

Antimicrobial resistance: accelerating national and global responses

WHO strategic and operational priorities to address drug-resistant bacterial infections in the human health sector, 2025–2035

Report by the Director-General

INTRODUCTION

1. Antimicrobial resistance is an urgent global health and socioeconomic crisis. An estimated 1.27 million global deaths were attributed to drug-resistant bacterial infections in 2019. Antimicrobial resistance threatens all age groups in all regions, with low- and middle-income countries most affected. It has significant impacts on human and animal health, food production and the environment, and threatens the achievement of multiple Sustainable Development Goals. The World Bank estimates that, if not controlled, antimicrobial resistance will result in US\$ 1 trillion to 3.4 trillion annual losses to gross domestic product (GDP) by 2030 and an additional US\$ 1 trillion health care costs by 2050.
2. The development and spread of antimicrobial resistance increase the risk that common infections become impossible to treat and routine medical procedures become unsafe, including surgery and cancer treatment, thus reversing many of the gains made in modern medicine. In addition to the deaths attributable to drug-resistant infections, antimicrobial resistance is responsible for significant morbidity and disability. Antimicrobial resistance places a heavy burden on health systems and complicates the response to health emergencies.
3. Antimicrobial resistance is driven by misuse and overuse of antimicrobials. Many antimicrobials, especially antibiotics, are losing their effectiveness. There is an inadequate pipeline for new antimicrobials in research and development, as well as an urgent need for additional measures to ensure equitable access to new and existing antibiotics.
4. Antimicrobial resistance affects countries in all regions and at all income levels. Its drivers and consequences are exacerbated by poverty and inequality – for example, through unhealthy environments that enable the spread of infections; lack of access to water, sanitation and hygiene, and safe, good quality and affordable health services; and limited opportunities to make informed choices about behaviours to prevent and manage infections, especially the appropriate use of antibiotics.
5. In 2015 the Sixty-eighth World Health Assembly in resolution WHA68.7 adopted the global action plan on antimicrobial resistance and urged Member States to develop and implement national action plans on antimicrobial resistance, adapted to local contexts. Since antimicrobial resistance

requires a comprehensive One Health response, WHO and the other Quadripartite organizations – namely the Food and Agriculture Organization of the United Nations, the United Nations Environment Programme and the World Organisation for Animal Health – have endorsed the global action plan and are collaborating on multisectoral actions for its implementation.

6. As at November 2023, 178 countries had developed multisectoral national action plans on antimicrobial resistance. However, in 2023 only 27% of countries reported implementing their national action plans effectively and only 11% had allocated national budgets to do so.

7. The implementation of national action plans in the human health sector is often fragmented and limited to hospitals, despite the vast majority of antibiotic use being outside hospitals. Capacity to prevent, diagnose and treat bacterial infections and drug resistance, and the evidence base for policy development, are very limited in low- and middle-income countries. The integration of antimicrobial resistance interventions in health systems, and inter-dependencies with other health systems capacities and priorities, are often not recognized in strategies for universal health coverage or health emergencies.

8. In line with resolution WHA72.5 (2019), in 2023 the Director-General reported to the Seventy-sixth World Health Assembly the need to accelerate the implementation of national action plans and proposed the development of a WHO strategic and operational framework to address drug-resistant bacterial infections in the human health sector.¹ Each of the other Quadripartite organizations has already developed a sector-specific antimicrobial resistance strategy or flagship report^{2,3,4}, but there is not yet one for the human health sector. Ahead of the 2024 High-level meeting of the United Nations General Assembly on antimicrobial resistance, there is urgent need to articulate sector-specific priorities and actions, including to inform global and country-level discussions on targets, financing, multisectoral collaboration, governance and accountability.

9. This report presents urgent strategic and operational priorities for an accelerated programmatic response to antimicrobial resistance in the human health sector. The priorities complement and are informed by strategies developed by WHO regional offices.⁵

10. The strategic vision underlying the development of the priorities is the control and reversal of the urgent public health and socioeconomic crisis due to drug-resistant infections in humans. The specific aims are to slow the emergence and spread of drug-resistant bacterial infections and to preserve effective antibiotics for future generations.

