



CAN WE BEAT THE INCREASING DANGER OF ANTIMICROBIAL RESISTANCE?



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What is antimicrobial resistance, and why is it a concern?

Antimicrobial resistance arises when microbes evolve following exposure to antimicrobial agents. Often referred to as 'superbugs', microbes that develop resistance to antimicrobials present a serious danger to public health, threatening the ability to treat common infectious diseases such as pneumonia, tuberculosis and gonorrhoea.¹ Antimicrobial resistance can also greatly increase the risks involved with common, major medical procedures, including organ transplants, caesarean sections and hip replacements.¹ Furthermore, antimicrobial resistance places a major economic burden on healthcare systems due to increases in the cost of healthcare.¹

“*Antimicrobial resistance is one of the greatest threats we face as a global community*”

Amina Mohammed, UN Deputy Secretary-General and Co-Chair of the IACG²

Antibiotic resistance is perhaps the most well-publicised variant of antimicrobial resistance. Resistance to first-line antibiotics is widespread globally, and many infections are already untreatable. For example, infections caused by methicillin-resistant *Staphylococcus aureus*, better known as MRSA, are estimated to be 64% more deadly than infections caused by non-resistant forms.¹ Furthermore, there were 480 000 new cases of multidrug-resistant tuberculosis in 2014, only half of which were successfully treated.¹

“*More and more common diseases, including respiratory tract infections, sexually transmitted infections and urinary tract infections, are untreatable²*”

Unfortunately, antimicrobial resistance is not just limited to bacteria – fungi, viruses and parasites can also develop resistance. In a series of surveys carried out by the World Health Organization between 2014–2016, the prevalence of acquired drug resistance in adults with HIV receiving antiretroviral therapy ranged from 3–29%.³ In 2016, resistance to the first-line treatment for malaria caused by *Plasmodium falciparum* was confirmed in Southeast Asia, with multidrug resistance occurring along the Cambodia–Thailand border.¹



What causes antimicrobial resistance?

While the ability of microbes to develop resistance is a natural phenomenon, antimicrobial resistance is being accelerated by the global over-prescription and inappropriate use of antimicrobials.

For instance, antimicrobials are often incorrectly used to treat common viral infections, including colds and flu.¹ Antimicrobials are also misused in agriculture, where they are given to animals to promote growth and prevent disease.¹ Resistant microbes can spread easily, not only from person to person but also between humans and animals, via animal products. Poor infection control, inadequate sanitation and inappropriate food handling are encouraging the spread of antimicrobial resistance and threatening global food security.^{1,4}

What is being done to prevent further antimicrobial resistance?

Combating antimicrobial resistance requires a coordinated response. A global action plan unveiled at the World Health Assembly, Geneva, Switzerland, in 2015 aimed to improve awareness of antimicrobial resistance, strengthen monitoring and research, reduce infection rates, optimise the use of existing antimicrobials and secure investment for the development of new drugs.⁴

The World Health Organization is helping countries to develop national action plans and strengthen their healthcare and surveillance systems to combat antimicrobial resistance. It is also collaborating with the Food and Agriculture Organization of the United Nations and World Organization for Animal Health to encourage practices that can prevent the emergence and spread of antimicrobial resistance, such as the more stringent use of antibiotics in humans and animals.⁴ World leaders have also signalled their commitment to tackling the threat of antimicrobial resistance by signing a political declaration at the United Nations General Assembly, New York, USA, in 2016.^{1,4}

Since its inception in 2015, **World Antibiotic Awareness Week** has been held every November with the intent of raising awareness and highlighting the best healthcare practices among the general public, healthcare workers and policymakers.^{1,4,5}

“*If no action is taken... drug-resistant diseases could cause 10 million deaths each year by 2050 and... by 2030, antimicrobial resistance could force up to 24 million people into extreme poverty*”



Are there any pharmaceutical strategies to tackle antimicrobial resistance?

Unfortunately, antimicrobial resistance is spreading faster than the development of new drugs, highlighting the urgent need for further investment into research and development. However, recent discoveries offer great promise, including the new antibiotic, cefiderocol.⁶ While most new antibiotics target bacteria via widely used molecular mechanisms – therefore, making them susceptible to the same forms of resistance already in existence – cefiderocol exploits a basic requirement for iron, which is required for bacterial replication.⁶ By binding to iron, cefiderocol is absorbed into bacteria, undetected, where it can destroy bacteria by disrupting the protective cell wall.⁶

It has outperformed conventional antibiotics in trials of older adults with multidrug-resistant infections.⁶

More recently, a teenager with cystic fibrosis became the first person in the world to be treated with a cocktail of bacteriophages (viruses that kill bacteria but do not harm human cells) after developing a multidrug-resistant infection following a lung transplant.⁷ The specificity and low toxicity of bacteriophages make them an attractive candidate for further clinical investigation.

Antimicrobial resistance is a major concern for healthcare, agricultural and economic systems around the world. By raising awareness, ensuring the considered use of antimicrobials and investing in new treatment strategies, we can hopefully prevent the development of further antimicrobial resistance.

1. World Health Organization. Antimicrobial resistance. Fact sheet. 15 February 2018. <https://www.who.int/en/news-room/fact-sheets/detail/antimicrobial-resistance>. Accessed 13 November 2019

2. Food and Agriculture Organization of the United Nations. New report calls for urgent action to avert antimicrobial resistance crisis [press release]. 29 April 2019. <http://www.fao.org/news/story/en/item/1191036/icode/>. Accessed 13 November 2019

3. World Health Organization. HIV drug resistance report 2019. July 2019. <https://www.who.int/hiv/pub/drugresistance/hivdr-report-2019/en/>. Accessed 13 November 2019

4. World Health Organization. Antibiotic resistance. Fact sheet. 5 February 2018. <https://www.who.int/en/news-room/fact-sheets/detail/antibiotic-resistance>. Accessed 13 November 2019

5. World Health Organization. World Antibiotic Awareness Week 2019. 2019. <https://www.who.int/news-room/events/detail/2019/11/18/default-calendar/world-antibiotic-awareness-week-2019>. Accessed 13 November 2019

6. Matthews-King A. Antibiotic 'Trojan horse' could defeat superbugs causing global medical crisis, trial finds. In: *The Independent*. 25 October 2018. <https://www.independent.co.uk/news/health/antibiotic-resistance-bacteria-infection-superbug-ecoli-uti-symptoms-lancet-a8601641.html>. Accessed 13 November 2019

7. Matthews-King A. UK girl first in world to have deadly superbug infection treated with bacteria-hunting GM viruses. In: *The Independent*. 8 May 2019. <https://www.independent.co.uk/news/health/antibiotic-resistance-bacteria-virus-lung-transplant-cystic-fibrosis-gosh-a8905436.html>. Accessed 13 November 2019

Alpharmaxim has extensive experience in helping healthcare companies across the world communicate with physicians and patients about a number of subject areas, including antibiotics, vaccinations and rare diseases.



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