

Implementing the global action plan on antimicrobial resistance

Second quadripartite biennial report



Food and Agriculture Organization of the United Nations

UN environment programme

World Health Organization

World Organisation for Animal Health

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Contents

Foreword iv

Acknowledgements vi

Abbreviations vii

Executive summary viii

Introduction 1

Summary of progress from the quadripartite organizations in 2022–2024 5

Implementation of AMR NAPs, 2022–2024 11

Challenges and opportunities for accelerated action 31

References 39

Annex. Selected indicators for monitoring and evaluation of implementation of the global action plan 2022–2024 in each sector 43

Foreword

Antimicrobial resistance (AMR) continues to evolve as a complex, accelerating global challenge – one that is no longer a distant threat but a present reality, affecting health systems, food production, livelihoods and environmental sustainability across the globe. While important progress has been made in raising awareness and developing basic strategies, the pace and coherence of global and national responses fall short of what is needed to contain this threat meaningfully and to achieve the goals of the 2030 Agenda for Sustainable Development.

Nearly a decade after adoption of the Global Action Plan on AMR (GAP-AMR), many countries have mobilized political will and taken action to address AMR through national action plans (NAPs) and sectoral initiatives. Implementation nevertheless remains uneven, despite widespread recognition of the need for coordinated multisectoral approaches based on One Health principles. NAPs often lack sufficient prioritization, dedicated funding or integration into broader policy and institutional frameworks. In many cases, coordination mechanisms remain underdeveloped, limiting the effectiveness and sustainability of AMR responses.

The political declaration of the United Nations General Assembly high-level meeting on AMR in 2024 marked a critical turning point. It clearly expresses the importance of moving beyond fragmented or early-stage interventions towards more structured, inclusive, accountable implementation. As countries prepare to update the GAP-AMR, the global AMR community has a unique opportunity to meet this commitment, align national priorities with global targets and drive transformative change across sectors.

This second biennial report, prepared jointly by the quadripartite organizations – the Food and Agriculture Organization of the United Nations (FAO), the United Nations Environment Programme (UNEP), the World Health Organization (WHO) and the World Organisation for Animal Health (WOAH) – is timely. It provides an overview of areas in which progress has been achieved and where persistent gaps require attention. The findings provide a baseline for assessing how to achieve the new global targets and identify opportunities for targeted investment, stronger governance and greater collaboration.

Effective implementation of NAPs on AMR and integration of AMR into national systems for human health, animal health, agrifood and environmental governance will require sustained support through predictable financing, strengthened technical capacity and inclusive stakeholder engagement. Designing and implementing AMR interventions in ways that promote equity, resilience and accountability will be critical to achieving a long-term impact and preserving the effectiveness of antimicrobials for future generations.

The quadripartite organizations remain committed to supporting Member States in this work. With the available knowledge, tools and partnerships, the global community must now translate commitment into action, guided by shared responsibility, reinforced through collaboration and driven by the urgency of protecting human health, animal health, food and agriculture and environmental health worldwide.

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Abbreviations

AMR	antimicrobial resistance
AMU	antimicrobial use
ANIMUSE	ANImal antiMicrobial USE
AST	antimicrobial susceptibility testing
AWaRe	Access, Watch, Reserve
FAO	Food and Agriculture Organization of the United Nations
GAP-AMR	Global Action Plan on AMR
GLASS	Global Antimicrobial Resistance and Use Surveillance System
HIC	high-income countries
InFARM	International FAO Antimicrobial Resistance Monitoring
IPC	infection prevention and control
LIC	low-income countries
LMIC	lower–middle-income countries
NAP	national action plan
PMP	Progressive Management Pathway
R&D	research and development
SDG	Sustainable Development Goal
TrACSS	Tracking AMR Country Self-assessment Survey
UNEP	United Nations Environment Programme
UNGA HLM	United Nations General Assembly High-level Meeting
VSAFE	Veterinary Monitoring and Surveillance System for Substandard and Falsified Veterinary Products
WHO	World Health Organization
WOAH	World Organisation for Animal Health

Executive summary

Antimicrobial resistance (AMR) remains a growing threat to human health, animal health, agriculture, food production and ecosystems worldwide. Recent evidence shows that bacterial AMR was associated with an estimated 4.71 million deaths in 2021 and directly attributed to 1.14 million deaths. Cumulative forecasts for the period 2025–2050 suggest that 39.1 million deaths will be attributable to AMR and 169 million deaths associated with AMR. The economic impact is also significant: with estimates suggesting that treating drug-resistant bacterial infections could cost up to 412 billion dollars annually, with an additional 443 billion in workforce and productivity losses projected over the next decade. The impacts of bacterial AMR are projected to cause animal production losses of 953 billion dollars by 2050.

This is the second biennial progress report jointly produced by the quadripartite. Exceptionally, the report is based on data for 2022–2024 to align it with future biennial reporting. The report provides a summary of progress made by the quadripartite in addressing AMR during 2022–2024. It also highlights areas of progress or challenges in implementation of AMR NAPs, derived by analysis of data from the annual Tracking AMR Country Self-assessment Survey (TrACSS). It provides a list of areas that would benefit from accelerated action, including by considering greater emphasis in the updated GAP-AMR. The Annex provides data on the recommended indicators of the current GAP-AMR monitoring and evaluation framework.

Implementation of AMR NAPs 2022–2024

The data for this analysis were derived primarily from TrACSS, to which, in 2024, a record number of 186 countries reported their progress, representing 96% of WHO Member States.

Progress in AMR NAPs: The proportion of countries that have developed an AMR NAP has increased steadily. In 2024, 170 Member States (88% of 194) had developed an AMR NAP, as compared with 79 (41% of 194) in 2017; 124 Member States (64% of 194) are implementing their NAPs; and 18 Member States (9% of 194) have made a specific financial provision in their national budget for their AMR NAP.

Multisectoral coordination: The AMR response requires a One Health approach; however, progress has plateaued in the past 3 years, thus, in 2024, 100 Member States (52% of 194) still had no formalized, functional mechanism for multisectoral coordination. The proportion of countries in which all One Health sectors were involved in AMR NAP coordination increased, however, from 22% (42 of 194) in 2022 to 40% (78 of 194) in 2024.

Awareness: The proportion of countries that had conducted a national awareness campaign targeting all or most priority stakeholder groups increased modestly to 39% (75 of 194) in 2024. Progress has been stagnant over the past few years.

Human health sector: In 2024, 76% (141 of 186) of participating countries reported that they offered at least some training and professional education on AMR in the human health sector. Over half of the participating countries (54%, 100 of 186) in 2024 reported that they had a standardized national surveillance system for AMR in humans. Globally, 69% (128 of 186) of the participating countries reported that one or more reference laboratories had the capacity to perform antimicrobial susceptibility testing (AST) for all critical bacteria included in the Global Antimicrobial Resistance and Use Surveillance System (GLASS).

Animal health sector: The proportion of countries that reported systematic training on AMR and on prudent use of antimicrobial agents in the veterinary animal sector increased from 44% in 2022 to 50% in 2024. The proportion of countries with plans or systems for use of antimicrobials in both terrestrial and aquatic animals increased from 35% in 2022 to 47% in 2024.

Food and agriculture sector: Between 2022 and 2024, countries made moderate progress in strengthening AMR-related training for stakeholders in the food and agriculture sectors. Incremental improvements were reported in establishing AMR surveillance systems for food of animal (terrestrial and aquatic) and plant origin.

Environmental sector: In 2024, 78% (145 of 186) of participating countries reported involvement of the environmental sector in their AMR multisectoral coordination. Less than half of participating countries (48%; 87 of 182) reported that they had legislation or regulations to prevent AMR and control contamination of the environment with antimicrobials.

Challenges and opportunities for accelerated action

Multisectoral coordination: The AMR response requires a multisectoral approach, with strong governance structures providing high-level political oversight, accountability frameworks, adequate resources and technical working groups for effective collaboration.

Financing and sustainability: Sustainable, predictable national and global sources of funding should be available for implementation of cost-effective, evidence-based interventions in all sectors. Integration of specific AMR interventions into broader sectoral national plans and budgets is essential to ensure sustainability. Prioritization of activities and costed NAPs should be the basis for allocation of domestic resources and mobilization of external funds, including through innovative financing mechanisms.

Equity in AMR plans and policies: Social and economic inequalities can have an impact on AMR surveillance, prevention, diagnosis and treatment plans and policies in all sectors. Inequalities act as barriers and limit people's access. More emphasis should be placed on the development and implementation of AMR NAPs to ensure that they address such social determinants.

Human health: Tackling AMR requires a people-centred approach, by integrating core interventions into primary health care systems and removing barriers to access. National AMR surveillance systems should be strengthened to improve the quality and representativeness of data. Antimicrobial stewardship should be enhanced, especially in primary care. More countries should join the GLASS programme on antimicrobial use (AMU) in order to track their progress towards the goal set at the United Nations high-level meeting (UNGA HLM) on AMR in 2024 of ensuring that at least 70% of human antibiotic use globally is from the "Access" group of antimicrobials in the WHO AWaRe (Access, Watch, Reserve) classification, as an indication of more appropriate use of antibiotics.

The challenges include unequal access to antimicrobials, weak laboratory systems and limited diagnostics. Ensuring equitable access to quality antibiotics and increasing funding for research and development (R&D) on antibacterial and antifungal agents are critical.

Animal health: Cross-sectoral coordination and prioritization of preventive measures are essential. Investment in animal vaccines and surveillance systems must be increased. Adequate funding must be provided for AMR and AMU initiatives in the animal health sector.

Food and agriculture: Operationalization of AMR strategies in agrifood systems is limited. Capacity-building for stakeholders is sporadic and under-resourced. Surveillance systems for AMR and AMU in food-producing animals and crops should be strengthened. Access to diagnostics and well-equipped laboratories for detection of AMR and antimicrobial residues to guide practices and policy decisions along the agrifood value chains need further and sustained enhancement. Regulatory frameworks and their enforcement must be improved.

Environment: Environmental action should be more prominent in AMR strategies. National governance should be strengthened in integrated multisectoral coordination mechanisms, with development and enforcement of comprehensive environmental policies and regulations. Surveillance and monitoring systems for AMR in the environment should be improved.

The political declaration of the UNGA HLM established global targets for various AMR indicators and called for updating of GAP-AMR by 2026. The data collated for this biennial report and the summarized information can be considered a baseline for gauging progress and for highlighting critical gaps to be addressed in the updated GAP-AMR.

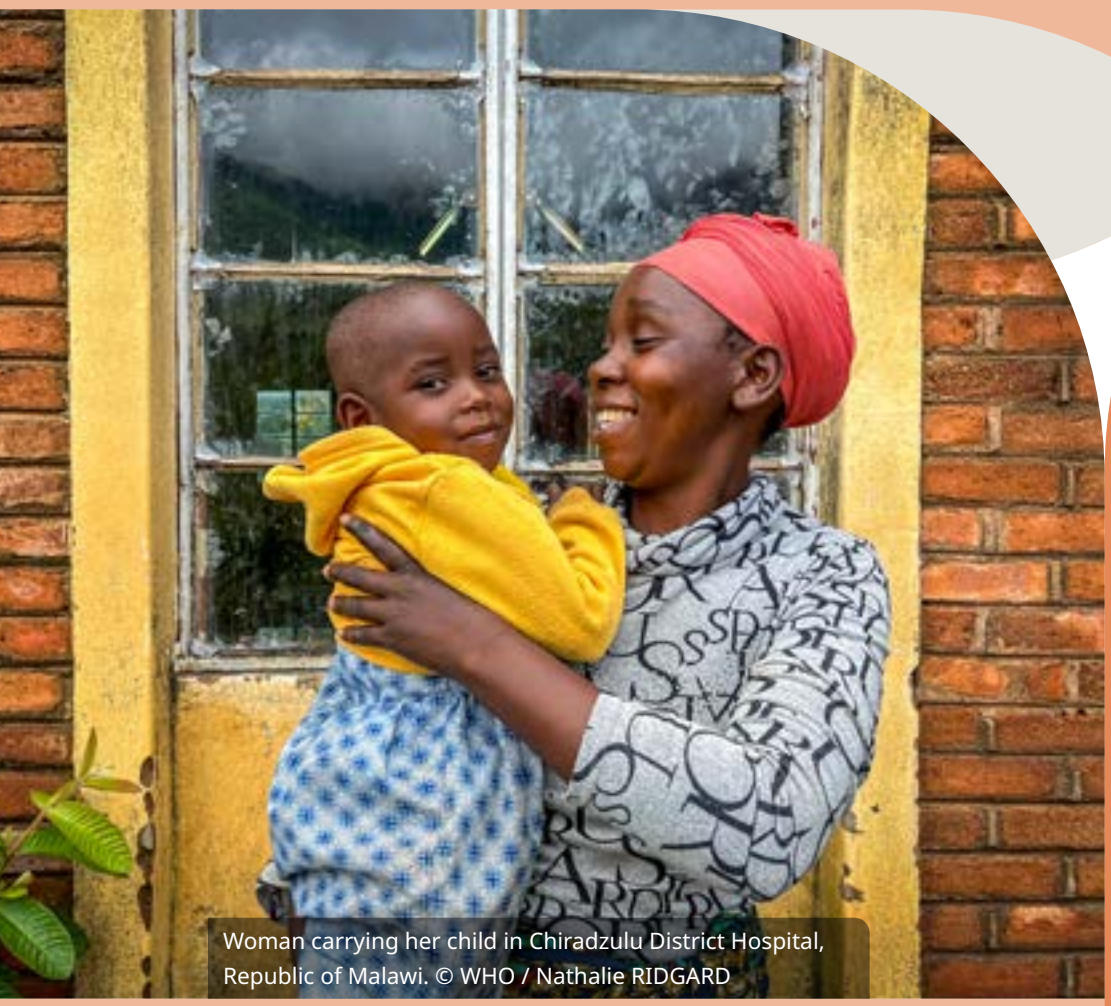
The quadripartite is committed to continuing monitoring and reporting on progress and challenges in implementation of the GAP-AMR, and AMR NAPs and to providing policy guidance and technical assistance to countries in achieving the targets of the UNGA HLM on AMR.



Second Round of Routine Immunization Catch-up Campaign, Gaza Strip, 18–29 January 2026. © WHO

1

Introduction



Woman carrying her child in Chiradzulu District Hospital, Republic of Malawi. © WHO / Nathalie RIDGARD

AMR is a growing threat to human health, animal health, agriculture, food production and ecosystems around the world. A recent global study estimated that 4.71M deaths in 2021 were associated with bacterial AMR, including 1.14 million deaths attributable to bacterial AMR *(1)*. Cumulative forecasts in the same study for the period 2025–2050 suggest that 39.1 million deaths will be attributable to AMR and 169 million deaths will be associated with AMR. Failure to address AMR will also continue to put substantial pressure on economies. If left unaddressed, treating drug-resistant bacterial infections alone is estimated to cost up to 412 billion dollars annually, with an additional 443 billion dollars in workforce participation and productivity losses projected each year over the next decade *(2)*. Another study suggested an annual reduction of US$ 1.7 trillion in global economic output by 2050 *(3)*. Further, without strong global, regional, and national responses, bacterial AMR is projected to cause animal production losses of 953 billion dollars by 2050, reducing global GDP by 40 billion dollars annually *(4).*

Gender roles and inequalities shape antimicrobial use, healthcare access, and exposure to resistant infections. Women and girls, as primary caregivers and most of the health workforce, face higher risks of (drug-resistant) infections due to caregiving roles and limited water and sanitation access. Men are more exposed through male-dominated sectors such as livestock, aquaculture, and waste management. Addressing AMR requires gender-responsive and cross-sectoral approaches *(5).*

Box 1. Sustainable Development Goals (SDG) indicators for AMR – Global and regional estimates

The SDG 3.d.2 indicators for bloodstream infections focus on *E. coli* resistant to third-generation cephalosporins and *S. aureus* resistant to methicillin (MRSA) and are used to monitor global progress. WHO estimates indicate that, in 2023, the percentage of resistance of *E. coli* to third-generation cephalosporins was 44.8% (95% CI: 39.3–50.4) globally, with regional variations[1] ranging from 19.9% (15.9–24.7) in the WHO European Region to 70.7% (62.3–78.0) in the WHO African Region. The percentage of resistance of *S. aureus* to methicillin was 27.1% (23.5–31.0) globally, with the lowest rate in the WHO European Region (9.7% [7.0–13.2]) and the highest in the WHO Eastern Mediterranean Region (50.3% [39.8–60.8]) *(6).*

Mitigation of this global challenge to health and sustainable development requires a holistic One Health approach. Both sector-specific actions and multisectoral collaboration must be strengthened in human health, animal (terrestrial and aquatic) and plant health, food production and the environment. Effective, sustained delivery of priority AMR interventions requires strong political engagement, coordination, resource allocation and integration into broader system strengthening in all sectors. The GAP-AMR *(7)*, developed by WHO with the support of FAO and the WOAH, was adopted in 2015 to meet the urgent need to combat AMR at national, regional and global levels.

[1] In accordance with resolution WHA78.25 (2025), Indonesia was reassigned to the WHO Western Pacific Region as of 27 May 2025. In this instance, data analysis had already been completed with data pertaining to Indonesia included in the South-East Asia regional aggregates. WHO regional comparisons must be done with caution.

In 2024, the political declaration adopted by the UNGA HLM *(8)* established global targets for various AMR indicators and called for expedited local, national, regional and global efforts for an effective, sustainable, inclusive multisectoral response to AMR. The targets include: reducing the number of human deaths associated with bacterial AMR by 10% by 2030; at least 60% of countries have funded NAPs on AMR by 2030; 95% of countries submit responses to the annual TrACSS; 70% of antibiotics used for human health globally are in the WHO Access group; a meaningful reduction in the quantity of antimicrobials used globally in agri-food systems; and prevention of the discharge of antimicrobials into the environment by increasing research and catalysing action. The UNGA HLM on AMR also called for updating of the GAP-AMR by 2026. The data presented in this biennial report can be considered a baseline for gauging both progress and critical gaps that remain to be addressed in an updated GAP-AMR.