11. Three urgent strategic priorities are being proposed for a comprehensive public health response to antimicrobial resistance in the human health sector. The first is the prevention of all infections that give rise to the use of antibiotics, noting that viral and other infections contribute to inappropriate antibiotic use. The second strategic priority is universal access to quality diagnosis and appropriate

¹ Document A76/37.

² The FAO action plan on antimicrobial resistance 2021–2025. Rome: Food and Agriculture Organization of the United Nations; 2021 (<https://www.fao.org/documents/card/en/c/cb5545en>, accessed 15 December 2023).

³ Strategy on antimicrobial resistance and the prudent use of antimicrobials: preserving the efficacy of antimicrobials. Paris: World Organisation for Animal Health; 2016 (<https://www.woah.org/app/uploads/2021/03/en-amr-strategy-2022-final-single-pages.pdf>, accessed 15 December 2023).

⁴ Bracing for superbugs: strengthening environmental action in the One Health response to antimicrobial resistance. Nairobi: United Nations Environment Programme; 2023 (<https://www.unep.org/resources/superbugs/environmental-action>, accessed 15 December 2023).

⁵ See for example documents AFR/RC73/6 and EUR/RC73/7.

treatment of infections. The third priority is strategic information and innovation – notably surveillance of both antimicrobial resistance and antimicrobial consumption/use; the development of new vaccines, diagnostics and antimicrobial agents; and measures to make these accessible and affordable. The following sections elaborate these three strategic priorities; related operational priorities based on a people-centred approach and core package of interventions; and enabling actions to support Member States.

SCOPE AND GUIDING PRINCIPLES

12. The strategic and operational priorities are intended to guide efforts to tackle the causes and consequences of drug-resistant infections for people, communities and health systems. This represents a shift in focus from pathogens to health systems.

13. The priorities focus on drug-resistant bacterial infections and the threat of their resistance to antibiotics. Other infections, such as viral and fungal infections, may elicit the inappropriate use of antibiotics and are also considered. The pandemic of coronavirus disease (COVID-19), for example, contributed to antimicrobial resistance. As further evidence emerges on the magnitude and public health impact of drug-resistant fungal infections, the scope of the priorities may be updated.

14. Since tackling antimicrobial resistance requires a cross-cutting public health approach, the priorities have critical linkages to Health Assembly resolutions and global strategies and plans for, inter alia, infection prevention and control; water, sanitation and hygiene; immunization; maternal and child health; diagnostics and laboratory strengthening; primary health care; universal health coverage; health emergency preparedness and response; the health workforce; and disease-specific strategies such as those for HIV, tuberculosis, malaria and sexually-transmitted infections.

15. The strategic and operational priorities have been developed by the Secretariat in consultation with Member States and other global stakeholders.

16. The country-level operational priorities comprise the people-centred approach to antimicrobial resistance and its accompanying package of essential interventions. This approach was developed by means of extensive review of evidence, including from annual Tracking AMR Country Self-assessment Surveys (TrACSS) in over 170 countries and the Global Antimicrobial Resistance and Use Surveillance System (GLASS). It was also informed by feedback from a global consultation with Member States and other stakeholders, and expert opinion including input from WHO's Strategic and Technical Advisory Group for Antimicrobial Resistance.

17. Guiding principles of the priorities include, but are not limited to, access, equity, efficiency, scalability, sustainability, accountability; addressing common and specific needs for all income settings; integration of priority actions in all levels of health systems; and solidarity to address a global threat, including the role that more affluent countries must play.

STRATEGIC PRIORITIES

18. The three strategic priorities – prevention of infections, universal access to quality diagnosis and appropriate treatment, and strategic information and innovation – represent interdependent elements of a comprehensive public health approach for sustained impact in slowing the emergence and spread of drug-resistant bacterial infections and preserving effective antibiotics. Cross-cutting and enabling functions embedded across the three strategic priorities include leadership, governance, financing,

regulation, accountability, advocacy, and education, awareness-raising and behaviour change among both health professionals and communities.

19. **Prevention of infections.** The objective for this priority is to reduce all infections which may result in antibiotic use. This has a direct public health impact on morbidity and mortality and will reduce the emergence and spread of antimicrobial resistance. It requires accelerated implementation of water, sanitation and hygiene measures both in health facilities and communities; infection prevention and control and patient safety; and immunization.

