

What do we need to do to tackle antimicrobial resistance?



Infectious disease accounts for a substantial proportion of deaths worldwide. Continuing progress in the treatment of many infections is now threatened by the increasing numbers and widening distribution of pathogens resistant to antimicrobial (antibacterial, antiviral, antiparasitic, and antifungal) drugs.

Until fairly recently, antimicrobial resistance was regarded as an issue mainly confined to developed countries. Certainly, antimicrobial resistance is often widespread in high-income countries. Recent data suggest that at least 2 million Americans fall ill from antimicrobial-resistant pathogens every year, 23 000 of whom die from these infections.¹ Antimicrobial resistance also continues to increase in Europe, especially in Gram-negative bacterial pathogens;² the excess mortality attributable to resistant hospital infections exceeds 25 000 deaths annually, and associated health-care costs and productivity losses total at least €1.5 billion each year.³ In addition to the direct effects on mortality and morbidity and the economic burden, a loss of effective antibiotics places at risk many of the procedures of modern medicine such as cancer chemotherapy, organ transplantation, and the care of premature babies.

Notwithstanding earlier assumptions, the threat of antimicrobial resistance is global. Data from around the world confirm that antimicrobial resistance, including multidrug resistance, is increasing in health-care settings and in the community.³ WHO is striving to articulate and address the issue^{3,4} and strategic initiatives in developing countries are attracting growing attention—eg, the roadmap constructed to tackle the global challenge from an Indian perspective⁵—but much more is needed. The crisis is exacerbated by a paucity of innovation in the development of new antibiotics, such that we are in danger of returning to a pre-antibiotic era.

Many of the national academies of science and medicine have a long history of interest in antimicrobial resistance, both in analysing the issues and proposing solutions. Recently, academies have started to work together to deliver stronger messages to policy makers—eg, in the European Union⁶ and the G8.⁷ This Comment is published to coincide with the launch of a statement⁸ by the global network of science academies represented by the InterAcademy Panel (IAP, representing academies

of science) and the InterAcademy Medical Panel (IAMP, representing academies of medicine). IAP and IAMP share a commitment to strengthening the role of science in tackling societal priorities (including health), developing programmes for scientific capacity building (including in health), supporting science education and communication, and encouraging the careers of young scientists. The academy networks provide an independent voice, free of vested political and commercial interests, and are able to draw upon the best science from all relevant disciplines and the experiences of the different contexts in which science has been applied.

The IAP-IAMP statement⁸ is a call for action, capitalising on previous work by member academies and others. In addressing recommendations to international and national policy makers, IAP and IAMP emphasise that antimicrobial resistance must receive much greater prominence in global strategic discussions. For example, although growing recognition of this threat to global health was apparent at the 66th World Health Assembly in May, 2013, the recent report⁹ by the UN high-level panel on the post-2015 development agenda omitted mention of antimicrobial resistance in the illustrative goals for health.

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Panel: Global recommendations from the InterAcademy Panel and InterAcademy Medical Panel call for action to tackle antimicrobial resistance⁸

- 1 Develop, improve, and promote integrated surveillance systems for antimicrobial resistance in human and animal health sectors to provide the evidence base for action across sectors. The use of antibiotics in animal husbandry in many countries must be curtailed and other applications in agriculture re-examined.
- 2 Develop, improve, and implement information and education programmes about the rational and prudent use of anti-infective drugs, sharing evidence about what works to guide antibiotic stewardship efforts worldwide.
- 3 Produce education programmes for patients and the public on the prevention and management of infections.
- 4 Enable access for all to infection prevention and control programmes.
- 5 Recognise that migrant populations and medical tourists might be at particular risk, which has implications for screening of these and other vulnerable groups.
- 6 Encourage industry innovation and public-private collaborative research and development programmes for therapeutics, diagnostics, and vaccines.
- 7 Increase research capacity, including clinical research capacity, worldwide. The science agenda should incorporate fundamental biosciences research and social science research into the determinants of the origin and spread of drug resistance.
- 8 All these actions require new and improved commitment to, and structures for, a global partnership to tackle the research and innovation priorities, to share data, and to build and support sustained surveillance, stewardship, and infection control programmes.

Preservation of the effectiveness of existing antimicrobial drugs and acceleration of the discovery and development of new drugs will both be crucial. To be successful, a comprehensive strategy based on sound science will need a much higher political and public visibility worldwide. A multidisciplinary, cross-sectoral approach needs to incorporate health, agriculture, development, economics, and other policy areas. In identifying the relevant priorities, the academies recommend coordinated action across a broad front; the common element in these diverse actions (panel) is the core importance of generating and using new knowledge.

Many of these actions, of course, have potentially wider value with respect to understanding communicable diseases and delivering improved health care. The present threat of antimicrobial resistance necessitates a global partnership to ensure sharing of good practice, provision of scientific and technical assistance and the political commitment to underpin optimum surveillance, effective and relevant research, accelerated innovation, and access to rational and prudent infectious disease management for all. Academies stand ready to play their part to clarify specific options for action and to mobilise the biomedical community to participate. IAP and IAMP aim to continue to stimulate debate about solutions to diminish the present threat and avert worse problems as part of their expanding role in advising about how scientific evidence can inform policy options for the post-2015 sustainable development challenges.^{10,11}

*Robin Fears, Volker ter Meulen

German National Academy of Sciences Leopoldina, 06019 Halle (Saale), Germany (RF); and InterAcademy Panel, Trieste, Italy (VtM)
robinfears@aol.com

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