

MULTI-SECTORAL RESPONSES TO ANTIMICROBIAL RESISTANCE

What is antimicrobial resistance?

Antimicrobial resistance (AMR) is a phenomenon in which microbes – bacteria, viruses, fungi and parasites – become resistant to existing medicines. It is a complex and urgent development challenge. This issue brief will focus on a sub-type of AMR, antibiotic resistance (ABR), and will use both terms and data when relevant.

The health impacts of AMR include increased mortality, longer hospital stays and higher medical costs for both individuals and health systems.¹ Without action to address resistance to antibiotics, global deaths from bacterial infections, such as tuberculosis (TB), and pneumonia, as well as the complications of infection such as sepsis, are projected to rise at an alarming rate from around 700,000 per year currently to an estimated 10 million per year by 2050.² AMR also negatively affects animal health and welfare,³ food safety, food security and economic well-being of farming households.⁴ A 2016 AMR review commissioned by the United Kingdom and the Wellcome Trust estimated that AMR will cause 300 million people to die prematurely and cost the world up to US\$100 trillion in lost output by 2050.⁵ The World Bank estimates that AMR could push as many as 24.1 million people into extreme poverty and reduce annual global Gross Domestic Product by up to 3.8 percent by 2050.⁶

A robust multi-sectoral response to AMR is central to achieving many of the Sustainable Development Goals (SDGs), including universal health coverage, poverty reduction and the pledge to leave no one behind.⁷ AMR is a global challenge that cuts across borders and affects all countries, all regions and all levels of development.⁸ However, not all countries and systems are equally equipped to respond. It remains important for AMR responses to be tailored to specific country contexts and capacities, including resource poor, conflict-affected and challenging operating environments.

While AMR is a natural occurrence, human action is exacerbating its spread. Contributing factors include use and misuse of antibiotics in medical,⁹ animal and agricultural¹⁰ practices. Most antibiotics are consumed by animals, with the livestock sector accounting for as much as 70 percent of annual antibiotic consumption in some countries.¹¹ This, along with aquaculture consumption of antibiotics,

is projected to increase considerably by 2030.¹² While antibiotics are important for animal health, they are also often used inappropriately both as growth promoters and for routine prophylaxis.¹³ Other contributing factors to AMR include a lack of access to appropriate healthcare services, including inappropriate use of antibiotics, sub-optimal infection prevention and water and sanitation systems, and environmental pollution resulting in antibiotic residues and resistant bacteria ending up in soil, crops and water.¹⁴

The challenge of antibiotic resistance is amplified by gaps in research and development of new health technologies and access to existing ones.¹⁵ All classes of antibiotics currently on the market were discovered before 1988.¹⁶ The current innovation pipeline is fragile, as most of the drugs in clinical development are modifications of existing classes and represent short-term solutions.¹⁷ While the appropriate use of existing antibiotics must be promoted, attention should simultaneously be given to unequal access to healthcare which has meant that many, especially in developing countries, are yet to enter the antibiotic age.¹⁸ As many as 5.7 million people die each year from treatable infectious diseases due to lack of access to antibiotics, and many have limited access to diagnostics and vaccines, critical for appropriate medical care and prevention of infections.¹⁹



Photo: DFID/Vicki Francis

Antimicrobial resistance and antibiotic resistance: important facts

- The discovery of antibiotics in the 1920s fundamentally transformed modern medicine. Antibiotics are cures for bacterial infections (among many of them being pneumonia and gonorrhoea) and they help prevent infections that can arise after major surgeries. Antibiotics also make post-natal care for premature infants and cancer chemotherapy safer.
- When resistance occurs, standard treatments become ineffective and infections persist and may spread to others.
- Antibiotic resistance has already reached a critical point for some bacterial infections. For example, drug-resistant TB (DR-TB) is responsible for nearly one-third of the current estimated AMR-related deaths. DR-TB treatment is long (two years and can involve ingesting over 14,600 antibiotic pills), painful and expensive. Patients who adhere to the treatment still only have about a 50 percent chance of being cured. Recent WHO TB treatment guidelines recommend the use of new antibiotics, but access in many developing countries is still limited.
- Some bacteria are already resistant to all available antibiotics. For example, resistance to carbapenems and colistin, considered medicines of last resort for some infections, have been documented in a growing number of countries, including developing countries in Asia.
- No new classes of non-TB antibiotics have been discovered and brought to market in the past three decades and only two new treatments for DR-TB have received regulatory approval in 50 years.