20. **Universal access to affordable, quality diagnosis and appropriate treatment of infections.** To reduce morbidity and mortality caused by infections while reducing the inappropriate use of antibiotics, people need access to quality diagnosis and appropriate treatment of both susceptible and drug-resistant infections at all levels of the health system. In the context of overall efforts to strengthen health systems and expand access to health services through the primary health care approach, while reducing financial hardship, this priority requires integration of specific interventions – notably for diagnostic and antibiotic stewardship based on WHO’s AWaRe (access, watch, reserve) classification and the WHO AWaRe antibiotic book. It includes ensuring gender-equitable access and addressing the specific needs of vulnerable groups including migrants and refugees.

21. **Strategic information and innovation.** To guide and support the response to antimicrobial response by ensuring the availability of key evidence, policies, and products, crucial information and evidence gaps must be filled, especially in low- and middle-income countries, and measures taken to address critical gaps in research and development and access for antibiotics, diagnostics and vaccines. This priority therefore includes strengthening and improving the surveillance of antimicrobial consumption and antimicrobial resistance, including through national antimicrobial resistance prevalence surveys; promoting evidence generation at country-level to inform policy development; comprehensive measures to promote increased research and development targeted to greatest public health needs; the introduction of programmatic innovations such as genomic surveillance, point-of-care diagnostics and digital health solutions; and regional and global mechanisms to overcome pipeline, production, distribution and access bottlenecks.

OPERATIONAL PRIORITIES

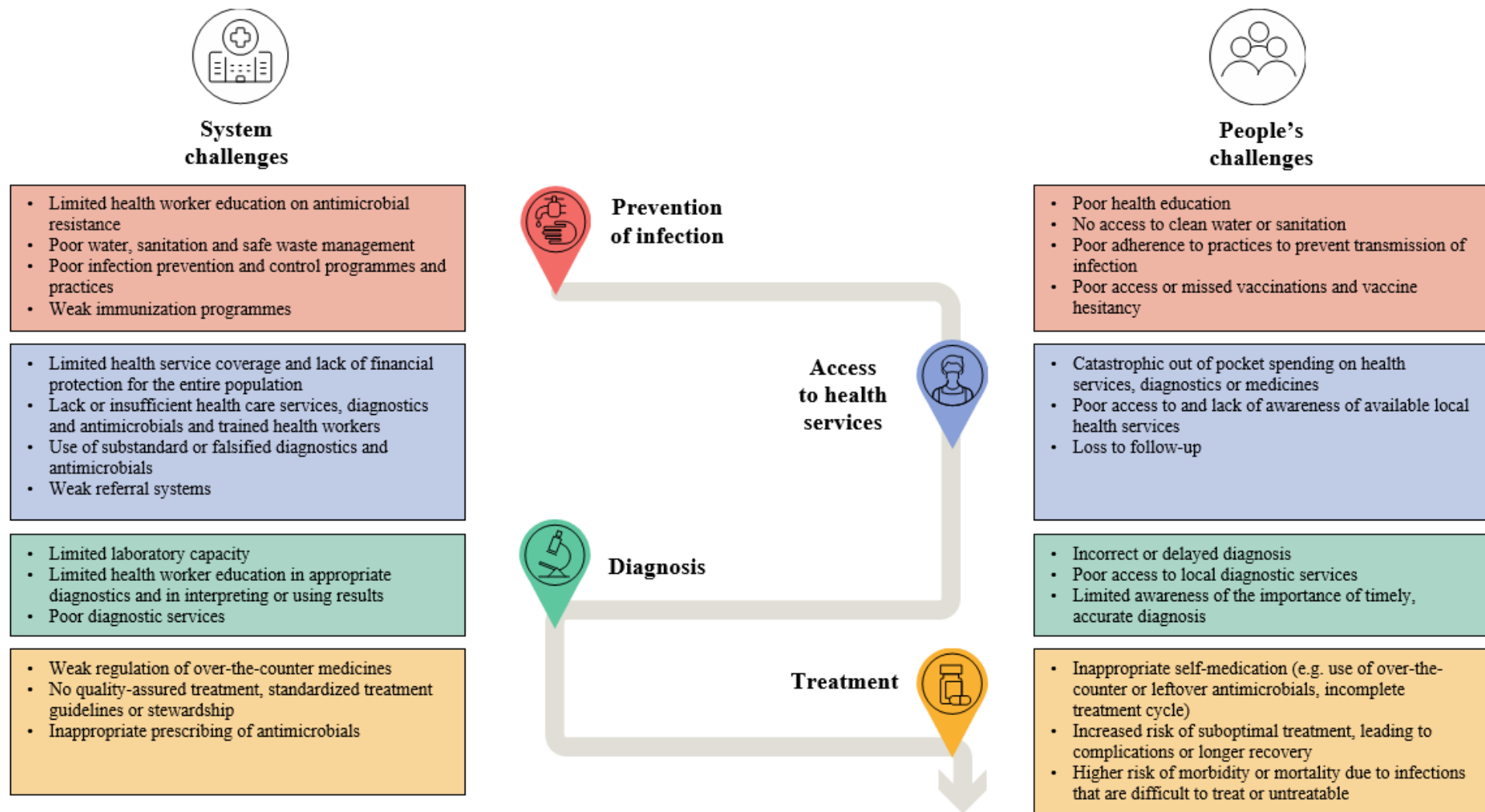
The people-centred approach and core package of country-level interventions