The GAP-AMR mandated the quadripartite partner organizations to produce biennial reports on national and global progress in addressing AMR. The sources of data for measuring progress include those on implementation of AMR NAPs submitted by countries annually to TrACSS and aggregated data collected by the quadripartite organizations, including for targets linked to the Sustainable Development Goals (SDGs). An initial report was produced for the United Nations Secretary-General in 2019, entitled "Follow-up to the political declaration of the high-level meeting of the General Assembly on antimicrobial resistance" *(9)*. The first quadripartite biennial report was published in 2023, with data for 2020–2021 *(10)*.

This second biennial progress report produced by the quadripartite is based on data for 2022–2024. In view of unforeseen delays in publication of the previous report and significant changes made to the TrACSS questionnaire in 2025, this second report, exceptionally, provides data for 3 years. The report highlights progress and challenges in implementation of AMR NAPs, provides sector-specific data on the recommended indicators in the GAP-AMR monitoring and evaluation framework *(11)* and proposes areas for accelerated action to be considered in the planned update of the GAP-AMR. The target readership includes policy-makers, technical staff, academics, researchers, members of civil society, private-sector representatives, development partners and donors. In engaging this diverse audience, the report encourages cross-sectoral collaboration and gender-balanced participation to ensure inclusive and effective implementation.

The report comprises an introduction, a summary of progress by the quadripartite organizations, a report on progress made by countries in implementing their AMR NAPs as observed in their reports to TrACSS[2] and emerging issues and opportunities for accelerated action. The Annex presents the status of key indicators in the GAP-AMR monitoring and evaluation framework for the period 2022–2024.

[2] Since inclusion of UNEP in the quadripartite, the acronym TrACSS has been changed from "Tripartite AMR country self-assessment survey" to "Tracking AMR country self-assessment survey".

2

Summary of progress from the quadripartite organizations in 2022–2024



Farmer hands with soil for plants growth in South Africa. © iStock / PeopleImages

FAO: Addressing AMR in the agrifood sector

FAO continues to play a central role in advancing the global response to AMR in the food and agriculture sectors. Guided by the FAO Action Plan on AMR 2021–2025 *(12)*, the Organization supports Members in designing and implementing context-specific, sustainable solutions to reduce reliance on antimicrobials while enhancing the resilience of agrifood systems in a One Health framework.

In 2024, FAO launched a 10-year initiative for transforming agrifood systems by reducing their reliance on antimicrobials (RENOFARM). The five interconnected pillars – health services, production practices, alternatives, incentives and connections – are designed to support countries in identifying local solutions to promote responsible AMU while safeguarding productivity and livelihoods. The initiative has gained broad political support and was formally acknowledged in the 2024 United Nations General Assembly political declaration on AMR, reflecting Member States' recognition of FAO's leadership and commitment to sustainable agrifood systems. Through the initiative, AMR actions will be mainstreamed in the food and agriculture sectors of around 100 countries through whole-value-chain capacity building and data sharing through InFARM.

To contribute to global evidence by instituting integrated surveillance, FAO has operationalized the International FAO Antimicrobial Resistance Monitoring (InFARM) system. InFARM supports national, regional and global surveillance and monitoring of AMR and AMU in the food and agriculture sectors. It consists of an information technology platform and capacity-building for collecting, collating, analysing, visualizing and interpreting data on AMR and AMU as a basis for decisions. The system is used currently to collect data on AMR in livestock, aquaculture and associated food production but is being extended to include data on AMU in plant production and protection. In December 2024, FAO concluded the first InFARM annual open call for AMR data, in which participation surpassed the target. Of 52 countries enrolled in InFARM, 49 reporting surveillance activities and 28 submitted AMR data on animals and food, laying the groundwork for strong global collaboration.

The Progressive Management Pathway (PMP) for AMR guides countries in implementing the components of their AMR NAPs related to food and agriculture sector in a stepwise, measurable approach. FAO recently released a comprehensive user's manual and an accompanying e-learning course to support the 50 countries, some of which have re-assessed their AMR-NAPs, to help them in assessing their AMR-NAPs and progress in implementation and in transforming the assessment results into actions. This approach has fostered cross-sectoral dialogue, with the inclusion of agrifood sectors into AMR-NAPs, promoting a One Health approach.

By linking technical guidance, digital systems and political advocacy, FAO helps countries to move from commitment to action, strengthening resilience, protecting public health and contributing to global efforts to preserve the efficacy of antimicrobials for generations to come.

UNEP: Addressing AMR in the environment health sector

As the leading global environmental authority, UNEP provides science-based evidence for ensuring that environmental dimensions are included in global and national response strategies on AMR. UNEP formally joined the quadripartite Joint Secretariat on AMR in 2022, guided by the Strategic Framework for Collaboration on AMR.

UNEP advances advocacy and coordination by placing the environment and prevention at the core of AMR solutions. It promotes integration of environmental actions in One Health

responses, strengthening of governance, enhancement of monitoring and surveillance and ensuring environmental best practices at all levels. UNEP helps to embed environmental AMR measures into national and regional policies and NAPs, such as reducing discharges into the environment from sectors such as pharmaceutical manufacturing, health care, agri-food production and municipal systems.

The report Bracing for superbugs: strengthening environmental action in the One Health response to antimicrobial resistance *(13)*, published in 2023, provided scientific findings and actionable solutions to environmental contributions to AMR. UNEP has also increased awareness, mobilized stakeholders and advocated for stronger political commitment to address environmental drivers of AMR. Communication materials include a video, web stories, a revised AMR knowledge hub and media engagement, including articles in *The Guardian*. UNEP also actively participates in World AMR Awareness Week by engaging diverse audiences.

UNEP contributes to decision-making by integrating AMR into environmental agendas and supporting important fora, such as the UNGA HLM on AMR, high-level AMR conferences in Oman (*2022*) and Saudi Arabia (*2024*), the African Ministerial Conference on the Environment, the Asia–Pacific Environment Forum and the Ministerial Conference on Environment and Health.

UNEP supports countries by providing technical assistance and capacity-building in reducing the environmental risks of AMR, such as safe disposal of unused antimicrobials, inclusion of AMR in the NAPs of African Member States and regional mapping in Latin America and the Caribbean. In 2022, UNEP led webinars *(14)* on the environmental dimensions of AMR and promoting their inclusion in AMR NAPs.

WHO: Addressing AMR in the human health sector

In 2024, the World Health Assembly, in its discussions on AMR *(15)*, welcomed the WHO strategic and operational priorities to address drug-resistant bacterial infections, 2025–2035 *(16)*, which would guide the AMR response in the human health sector. The priorities were chosen to reflect the WHO people-centred approach to addressing AMR and its core package of 13 interventions *(17)*.

Prevention of infections: WHO supports countries in enhancing measures for infection prevention and control (IPC) and has developed the Global action plan and monitoring framework on IPC, 2024–2030 *(18)*. WHO provides guidance to strengthen water, sanitation and health, waste management and surveillance in health-care facilities and communities *(19,20)*. Global best practices for safe management of pharmaceutical waste have been published *(21)*. WHO also promotes research on the role of vaccines in reducing AMR, including analyses of vaccine pipelines *(22)*. Gender-responsive IPC measures recognize the differentiated exposure and caregiving roles of women and men in households and health-care settings, ensuring that both benefit equally from infection prevention interventions.

Universal access to affordable, good-quality diagnosis and appropriate treatment of infections: WHO has established a global AMR diagnostic initiative *(23)* to strengthen bacteriology and mycology laboratory capacity in countries and improve access to high-quality, timely diagnosis. WHO has helped to extend access to new and existing antibiotics by improving forecasting, addressing shortages of antibiotics *(24)* and introducing new antibiotics. WHO has also strengthened antimicrobial stewardship to reduce inappropriate use of antimicrobials, including adapting and adopting the AWaRe guidance for use of antibiotics *(25)*, providing guidance on AMU and monitoring progress *(26)*.

Strategic information, science and innovation: WHO supports countries in collecting, analysing, reporting and using data on AMR and AMU *(27)*. In 2024, 130 countries were enrolled in GLASS *(28)*, of which 104 submitted data on AMR and 74 submitted data on AMU at least once between 2021 and 2023. National reporting of bloodstream infections increased by an average of 22.7% annually between 2016 and 2024. WHO is working to improve estimates of the AMR burden by strengthening routine surveillance supporting national surveys, use of other data sources and modelling *(29)*. To guide research, product development and public health action, WHO promotes prioritized research agendas n human health *(30)* and One Health *(31)* and publication of priority pathogen *lists (32)*, analyses of product pipelines *(33,34)* and support for incentives to conduct R&D *(35)*.

Governance, education and awareness: WHO provides guidance and tools for countries to develop, implement and monitor their AMR NAPs *(36,37)*, including new approaches to mainstreaming AMR interventions into primary health care *(38)* and addressing gender inequalities *(39)*. International workshops have been organized to improve leadership skills for effective multisectoral coordination *(40)*. WHO has developed guidance and other material for inclusion of AMR in training curricula *(41)* for health workers and in school health programmes *(42)* and raises the awareness of the public *(43)* and policy-makers through campaigns, including the annual World AMR Awareness Week *(44)*. To maximize its impact, WHO has formed the WHO Task Force of AMR Survivors *(45)*, the Global AMR Media Alliance, the quadripartite Working Group on Youth Engagement and networks of parliamentarians. Gender-responsive awareness campaigns ensure messages reach women and men effectively, reflecting differences in roles, literacy, and information access (*42*).

WOAH: Addressing AMR in the animal health sector

Awareness: WOAH has extended the scope of its campaign to include companion animals by collaborating with the World Small Animal Veterinary Association in developing educational materials for pet owners and veterinarians *(46)*.

Before the UNGA HLM on AMR, WOAH conducted a high-impact media engagement campaign on global platforms to disseminate the outcomes of a project on the economic impacts of AMR in food-producing animals *(47)*.

Surveillance and research: During the ninth round of data collection (2023–2024) for the ANImal antiMicrobial USE (ANIMUSE) global database, 157 countries submitted reports *(48)*, providing access to this crucial information. Of the reports, 111 (71%) included quantitative data for at least 1 year between 2022 and 2023. ANIMUSE promotes transparency in AMU reporting; however, although there have been steady improvements in data quality, 73 WOAH members (66%) in the latest round still did not publish their national AMU reports online. In 2023, 112 of 157 of WOAH Members (71%) no longer allowed use of antimicrobial agents for growth promotion, regardless of their national legislation, while 34 members (22%), mainly in the Americas and Asia-Pacific regions, reported use of growth promoters. Between 2020 and 2022, AMU per kg of animal biomass decreased by 5% globally, with significant decreases in Europe (23%) and Africa (20%) but an increase in the Middle East (43%). Overall, tetracyclines remained the most frequently used antimicrobial class globally in animal health.

Quality of veterinary products: The political declaration of the UNGA HLM on AMR identified substandard and falsified antimicrobials as a key driver of inappropriate AMU and stressed the importance of strengthening systems to address the issue. In response, WOAH is piloting a Veterinary Monitoring and Surveillance System for Substandard

and Falsified Veterinary Products (VSAFE-pilot). Participation in VSAFE-pilot increased from 42 Members in December 2023 to 65 in December 2024, with consistent monthly engagement. Since its launch, VSAFE-pilot has identified 141 confirmed substandard and falsified veterinary products, including antiparasitics, vaccines and antimicrobials.

Aquatic animal health: WOAH has developed e-learning modules *(49)* on responsible AMU, including a module on AMR stewardship in aquatic animals, which is being pilot-tested. The aim is to enhance technical knowledge and to align practices with global veterinary standards.



AZERBAIJAN: Impact of Codex Trust Fund project on food safety – September 2023. © WHO / Sue Price

3

Implementation of AMR NAPs, 2022–2024



A farmer is working under the heat in Pathum Thani, on December 10, 2025. © WHO / Ploy Phutpheng

Annual AMR country self-assessment survey (TrACSS)

TrACSS *(50)*, which has been administered annually since 2017, is an essential quadripartite tool for monitoring global and national responses to AMR since adoption of the GAP-AMR in 2015. It is aligned with the five GAP-AMR objectives and receives information on indicators of countries' progress in implementation of their AMR NAPs. In 2022, the TrACSS questionnaire was reviewed and revised extensively. The revised version separates the questions on terrestrial and aquatic animals and includes more questions on the environment since UNEP joined to form the quadripartite. Since 2024, an online platform has been used to invite Member State AMR focal points from the various sectors to complete the TrACSS. The results have been reported for 8 consecutive years, and responses from the surveys are published in the open-access TrACSS database.

TrACSS is currently the only global mechanism for monitoring implementation of AMR NAPs and GAP-AMR, and supports the GAP-AMR monitoring and evaluation framework, developed and published in 2019 (*11*). The framework recommends a list of indicators. The latest data on the indicators are reported in the Annex. This section consists of an assessment of countries' progress in implementing their AMR NAPs, with a comparison of their progress according to the four World Bank income group classification.

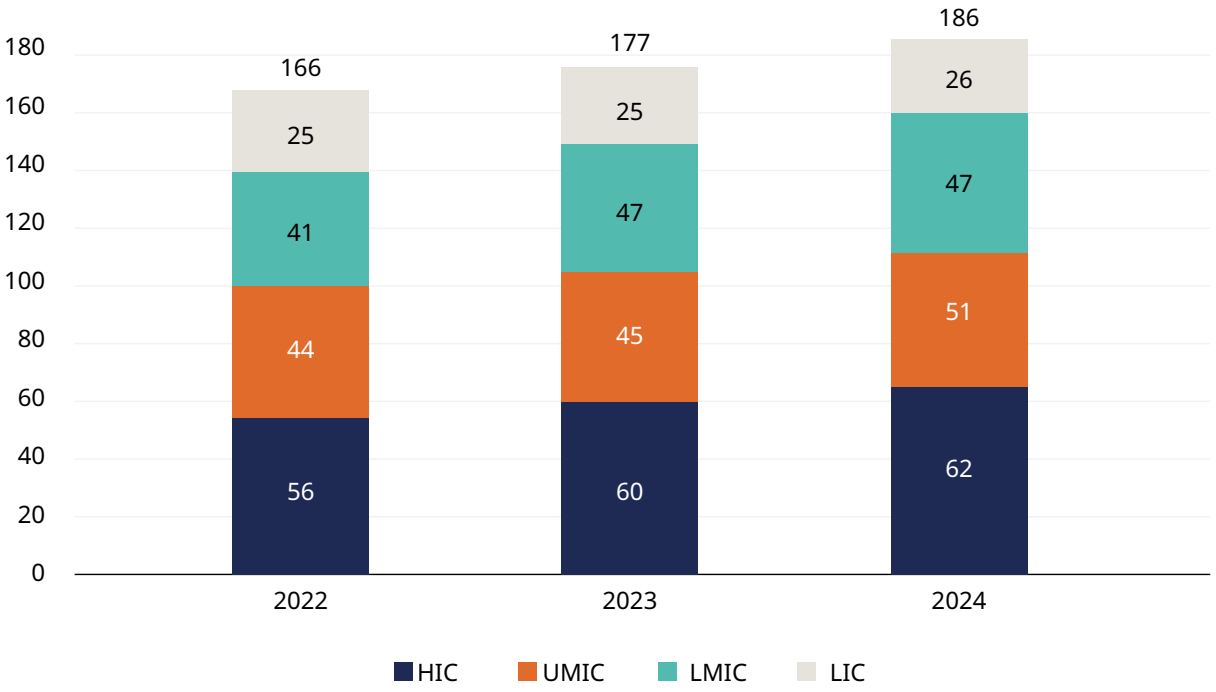
As the TrACSS is a self-assessment survey, it has several limitations, including potential reporting bias. Furthermore, differences in national data collection standards may affect the quality of the data reported.

Countries that participate in the TrACSS

In 2024, the survey was sent to 194 WHO Member States. Although the member states of FAO, UNEP and WOAH are not exactly the same ones as those of WHO, the results for WHO Member States are reported here because of precedence and for consistency. A record number of 186 countries reported on their progress in 2024 (Fig. 1), representing 96% of all Member States and meeting the global target of a 95% response rate to the TrACSS set by the UNGA HLM on AMR in 2024.

Countries are classified according to 2024 World Bank income groups, and the results are summarized and compared for high-income countries (HIC), upper-middle-income countries (UMIC), lower- to middle-income countries (LMIC) and low-income countries (LIC). The TrACSS profiles of all participating countries are available online *(50)*.

