 70 new antibiotics make it to market. Support for research in universities and industry is important to find new drugs that can be brought through the antibiotic development pipeline by pharmaceutical companies.

Vaccinologists are working on universal vaccines. Is there such a concept in antibiotic development?

Yes, there is. An analogous concept in antibiotic development would be the search for immutable drug targets, or in other words antibiotic targets that cannot mutate to cause resistance without affecting the survival of the bacteria.

What is humanity's best hope for beating the resistance problem?

As we continue to protect the antibiotics that we have, scientists are exploring exciting new ways to tackle this problem. New vaccines to prevent infection, viruses that target bacteria (called phages), entirely new antibiotics, antimicrobial peptides (short parts of proteins) and nucleic acids (short pieces of DNA) have all shown potential.

Historically, many antibiotic-producing fungi and bacteria were found in soil, where they used these compounds to compete with each other. Unfortunately, most soil microbes cannot grow in the laboratory. Scientists are now using clever ways to grow previously "unculturable" microbes from different samples and discover new antibiotics.

Another approach is to develop drugs that don't kill bacteria but rather limit the damage they cause humans. Drugs like this should not select for resistance and might be enough to treat infections if our immune systems can finish the job.

Finally, using antibiotics in new and different combinations has proven potential. Similarly, new adjuvants (non-antibiotic compounds) to enhance the power of older antibiotics may allow them to be used against resistant infections.

Provided by The Conversation

Citation: Will we really die from minor scratches in the future? Q&A with antibiotic resistance expert (2024, June 17) retrieved 26 June 2024 from https://medicalxpress.com/news/2024-06-die-minor-future-qa-antibiotic.html