ICU
MANAGEMENT & PRACTICE

Global Burden of Bacterial Antimicrobial Resistance

In 2014, the Review on Antimicrobial Resistance (AMR) predicted that AMR could lead to 10 million deaths by 2050, prompting global attention and commitments from the World Health Organization (WHO) and the United Nations (UN). Despite these efforts, national action plans to combat AMR have seen uneven implementation and funding, leading to uncertain progress.

A global estimate of the burden of bacterial AMR in 2019 found that 1.27 million deaths from bacterial infections were attributable to AMR, but comprehensive data on AMR trends remain limited, particularly in low-income regions like sub-Saharan Africa and South Asia.

Recent research highlights the potential benefits of paediatric vaccines, improved water and sanitation infrastructure, and better infection control practices in reducing AMR-related deaths in low- and middle-income countries (LMICs). Although there was a reported decline in sepsis-related deaths from 1990 to 2017, demographic changes are expected to increase vulnerability to sepsis and AMR mortality. The ongoing overuse of antimicrobials exacerbates the problem, making it crucial to forecast future AMR burdens and evaluate the impact of various policy interventions.

A recent study estimates all-age and age-specific deaths and disability-adjusted life-years (DALYs) attributable to and associated with bacterial AMR for 22 pathogens, 84 pathogen-drug combinations, and 11 infectious syndromes across 204 countries from 1990 to 2021. It utilises a vast dataset comprising multiple sources, including cause of death records, hospital discharge data, and antibiotic use surveys, encompassing over 520 million individual records.

To quantify the AMR burden, the researchers assessed five key components: deaths involving sepsis, the proportion of infectious deaths attributable to specific syndromes, the proportion of syndrome deaths linked to particular pathogens, resistance rates of pathogens to antibiotics, and the excess risk of death or infection duration due to resistance. Using these components, the study defines AMR disease burden through two counterfactual scenarios: one where drug-resistant infections are replaced by drug-susceptible infections and another where they are replaced by no infections.

The study also provides global and regional forecasts of AMR burden through 2050 under three scenarios: a reference scenario predicting the most likely future, a Gram-negative drug scenario focusing on future drug development for Gram-negative pathogens, and a better care scenario anticipating improvements in healthcare quality and access to appropriate antimicrobials. The final estimates are presented at the global, super-regional, and regional levels.

In 2021, an estimated 4.71 million deaths were associated with bacterial AMR, with 1.14 million deaths directly attributable to AMR. Over the past 31 years, trends in AMR mortality showed significant variations by age and location. Deaths from AMR decreased by more than 50% among children under five years, while they increased by over 80% for adults aged 70 and older. AMR mortality decreased in children across all super-regions but increased for individuals aged 5 and older.

Among the pathogens, methicillin-resistant Staphylococcus aureus saw the most significant increase in associated deaths, from 261,000 deaths in 1990 to 550,000 in 2021. Resistance to carbapenems also rose sharply, with associated deaths increasing from 619,000 in 1990 to 1.03 million in 2021.

Forecasts indicate that by 2050, there could be 1.91 million deaths directly attributable to AMR and 8.22 million deaths associated with AMR globally. The regions projected to experience the highest all-age AMR mortality rates are South Asia, Latin America, and the Caribbean. The increase in deaths attributable to AMR is expected to be most pronounced among individuals aged 70 and older, representing 65.9% of all-age

deaths by 2050.

While deaths due to AMR could rise by 69.6% from 2022 to 2050, the increase in DALYs is projected to be much smaller at 9.4%, reaching 46.5 million by 2050. Under a better care scenario, approximately 92 million deaths could be prevented between 2025 and 2050 through improved care for severe infections and better antibiotic access. Additionally, developing a Gram-negative drug pipeline could potentially avert 11.1 million AMR deaths.

Understanding the changing trends in AMR mortality is crucial for making informed decisions about public health interventions. The findings highlight the effectiveness of infection prevention strategies, evident in the reduction of AMR deaths among children under five years old. However, a troubling increase in AMR burden among individuals aged 70 and older reflects the challenges posed by an ageing global population.

The contrasting trends in AMR mortality between younger and older populations account for the moderate projected increase in global DALYs compared to the rise in deaths. Due to the significant variability in AMR burden by age and location, the study emphasises the need for a multifaceted approach to interventions. These should include infection prevention, vaccination, reduction of inappropriate antibiotic use in agriculture and healthcare and research into new antibiotics to mitigate the anticipated increase in AMR-related deaths by 2050.

Source: The Lancet
Image Credit: iStock

Published on : Thu, 3 Oct 2024