Fig. 1. Numbers of countries that participated in the 2022–2024 TrACSS, by World Bank country income group



Source: WHO *(50)*

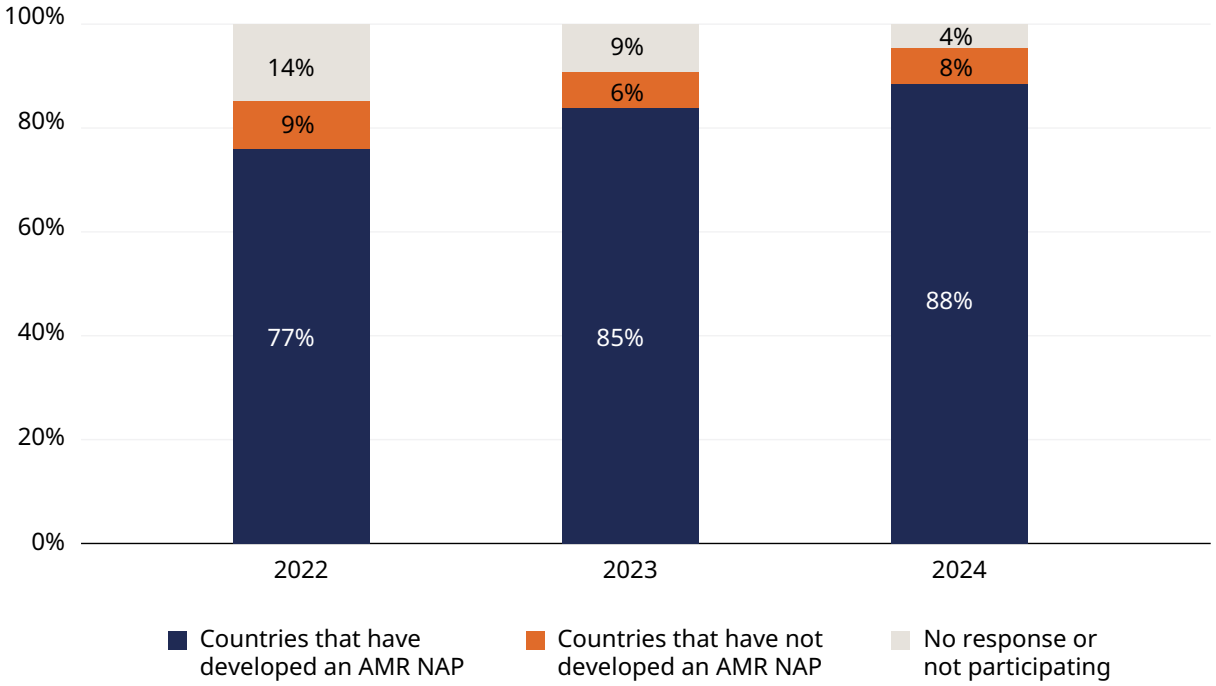
Data analysis for measuring national progress in implementation of AMR NAPs

Key indicators to measure progress in implementing NAPs and in meeting global AMR targets were selected for comparison among income groups and for 8-year trend analyses. The indicators signal progress made in human health, animal health, food and agriculture and the environment. In the text below, for most of the selected indicators, the absence of nationwide implementation corresponds to levels A and B, whereas achievement of nationwide implementation corresponds to levels C–E, unless otherwise stated. The proportions of countries in each income group that achieved a given number of indicators are also presented.

Trends in multisectoral indicators

AMR NAPs. The proportion of countries that have developed an AMR NAP since the inception of TrACSS has increased steadily. In 2024, 170 Member States (88% of 194) had developed an AMR NAP (Fig. 2). Internal data from countries and regional offices indicate that a total of 178 countries have an AMR NAP.

Fig. 2. Proportion of countries in various stages of AMR NAP development, 2022–2024



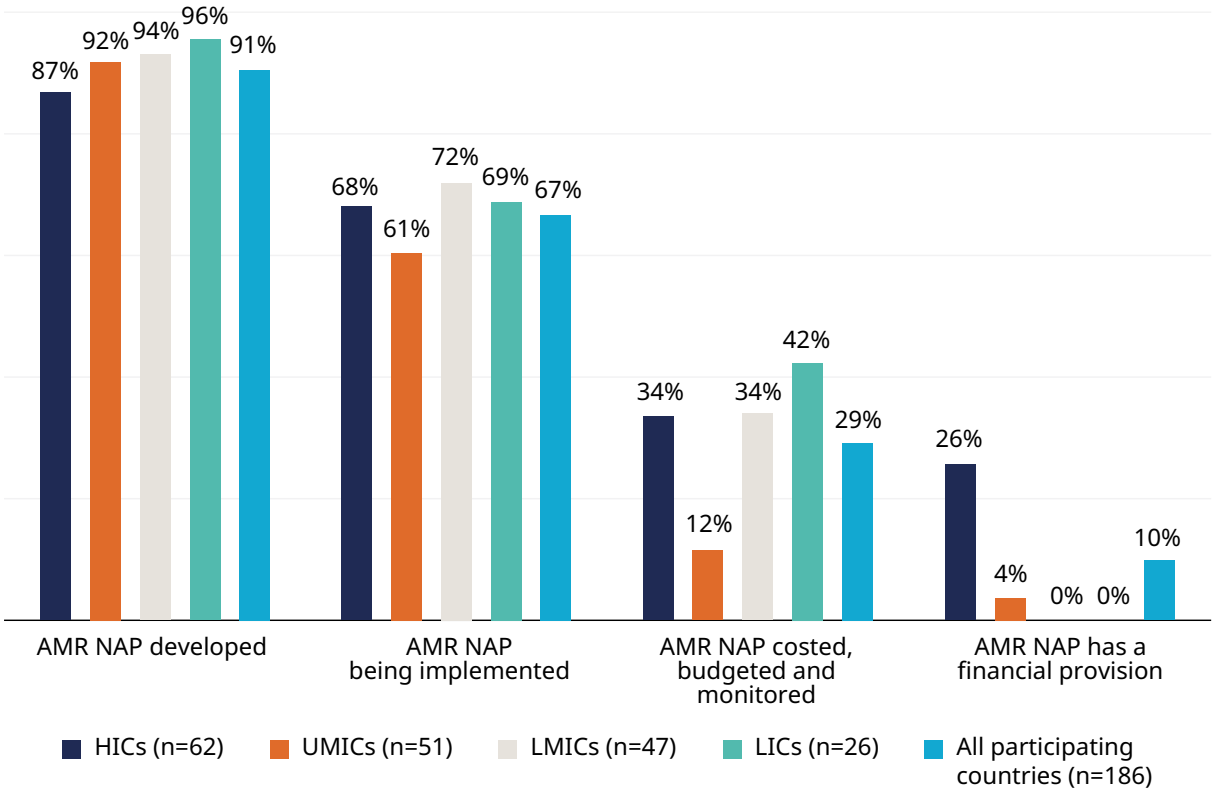
Proportions are those of the 194 WHO Member States (from question 2.3 of the 2022–2024 TrACSS). Countries that did not participate in the TrACSS or provide a response for this indicator are depicted in grey.

Source: TrACSS *(50)*.

Data from the 186 countries that participated in TrACSS 2024 indicate that solid progress has been made in development of AMR NAPs in countries at all income levels, and 67% of all countries reported implementation of their plans. The proportion of countries that have costed and budgeted their plan and are actively monitoring its implementation has also increased, from 19% (31 of 163) in 2021 to 29% (54 of 186) in 2024. While 42% of LIC and 34% of HIC and LMIC reported having costed and budgeted their plan, only 12% of UMIC had done so, with a monitoring mechanism (Fig. 3).

Fewer countries had made specific financial provision for their AMR NAP in their national budgets: 10% (18 of 186) in 2024. Only 26% of HIC (16 of 62), 4% (2 of 51) of UMIC and no LMIC and LIC reported that they had made financial provision for their AMR NAP. As 67% of countries reported that they were implementing their plans, however, it can be assumed that activities were being implemented with other resources or with other funding. To ensure sustainable implementation and attainment of the UNGA HLM on AMR target of least 60% of countries having funded plans by 2030, core AMR NAP activities should be embedded in relevant sector-specific national plans and budgets.

Fig. 3. Proportions of countries that reported on AMR NAP development (left), implementation (centre left), costing, budgeting and monitoring (centre right), and financial provision (right), by World Bank country income group, 2024

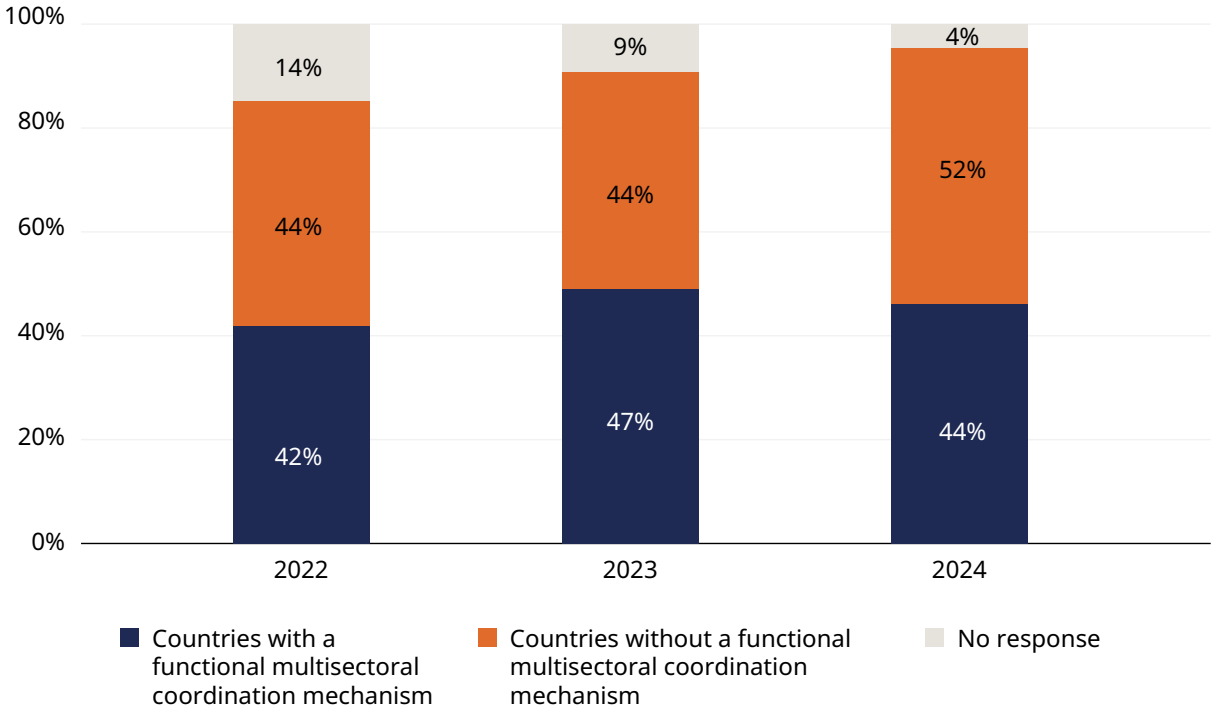


The proportions are of the 186 countries that responded to question 2.3 in the 2024 TrACSS.

Source: TrACSS *(50)*.

Multisectoral coordination of AMR. The AMR response requires a One Health approach, with the engagement of all relevant sectors (human health, animal health, agriculture and the environment). Progress has, however, plateaued in the past 3 years, and 52% (100 of 186) of countries still have no formalized, functional coordination mechanism. A formalized mechanism includes an establishment with government leadership, technical working groups with clear terms of reference, regular meetings, funding for operation of the coordination mechanism, and regular reporting and accountability. It further connotes joint working and integrated approaches in relevant areas to support implementation and monitoring of AMR NAPs. Fig. 4 illustrates the proportions of countries with and without a functional multisectoral working group on AMR.

Fig. 4. Proportions of countries with and without a functional multisectoral working group on AMR, 2022–2024



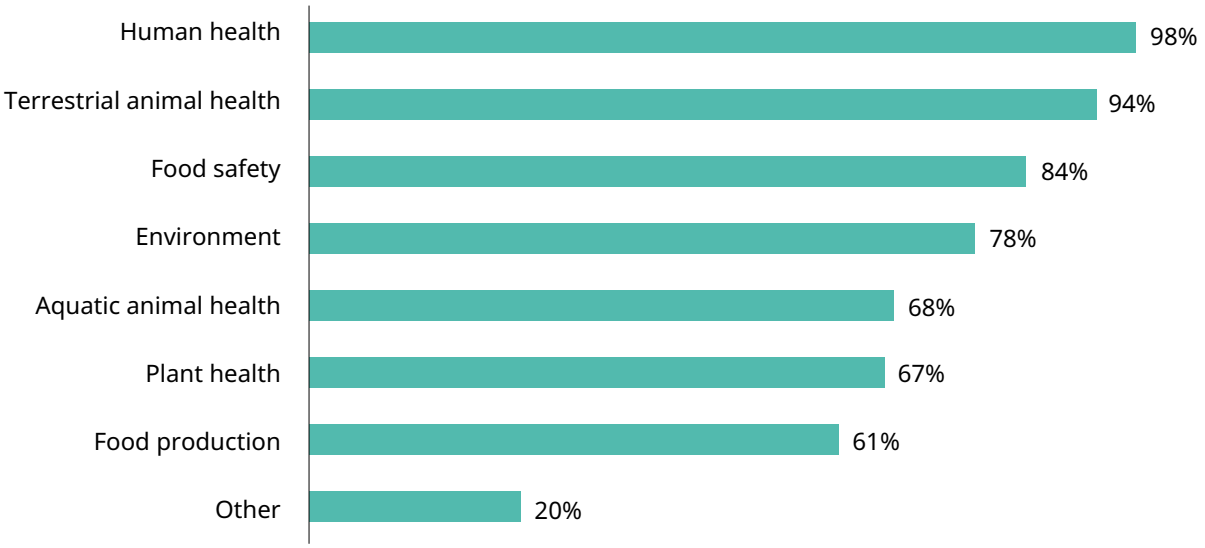
Proportions of the 194 WHO Member States that responded to question 2.1 of the 2022–2024 TrACSS. Countries that did not participate in the TrACSS or provide a response for this indicator are depicted in grey.

Source: TrACSS *(50)*.

The existence of a formalized multisectoral coordination mechanism on AMR differed by income group. While nearly half of participating HIC (48%, 30 of 62), UMIC (45%, 23 of 51) and LMIC (49%, 23 of 47) reported having a formalized multisectoral coordination mechanism, this was the case for less than half of the participating LIC (38%, 10 of 26) (Fig. 4).

In 2024, nearly all participating countries reported that their AMR multisectoral coordination mechanism involved the human health (98%, 183 of 186) and the terrestrial animal health sectors (94%, 174 of 186) – the highest representation of all sectors (Fig. 5).

Fig. 5. Sector involvement in the AMR multisectoral coordination mechanism, 2024



Proportions are those of the 186 countries that participated in the 2024 TrACSS that provided a response to question 2.2.
Source: TrACSS *(50)*.

The trends between 2022 and 2024 in the participation of other sectors increased as follows:

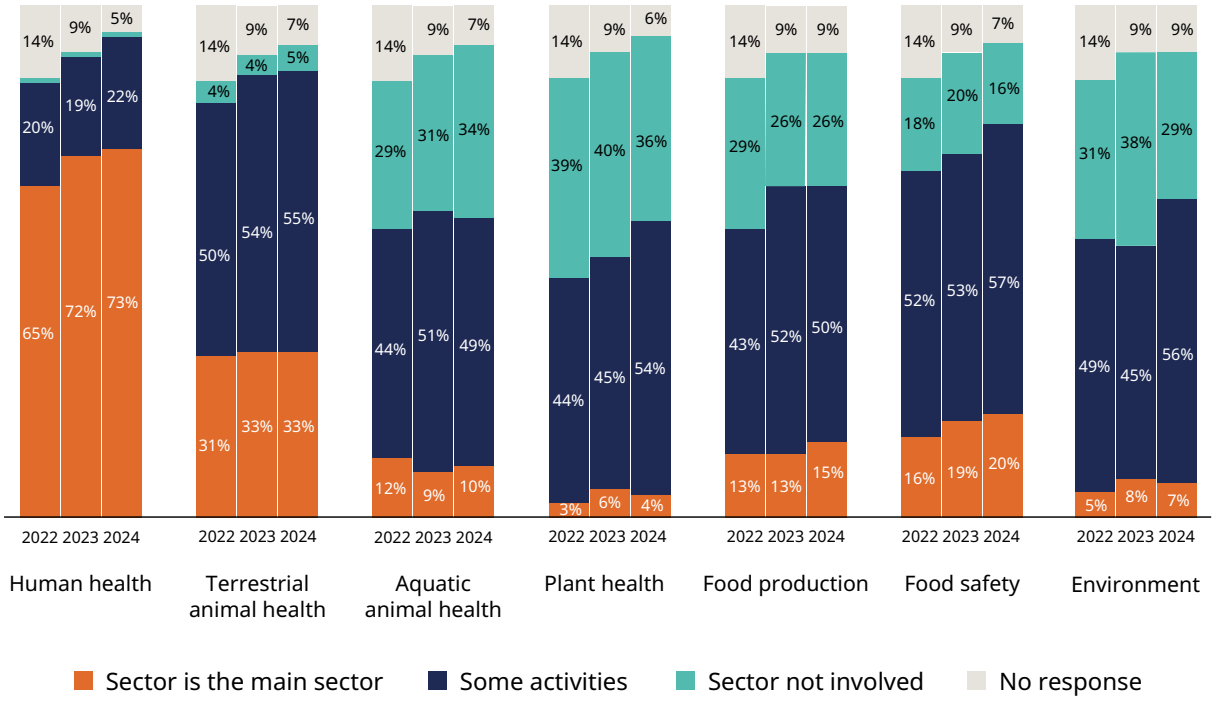
- food safety sector: from 79% (131 of 166) in 2022 to 84% (157 of 186) in 2024;
- environmental sector: from 65% (108 of 154) in 2022 to 78% (145 of 186) in 2024;
- plant health sector: from 51% (84 of 166) in 2022 to 67% (124 of 186) in 2024;
- food production: from 54% (90 of 166) in 2022 to 61% (113 of 186) in 2024; and
- all sectors simultaneously: from 25% (42 of 166) in 2022 to 42% (78 of 186) in 2024.

While more work is required to ensure the functionality of the multisectoral coordination mechanism, the increasing involvement of all sectors over the past 3 years indicates greater synergy and collaboration in mitigating the impact of AMR.

Awareness of AMR. Since 2019, countries have been asked to report whether a nationwide, government-supported AMR awareness campaign has been conducted. The proportion of countries in which a national awareness campaign targeted all or most priority stakeholder groups remained at about one third in 2022 and increased modestly to 39% (75 of 194) in 2024. Almost two thirds of all countries (57%, 111 of 194) reported that no or limited AMR awareness-raising activities were conducted in 2024. The remaining countries did not respond to this question or did not participate in the survey. There was no clear trend by income category in 2024. More UMIC (53%, 27 of 51) and LIC (35%, 9 of 26) reported having attained this level than HIC (42%, 26 of 62) and LMIC (28%, 13 of 47).

