

ANTIBIOTIC & ANTIMICROBIAL RESISTANCE

A GLOBAL HEALTH THREAT THAT CANNOT BE IGNORED



Antimicrobial resistance (AMR) occurs when microorganisms develop the ability to survive treatments that were once effective against them. As resistance increases, infections become more **difficult to treat**, leading to **longer hospital stays, higher healthcare costs, and increased mortality**. Today, AMR is recognized as one of the greatest threats to global public health.

While the term **antibiotic resistance** refers specifically to bacteria becoming resistant to antibiotics, AMR is a broader concept that includes resistance to antibacterial, antifungal, antiparasitic, and antiviral therapies.

In 2019, approximately

1.27 MILLION

deaths were directly attributable to antimicrobial resistance.

5 MILLION

deaths were associated with drug-resistant bacterial infections, approximately.

By 2050, WHO projections estimate that up to

10 MILLION

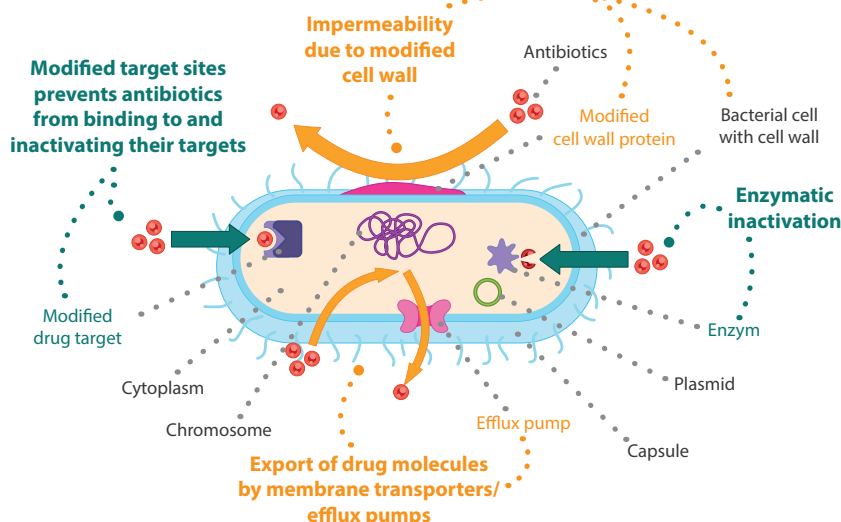
deaths could be caused by antimicrobial resistance annually.

Bacteria are trying to defend themselves against antibacterial agents

=
natural phenomenon

RESISTANCE MECHANISMS

HOW BACTERIA PROTECT THEMSELVES



Bacteria are **remarkably adaptable organisms**. Through genetic mutation and gene transfer, they continuously develop new mechanisms to survive exposure

to antimicrobial agents (e.g., antibiotics). Gram-negative pathogens already employ a **wide variety of defence mechanisms**. This is a selection. ↑

Resistance develops through human/animal/environment interactions ...

- ▶ Human medicine
- ▶ Animal husbandry & food production
- ▶ Environment (water resources & wastewater)

... and spreads across systems:

- ▶ Global mobility (travel & patient transfers)
- ▶ Food chains
- ▶ Environment & water (wastewater discharge)
- ▶ Healthcare facilities

WHO PRIORITY LIST

OF RESISTANT BACTERIAL PATHOGENS

CRITICAL

HIGH

MEDIUM

Acinetobacter baumannii
carbapenem-resistant

Enterobacterales
third-generation cephalosporin-resistant

Enterobacterales
carbapenem-resistant

Mycobacterium tuberculosis
rifampicin-resistant

Salmonella Typhi
fluoroquinolone-resistant

Shigella spp
fluoroquinolone-resistant

Enterococcus faecium
vancomycin-resistant

Pseudomonas aeruginosa
carbapenem-resistant

Non-typhoidal Salmonella
fluoroquinolone-resistant

Neisseria gonorrhoeae
third-generation cephalosporin and/or fluoroquinolone-resistant

Staphylococcus aureus
methicillin-resistant

Group A Streptococci
macrolide-resistant

Streptococcus pneumoniae
macrolide-resistant

Haemophilus influenzae
ampicillin-resistant

Group B Streptococci
penicillin-resistant

... particularly through biofilms

Healthcare water systems can act as reservoirs for resistant gram-negative bacteria and contribute to their persistence and spread ...

You can find these and other challenges as well as strategies for infection prevention and control here:



UNDERAPPRECIATED DRIVERS

Rapid global movement · Limited development of new antibiotics · Environmental reservoirs of resistance · Inadequate infection prevention measures

The sources used can be found at <https://www.i3membrane.com/en/medical/knowledge/sources/>.

Information sheet

MULTIDRUG-RESISTANT GRAM-NEGATIVE BACTERIA