22. The people-centred approach to antimicrobial resistance summarizes the country-level actions needed to operationalize the three strategic priorities. It emphasizes an integrated programmatic approach, aligned with strategies for primary health care, universal health coverage and health emergency preparedness and response, that covers all levels of the health system.

23. This approach puts people at the centre of antimicrobial resistance interventions, based on a root-cause analysis of both “system challenges” and “people’s challenges” (Fig. 1).¹ It also emphasizes engagement of communities, civil society, academia and the private sector.

¹ People-centred approach to addressing antimicrobial resistance in human health: WHO core package of interventions to support national action plans. Geneva: World Health Organization; 2023 (<https://iris.who.int/handle/10665/373458>, accessed 1 December 2023).

Fig. 1. System and people's challenges for antimicrobial resistance



24. The people-centred approach to antimicrobial resistance and its package of core interventions includes four programmatic pillars plus strategic information and effective governance as essential foundations (Table 1). When developing or revising their national action plans on antimicrobial resistance, countries can use the package of interventions to identify gaps, inform prioritization at different levels of the health system and guide the integration of interventions in national health sector plans and strategies.

25. The pillars and core interventions of the approach constitute the proposed operational priorities for addressing drug-resistant bacterial infections in countries. Full implementation of the approach will slow the emergence and spread of antimicrobial resistance and reduce the associated morbidity, mortality and wider socioeconomic impact.

Table 1. Strategic priorities and the people-centred approach to antimicrobial resistance

Strategic priorities	Pillars/foundations of the people-centred approach	Core interventions
Prevention	Prevention	<ul style="list-style-type: none"> • Universal access to water, sanitation and hygiene and waste management • Implementation of core infection prevention and control components • Access to vaccines and expanded immunization
Universal access	Access to essential health services	<ul style="list-style-type: none"> • Antimicrobial resistance diagnosis and management health services made available and affordable • Uninterrupted supply of quality-assured, essential antimicrobials and health products for antimicrobial resistance
	Timely, accurate diagnosis	<ul style="list-style-type: none"> • Good quality laboratory system and diagnostic stewardship to ensure clinical bacteriology (and mycology) testing
	Appropriate, quality-assured treatment	<ul style="list-style-type: none"> • Up-to-date evidence-based treatment guidelines and programmes for antimicrobial stewardship • Regulation to restrict sales of non-prescription antimicrobials
Strategic information and innovation	Strategic information foundation	<ul style="list-style-type: none"> • National antimicrobial resistance surveillance network to generate good quality data for patient care and action on antimicrobial resistance • Surveillance of antimicrobial consumption and use to guide patient care and action on antimicrobial resistance • Antimicrobial resistance research and innovation including behaviour and implementation science
(Cross-cutting)	Effective governance foundation	<ul style="list-style-type: none"> • Antimicrobial resistance advocacy, governance and accountability in the human health sector, in collaboration with other sectors • Antimicrobial resistance awareness-raising, education and behaviour change of health workers and communities

Enabling actions to Support Member States

26. Member States have the primary responsibility to develop, cost, finance, implement and monitor their antimicrobial resistance national action plans. The Secretariat supports countries on all aspects of the antimicrobial resistance response, through country-level technical assistance tailored to local context including for fragile, conflict-affected and vulnerable settings, and coordination of global or regional action and partnerships.