The human and terrestrial animal health sectors were the main targets of awareness campaigns (72% and 33%, respectively) in all participating countries in 2024. Some awareness-raising activities were conducted in the other sectors (in > 50% of all countries in 2024). It is of some concern that awareness activities were not conducted in the aquatic animal health, plant health or environment sectors in about one third of countries in 2024 (Fig. 6).

Fig. 6. Proportions of countries by level of sector involvement in awareness activities, 2022–2024



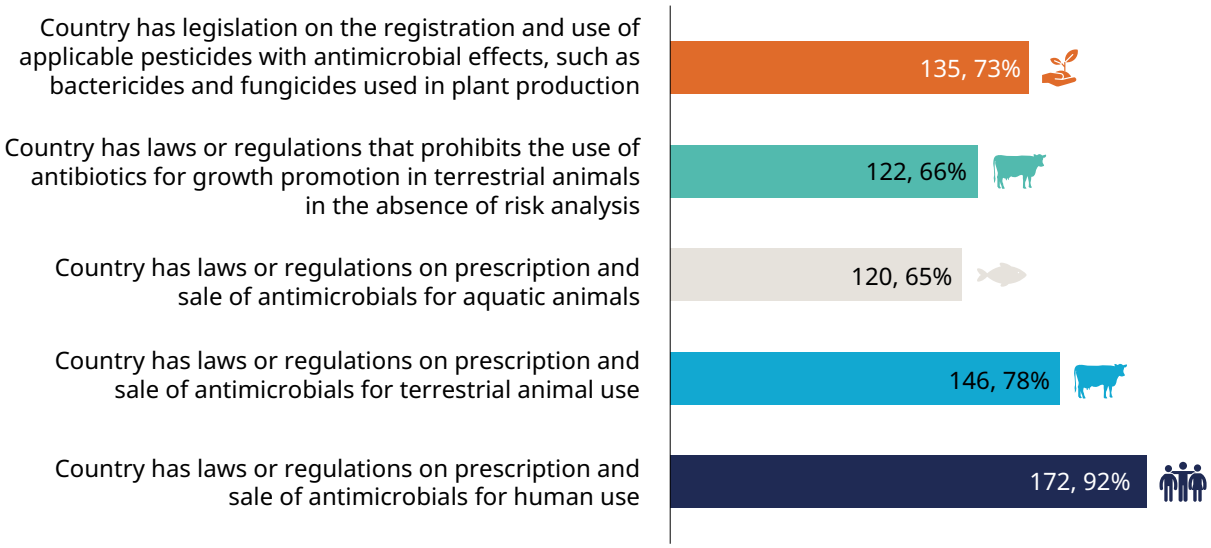
Proportions of 194 WHO Member States that responded to question 2.9 of the TrACSS. Countries that did not participate in the 2024 TrACSS or provide a response about this indicator are depicted in grey.

Source: TrACSS *(50)*.

Laws or regulations on AMU. Since 2022, there has been a steady increase in the number of countries that report that they have laws or regulations on the prescription and use of antimicrobials in various sectors. Laws or regulations on the prescription and sale of antimicrobials for human use were reported by 92% (172 of 186) of participating countries in 2024, as compared with 89% (147 of 166) in 2022. The countries were almost all HIC (98%, 61 of 62) and UMIC (98%, 50 of 51) and the majority of LMIC (87%, 41 of 47) and LIC (77%, 20 of 26). The greatest improvements since 2022 were observed in UMIC (93%, 41 of 44) and LMIC (80%, 33 of 41).

Progress was seen in all other One Health sectors. The number of countries with regulations on the prescription and use of antimicrobials for terrestrial and aquatic animals increased from 123 to 146 and from 95 to 120 between 2020 and 2024, respectively. In 2024, 122 countries reported that they had laws or regulations on the use of antibiotics as growth promoters in terrestrial animals, as compared with 110 in 2022. In 2024, 135 countries reported legislation on the registration and use of pesticides with antimicrobial effects in plant production, as compared with 115 in 2024 (Fig. 7).

Fig. 7. Numbers and proportions of countries that reported laws or regulations on AMU, by sector, 2024



Proportions are those of the 186 countries that participated in the 2024 TrACSS and provided an answer to question 2.8.

Source: TrACSS *(50)*.

Implementation of AMR NAPs in the human health sector

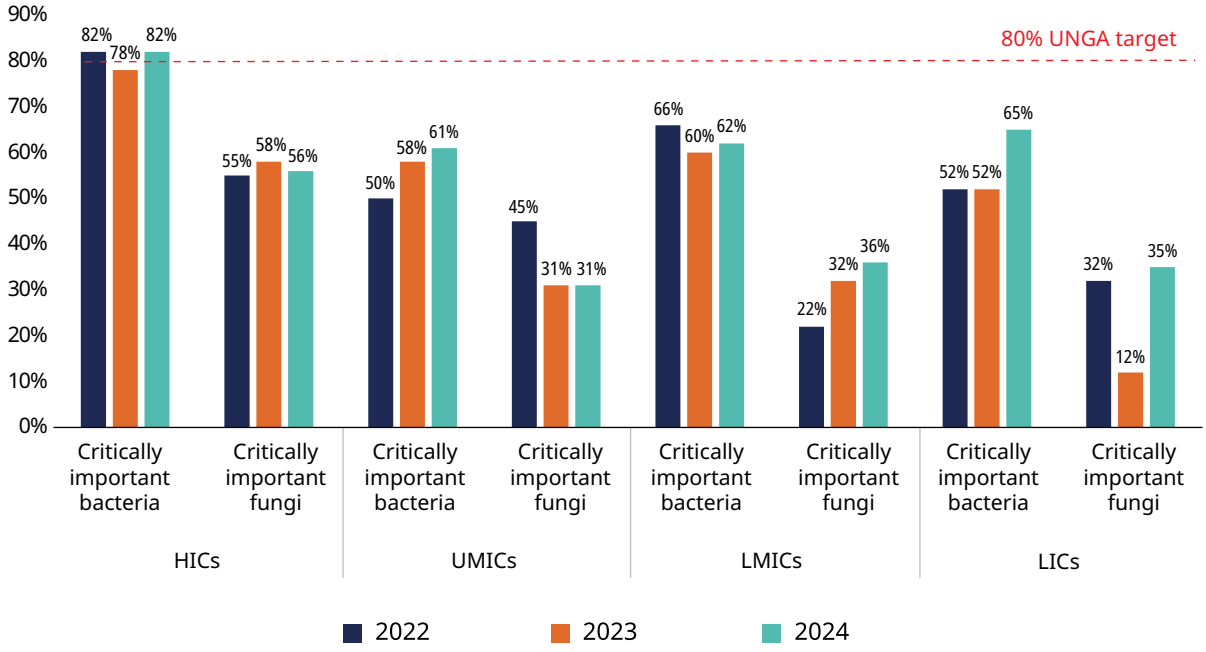
Training and professional education in AMR. In 2024, 76% of participating countries (142 of 186) reported that they offered at least some training and professional education on AMR in the human health sector (levels C–E of indicator 3.1). Most HIC (87%, 54 of 62), UMIC (71%, 36 of 51), LMIC (70%, 33 of 47) and LIC (73%, 19 of 26) reported this level. While all countries should systematically include AMR in the curricula of health-care trainees and workers (level E), this was the case in only 13% of HIC (8 countries) and 12% of UMIC (6 countries) and in no LMIC or LIC.

National surveillance for AMR in humans. Over half of participating countries (54%, 100 of 186) in 2024 reported having a national standardized surveillance system for AMR in humans (levels D–E of indicator 3.3). LIC have improved markedly as compared with other income groups. In 2024, 46% (12 of 26) of LIC reported level D or E, as compared with 33% in 2022 (8 of 25). In 2024, the percentage of countries with a standardized AMR surveillance system was higher in LMIC (53%, 25 of 47) and HIC (63%, 39 of 62); since 2022, there has been a gradual decrease in the percentages of HIC and LMIC that report level D or E. In 2022, 123 countries, territories and areas were enrolled in GLASS-AMR, of which 92 reported the results of bacterial identification *(27)*.

Laboratory and diagnostic capacity. Globally, 69% of participating countries (128 of 186) reported that one or more reference laboratories had the capacity to test for AST of all critical bacteria included in GLASS (*Acinetobacter baumannii*, *Pseudomonas aeruginosa*, *Escherichia coli, Klebsiella* spp., *Proteus, Enterococcus faecium*, *Staphylococcus aureus*, *Campylobacter* spp., salmonellae, *Neisseria gonorrhoeae, Streptococcus pneumoniae*, *Haemophilus influenzae*, *Shigella* spp.), but only 41% (77 of 186) reported such capacity for critically important fungi (*Candida* and *Aspergillus* spp.). More HIC (82%, 51 of 62) reported having the capacity for bacterial AST than UMIC (61%, 31 of 51), LMIC (62%, 29 of 47) and LIC (65%, 17 of 26). Nevertheless, UMIC and LIC reported greater capacity than in 2022, when data collection began (Fig. 8). Globally, the capacity for bacterial AST increased from 56% (108 of 194) in 2022 to 66% (128 of 194) in 2024, whereas fungal AST capacity increased from 35% (68 of 194) to 40% (77 of 194). Further capacity strengthening will be required

to meet the global target of 80% of countries able to test for resistance in all bacterial and fungal pathogens included in GLASS by 2030.

Fig. 8. Country capacity to perform AST for critically important bacteria and fungi by income category, 2022–2024

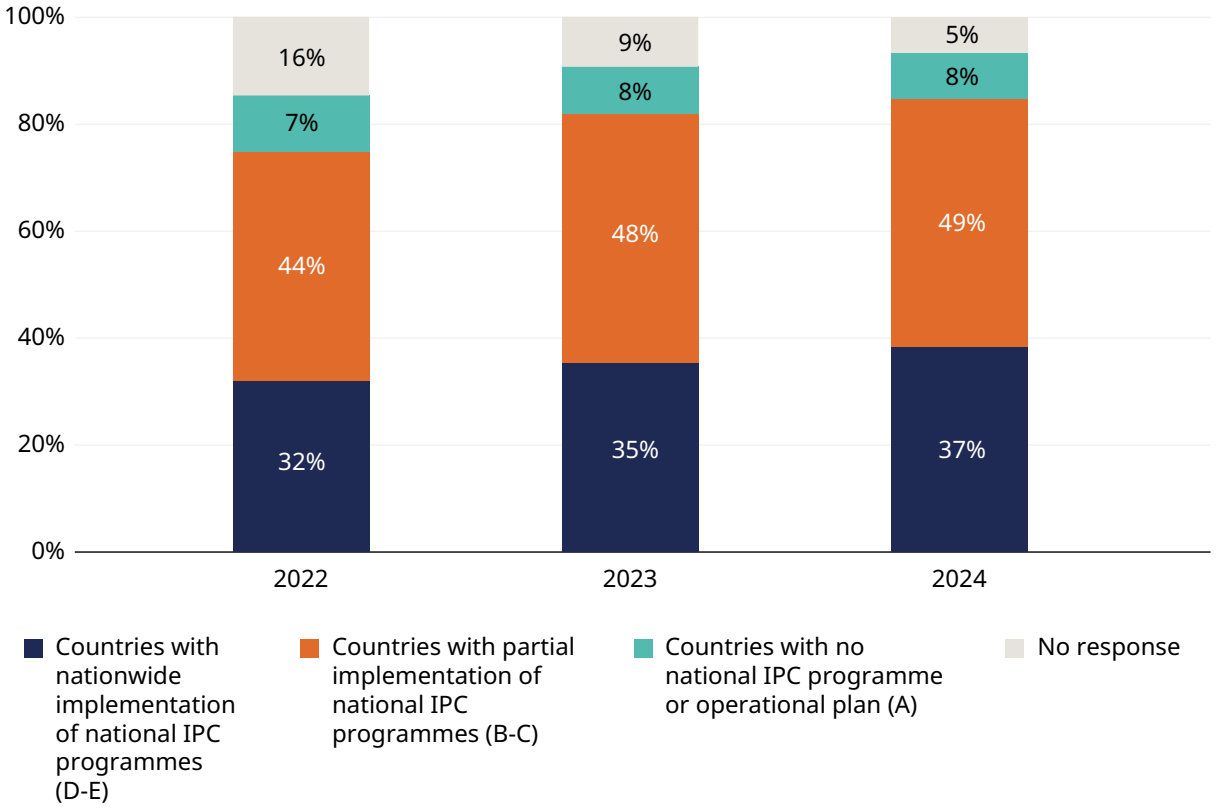


The proportions are those of the total number of countries by income category in a given year that responded to questions 3.4.2 and 3.4.3 of TrACSS. The total number of countries per income category in each year is as follows: HIC, 62; UMIC, 51; LMIC, 47; LIC, 26 in 2024; HIC, 60; UMIC, 45; LMIC, 47; LIC, 25 in 2023; and HIC, 56; UMIC, 44; LMIC, 41; and LIC, 25 in 2022. Critically important bacteria are the following: *Acinetobacter baumannii*, *Pseudomonas aeruginosa*, *Escherichia coli, Klebsiella* spp., *Proteus, Enterococcus faecium*, *Staphylococcus aureus*, *Campylobacter* spp., Salmonellae, *Neisseria gonorrhoeae, Streptococcus pneumoniae*, *Haemophilus influenzae* and *Shigella* spp. Critically important fungi are *Candida* and *Aspergiillus* spp.

Source: TrACSS *(50)*.

Infection prevention in human health care. In 2024, 39% of responding countries (72 of 186) reported having developed a national IPC programme and having implemented it nationwide (levels D–E of indicator 3.5). The higher the income category, the larger the percentage of countries that reported this level of achievement: 12% (3 of 26) of LIC, 21% (10 of 47) of LMIC, 39% (20 of 51) of UMIC and 63% (39 of 62) of HIC. Crucially, a national IPC programme or an operational plan was available in most LIC (85%, 22 countries) and LMIC (74%, 35 countries) and in almost half of UMIC (45%, 23 countries) and a third HIC (26%, 16 countries); however, it was either not implemented or was implemented in only some health facilities. There has been little increase since 2022 in the proportion of countries that partially (B–C) or nationally (D–E) implement IPC programmes (Fig. 9).

Fig. 9. Proportions of countries in which there is nationwide implementation of IPC programmes in human health care

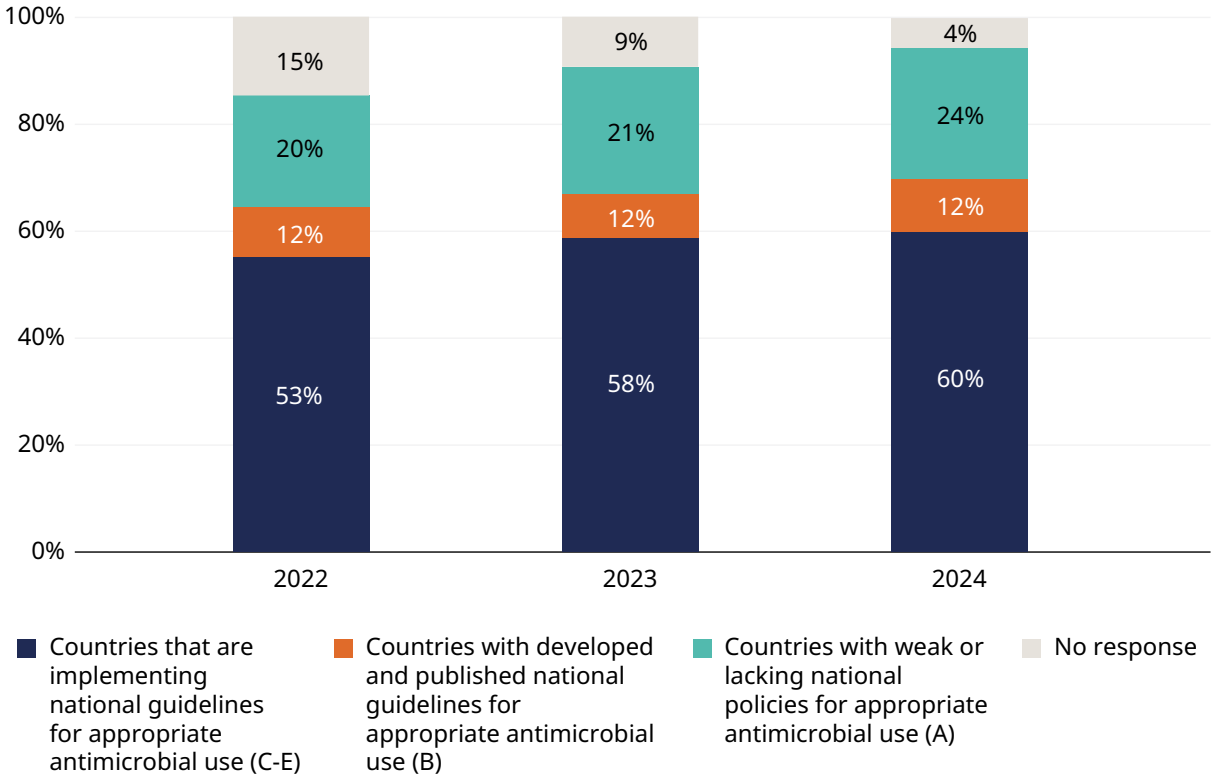


Proportions are those of the 194 Member States that provided A–E responses to question 3.5.

Source: TrACSS *(50)*.

