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WHO core package of interventions to support national action plans

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Preface

Antimicrobial resistance (AMR) is a global public health and socio-economic priority. Bacterial AMR alone causes an estimated 1.27 million global deaths per year, more than HIV/AIDS and malaria.

Since the adoption of the *Global Action Plan on AMR* in 2015, more than 170 countries have now developed their national action plans on AMR. However, as evidenced by annual results from the *Tracking Antimicrobial Resistance Country Self-Assessment Survey*, progress with implementing the national action plans on AMR in the human health sector has been slow, fragmented, and lacking a programmatic approach that considers interdependencies of interventions, which are properly costed and budgeted.

While many countries have shown progress in areas such as AMR surveillance and antimicrobial stewardship, their overall AMR response in the human health sector is not comprehensive. The focus has been on understanding AMR as a biological phenomenon, with limited attention to the needs of people and patients seeking prevention, diagnosis, and treatment of (drug-resistant) infections.

Within the human health sector, people and patients have diverse needs, preferences, values, and expectations that influence their health-seeking behaviours and interactions with health systems. They face multiple people challenges and health system barriers when accessing health services. These include hard-to-reach health care facilities that often lack both trained health workers and quality health products or critical supplies to accurately diagnose and appropriately treat (drug-resistant) infections. Other barriers include poor access to clean water and safe sanitation services to prevent infections, out-of-pocket expenditures for diagnosis and treatment, interrupted supply of quality health products such as vaccines, lab reagents, diagnostics, and essential, quality-assured antimicrobials. These systems' hurdles are often due to weak AMR governance at all levels ranging from the national level down to the community setting.

Many of these barriers highlight the need to integrate the AMR response with broader health systems strengthening efforts including primary health care approaches to achieve universal health coverage, but also to link it with emergency preparedness and response efforts at the country level.

For these reasons, World Health Organization (WHO) has developed the *People-centred approach to addressing AMR in the human health sector and the WHO core package of AMR interventions* that puts people and their needs at the centre of the AMR response and guides policy-makers in taking a more programmatic and comprehensive approach to tackling AMR in the human health sector. The 13 core AMR interventions promote equitable and affordable access to quality health services for the prevention, diagnosis and treatment of infections, including drug-resistant infections, at all levels of health care within a country.

Undoubtedly, mitigating AMR requires a coordinated approach across the human and animal health, agriculture, and the environment sectors. At the same time, there are sector specific priority interventions that require sector specific governance, financing, and implementation. The people-centred approach and the package of 13 core AMR interventions will guide policy-makers and technical staff in designing appropriate plans for the human health sector that will "leave no one behind", which are optimally integrated in relevant health system strengthening initiatives such as primary health care, universal health coverage, and support pandemic preparedness and response strategies. A strong "people-centred" response in the human health sector will greatly contribute to One Health actions under the umbrella of multisectoral national action plans on AMR.

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Abbreviations

AMC	antimicrobial consumption
AMC/U	antimicrobial consumption and use
AMR	antimicrobial resistance
AMS	antimicrobial stewardship
AMU	antimicrobial use
AWaRe	access, watch, reserve
HAI	health care-associated infection
IACG	Inter-Agency Coordination Group
IHR	International Health Regulations (2005)
IPC	infection prevention and control
JEE	Joint External Evaluation
NAP	national action plan
PHC	primary health care
SDG	Sustainable Development Goal
SOP	standard operating procedure
WASH	water, sanitation and hygiene
WASH FIT	water and sanitation for health facility improvement tool

Executive summary

This document outlines the concept and content of the WHO people-centred approach to addressing antimicrobial resistance (AMR) in the human health sector. The proposed approach recognizes and aims to address the challenges and health system barriers people face when accessing health services to prevent, diagnose and treat (drug-resistant) infections. It puts people and their needs at the centre of the AMR response and guides policy-makers in taking programmatic and comprehensive actions to mitigate AMR in line with a proposed package of core interventions. These interventions are based on a review of four pillars and two foundational steps that are critical to overcome barriers faced by people and health systems in addressing AMR. The four pillars are: *(1)* prevention of infections; *(2)* access to essential health services; *(3)* timely, accurate diagnosis; and *(4)* appropriate, quality-assured treatment. The pillars are supported by the two foundational steps: effective governance, awareness and education; and strategic information through surveillance and research. Building and adding on to the objectives of the *Global action plan on AMR*, the 13 core interventions and accompanying priority actions are designed to address AMR in a programmatic manner that puts people, their needs and equitable access to health services at the centre of the AMR response in the community, in primary care, secondary and tertiary care, and at national and/or subnational level.