Responding to antimicrobial resistance

In 2016, United Nations Member States adopted a landmark General Assembly Political Declaration on Antimicrobial Resistance²⁰ recognizing that the best chance of successfully addressing AMR lay in the promotion and protection of human health within a **One Health** approach which requires multi-sectoral responses. One Health calls for designing and implementing programmes, policies, legislation and research in a way in which multiple sectors communicate and work together to achieve better public health outcomes, recognizing that the health of humans, animals and the planet are interconnected.²¹

The Political Declaration underlined that the framework of a global AMR response should be the 2030 Agenda and the blueprint the Global Action Plan on Antimicrobial Resistance developed by the World Health Organization in collaboration with the Food and Agriculture Organization (FAO) and the World Organization for Animal Health (OIE) and adopted in 2015 by the 68th World Health Assembly.²² The WHO, FAO and OIE have developed a joint Tripartite Workplan, that has recently expanded to include the United Nations Environment Programme (UNEP). Furthermore, the Political Declaration called for the establishment of an ad-hoc



Source: FAO, OIE and WHO: Take Action Now to Protect Human, Animal, Plant & Environmental Health. <http://www.who.int/antimicrobial-resistance/OIE-FAO-WHO-AMR-LEAFLET-INFO-GRAPHIC.pdf?ua=1>

United Interagency Coordination Group on Antimicrobial Resistance (IACG), hosted by WHO. The IACG is working to provide practical guidance for approaches needed to ensure sustained, effective global action to address AMR and is tasked to report back to the United Nations Secretary-General in 2019.²³

Antimicrobial resistance : strategic objectives agreed by United Nations Member States

- **Improve awareness and understanding of AMR.**
- **Strengthen knowledge and evidence** through surveillance, data sharing and research.
- **Reduce the incidence of infection**, including prevention and control of infections in humans and animals with improved immunization, sanitation, safe and clean water and healthy environments, as well as invest in strong health systems capable of providing universal health coverage and promote access to quality and affordable antibiotics.
- **Optimize the use of antibiotics in animal and human health**, including improving microbiology laboratory and diagnosis capacity, prescription practices, guidelines, incentives and regulations and develop sustainable production practices to reduce antibiotic dissemination in the environment.
- **Make the economic case for sustainable investment**, including in R&D of new medicines, diagnostics, vaccines and other health technologies. R&D should be guided by principles of affordability, effectiveness, efficiency, equity and be a shared responsibility by delinking the cost of R&D investment from price and volume of sales.

Sources: UNGA Political Declaration (2016) and WHO Global Action Plan (2015)

The 2030 Agenda recognizes the levels of inequality that exist between and among individuals, communities and countries. Equity is central to achieving universal health coverage. As with the adoption of the SDGs, pursuit of universal health coverage is ultimately a political choice. But it also requires a fundamental redefinition of what comprises an enabling environment. A development perspective to AMR should address at minimum the areas described below.

Research and data

Research in developing countries is neglected²⁴ and the 2018 WHO Global Antimicrobial Resistance Surveillance (GLASS) Report documents important gaps in data and surveillance systems, while providing an important framework for future monitoring.²⁵ Effective and evidence-driven responses require improved monitoring and surveillance capacity to generate data on context-specific drivers and levels of resistance.

Multi-sectoral national action plans

In the Political Declaration, countries committed to developing national action plans, programmes and policy initiatives. In a 2018 summary on country self-assessments 92 countries reported they have AMR national plans and 88 countries have made progress in implementing them.²⁶ AMR is a multifaceted challenge and therefore the One Health and its multi-sectoral approach is central to successful responses. National and global strategies are needed to provide sustained technical, political and financial investment to develop effective multi-sectoral plans for all countries and to fully finance and implement them.