Optimization of AMU in humans. Globally, 63% (118 of 186) of countries reported that guidelines for appropriate use of antimicrobials were available and implemented in at least some health-care facilities (levels C–E of indicator 3.6) in 2024. More HIC and UMIC reported this level of achievement – 81% (50 of 62) of HIC and 59% (30 of 51) of UMIC, as compared with 53% (25 of 47) of LMIC and 46% (12 of 26) of LIC. About one third of countries reported no or weak national policies for appropriate AMU: 29% of UMIC (15 countries), 34% of LMIC (16 countries) and 31% of LIC (8 countries), as compared with 11% of HIC (7 countries). Since 2022, there has been little increase in the proportion of countries with national guidelines for appropriate AMU (level B) and are implementing such guidelines in all health facilities (levels C–E) (Fig. 10).

Fig. 10. Proportions of countries that implement national guidelines for optimizing AMU in humans



Proportions are those of the 194 Member States that provided A–E responses to question 3.6.

Source: TrACSS *(50)*.

National monitoring system for AMU. Slightly fewer than half of the countries (49%, 92 of 186) reported a system for monitoring total national and/or subnational sales of antimicrobials (levels C–E of indicator 3.2). While this was the case in over half of HIC (68%, 42 of 62) and UMIC (53%, 27 of 51), only 38% (18 of 47) of LMIC and only 19% of LIC (5 of 26) monitored total sales of antimicrobials. Of the 34 countries that met the current target of use of at least 60% Access antibiotics for human health, 21 were HIC, 5 were UMIC, 6 were LMIC, and 2 were LIC. Of the 19 countries that met the new UNGA HLM target of 70% use of Access antibiotics, 11 were HIC, 2 were UMIC, 4 were LMIC, and 2 were LIC *(51)*.

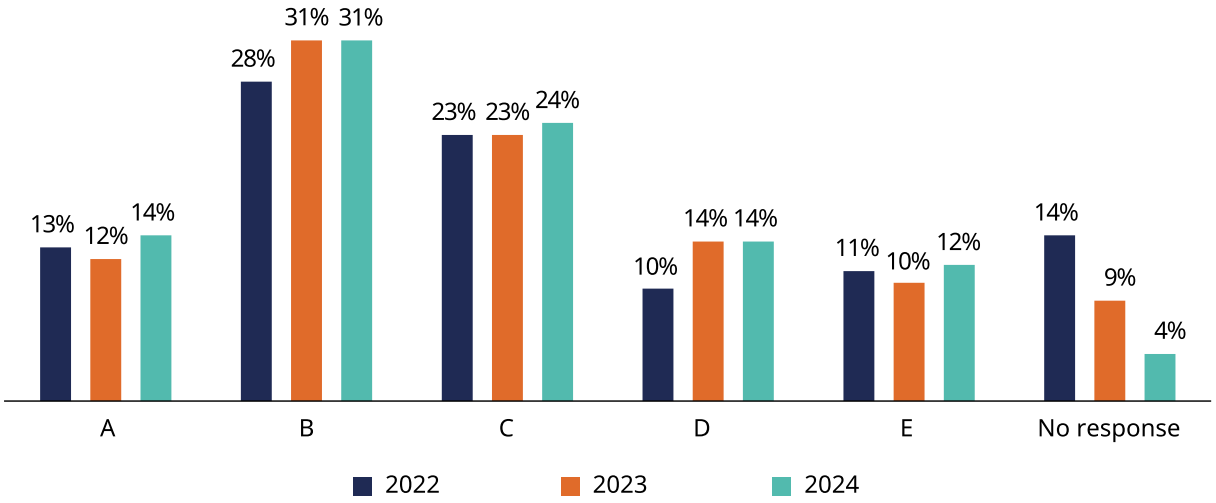
Adoption of the AWaRe classification for national lists of essential medicines. In the AWaRe system, antibiotics are classified into three groups, Access, WAtch and REserve, to guide stewardship. Nearly one half (48%, 90 of 186) of all participating countries reported having adopted the AWaRe classification in their national Essential Medicines list (levels C–E of indicator 3.7). In general, the trend in this indicator is inverse, whereby more countries in lower income categories reported having adopted the AWaRe classification: 58% (15 of 26) of LIC, 57% (27 of 47) of LMIC, 51% (26 of 51) of UMIC and 35% (22 of 62) of HIC.

Implementation of AMR NAPs in the animal health sector

Training and professional education in AMR

Training and professional education on AMR in veterinary and aquatic animal health are crucial to ensure responsible use of antimicrobials, prevent the development of resistant pathogens and safeguard both animal and human health. Training helps to maintain the efficacy of treatments and global health initiatives. In the veterinary animal sector, the percentage of countries that reported systematic training on AMR and prudent use of antimicrobial agents increased from 44% in 2022 to 47% in 2023 and further to 50% in 2024 (Fig. 11). In the aquatic animal health sector, 31% of countries reported that they provided systematic training in 2022 and 2023, although the proportion decreased to 29% in 2024.

Fig. 11. Training and professional education on AMR in terrestrial animals

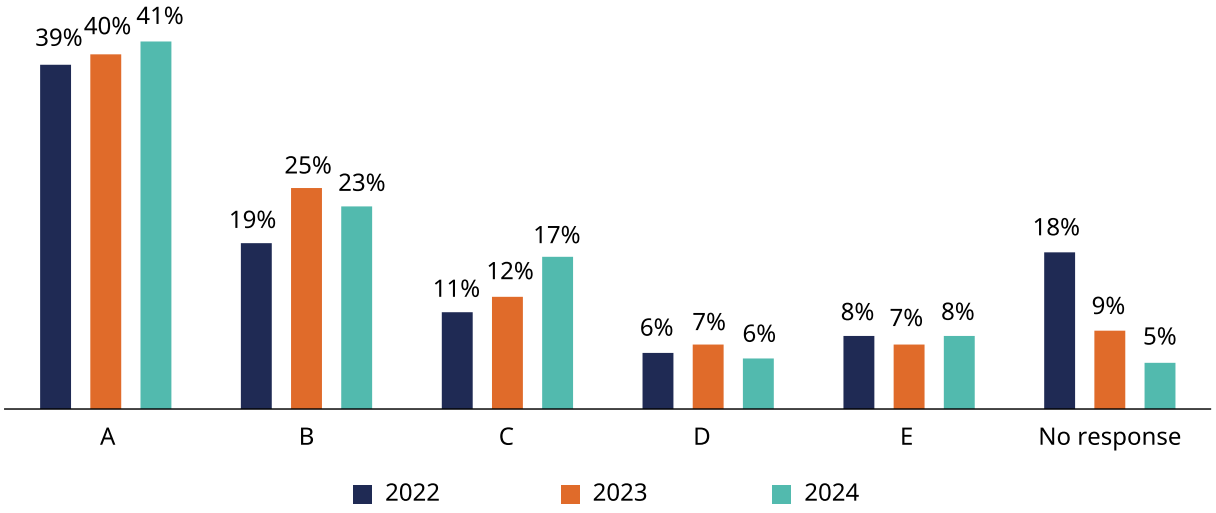


Source: TrACSS *(50)*.

Progress in strengthening veterinary services

Veterinary services must be strengthened to combat AMR effectively and ensure veterinary public health. Better veterinary services provide early detection, prevention and control of AMR and responsible use of antimicrobials, thus safeguarding both animal and human health. In the veterinary animal health sector, the percentage of countries that reported strengthened (levels C–E) veterinary services slightly increased from 42% in 2022 to 45% in 2023 (Fig. 12) but decreased to 43% in 2024. The aquatic animal health sector showed a consistently but small positive trend, the percentage of countries that reported strengthened aquatic animal health services increasing from 25% in 2022 to 27% in 2023 and further to 31% in 2024.

Fig. 12. Strengthening aquatic animal health



Source: TrACSS *(50)*.

National surveillance for AMR in terrestrial and aquatic animals

National surveillance for AMR in terrestrial and aquatic animals is crucial for early detection and monitoring of resistance patterns to enable timely interventions to prevent the spread of resistant pathogens and ensure the effectiveness of antimicrobial treatments. It also helps protect both animal and public health. Countries were asked whether they had national plans or systems for monitoring the sales or use of antimicrobials in aquatic and terrestrial animals.

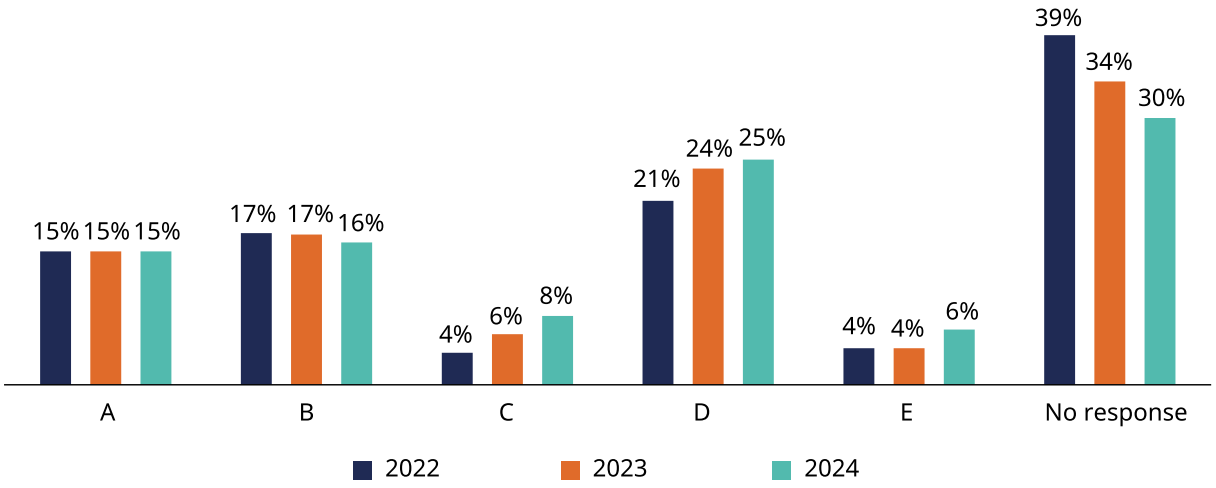
The percentage of countries with plans or systems solely for terrestrial animals remained constant at 18% throughout the reporting period. In 2022 and 2023, only 1% of the countries reported having a plan or system exclusively for aquatic animals, with a slight increase to 2% in 2024. The percentage of countries with plans or systems for both terrestrial and aquatic animals increased slightly, from 35% in 2022 to 41% in 2023 and to 47% in 2024. Overall, the proportion of countries that reported having at least a plan or system increased from 54% in 2022 to 59% in 2023 and 66% in 2024.

National monitoring system for sales and use of antimicrobials

Members are increasingly submitting data to WOAH on antimicrobial sales and use, with 61% submitting data to WOAH in 2022, 66% in 2023 and 71% in 2024. Accurate data on antimicrobial sales and use enable WOAH and its members to develop informed policies and regulations. The data are used in developing NAPs and international guidelines to promote responsible use of antimicrobials.

WOAH members report regularly on AMU, promoting transparency and accountability and ensuring that countries adhere to international standards and commitments, thereby enhancing trust and cooperation in the global fight against AMR. The proportion of members that reported baseline information (level A) remained at 15% for the 3 consecutive years under consideration, while 17% of countries reported data for option 1 (level B) in 2022 and 2023, decreasing to 16% in 2024. The numbers of members at levels C–E increased, from 28% in 2022 to 34% in 2023 and 39% in 2024 (Fig. 13).

Fig. 13. WOAH reporting options for AMU



Source: TrACSS *(50)*.

Infection prevention in animals

Good animal husbandry and biosecurity are essential to maintain animal health, reduce stress and enhance immunity, thereby decreasing the need for antimicrobials. These practices also promote sustainable farming and can lead to significant cost savings for farmers. Most countries reported developing and promoting good animal husbandry and biosecurity (level B). In the veterinary animal health sector, 46% of countries had such activities in 2022, the proportion rising to 55% in both 2023 and 2024, indicating a growing commitment to improving animal health standards. In the aquatic animal health sector, the percentage of countries with such activities also showed an upward trend, from 46% of countries in 2022 to 51% in 2023 and to 53% in 2024. This consistent improvement illustrates the increasing focus on aquatic animal health.

Implementation of national plans for good animal husbandry and biosecurity in the veterinary animal health sector fluctuated: 32% of countries were at levels C–E in 2022, which decreased to 30% in 2023 and rose to 33% in 2024. In the aquatic animal health sector, performance at levels C–E increased from 21% in 2022 to 23% in 2023, then decreased slightly to 22% in 2024, reflecting some efforts to implement and monitor such plans.

Optimization of AMU in animals

Optimizing AMU in veterinary and aquatic animal health is essential to combat AMR, to ensure animal health and welfare, for sustainable farming practices, to protect public health and to provide economic benefits to farmers. For terrestrial animals, the percentage of countries that reported AMU at levels C–E showed a positive trend, increasing from 43% in 2022 to 48% in 2023 and to 52% in 2024. Similarly, an upward trend was observed in optimal AMU in aquatic animals, levels C–E increasing from 35% in 2022 to 40% in 2023 and 41% in 2024.

AMR NAP implementation in the food and agriculture sector

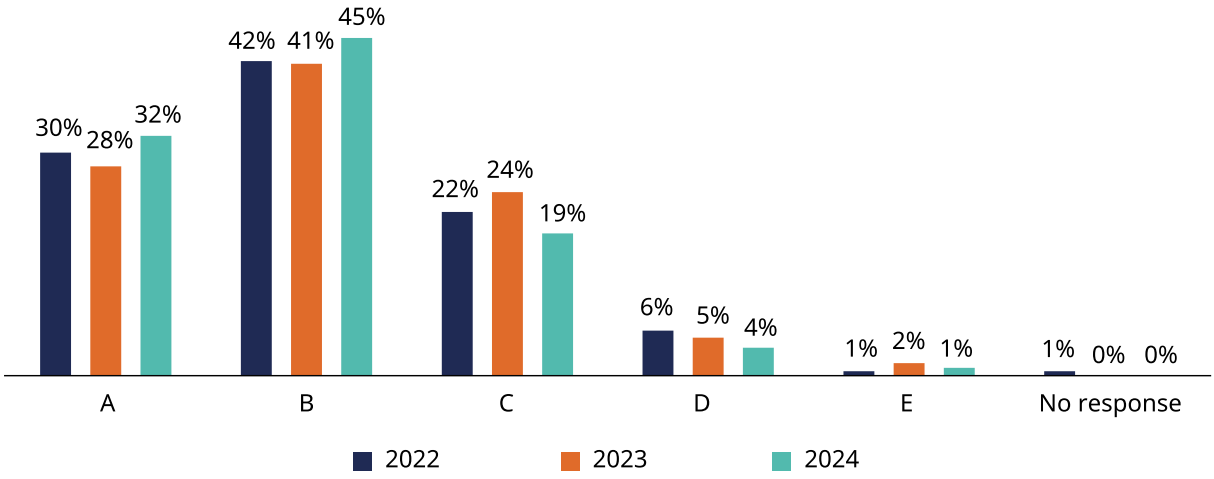
Training and professional education in AMR

Between 2022 and 2024, countries made moderate progress in strengthening training in AMR for stakeholders in the food and agriculture sectors. The proportion of countries with

no training provision (option A) remained steady at 29.7% and 27.7% in 2022 and 2023, respectively, before increasing to 31.7% in 2024. The proportion of countries that reported ad-hoc training for at least two stakeholder groups (option B) increased from 41.8% in 2022 to 44.6% in 2024, indicating a gradual increase in broader stakeholder engagement. The proportion of countries that delivered ad-hoc training to most stakeholders (option C) increased in 2023 (24.3%) but decreased in 2024 (18.8%), suggesting difficulty in scaling up or sustaining outreach. The proportions of countries that provided more advanced nationwide implementation, routine training (option D) and evaluation of training systems (option E) remained low in all 3 years, applying to fewer than 5% of countries in 2024.

Trends in provision of training according to country income classification showed persistent disparities. In 2023, 55.4% of HIC reported no to limited training, a slight increase from 52.8% in 2022. The proportion of LMIC decreased from 80.9% to 69.4%, and limited progress and fluctuations were observed among LIC, 46.4% still reporting no training in 2024 as compared with 51.9% in 2022 (Fig. 14). Despite some gains in middle-income groups of countries, training capacity remained disproportionately low in LIC, indicating that targeted support should be provided.

Fig. 14. Trends in provision of training and professional education in AMR, 2022–2024, by income group



Source: TrACSS (50).

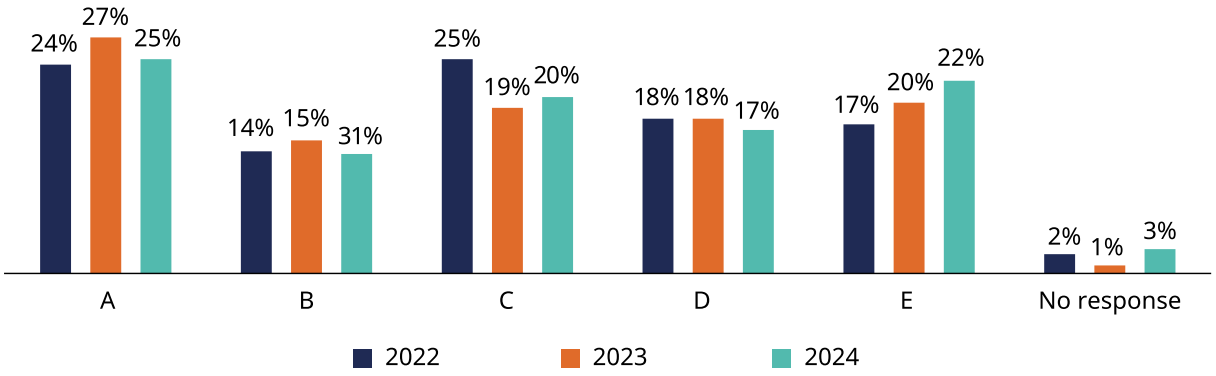
National monitoring system for use of antimicrobial pesticides

Between 2022 and 2024, limited progress was observed in establishment of national systems to collect data and report on the amounts of pesticides sold and used nationally, including antimicrobial pesticides such as bactericides and fungicides. In 2024, 31.4% of countries (54 of 186) reported having a national plan or system, a slight increase from 28.7% in 2023 and 28.8% in 2022. The marginal increase suggests that, while awareness is increasing, system development remains slow. The proportions of countries with systems under development decreased from 32.0% in 2022 to 23.8% in 2024, while that of countries with no monitoring system remained high in 2024, at 44.8% (77 of 186). LMIC and LIC were disproportionately represented among countries with no monitoring systems. In 2024, over 87% of LMIC and nearly 68% of LIC reported having no formal plan, indicating that technical and financial assistance is necessary to ensure operationalization of monitoring systems for AMR surveillance.