The development of the people-centred core package of AMR interventions was based on a review of the evidence and multidisciplinary expert opinion, complemented with feedback from a global online consultation and WHO's strategic and technical advisory group on antimicrobial resistance. As countries develop or revise their national action plans (NAPs) on AMR, the people-centred core package of interventions can support the design and prioritization of actions in the human health sector at the different levels of implementation and integrated with broader health system strengthening and pandemic preparedness and response plans.

01

Introduction

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1.1 Background

AMR is a natural evolutionary response to exposure to antimicrobials that has been exacerbated by human behaviour, such as misuse and overuse in humans, agriculture and animal health, and environmental pollution *(1)*. It has far-reaching implications, challenging our ability to treat common infections and perform life-saving surgery, and increases the risk of future pandemics due to resistant pathogens. Infections caused by resistant bacteria are among the leading causes of death for people of all ages: in 2019, bacterial AMR was directly responsible for 1.27 million deaths and contributed to 4.95 million deaths globally, with the highest burden estimated to be in western sub-Saharan Africa *(2)*. These figures for mortality exceed those for HIV/AIDS, malaria and drug-susceptible tuberculosis in HIV-negative individuals *(3, 4)* and exceed earlier warnings *(5, 6)*.

Since WHO Member States endorsed the *Global action plan on AMR* in 2015 *(7)*, 170 countries have developed a NAP on AMR. There is, however, a large gap in sustainable implementation of NAPs. For example, the latest Tracking AMR Country Self-assessment Survey shows that only 28% (47 of 166 countries that reported for the survey in 2022) are implementing and monitoring their NAPs, approximately half of which (n = 24) are low- and middle-income countries *(8)*. A recently published systematic analysis confirms that countries are challenged mainly by lack of financing, accountability, feedback mechanisms, education and equitable access to diagnostics and antimicrobials *(9)*. Even in countries that implement their NAPs, the work is often fragmented and siloed. During the past six years, the survey shows that, although an increasing number of countries report that they have a standardized AMR surveillance system for human health, little or no progress is being made in other areas, such as regulation of antimicrobials, education and awareness-raising on AMR, monitoring antimicrobial consumption (AMC), infection prevention and control (IPC) and optimizing use of antimicrobials in human health *(8)*.

While the Global action plan on AMR includes multisectoral strategic objectives to tackle AMR within a broader One Health context, detailed, sector-specific global strategies are essential for an optimal AMR response *(10, 11)*. To support this a comprehensive WHO global strategic and operational plan for the human health sector is being developed. It will outline global AMR strategic priorities and an operational framework for country-level actions based on the people centred-approach and the core package of AMR interventions described in this document *(12, 13)*.

Country-focused, sector-specific, evidence-based guidance is vital for addressing AMR in countries, particularly for designing, prioritizing, implementing and monitoring AMR interventions in the human health sector, recognizing the interdependence of interventions and places people, their needs and equitable access[1] to health care at the centre of the AMR response. To support national implementation, WHO has developed a core package of 13 interventions to address AMR in a people-centred approach (Box 1).