Environment

The greater involvement of the environment sector is especially important because antibiotics and disinfectant agents released by human activity drives resistance development in bacteria around us.²⁷ Up to 75 percent of antibiotics used in aquaculture may be lost into the surrounding environment and more than 50 percent of municipal solid waste ends up in landfills and open dumps.²⁸ Hospital waste often includes high concentrations of antibiotics and disinfectants that, without proper treatment, can pass into water and soils both directly and through sewage systems, contributing to resistance development and spread.

Innovation and access to health technologies

Increasing research and development into new antibiotics, vaccines and diagnostics, while promoting greater and appropriate access to existing ones is critical. For example, vaccinating to prevent bacterial pneumonia could avert 1,337,000 deaths.²⁹ An estimated 11.4 million cumulative days on antibiotics – which amounts to a 47 percent reduction in antibiotics used to treat pneumonia – could be avoided annually by providing universal coverage of pneumococcal conjugate vaccine (PCV) to children under 5.³⁰ According to WHO and UNICEF, global immunization coverage for pneumonia is estimated to be only 42 percent and many developing countries have not yet or just partially introduced PCV nationally.³¹ Greater attention must be paid to DR-TB as patients are severely neglected, with significant gaps in access to

prevention, diagnostics, treatment and R&D for new drug regimes. Global and national DR-TB responses need to be improved and AMR and DR-TB programmes better integrated (which is one of the key commitments that Member States made at the September 2018 UNGA High Level Meeting on TB).³²

Opportunities for UNDP to support antimicrobial resistance responses

In line with its Strategic Plan 2018-2021, UNDP helps countries strengthen policies, systems and institutions to eradicate poverty, modernize key sectors for sustainable development and build resilience to crises and shocks. UNDP's HIV, Health and Development Strategy 2016-2021: Connecting the Dots focuses on three inter-connected action areas of relevance to multi-sectoral responses to AMR. These are: reducing inequalities and social exclusion; promoting effective and inclusive governance for health; and building resilient and sustainable health systems.

One of the key lessons learned 30 years into the AIDS response is that sustainable responses to complex health and development challenges are best provided through engagement and partnership of multiple stakeholders, across key government sectors and segments of society. UNDP is committed to supporting the United Nations development system as an integrator and connector of multi-sectoral responses as envisaged by the 2030 Agenda. With its expertise in multi-sectoral development responses and its presence in over 170 countries and territories, UNDP is well placed to work with partners to support countries and partners in the development of ambitious, coordinated and effective AMR responses.

In May 2018, WHO and UNDP signed a Memorandum of Understanding to improve health outcomes across several goals and targets of the 2030 Agenda, including AMR. UNDP also works closely with UNEP, FAO and other relevant partners within the AMR response.



Photo: Jim Holmes for AusAID

UNDP experience in responses relevant to antimicrobial resistance

Building on its comparative advantage as a development actor working across several branches of government, UNDP is a convener or partner in the below initiatives that strengthen coordinated responses to sustainable development priorities relevant to AMR.

- As a founding co-sponsor of the [Joint UN Programme on HIV/AIDS \(UNAIDS\)](#), UNDP has a proven record of ensuring that sectors beyond health are engaged in HIV-related responses. UNDP has traditionally convened government stakeholders, including ministers of finance, trade, industry, justice, health, foreign affairs, gender and social protection, as well as other key partners from civil society, academia and the private sector to jointly respond to HIV in a coordinated and coherent manner. For example, UNDP served as the secretariat of the Global Commission on HIV and the Law and together with governments, civil society and United Nations partners has supported 89 countries to implement the Commission's recommendations.
- UNDP's partnership with the [Global Fund to Fight AIDS, Tuberculosis and Malaria](#) focuses on three areas of work: policy, implementation support, including procurement of health technologies, and capacity development. UNDP serves as an interim Principal Recipient in some of the most challenging operating environments and as of October 2018 is managing 31 grants covering 18 countries and two regional grants covering an additional 21 countries. TB is a component in 12 of the UNDP-managed Global Fund grants.
- UNDP is a key partner of the [Global Healthcare Innovation Technology \(GHIT\) Fund](#) which supports research and development for new health technologies for neglected diseases. 50 percent of the GHIT portfolio is relevant to AMR, providing grant funding to support research for TB medicines and diagnostics.
- UNDP supports governments to build resilient health systems, including through the provision of technical support and the convening of multi-sectoral platforms to strengthen legal, policy and regulatory frameworks, national