National surveillance system for AMR in food of terrestrial and aquatic animal and plant origin

Between 2022 and 2024, incremental improvements were reported in establishing AMR surveillance systems for food of animal (terrestrial and aquatic) and plant origin (Fig. 15). In 2024, 20.0% of countries (36 of 186) reported having an operational surveillance system (option E), an increase from 16.7% in 2022. The proportion of countries with no plan (option A) peaked at 32.9% in 2023 before decreasing to 30.0% in 2024, while the numbers of countries that had conducted early-stage planning and partial implementation (options B–D) remained relatively stable. More LIC and LMIC had adopted options A and B, indicating significant structural gaps, while HIC and UMIC were more likely to report full or partial surveillance. Strengthened laboratory and data management capacity will be a key factor for ensuring inclusive AMR surveillance in countries at all income levels.

Fig. 15. Trends in national surveillance systems for AMR in food, 2022–2024



Source: TrACSS *(50)*.

Effective integration of laboratories in surveillance of AMR in animal health and food safety sectors

Between 2022 and 2024, progress in effective integration of laboratories into national AMR surveillance systems in the animal health and food safety sectors remained limited. In 2024, only 11.5% of countries (21 of 186) reported that all laboratories that performed AST were fully integrated into the national surveillance system, with clear roles and responsibilities, and were linked in a national network coordinated by a national reference laboratory (option E). The proportion is unchanged from 2023 and reflects only a minor increase from 11.1% in 2022, signaling persistent structural and operational gaps.

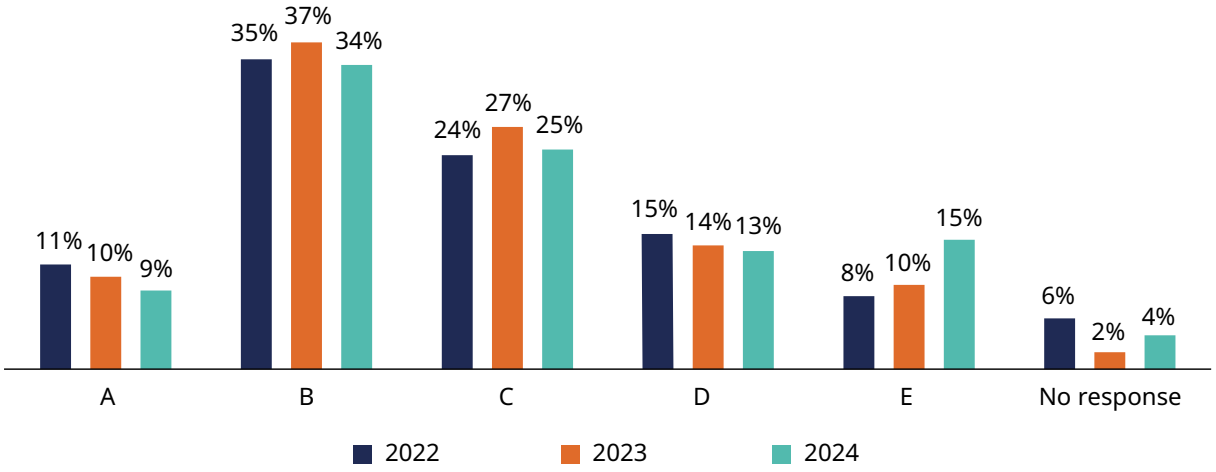
Partial integration (option C) is more common, with 27.9% of countries reporting that some laboratories were linked to a national surveillance system: an increase from 24.9% in 2023 and 25.9% in 2022. Nevertheless, 31.2% of countries (57 of 186) reported that laboratories continued to operate in isolation, performing AST for internal purposes without contributing to national surveillance systems (option B), and 21.3% of countries (39 of 186) reported that information on laboratory integration was not available (option A), constituting major gaps in information and coordination.

Disaggregated data show that LMIC and LIC usually select options A and B, indicating limited laboratory infrastructure, weak governance and gaps in intersectoral coordination. HIC and some UMIC were more likely to report laboratory integration, with stronger institutional frameworks and mandates for surveillance. Strengthening cross-sectoral coordination and aligning laboratory networks with national AMR systems strategies are essential to ensure integrated surveillance in both the animal health and the food safety sectors.

Infection prevention in the food sector, including good manufacturing, management and hygiene practices

Countries have shown steady but modest progress in nationwide implementation of good management and hygiene practices over the past 3 years (Fig. 16). In 2024, 12.9% of countries had systems for monitoring such practices and had published guidance (option E), an increase from 9.0% in 2022. While 38.6% of countries continued to report ad-hoc activities (option B) in 2024, the proportion of those with a national plan (option C) remained at about 25% between 2022 and 2024. Most LMIC and LIC used options A and B, indicating limited structure or enforcement, while HIC were more likely to report implementation and monitoring and thus more advanced operationalization.

Fig. 16. Trends in Infection prevention in the food sector, including good manufacturing, management and hygiene practices, 2022–2024



Source: TrACSS *(50)*.

Optimization of use of antimicrobial pesticides in plants

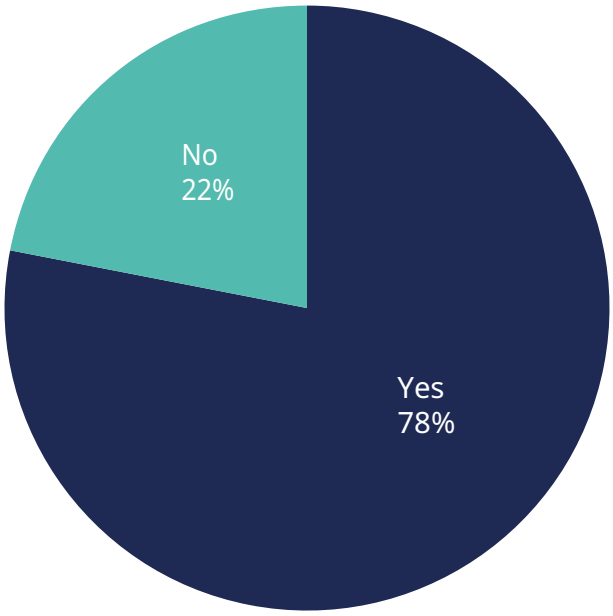
Gradual improvements were reported between 2022 and 2024 in national regulatory approaches to the use of pesticides in plant production, including national manufacture, import, marketing authorization, control of safety, quality and efficacy and distribution of pesticides. The proportion of countries that had enforcement mechanisms (option E) increased from 8.4% in 2022 to 11.3% in 2024. The proportion that had legislation that covered all aspects of use of pesticides (option C) also increased, from 23.8% in 2023 to 28.8% in 2024. By 2024, however, 14.7% of countries still reported that they had no national legislation (option A). LMIC and LIC most frequently reported partial or no legislation (options A and B), while HIC and UMIC were more likely to have regulatory frameworks (options D and E). Bridging this gap will require legal reform and investment in regulatory infrastructure.

Implementation of AMR NAPs in the environmental sector

Multisectoral coordination involving the environmental sector

Strengthening multisectoral coordination of AMR is essential for effective implementation of AMR NAPs. This involves all relevant actors, with clear priorities and sustainable funding. As of 2024, 78% (145 of 186) of participating countries reported involvement of the environmental sector in their AMR multisectoral coordination mechanisms (Fig. 17).

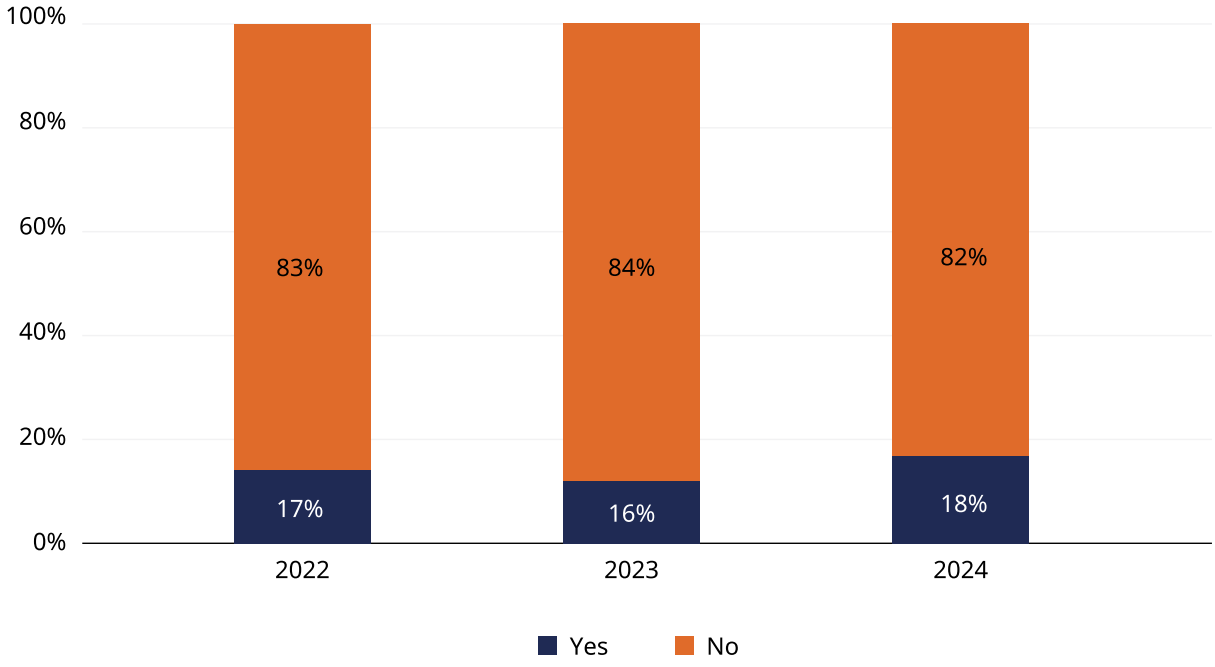
Fig. 17. Involvement of the environmental sector in multisectoral coordination of AMR activities



Source: TrACSS *(50)*.

A risk assessment of AMR in the environment can be used to identify risks and evaluate the hazards to human, animal, plant and ecosystem health. It can also aid in prioritizing actions to address AMR in the environment. In 2024, only 16% of countries (29 of 183) reported that a national assessment had been conducted of the risk of AMR in the environment. The percentage was higher among HIC, at 30%, as compared with 7% of LIC, 8% of LMIC and 15% of UMIC (Fig. 18).

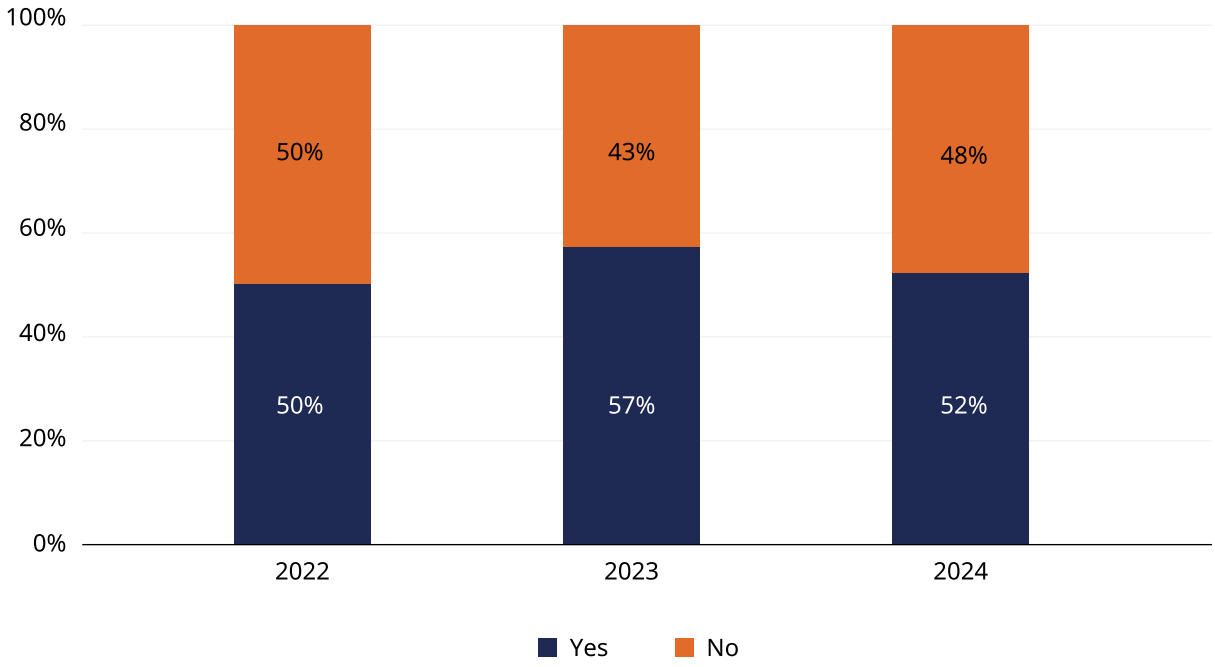
Fig. 18. Proportions of countries that had conducted a risk assessment of AMR in the environment



Source: TrACSS *(50)*.

Legislation and policies are crucial to prevent and reduce releases of antimicrobials and AMR into the environment. In 2024, fewer than half of the participating countries (48%; 87 of 182) reported having legislation or regulations to prevent contamination of the environment with antimicrobials and AMR. This percentage was higher among HIC (57%) than LIC (50%), LMIC (40%) and UMIC (44%) (Fig. 19).

Fig. 19. National legislation to prevent environmental contamination with AMR



Source: TrACSS *(50)*.

4

Challenges and opportunities for accelerated action



Pharmaceutical products and antimicrobial stewardship in Cambodia. © WHO / Enric Catala Contreras

All sectors

Prioritization, costing, monitoring and mainstreaming of AMR interventions for effective implementation of AMR NAPs. When they adopted the GAP-AMR in 2015, countries committed themselves to developing NAPs aligned with GAP-AMR, and, over the past 8 years, 88% of countries have done so. Many of the plans, however, are over-ambitious, with unclear priorities and insufficient resources, and do not include monitoring. In many countries, therefore, full implementation has not been achieved.

The political declaration of the UNGA HLM on AMR *(8)* calls for investment of US$ 100 million to catalyse implementation of funded plans by at least 60% of countries by 2030, by diversifying funding sources and increasing the number of contributors to AMR. In 2024, only 29% of countries reported to TrACSS that they had a costed, budgeted plan that was monitored regularly, and 10% reported specific financial provision for their AMR NAP. It is important that countries prioritize and cost their operational plans, coordinate within and across sectors and with various ministries, such as for planning and finance, to embed AMR interventions in other national plans and budgets. This will help to make the case for use of AMR interventions to strengthen systems in all relevant sectors to improve access to prevention, diagnosis and appropriate treatment of infections, including those that are drug-resistant, and to monitor environmental impacts.

Multisectoral coordination requires further strengthening. While addressing AMR requires a multisectoral approach, only about 50% of the countries that responded to TrACSS 2024 reported having a functional multisectoral coordination mechanism. It has been shown that broad sectoral involvement in the development and implementation of AMR NAPs results in greater implementation in all sectors *(52)*. For effective multisectoral collaboration, a strong governance structure with political accountability, adequate resources, an oversight function, technical working groups and engagement with a wide range of stakeholders is critical. Recognition of the interconnectedness of human, animal and environmental health (One Health) in global political forums provides opportunities to promote collaborative AMR strategies.

The political declaration of the UNGA HLM on AMR in 2024 calls for local, national, regional and global involvement in governance for an effective, sustainable, inclusive multisectoral response to AMR. The Global Leaders Group *(2)* and the multi-stakeholder partnership platform of the quadripartite facilitate multisectoral exchange and sharing of best practices. At national level, greater investment is needed in leadership skills for effective multisectoral collaboration.

Equitable AMR plans, policies and response. AMR plans and policies have so far had limited focus on equity and gender equality: 125 of 145 publicly available NAPs make no mention of social determinants of AMR such as gender, sex or other variables. Strong associations have been found between poverty, inequity and poor access to prevention, diagnosis or appropriate treatment services. To achieve the goals of the 2030 Agenda for Sustainable Development and the SDGs and to ensure that no one is left behind, considerations of gender equality, social equity, disability and rights must be included in AMR interventions and policies. Gender-responsive AMR policies and NAPs should use sex-disaggregated data, integrate gender across surveillance, awareness, and stewardship, and ensure equitable participation. Strengthening gender equality in education, training, and resources supports sustainable AMR outcomes (*5*).

Young people as catalysts. Advancing the multisectoral global AMR agenda through engagement of young people will sustain its momentum. Young people bring innovation, energy and local insights, yet their involvement in AMR policy and implementation remains

limited. The quadripartite has launched initiatives such as the quadripartite Working Group on Youth Engagement for AMR *(53)* and the AMR Toolkit for Youth Engagement *(42)* to empower youth to lead action. The aim of the initiatives is to build capacity, foster cross-sectoral collaboration and promote meaningful participation in national and global decision-making. Despite progress, challenges persist, including lack of structured opportunities, limited representation in governance, limited access to resources and support and minimal integration into formal AMR programmes. The number of youth-inclusive strategies should be increased, such as by including AMR in educational curricula and leadership development and on digital engagement platforms.