Box 1. A people-centred approach to AMR

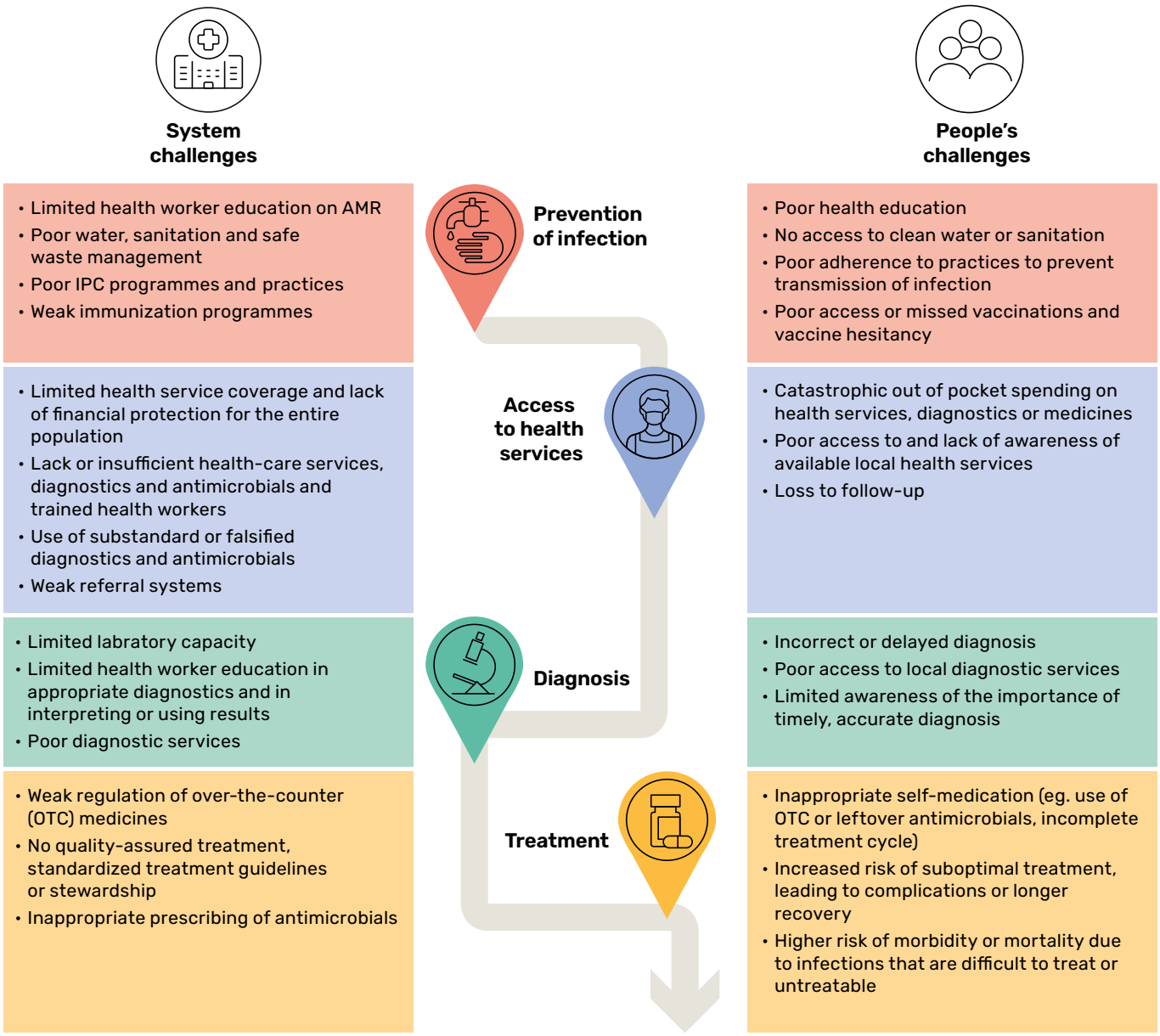
An approach to care that "consciously adopts individuals', carers', families' and communities' perspectives as participants in, and beneficiaries of, trusted health systems that respond to their needs and preferences in humane and holistic ways." Such an approach "requires that people have the education and support they need to make decisions and participate in their own care" *(14-16)*. For the AMR response, this includes not only engaging and empowering people and communities to be AMR champions and to promote responsible use of antimicrobials but also to prioritize people's needs and values and ensure equitable access in the design and delivery of health care services from prevention to diagnosis, treatment and care of infections, including drug-resistant infections

1.2 Aims

The **first objective** of the people-centred approach to addressing AMR in human health is to shift the narrative of AMR away from a solely biological phenomenon (drug-resistance) towards a people-centred narrative. This approach pays attention to the needs and challenges of people and patients seeking health services for the prevention, diagnosis and treatment of (drug-resistant) infections, referred to as "the AMR people journey" (Fig. 1).

[1] Access refers to equitable availability and affordability of quality health services and health products.

Fig. 1. Challenges faced on the AMR people journey[a,b]



[a]OTC: over-the-counter, IPC: Infection, Prevention and Control.

[b]Infection prevention is important in both communities and health-care facilities and continues throughout the journey. Treatment includes the continuous care that might be required for an AMR infection. The list of challenges may not be exhaustive or applicable to all countries.