procurement and supply chain systems and remove barriers to access to medicines and other health technologies. For example, leading the [Access and Delivery Partnership \(ADP\)](#), UNDP works with WHO, PATH and the Special Programme for Tropical Disease Research (TDR) to strengthen health systems to facilitate appropriate introduction and delivery of health technologies for TB, malaria and neglected tropical diseases. In addition, through its partnership with Gavi (the Vaccine Alliance) and the Government of India, UNDP is rolling out an [Electronic Vaccine Intelligence Network \(eVIN\)](#) and improving capacities of national immunization systems.

- UNDP supports countries and development partners to implement solutions that simultaneously consider the health of people and the planet. UNDP is involved in partnerships and initiatives designed to reduce environmental impact and resilient health systems and strategies, including work in sustainable health procurement, health related waste management and reduction in the use of mercury and other pollutants and overall work on [planetary health](#). For example, UNDP-hosted [Sustainable Procurement in the Health Sector Initiative](#), UNDP and the Stockholm International Water Institute project [Reducing Emissions from Antibiotic Production through Resource Efficiency](#), the UNDP Global Fund [Healthcare Waste Management Toolkits](#) and UNDP partnership with [Health Care Without Harm](#) and with the [Global Environmental Facility](#).
- UNDP supports the government of Viet Nam through the project [Strengthening Capacity in One Health Implementation in Viet Nam](#). Working with WHO and FAO, UNDP supports the development of functional, high-level, multi-sectoral coordination strategies, policies and mechanisms across the animal health, human health and environment sectors, including by developing a National Strategic Action Plan and Platform for One Health that includes relevant government entities and ministries, regional institutes, provincial authorities, bilateral and multilateral partners, NGOs, universities, laboratories and other stakeholders.

Conclusion

Responding to AMR is a sustainable development priority. AMR undermines gains achieved under the Millennium Development Goals, as well as the attainment of multiple Sustainable Development Goals of the 2030 Agenda and the commitment to leave no one behind. At the same time, the complexity and multidimensionality of AMR, and the One Health approach that governments have committed to, requires greater coordination, stronger governance and effective partnerships, as prioritized in the 2030 Agenda.

This global development challenge requires multi-sectoral responses that UNDP is uniquely positioned to support and strengthen. UNDP's country presence and experience in convening and supporting multi-sectoral responses and partnerships enables it to support governments, civil society, the private sector and the United Nations system to establish and implement strategies to address the multiple causes, impacts and determinants of AMR.

UNDP can support multi-sectoral responses to AMR as follows.

- 1 UNDP can convene and promote regional, national and south-south dialogue, platforms and partnerships to ensure whole-of-government and whole-of-society AMR responses. UNDP could support the stronger integration of health and development responses, as well as the creation of national and regional One Health multi-sectoral platforms and governance strategies to ensure policy coherence with the inclusion of development, environment, financing, human and animal health, food,

agriculture and trade governmental sectors, as well as relevant partners and stakeholders including affected communities, civil society, academics, professional societies and the private sector.

- 2 UNDP can leverage its partnership with WHO on non-communicable diseases, including the development of national investment cases.³³ UNDP can also leverage its joint convening role on investment and efficiency under the new 2018 UNAIDS Division of Labour³⁴ to support the development, financing and implementation of AMR national action plans and strategies with a One Health and multi-sectoral approach.³⁵
- 3 UNDP can support mainstreaming of AMR in development responses and help strengthen linkages between AMR and the 2030 Agenda, through inclusion of AMR in existing SDG-funding and review processes, including Voluntary National Reviews, its participation in the High-Level Political Forum on Sustainable Development and through national strategies for the achievement of the SDGs, including AMR-relevant interventions in mainstreaming, acceleration and policy support and the United Nations Development Assistance Frameworks.³⁶
- 4 UNDP can support strategies to meet the specific needs of developing countries in AMR responses, including by strengthening systems, policies and institutions, including as recommended by the WHO Strategic and Technical Advisory Group on antimicrobial resistance in relation to country health strategies to achieve universal health coverage.³⁷