Sustainable financing for the multisectoral AMR response. In 2024, about 10% of countries had made specific financial provisions in their national sectoral budgets and plans to implement their AMR NAPs. Evidence of the cost-effectiveness of various AMR interventions and their alignment with systems strengthening should be used promote allocation of adequate domestic financing for AMR. Strengthening of global funding initiatives and attracting more contributors to the Antimicrobial Resistance Multi-Partner Trust Fund *(54)*, specific allocations for addressing AMR and One Health in the Pandemic Fund *(55)* and consideration of AMR as a global public good in budgets for overseas development assistance could provide the necessary financial resources for national, regional and global AMR initiatives. Funding mechanisms must be strategically adapted to the needs of different sectors to ensure that they are adequate for the planned actions, regardless of the sector involved.



Safe, Clean, Green, and Climate-Resilient Healthcare Facilities Initiative in Lao PDR. © WHO / Bart Verweij

Human health

A people-centred approach to addressing AMR in primary health care-oriented systems. The AMR response should address gaps in the health system and meet the needs and challenges of people and patients who seek health services for the prevention, diagnosis and treatment of (drug-resistant) infections, referred to as "the AMR people journey". To address these health system barriers and challenges, WHO has developed a people-centred approach to addressing AMR in human health and a core package of interventions *(17)*. This approach should be used to identify interventions that could be included in primary health care to achieve universal health coverage. This will also promote sustainability, greater awareness, community engagement and a more comprehensive, integrated approach to addressing AMR in human health.

Surveillance of global AMU and antimicrobial stewardship. Access to existing and new antimicrobials and complementary diagnostics remains uneven within and among countries. In 2024, only 35 countries, territories and areas met the 2023 global target of use of at least 60% Access antibiotics. The UNGA HLM political declaration increased the target to 70%; however, only 19 countries have currently met this target. More countries should join the GLASS-AMU to monitor progress in meeting the target. Additional indicators of AMU would provide more data for effective policy-making. Antimicrobial stewardship should be extended, especially in primary care, in which most antibiotics are used. Health-care workers should be given evidence-based guidance, such as the WHO AWaRe antibiotic book *(56)*, and access to essential medicines, diagnostics and health services. Perverse financial incentives and insufficient enforcement of regulations that result in inappropriate use of antimicrobials must also be addressed.

Equitable, appropriate access to high-quality, affordable antibiotics is critical to mitigate the impact of AMR on public health. Difficult access, global shortages, weak forecasting, insufficient financing, substandard and falsified products and fragile supply chains persist, especially in LMIC. At the same time, access to newer products is limited because of low, erratic volumes and high prices, which make companies hesitant to register and supply them. WHO is taking several steps to improve access to antibiotics. Further investment is necessary, including setting priorities for R&D of new antibiotics to ensure that they address areas of greatest public health importance, supporting countries in introducing new antibiotics and developing tools (e.g. for forecasting or guidance on antibiotic shortages) to support countries in ensuring access.

The antibacterial R&D pipeline is insufficient to deliver the innovative antibiotics necessary to treat drug-resistant infections in the coming years. Solutions to the antibiotic pipeline crisis will require more, more predictable, decades-long funding to promote innovation and incentives to overcome the lack of return on investment for new antibiotics, which are usually intended as products of last resort. Clinical trials networks should be extended to ensure efficient trials. Regulatory frameworks tailored to the complexity of R&D of antibiotics should be considered for product review and approval, and regulations should be tailored to overcome the complexity and cost of adherence to separate regulatory submissions in each country. WHO requires continued support to play its critical role in steering, prioritizing and monitoring R&D, identifying gaps and unmet public health need and setting targets for R&D in human health.

Improving clinical bacteriology and mycology laboratories for clinical management and AMR surveillance: Laboratory capacity for the diagnosis of bacterial and fungal infections and detection of AMR remains limited in many LMIC, affecting both clinical decision-making and access to appropriate diagnostic services. Reliable, timely laboratory results are essential for effective patient care and for guiding public health strategies.

Microbiology laboratories provide critical primary national and global data for AMR surveillance; however, many do not participate in external quality assurance programmes, which may undermine confidence in their results and hinder efforts to improve the quality of testing. Urgent global action is necessary to strengthen microbiology laboratory capacity and diagnostics, with insurance coverage of laboratory tests and adequate referral mechanisms to quality-assured laboratories, to improve both patient care and monitoring of AMR. WHO is developing the AMR Diagnostic Initiative to strengthen diagnostic capacity in bacteriology and mycology. The aim is to enhance laboratory systems and service delivery for quality-assured identification and AST of common bacterial and fungal pathogens, particularly in countries with limited resources.

Building health workforce capacity for a sustainable AMR response: Education and pre-service training are essential for an AMR response and can improve competence, foster accountability and increase responsible prescribing. Yet, in many LMIC, health workers do not have the appropriate competence or behaviour, obviating a sustained impact. Lack of harmonized norms for pre-service education and training on AMR poses another challenge. WHO is setting standards and developing normative products for training various health worker cadres. It has already launched competency frameworks and curricula for several health workforce streams, and curriculum assessment tools and technical briefs on AMR education are being developed. WHO requires further investment to support countries in use of these tools for systematic assessment of their education and pre-service training and to strengthen them.

Animal health

Strengthening cross-sectoral coordination. The animal health sector should be fully integrated into national AMR strategies. Over 90% of countries have developed AMR NAPs, but only half have an effective multisectoral coordination mechanism to guide and monitor implementation *(50)*. Weak coordination among the animal, human and environmental sectors result in isolated, less effective initiatives to tackle AMR. Countries should reinforce the role of the animal health sector in multisectoral coordination frameworks to strengthen cross-sectoral collaboration and the coherence of policy.

Emphasis on prevention. Preventive measures must be prioritized, starting with strengthening research and developing and using innovative tools in animal health. Investment in animal health represented only 7% of all AMR R&D funding between 2017 and 2024 *(35)*. Similarly, only 6 cents for every US$ 10 were allocated to R&D of animal vaccines between 2017 and 2024 *(35)*. While the UNGA political declaration requests member states to ensure, by 2030, that animal vaccination strategies are defined with an implementation plan according to the WOAH list of priority diseases for which vaccines could reduce AMU, we regrettably note that investments in animal health vaccines have decreased by 59% since 2018 *(35)*. Innovative tools for the prevention of animal disease must be developed and equitably deployed, including high-quality vaccines. In addition, effective biosecurity measures, good animal husbandry and development of alternatives to antimicrobials should complement such measures. For all this to happen, investments in animal health systems are essential. They ensure equitable access to veterinary services, improve disease prevention and management, and support the timely availability of quality, affordable veterinary medicines, vaccines, and diagnostics. Strengthening veterinary oversight of antimicrobial use at the national level is also crucial to achieving sustainable progress in mitigating AMR (*8*).

Resources for surveillance. To ensure informed decision-making, national surveillance systems for AMR and AMU must be strengthened and institutionalized. One of three countries does not use relevant data on antimicrobial consumption to make decisions

and to guide policy development in sectors *(50)*. This number increases to two of three countries in the aquatic animal health sector. Less than half of WOAH members (42%) have an integrated multisectoral surveillance system for AMR and AMU *(50)*. About 22% of WOAH members do not have a system for surveillance of AMU in animals *(50)*. National surveillance systems for AMR and AMU must be sustainably resourced and upgraded. Data for decision-making should be shared among sectors in a One Health approach. Importantly, national surveillance systems should ensure consistent reporting of information to global monitoring platforms, such as ANIMUSE, InFARM and GLASS.

Adequate funding for AMR and AMU initiatives in animal health. The animal health sector must be provided with adequate, sustained investment to contribute effectively to national and global activities against AMR. To ensure the full engagement of the animal health sector, funding mechanisms, both existing and new, must be strategically tailored to its specific requirements and priorities. The mechanisms should be proportionate to the planned actions in all sectors, including animal health. This will require establishment of sustainable, predictable national and global sources of funding to support implementation of cost-effective, evidence-based interventions based on robust surveillance systems.

Food and agriculture sector

Limited operationalization of AMR strategies in agrifood systems. While most countries have adopted AMR NAPs, operationalization of such plans in the food and agriculture sector remains limited. AMR-related objectives are often insufficiently embedded in national strategies for food safety, animal health, crop production or environmental management. In many cases, implementation is limited by fragmented institutional mandates, inadequate intersectoral coordination and insufficient allocation of financial and technical resources. Such constraints are particularly pronounced in low-resource settings, where broader systemic challenges also affect service delivery, regulatory enforcement and stakeholder engagement.

Inadequate scale and continuity of professional training. Capacity-building for key stakeholders in agrifood systems, such as farmers, veterinarians, animal health workers, food business operators and plant health professionals, remains sporadic and under-resourced. Training programmes, when they are available, are often provided ad hoc, with limited national coverage, sustainability or linkage to regulatory frameworks. As a result, awareness of the risks of AMR and of prudent AMU are inadequate in many value chains, especially in informal and small-scale production systems. Addressing such gaps will require institutionalized, sector-specific training and sustained investment in knowledge transfer and behaviour change (*57*).

Insufficient implementation of preventive measures in production. Adoption of infection prevention and control in food and agriculture systems remains limited. While good agricultural and veterinary practices, biosecurity measures and hygiene standards are promoted in some contexts, this is often inconsistent and not part of national programmes or supported by adequate monitoring. In many production settings, antimicrobials continue to be used as substitutes for underdeveloped animal health infrastructure and weak disease prevention systems. Extending access to preventive technologies and services, practical guidance and producer incentives are critical to reducing reliance on antimicrobials (*58*).

Limited surveillance and data integration along the food chain. Surveillance systems for AMR and AMU in food-producing animals, aquaculture, crops and food products are still in early stages of development in many countries. Laboratory networks frequently operate in silos and are not systematically integrated into national surveillance frameworks. Most data collection is fragmented, uncoordinated and of uneven quality and coverage.

These factors limit tracking of trends in resistance and transmission dynamics, hindering formulation of risk-based interventions in the agrifood system. Strengthening surveillance infrastructure and ensuring integration of data from all sectors are essential for more effective policy and planning.

Gaps in regulatory frameworks and enforcement mechanisms. Many countries lack comprehensive legal and institutional frameworks to regulate AMU in agriculture, including use of veterinary medicinal products, pesticides with antimicrobial properties and medicated feed. Even when there are regulatory provisions, the capacity to enforce them is often limited, and monitoring systems are insufficient to ensure compliance. Surveillance of residues in food products and environmental matrices remains underdeveloped in most settings. Such regulatory and institutional gaps perpetuate unregulated use and undermine national initiatives to mitigate the risks of AMR in agrifood systems (*59*).

Growing political commitment and momentum for transformation. Notwithstanding these challenges, important opportunities are emerging to ensure progress through more integrated, systemic approaches. The UNGA HLM political declaration on AMR reflects growing recognition among Member States of the urgency of addressing AMR in agrifood systems as a core component of the global response. FAO's RENOFARM (*60*) initiative, which is acknowledged in the declaration, provides a strategic framework for use by countries in reducing their reliance on antimicrobials through context-specific interventions in health services and production practices and by enabling policy and market conditions. Increased engagement with integrated monitoring platforms such as InFARM (*61*) allows countries to build stronger national data systems to be used in risk-based planning and policy implementation. Sustained political will, long-term investment and strengthened cross-sectoral coordination are essential to using the momentum to make measurable progress at scale.

Environment

Global attention to AMR has focused mainly on human health but is now adopting an approach that combines sector-specific and multi-sectoral interventions in the human, animal, plant and environment sectors to address AMR more effectively and comprehensively. There is widespread agreement that environmental action must be a more prominent solution. Coordinated strengthening of environmental action within the One Health response will help to reduce the burden of AMR on societies and to address the triple planetary crisis of climate change, nature and biodiversity loss, and pollution and waste. Mounting evidence, reported by UNEP in 2023 *(13),* demonstrates the critical role of the environment in the development, transmission and spread of AMR. This recognition was reinforced in the political declaration of the UNGA HLM, which acknowledges the importance of environmental action in addressing AMR. It calls for strengthening waste and wastewater management, integrating environmental aspects into AMR NAPs, addressing research gaps and advancing environmental surveillance. UNEP is at the forefront of implementation of the declaration, integrating environmental priorities into One Health strategies and supporting countries in preventing or reducing the environmental release of antimicrobials, AMR organisms and genes from key economic sectors, households and municipal systems.

While progress has been made in addressing the environmental dimensions of AMR, more work is required on the preventive and management measures outlined below.

Integration of the environment sector into multisectoral coordination mechanisms. This is essential for a comprehensive, effective response to AMR. Although AMR concerns

human health, animal health, agriculture and the environment, environmental authorities are still under-engaged in many national responses. Strengthening of their involvement would enhance cross-sectoral collaboration, address certain gaps and ensure that the environmental dimensions of AMR are fully reflected in planning and implementation. Clearly defined roles, balanced representation and institutionalized coordination will help to ensure more cohesive, accountable national AMR strategies based on a true One Health approach.

Strengthening governance and regulatory frameworks. Development and enforcement of comprehensive environmental policies and regulations in key economic sectors, such as pharmaceuticals, health care and agriculture, and in households and municipal systems is critical to mitigating AMR. Key regulatory opportunities include ensuring proper water and waste management in a life-cycle approach, from design and manufacture to safe disposal of unused antimicrobials, and treatment of wastewater. Complementary measures such as environmental risk assessments, sustainable public procurement practices, biosecurity and biosafety measures, eco-labelling and economic incentives could encourage compliance and innovation in various economic sectors. Promotion of circular economy approaches to minimize waste and encourage resource reuse could also contribute significantly to reducing AMR in the environment.

Improvement of surveillance and monitoring of AMR in the environment. Surveillance systems are fragmented, providing inadequate data on AMR in the environment. Robust, harmonized surveillance and monitoring systems and analysis of antimicrobial residues and AMR in the environment will increase the ability of countries to track trends in AMR and thus take informed decisions for action. Moreover, laboratory capacity to detect AMR in the environment should be increased, with representative, harmonized data systems. Strengthened reporting mechanisms in key economic sectors will improve early warning systems and ensure policy to address the environmental dimensions of AMR more effectively.

Promotion of awareness and of research on environmental drivers of AMR. Awareness of AMR in the environment should be increased, and research on environmental drivers and impact of AMR should receive adequate funding. Raising awareness by conducting regular, targeted national campaigns is vital to influence behaviour and for mitigating AMR. Tailored outreach to stakeholders, including environmental practitioners, health professionals, pharmacists, industry, farmers, regulators and communities, will improve waste and wastewater management. Strengthened interdisciplinary research is necessary to better understand the environmental drivers and impact of AMR, to assess the effectiveness of interventions and to develop cost-effective technological and behavioural solutions. Greater collaboration among researchers, policy-makers and practitioners will ensure that AMR strategies are based on scientific findings and innovation in all sectors.

Build capacity in the environmental sector. Capacity-building through training, infrastructure development and knowledge exchange will empower stakeholders in the environment sector to use preventive and control measures effectively to address the environmental dimensions of AMR. Dedicated funding for environmental interventions and capacity-building will ensure their full integration into broader AMR frameworks.

The urgency of addressing AMR through environmental action is undeniable. Strengthening environmental measures in the One Health approach – through coordinated action, greater multisectoral collaboration and innovation – will be vital to prevent and reduce the burden of AMR. An integrated response will also assist countries in achieving the commitments they made in the political declaration of the UNGA HLM, with the co-benefit of confronting interconnected global crises such as AMR and the triple planetary crisis of climate change, biodiversity loss and pollution and waste.