For example, people may lack access to safe, sufficient water, sanitation and hygiene (WASH) in health-care facilities which can contribute to the development and spread of infections and subsequent inappropriate antimicrobial use (AMU). On the other hand, ensuring affordable health services by providing more comprehensive insurance coverage for diagnosis and treatment of infections and locally trained health workers will strengthen the human health sector response to AMR.

By taking a more holistic "people-centred" approach to AMR, interventions can be better targeted to meet the people and health systems challenges in a country. Also, changing the narrative to be more people-centred will enhance awareness and understanding of AMR among policy-makers and the general public; this can ultimately drive political and financial commitments to address AMR.

The **second objective** is to equip policy-makers in the human health sector at the country level with a people-centred core package of AMR interventions to guide the design and prioritization of interventions taking into account the challenges faced along the AMR people journey.

As many countries are revising their NAPs on AMR and given the urgent need to accelerate sustainable implementation, the core package contains 13 interventions that should be prioritized at the country level based on the country context as part of the NAPs on AMR.

The proposed interventions are designed to ensure equitable, affordable access to good-quality preventive services, timely diagnosis, treatment and care of (drug-resistant) infections to reduce the impact of AMR on patients in terms of morbidity and mortality, while leaving no one behind and supporting the sustainable development goals (SDGs).

Aligned with the WHO handbook for NAPs on AMR in the human health sector *(17),* the core package of interventions supports countries along the six steps for sustainable implementation of NAPS on AMR (Fig. 2).

Finally, the package supports the integration of AMR interventions into broader work on national health system strengthening through universal health coverage and primary health care (PHC) strategies and plans, the implementation of the International Health Regulations *(2005)* (IHR) and pandemic preparedness and response efforts. Effectively tackling AMR cannot be undertaken through a siloed programme, and instead needs a cross-cutting "people-centred" response integrated into health sector strategies, programmes and budgets to ensure sustainability and efficient use of resources and the health workforce. It also provides opportunities to access existing national funding streams (e.g., universal health coverage, PHC and pandemic preparedness and response). Strengthening health system capacity will support work to contain AMR and vice versa *(18)*.

1.3 Target audience

The target audience of this publication are national and subnational policy-makers responsible for prioritizing and leading AMR interventions in the human health sector through multisectoral NAPs on AMR. The secondary audience are health workers, communities, civil society groups, professional organizations and the private sector involved in development, implementation, and monitoring of NAPs on AMR in human health.

