Global burden of antimicrobial resistance: essential pieces of a global puzzle

De Kraker, Marlieke; Harbarth, Stéphan Juergen

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Cape Town, Cape Town, South Africa (EC, MMe); Department of Infection Control and Epidemiology, Amrita Institute of Medical Science, Amrita Vishwa Vidyapeetham, Kochi, India (EC, SS); Centre for Antimicrobial Optimisation, Imperial College London, Hammersmith Hospital, London, UK (AHH)

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Christopher J L Murray and colleagues[1] highlight the global impact of the silent antimicrobial resistance (AMR) pandemic. The applied methodology is more thorough than previous efforts,[2] but there are a number of important limitations.

The basic building block for the complex modelling exercise is the fraction of sepsis and infectious syndromes among all deaths, which was based on data from only 16 of 204 countries, with more than 60% of the data coming from the USA. This type of data might not be the most suitable entry point for AMR burden estimation.

Although referred to as a "comprehensive assessment of the global burden of AMR",[1] many issues are not considered. Incidence of drug-resistant infections are not presented, complicating the interpretation of the mortality estimates. The burden estimates covered hospitalised and non-hospitalised patients, but pathogen distributions and case fatality ratios were based on hospital data. Disability-adjusted life-years (DALYs) did not include the effects of re-infection, prolonged treatment, disability, or other long-term sequelae, resulting in only a minor difference between global years of life lost (YLLs; 189 000) and DALYs (192 000). For YLLs, the authors applied the standard life expectancy; however, severe AMR infection mostly affects patients with a reduced life expectancy.[3] Finally, resistance proportions and relative risks (RRs) to determine health burden were kept equal for age, gender, anatomical infection site, and location (RRs only) due to data sparsity. This practical assumption distorts results, reducing the validity of ranking of infection types and geographical regions.

Ongoing studies, such as the Mortality from Bacterial Infections Resistant to Antibiotics (also known as MBIRA) and Predicting the Impact of Monoclonal Antibodies and Vaccines on Antimicrobial Resistance (also known as PrIMAVeRa) studies, will contribute to more precise AMR burden estimates.

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**Marlieke E A de Kraker, Stephan Harbarth*
marlieke.dekraker@hcuge.ch

Infection Control Programme, Geneva University Hospitals and Faculty of Medicine, 1205 Geneva, Switzerland

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Christopher J L Murray and colleagues[1] provide a sobering analysis on the burden of common antimicrobial-resistant infections and a warning that, as a global community, we are rapidly surrendering any advantage we had on treating infections such as pneumonia and sepsis.[2]

However, Murray and colleagues note some weaknesses in the veracity of the collated data, not least from low-income and middle-income countries (LMICs), and infer that poor validity of data could underestimate the burden of antimicrobial resistance (AMR) for LMICs due to antibiotic accessibility. This notion is supported by a 2021 study,[2] which reported that, in six of seven LMICs studied, the cost of the antibiotic influenced accessibility and, in some cases, the cost was deferred to the patient who could not afford second-line and third-line antibiotic combinations, even for the treatment of life-threatening infections.

This Article[1] also highlights the acute need for prospective studies that combine accurate microbiology (including genomics) with detailed epidemiology data, not least from LMICs.[3] Although excellent initiatives (eg, the Fleming Fund) are addressing LMIC AMR surveillance, it is essential that data from LMICs record all socioeconomic and geographical regions to truly address burden across all populations.

Crucially, there is an urgent need for greater engagement and support in LMICs that addresses the vital link between the microbiology laboratory and clinical wards, particularly with regard to critically ill patients.[4] Effective and timely laboratory reporting of AMR with access to appropriate and affordable drugs must now be a global priority.

For more on the **MBIRA study** see https://www.lshtm.ac.uk/research/centres-projects-groups/mbira#about

For more on the **PrIMAVeRa studies** see https://www.primavera-amr.eu/

For more on the **Fleming Fund** see https://www.flemingfund.org

We declare no competing interests.

**Timothy R Walsh, Rabaab Zahra, Kenneth Iregbu, Sharon J Peacock, Andrew Stewardson*
timothy.walsh@zoo.ox.ac.uk

Ineos Oxford Institute of Antimicrobial Research, University of Oxford OX1 3RE, Oxford, UK (TRW); Department of Microbiology, Quaid-i-Azam University, Islamabad, Pakistan (RZ); Department of Clinical Microbiology, National Hospital Abuja, Abuja, Nigeria (KI); Department of Medicine, School of Clinical Medicine, University of Cambridge, Cambridge, UK (SJP); Department of Infectious Diseases, The Alfred and Central Clinical School,