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Annex. Selected indicators for monitoring and evaluation of implementation of the global action plan 2022–2024 in each sector

Table A1.1 Human health indicator data – WHO

Measurement	Indicator name	Source of data	Indicator value 2022–2024 (global)
Patterns and trends in resistance in human health	Prevalence of bloodstream infections caused by methicillin-resistant *Staphylococcus aureus*	SDG 3.d.2 and GLASS WHO Global Health Observatory, AMR, SDG indicators (*1*)	Global median: 33.9% (Median and range by 2024 World Bank income level are reported for all countries, territories, and areas reporting 10 or more bacteriologically confirmed infections with antibiotic susceptibility test results.) Percentage of bacteriologically confirmed bloodstream infections with AST results that are resistant in: HIC: 1.6–59.1% UMIC: 0.0–87.8% LMIC: 13.6–90% LIC 6.7–93.5% 85 reporting countries

Measurement	Indicator name	Source of data	Indicator value 2022–2024 (global)
	Prevalence of bloodstream infections caused by ESBL in *Escherichia coli*	SDG 3.d.2 and GLASS WHO Global Health Observatory – AMR – SDG Indicators (*2*)	Global median: 44.7% (Median and range by 2024 World Bank income level are reported for all countries, territories, and areas reporting 10 or more bacteriologically confirmed infections with antibiotic susceptibility test results.) Percentage of bacteriologically confirmed bloodstream infections with AST results that are resistant in: HIC: 6.7–78.2% UMIC: 18.2%-85.7% LMIC: 19.8–96.3% LIC: 48.0–91.7% 84 reporting countries
Patterns and trends in resistance in HIV, TB and malaria	Percentage of new bacteriologically confirmed pulmonary TB cases associated with multidrug- and rifampicin-resistant *Mycobacterium tuberculosis*	WHO Global tuberculosis report *(3)* WHO Global Health Observatory – Drug-resistant TB *(4)*	Data available by country Globally, 188 990 cases of MDR/RR-TB notified in 2023
	Percentage of malaria patients displaying treatment failure after antimalarial treatment during surveillance in selected sentinel sites	WHO Global Malaria Programme WHO Malaria Threats Map-Treatment Failure *(5)*	No global aggregate Location-specific treatment failure of antimalarials

Measurement	Indicator name	Source of data	Indicator value 2022–2024 (global)
	Percentage of individuals tested positive for HIV starting antiretroviral therapy with detected HIV antiretroviral drug resistance (prevalence of pretreatment HIV drug resistance)	WHO Global HIV Programme HIV drug resistance report 2024 (*6*) Report on dolutegravir-containing therapy in specific populations (e.g. those on pre-exposure prophylaxis, newborns, adults on antiretroviral treatment). Resistance among people started on dolutegravir-containing antiretroviral treatment reported by 11 countries. Low levels detected only in South Sudan.	No global aggregate
	Percentage of individuals tested positive for HIV on antiretroviral therapy with virological failure and detected HIV antiretroviral drug resistance (prevalence of acquired HIV drug resistance)	WHO Global HIV Programme	No global aggregate
1.1 Awareness of key groups	Percentage of stakeholders (e.g. human and animal health workers, prescribers, farmers, food processing workers) who have knowledge of AMR and the implications for AMU and infection prevention (metrics to be developed)	Method to be developed	Not applicable

Measurement	Indicator name	Source of data	Indicator value 2022–2024 (global)
3.1 Quality of care	Incidence of surgical-site infections among inpatient surgical procedures	Evidence from a systematic review of 29 countries in 2023 as documented in the Global report on infection prevention and control 2024 *(7)*	Pooled global incidence of surgical-site infections was 2.5% (95% CI, 1.6;3.7) among general surgical patients. Analysis by WHO region*: African: 7.2% (95% CI, 4.3;11.8) Americas: 3.1% (95% CI, 2.2;4.3) South-East Asian: 1.2% (95% CI, 0.4;3.1) European: 2.2% (95% CI, 1.3;4.0) Eastern Mediterranean: 2.2% (95% CI, 1.3;4.0) Western Pacific: 0.6% (95% CI, 0.2;1.7)
3.2 Immunization coverage	Percentage of the target population that has received the last recommended dose of the basic series for each of the following vaccines: i) pneumococcal conjugate vaccine, final dose	WHO and UNICEF estimates of national immunization coverage – pneumococcal conjugate vaccine *(8)*	2022 – 61% 2023 – 65%
	ii) rotavirus vaccine, last dose	2022 – 52%	2022 – 52%
	iii) measles-containing vaccine, either alone or in a measles–rubella or measles–mumps–rubella combination, second dose	WHO and UNICEF estimates of national immunization coverage – measles vaccination coverage *(9)*	2022 – 73% 2023 – 74%
	Haemophilus influenzae type b-containing vaccine	WHO and UNICEF estimates of national immunization coverage – *H. influenzae* type b vaccination coverage *(10)*	2022 – 77% 2023 – 77%
3.3 Access to safe water	Proportion of population using safely managed drinking-water services	SDG 6.1 WHO Global Health Observatory –safely managed drinking-water services *(11)*	2022 – 73%

Measurement	Indicator name	Source of data	Indicator value 2022–2024 (global)
3.4 Access to sanitation	Proportion of population using safely managed sanitation services	SDG 6.2 WHO. Safely managed sanitation services *(12)*	2022 – 57%
4.1 Use of antimicrobials in humans	Total human consumption of antibiotics for systemic use (Anatomical Therapeutic Chemical classification code J01) in defined daily doses per 1000 population (or inhabitants) Proportion of access antibiotics for systemic use, relative to total antibiotic consumption in defined daily doses Relative proportion of AWaRe (Access, WAtch and REserve) antibiotics for paediatric formulations Percentage of adult and paediatric hospital patients receiving an antibiotic according to AWaRe categories	The global median value is calculated from published GLASS-AMU data for 60 countries, territories and areas *(13)* Data are not available for the last two indicators	Consumption of antibacterials (defined daily doses per 1000 inhabitants per day, DIDs) in 2022: 18.3 DIDs Relative use of antibiotics by AWaRe category in 2022: Access: 62.4% Watch: 36.3% Reserve: 0.2%[3] 35 countries, territories and areas met the target of at least 60% Access antibiotic use and 19 met the target of 70% Access antibiotic use
4.2 Access to antibiotics	Percentage of health facilities that have a core set of relevant antibiotics available and affordable on a sustainable basis	SDG indicator 3.b.3, with Access antibiotics disaggregated	Not applicable
4.7 Optimized AMU and regulation	Legislation or regulation that requires antimicrobials for human use be dispensed only with a prescription from an authorized health worker	TrACSS 2.8.1 Country has laws or regulations on prescription and sale of antimicrobials for human use *(14)*	2022 – 147 countries 2023 – 160 countries 2024 – 172 countries

Measurement	Indicator name	Source of data	Indicator value 2022–2024 (global)
1.a Targeted awareness raising	Nationwide, government-supported AMR awareness campaign targeting priority stakeholder groups based on stakeholder analysis	TrACSS 2.9 Raising awareness and understanding of AMR risks and response (levels D–E) *(14)*	2024 – 75 countries 2023 – 69 countries 2022 – 62 countries
2.a Data on AMR and AMU in humans	Countries that report to GLASS on: AMR in humans	GLASS-AMR dashboard *(15)*	123 countries, territories and areas are enrolled in GLASS-AMR and 92 reported data in 2022
	Countries that report to GLASS on: AMU in humans	GLASS-AMR dashboard *(15)*	90 countries, territories and areas were enrolled in GLASS-AMU and 63 reported data in 2022
2.h Use of AMR surveillance data	National bodies that review information from national AMR surveillance programmes and make and implement recommendations accordingly	TrACSS 2.12. Is the country using relevant AMR surveillance data to inform operational decisions and amend policies? *(14)*	2024 – 134 countries 2023 – 121 countries 2022 – 108 countries
3.e Hand hygiene in health care	Percentage of acute tertiary health-care facilities monitoring the hand hygiene compliance of health workers according to the WHO direct observation method or similar	2019 IPC survey of 3372 health-care facilities in 109 countries *(16)*	1378 of 3068 (45%) health-care facilities
3.f Basic water services in health-care facilities	Percentage of health-care facilities in which the main source of water is from an improved source, located on premises	WHO/UNICEF WASH in health care facilities 2023 report *(17)* 2023 – Insufficient data: 73 countries provided data, which is not enough to estimate global coverage	2022 – 78% of all health-care facilities globally have basic water services

Measurement	Indicator name	Source of data	Indicator value 2022–2024 (global)
3.g Basic sanitation services in health-care facilities	Proportion of health-care facilities with improved, and usable sanitation facilities, with at least one toilet dedicated for staff, at least one sex-separated toilet with menstrual hygiene facilities and at least one toilet accessible for users with limited mobility	WHO/UNICEF WASH in health care facilities 2023 report *(18)* Reported estimates are based on data from a sample of countries representing only 30% of the global population	52 countries reported data in 2023, which was not enough to estimate a global average. Regional coverage with basic sanitation services was 22% in sub-Saharan Africa and 36% in northern Africa and western Asia. 92% of health-care facilities had access to improved sanitation facilities. Sanitation facilities were usable in 81% of health-care facilities. 8% of health-care facilities had no sanitation service

* *In accordance with resolution WHA78.25 (2025), Indonesia was reassigned to the WHO Western Pacific Region as of 27 May 2025. In this instance, data analysis had already been completed with data pertaining to Indonesia included in the South-East Asia regional aggregates. WHO regional comparisons must be done with caution.*

Table A1.2 Animal health indicator data – WOAH

Measurement	Indicator	Source of data	Indicator value 2022–2024 (global)
4.4 Use in growth promotion	Percentage of veterinary antimicrobials authorized/used for non-veterinary medical purposes (e.g. for growth promotion); number of countries reporting use of antimicrobials for growth promotion	WOAH AMU database *(19)*	26% (41 of 157 countries) in 2021; 24% (36 of 152 countries) in 2022; 22% (34 of 157 countries) in 2023
4.5 Levels and trends in sales, / imports/use of antimicrobials in food-producing animals	a: Total volume of sales/ imports (or use), in mg/ kg biomass, in food-producing animals	WOAH AMU database (*19*)	104.75 mg/kg (113 countries) in 2019; 109.55 mg/kg (113 countries) in 2020; 106.15 mg/kg (116 countries) in 2021; 92.08 mg/kg (113 countries) in 2022
	b: Percentage of total sales/imports (or use classified as WHO highest priority critically important antimicrobial agents	WOAH AMU database (*19*)	12.8% (113 countries) in 2019; 17.1% (113 countries) in 2020; 12.3% (106 countries) in 2021; 6.3% (103 countries) in 2022
5.1 Global R&D pipeline	c: Number of new vaccines registered according to prioritization	Health for Animals *(21)*	No data
1.a Targeted awareness-raising	Nationwide, government-supported AMR awareness campaign targeting priority stakeholder groups in the following sector: b) animal health	TrACSS (*14*)	59/166 in 2022; 58/177 in 2023; 55/186 in 2024
1.b Strengthen veterinary services	a: Countries that in the last five years have had a WOAH PVS pathway activity (e.g., evaluation, gap analysis, follow-up legislation or laboratory mission)	WOAH PVS pathway *(20)*	62/ 182 countries in 2022; 66/183 countries in 2023; 65/183 countries in 2024
	b: Number of PVS pathway missions globally	WOAH PVS pathway (*20*)	22 in 2022; 34 in 2023; 31 in 2024
2.b Data on AMU in animals	Countries that report information on total quantities of antimicrobial agents sold for/imported for/ used in food producing animals	WOAH AMU database (*19*)	121/157 countries in 2022; 129/152 countries in 2023; 111/157 countries in 2024

Measurement	Indicator	Source of data	Indicator value 2022–2024 (global)
2.c Data reporting on AMU in animals	Countries that regularly report data on AMU in animals to the WOAH database, broken down by group of animal and administration route	WOAH AMU database (*19*)	In 2022 Rep. Op[3]. 2= 10, Rep. Op. 3= 74; in 2023 Rep. Op. 2= 8, Rep. Op. 3= 97; in 2024 Rep. Op. 2= 5, Rep. Op. 3= 83
2.i Authority and capability of veterinary services to manage AMU and AMR	Countries that achieve level III or more on PVS Critical Competency II-9 (the authority and capability of veterinary services to manage AMU and AMR and to undertake surveillance and control of the development and spread of AMR pathogens in animal production and in food products of animal origin, via a One Health approach)	WOAH PVS pathway (*20*)	0/7 countries in 2022; 3/10 countries in 2023; 2/4 countries in 2024
3.b Access to strengthened veterinary services	Level of access to veterinary advice and care within a country (e.g. number of qualified veterinarians and/or veterinary paraprofessionals per animal population)	WOAH PVS pathway (*20*)	1/7 countries[4] in 2022; 6/15 countries in 2023; 2/4 countries in 2024
3.d Infection prevention at the national level	Countries that implement minimum requirements for infection prevention (e.g. husbandry and biosecurity) for food animal production, in accordance with WOAH standards	WOAH PVS pathway (*20*)	2/7 countries in 2022; 4/15 countries in 2023; 3/4 countries in 2024
4.c Optimized use	Countries that have laws or regulations that prohibit the use of antibiotics for growth promotion in the absence of a risk analysis	TrACSS (*14*)	110/166 countries in 2022; 110/177 countries in 2023; 122/186 countries in 2024

PVS, performance of veterinary services

[3] Reporting Option 2 (animal groups), Reporting Option 3 (animal groups + routes of administration)

[4] Country achieves level III or more on PVS Critical Competency III-7.

Table A1.3 Food and agriculture indicator data – FAO

Measurement	Indicator name	Source of data	Indicator value 2022–2024 (global)
Goal: Reduced levels and slower development of resistance			
III. Patterns and trends in resistance for indicator *E. coli* from priority food-producing species	Resistance in commensal *E. coli* from key food-producing animals, as follows: a: Percentage of *E .coli* isolates resistant to third-generation cephalosporins (i.e. presumptive ESBL-producing *E. coli*) b: Patterns of resistance in *E. coli* to a defined panel of antimicrobials	FAO platform: The international FAO antimicrobial resistance monitoring system (InFARM)	First open call in 2024, with 49 countries reporting status of implementation of surveillance activities, of which 28 countries submitted AMR data. A report on early implementation is being developed. FAO may report data on this indicator retrospectively from 2015 onwards, starting in 2026.
Outcome 1: Improved awareness of AMR and behaviour change among policy-makers, farmers, veterinary and health workers, the food industry and the general public			
1.1 Awareness of key groups	Percentage of stakeholders (e.g. human and animal health workers, prescribers, farmers, food processing workers) who have knowledge of AMR and the implications for AMU and infection prevention (metrics to be developed)	Knowledge, attitude and practice surveys	Methodology to be developed
Outcome 4: Optimized use of antimicrobials in human and animal health; animal use for growth promotion phased out			
4.6 Levels and trends in sales/use of pesticides for the purpose of controlling bacterial or fungal disease in plant production	a: Total amount of pesticide (active substance) intended to repel, destroy or control bacterial or fungal disease (tonnes) b: Percentage of the above total composed of each of the following antimicrobial classes: aminoglycosides; tetracyclines; triazoles; oxolinic acid	FAOSTAT FAO platform InFARM	FAOSTAT. Analytical brief on pesticides use and trade 1990–2023, to be disseminated mid-2025, includes a focus section on antimicrobials. InFARM system to collect information on AMU from 2025

Measurement	Indicator name	Source of data	Indicator value 2022–2024 (global)
Outcome 5: Increased R&D on new medicines, diagnostics, vaccines and other interventions for priority pathogens			
Outputs for outcome 1: Improved awareness of AMR and behaviour change among policy-makers, farmers, veterinary and health workers, the food industry and the general public			
1.a Targeted awareness raising	Nationwide, government-supported AMR awareness campaign targeting priority stakeholder groups in the following sectors: plant health food production food safety	TrACSS, PMP-AMR (*22*)	87/159 countries in 2019; 82/136 countries in 2020; 94/163 countries in 2021 8/31 countries in 2022–2024 (Awareness campaign, Step 3, "Completed")
Outputs for outcome 2: Strengthened knowledge and evidence base used for policy and practical decisions			
2.d Data on AMU in plants	Countries that have systems to collect and report information on the quantity of pesticides used to control bacterial or fungal diseases in plant production	TrACSS, PMP-AMR	90/136 countries in 2020; 10/163 countries in 2021 1/31 (PMP-AMR v2.3, End-user monitoring, step 4, "Completed")
2.e Food and agriculture AMR laboratory network	Percentage of laboratories included in the national AMR surveillance system in the food and agricultural sectors with capacity to perform AST and/or bacterial isolation and identification according to international standards (*24*)	ATLASS (*23*)	Global data on ATLASS tool on the percentage of laboratories at Progressive Management Pathway (PIP) stage 3* per year as follows: 35.3% (N=17, year 2018), 20% (N=65, 2021), 10.3% (N=39, 2022), 34.2% (N=38, 2023). * Definition of PIP stage 3 developed = Capacity to test in a standardized manner samples for antimicrobial susceptibility testing (AST) on indicator and foodborne pathogens and to manage biological material and data with basic quality assurance procedures. Challenges may exist for the financial autonomy or the management.

Measurement	Indicator name	Source of data	Indicator value 2022–2024 (global)
2.f AMR surveillance data in animals and food	Countries that collect and report AMR surveillance data for: a: food producing animals (terrestrial and aquatic); b: food (of animal and plant origin)	TrACSS, AMR PMP	97/166 in 2022 92/177 in 2023 104/186 in 2024 3/31 (PMP-AMR ver.2.3, AMR surveillance, Step 2, "Completed") 7/31 (PMP-AMR, ver.2.3, Annual reporting, Step 2, "Completed")
2.g Prevalence of ESBL-producing indicator *E. coli* in animals	Countries that measure the prevalence of ESBL-producing indicator commensal *E. coli* in key food-producing species (terrestrial), in accordance with the WOAH terrestrial animal health code and the WOAH Manual of Diagnostic Tests and Vaccines for Terrestrial Animals	TrACSS	No data
2.h Use of AMR surveillance data	National bodies that review information from national AMR surveillance programmes and make and implement recommendations accordingly	TrACSS	34/136 countries in 2020; 34/163 countries in 2021
Outputs for outcome 3: Reduced incidence of infection in health facilities, farms and communities and reduced environmental contamination due to effective prevention			
3.a Regulation for antimicrobial waste	Countries that have a regulatory framework for the discharge of antimicrobials and waste potentially contaminated with antimicrobials into the environment	TrACSS, PMP AMR	
3.c Food safety standards	Countries that have adopted food safety standards consistent with the Codex Alimentarius	Survey on the use of Codex standards	

Measurement	Indicator name	Source of data	Indicator value 2022–2024 (global)
3.d Infection prevention at the national level	Countries that implement minimum requirements for infection prevention (e.g. husbandry and biosecurity) for food animal production, in accordance with WOAH standards	TrACSS, AMR PMP	
Outputs for outcome 4: Optimized use of antimicrobials in human and animal health; use for growth promotion in animals phased out			
4.a Regulatory framework for veterinary medicinal products	Countries that have a regulatory framework for veterinary medicinal products (including medicated feed) that covers all stages of the cycle (manufacture, supply, sale, use, disposal) and that meets other requirements of the WOAH and Codex standards	FAOLEX, TrACSS, PMP AMR	
4.b Regulatory framework for non-medicinal antimicrobials	Countries that have a regulatory framework for pesticides that considers all stages of the antimicrobial life cycle (production, supply, sale, use, disposal) and that meets other requirements in the reference international standards	FAOLEX, TrACSS	
4.c Optimized use	Countries that have laws or regulations that prohibit the use of antibiotics for growth promotion in the absence of a risk analysis	TrACSS PMP AMR	

ESBL, extended-spectrum b-lactamase

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