Fig. 2. Six steps for sustainable implementation of national action plans on AMR

02

Methods

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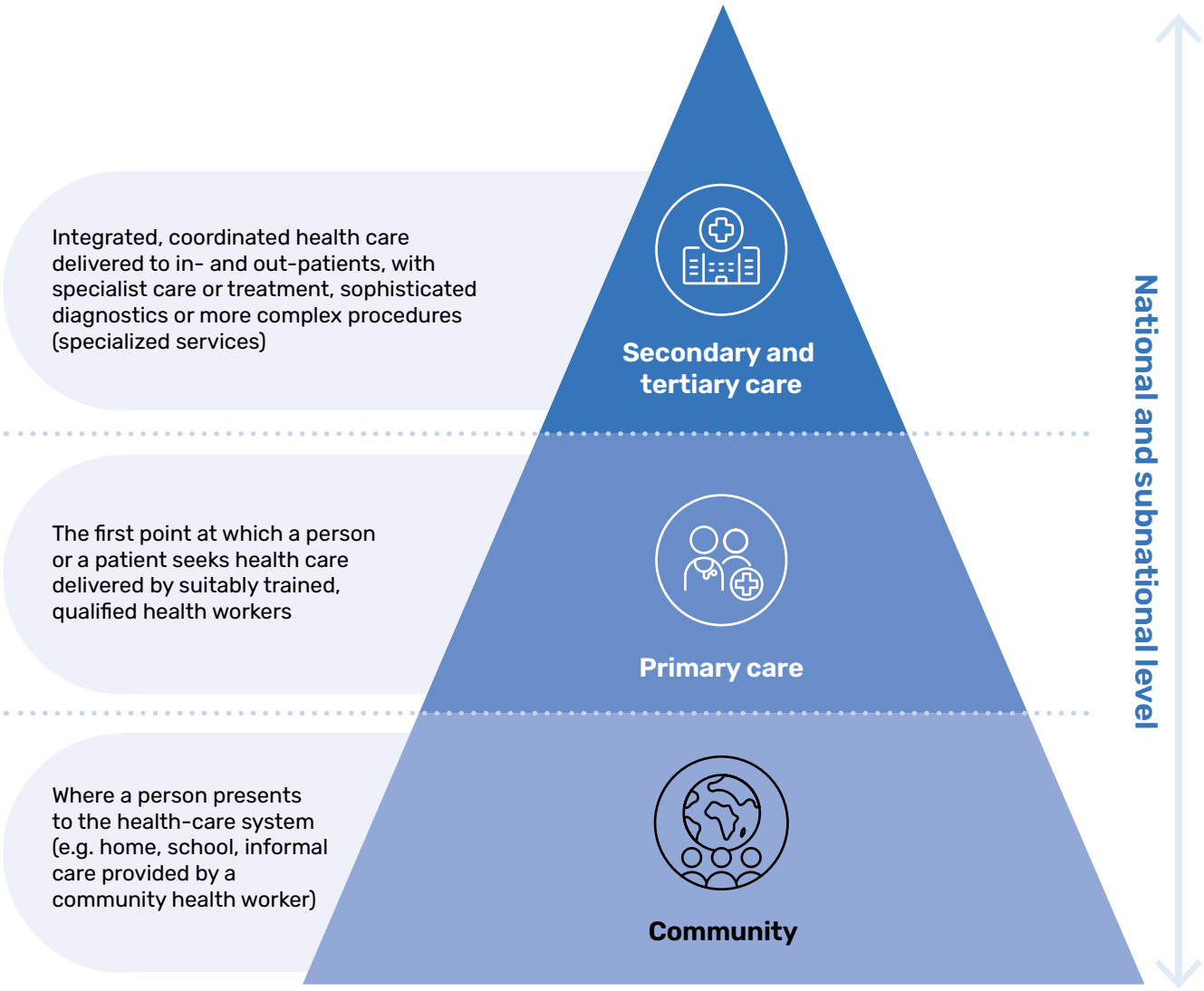
The people-centred approach and core package of AMR interventions was developed in steps (see Annex Fig. A.1.1), according to an agreed WHO definition of a people-centred approach (see Box 1) and adapted from similar exercises undertaken in programmes for tuberculosis and HIV/AIDS *(19, 20)*. A multidisciplinary working group was convened, representing various AMR-related disciplines in the AMR people journey (Fig. 1) and the global, regional and country levels of WHO. The group conducted a root-cause analysis of the challenges people face when accessing health services to prevent, diagnose and treat (drug-resistant) infections as well as their needs and the gaps in health systems (Fig. 1) at various levels of implementation (Fig. 3), as discussed in the published literature *(18–25)*. This exercise defined the structure of the people-centred approach and package of AMR interventions, consisting of four pillars, two foundational steps and the four implementation levels (Fig. 3, Box 2).

The working group identified 119 interventions for addressing people and system challenges and needs. The interventions were scored, prioritized and consolidated according to set criteria, resulting in a set of 13 core interventions and related priority actions (sub-interventions), as detailed in section 3. A draft of the document (*Draft people-centred framework for addressing AMR in the human health sector*) underwent a global online consultation *(21)* and was then reviewed and endorsed by WHO's Strategic and Technical Advisory Group on Antimicrobial Resistance. The methods are described in more detail in the Annex.

Fig. 3. Definitions of the four implementation levels[a] (community, primary care, secondary and tertiary care, national and/or subnational level)



[a] The "subnational level" refers to interventions such as guidelines, policies, laws and/or regulations at state, province or municipality level.

Box 2. Implementation levels

Implementation levels refer to the settings in which interventions and their priority actions should be implemented. Implementers may be policy-makers, national or local government officials or health-care managers. Implementation of a priority action at a specific level often requires the involvement of several stakeholders, such as policy-makers, civil society, community, academia, health-care professionals and the private sector.