27. Noting Member States' increased demands for technical assistance, the Secretariat is developing a global AMR Technical Assistance Mechanism; initiatives to address specific needs, for example the AMR Diagnostic Initiative; and targeted guidance and educational materials.
28. The Secretariat also supports countries to identify and mobilize domestic and external financing, such as through the Global Fund and the Pandemic Fund, and supports development of global and country-specific antimicrobial resistance investment cases.
29. The evidence base on antimicrobial resistance is very weak in most countries. The Secretariat supports generation and use of surveillance and research data, aligned with country-specific priorities and WHO's global research agenda for antimicrobial resistance in human health.
30. Specific efforts are needed to address the antibiotic pipeline and access crisis. With industry and relevant partner organizations, the Secretariat will monitor, inform and promote global research and development efforts, and develop mechanisms to support equitable, sustainable access to new and existing antibiotics alongside other needed health products such as vaccines, diagnostics and reagents. Examples of the diverse and tailored solutions needed include coordinated/pooled procurement, strategic stockpiling, improved forecasting and quantification, regulatory streamlining and expanded manufacturing.
31. To enhance commitment, action and resource mobilization to tackle antimicrobial resistance, and drawing on behavioural insights and other relevant evidence, the Secretariat will coordinate international advocacy, education and awareness-raising with key partners and networks – for example with policy-makers, legislators, health care providers and civil society, including youth and antimicrobial resistance survivors.

ACCOUNTABILITY AND TARGETS

32. To monitor implementation and progress towards global targets the Secretariat will develop an accountability framework in consultation with all relevant stakeholders.
33. The Secretariat has developed potential indicators for the strategic and operational priorities. The potential indicators for the strategic priorities are listed in Table 2.
34. Relevant outputs and indicators will be included in the measurement framework for WHO's fourteenth general programme of work.
35. The priorities and accountability framework will inform Member States deliberations, and potential development of global targets, for the 2024 High-level meeting of the United Nations General Assembly on antimicrobial resistance and the Fourth High-level Ministerial Meeting on Antimicrobial Resistance which Saudi Arabia plans to host in November 2024.
36. The accountability framework can be used to inform context-specific target-setting by countries, informed by both quantitative and qualitative strategic information.

Table 2. Potential indicators for the strategic priorities

Strategic priorities	Potential indicators
Prevention of infections	<ul style="list-style-type: none"> • Aggregate burden of disease for a set of tracer infections that may result in antibiotic use (global burden of disease data)
Universal access to affordable, quality diagnosis and appropriate treatment of infections	<ul style="list-style-type: none"> • Coverage of essential health services (SDG indicator 3.8.1) • Financial protection (SDG indicator 3.8.2) • Proportion of population seeking care in health care facilities with access to quality-assured bacteriology diagnosis • Antibiotic consumption in defined daily dose per 1000 inhabitants per day; overall and by AWaRe (access, watch, reserve) classification. (Note: this indicator is influenced by both access and appropriate use, so cannot be interpreted in isolation.)
Strategic information and innovation	<ul style="list-style-type: none"> • Number/proportion of countries with, and proportion of world's population covered by, nationally representative quality-assured antimicrobial resistance data from surveillance and/or surveys • Number of new: (i) medicines; and (ii) diagnostics in the research and development pipeline aligned with WHO target product profiles and bacterial priority pathogens list • International Health Regulations/joint external evaluation indicators for country capacities to manage antimicrobial resistance

ACTION BY THE EXECUTIVE BOARD

37. The Executive Board is invited to note the report. In its discussions, it is further invited to provide guidance on how the Secretariat can best provide support to Member States in:

- integrating the strategic and operational priorities to address drug-resistant bacterial infections in antimicrobial resistance national action plans;
- strengthening financing and governance of antimicrobial resistance national action plans to accelerate and sustain implementation;
- ensuring the strategic and operational priorities to address drug-resistant infections in the human health sector are reflected in discussions and outcomes of the 2024 High-level meeting of the United Nations General Assembly on antimicrobial resistance.

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