Photo: WHO

References

- 1 The World Health Organization. *Antimicrobial Resistance Fact Sheet*. 15 February 2018. www.who.int/news-room/fact-sheets/detail/antimicrobial-resistance
- 2 O'Neill, J. (chairman). *Tackling Drug-Resistant Infections Globally: Final Report and Recommendations*. The Review on Antimicrobial Resistance, May 2016.
- 3 World Organization for Animal Health (OIE). "Antimicrobial Resistance." www.oie.int/en/for-the-media/amr/.
- 4 Food and Agriculture Organization of the United Nations. "Antimicrobial Resistance." www.fao.org/antimicrobial-resistance/en/
- 5 O'Neill, J. (see above).
- 6 World Bank Group. *Drug-Resistant Infections: A Threat to Our Economic Future*, Final Report. March 2017.
- 7 "Transforming our world: the 2030 Agenda for Sustainable Development," resolution adopted by the United Nations General Assembly on 25 September 2015 (A/RES/70/1).
Jasovský, D., et al. "Antimicrobial Resistance – A Threat to the World's Sustainable Development," ReAct Europe, Uppsala University, Sweden: Development Dialogue paper no.16, April 2016.
- 8 WHO. *AMR Global Report on Surveillance 2014*.
Prince Mahidol Award Conference. "Bangkok Statement: A Call to Action on Making the World Safe from the Threats of Emerging Infectious Diseases." Bangkok, 2018.
"Together Today for a Healthy Tomorrow." Berlin Declaration of the G20 Health Ministers. 2017.
Cecchini, M., et al. *Antimicrobial resistance in G7 countries and beyond: Economic Issues, Policies and Options for Action*. OECD, 2015.
- 9 Eili, Y. Klein, et al. "Global increase and geographic convergence in antibiotic consumption between 2000 and 2015," printed 26 March 2018. Proceedings of the National Academy of Sciences, 201717295; DOI: 10.1073/pnas.1717295115.
- 14 UNEP. "Antimicrobial resistance from environmental pollution among biggest emerging health threats," news release, Nairobi, 5 December 2017. www.unenvironment.org/news-and-stories/press-release/antimicrobial-resistance-environmental-pollution-among-biggest
- 15 United Nations Secretary-General High-Level Panel on Access to Medicines, Report 2016. www.unsgaccessmeds.org
- 16 WHO. *Prioritization of pathogens to guide discovery, research and development of new antibiotics for drug-resistant bacterial infections, including tuberculosis*. September 2017. www.who.int/medicines/areas/rational_use/prioritization-of-pathogens/en/
- 17 WHO. *Antibacterial Agents in Clinical Development: An analysis of the antibacterial clinical development pipeline, including tuberculosis*. September 2017
Pew Charitable Trusts, "Antibiotics Currently in Global Clinical Development," updated September 2018
- 18 Mendelson, M., et al. "Maximising access to achieve appropriate human antimicrobial use in low-income and middle-income countries," *Lancet* 387, 188–198 (2015).
- 19 Daulaire, N., et al. "Universal Access to Effective Antibiotics is Essential for Tackling Antibiotic Resistance," *J. Law. Med. Ethics* 43, 17–21 (2015).
- 20 "Political Declaration on the United Nations High Level Meeting on Anti-microbial Resistance," A/RES/71/3 UNGA 2016.
- 21 WHO. "One Health." September 2017. www.who.int/features/qa/one-health/en/
- 22 Sixty-eighth World Health Assembly. "Global Action Plan on Antimicrobial Resistance." Resolution WHA 68.7, WHO 2015.
- 23 Website of the United Nations Interagency Coordination Group on Antimicrobial Resistance (IACG) Secretariat hosted by WHO: www.who.int/antimicrobial-resistance/interagency-coordination-group/en/
- 24 Founou, R.C., et al. "Clinical and economic impact of antibiotic resistance in developing countries: A systematic review and meta-analysis" *PLoS ONE* 12(3): e0180631 (2017)

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