03

Core package of interventions and priority actions for addressing antimicorbial resistance (AMR) in a people-centred approach

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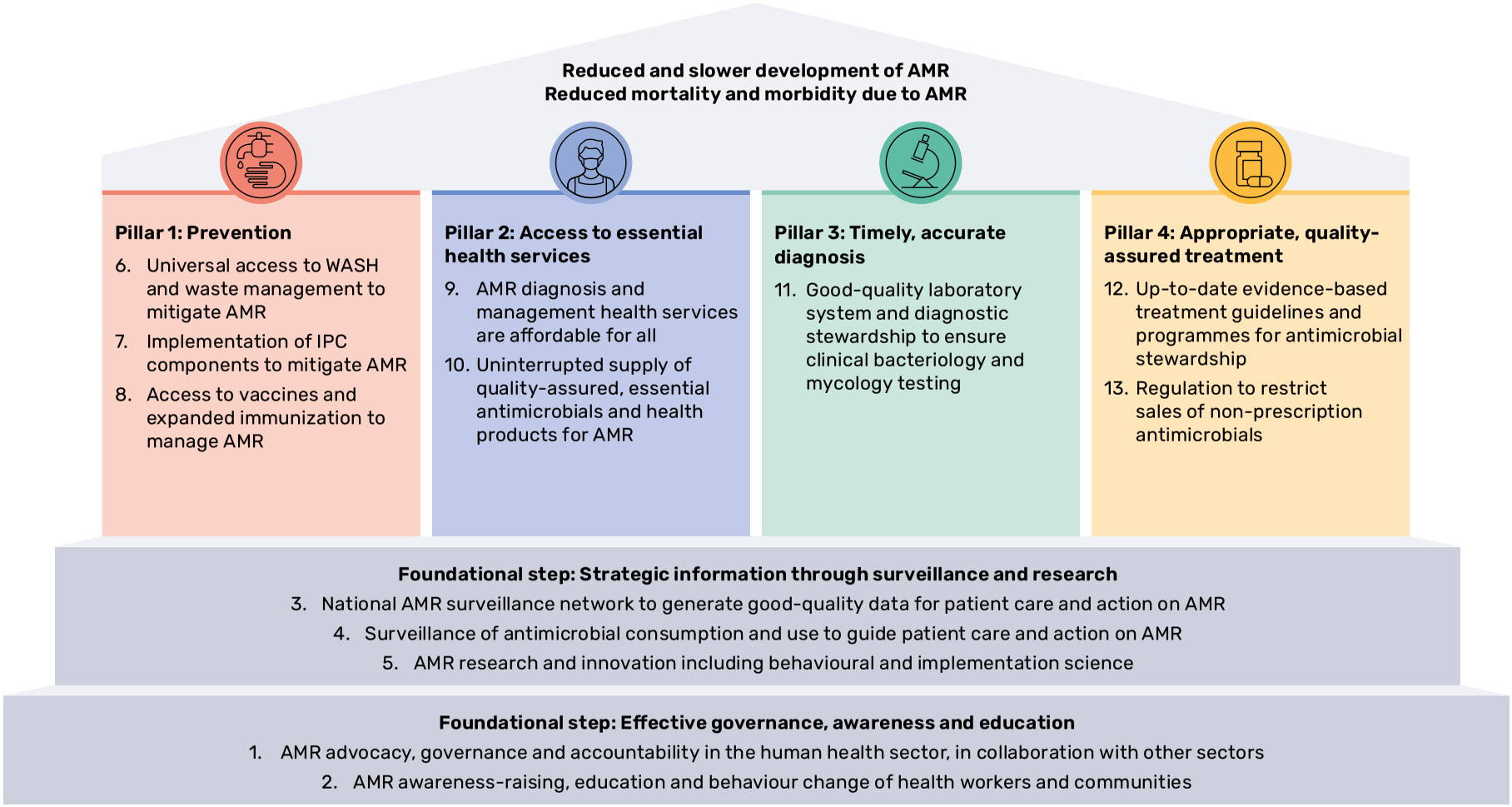
Fig. 4. The people-centred core package of AMR interventions



IPC, infection prevention and control; AMR, antimicrobial resistance

The people-centred core package comprises 13 AMR interventions (Fig. 4) to be implemented at the country level. Five interventions are associated with the **two foundational steps** of effective governance, awareness and education, and strategic information through surveillance and research. Eight additional interventions are associated with the **four pillars**, which reflect the AMR people journey: prevention of infections; access to essential health services; timely and accurate diagnosis; and appropriate, quality-assured treatment. These interventions are directed towards two overarching goals: reduced and slower development of AMR; and reduced mortality and morbidity due to AMR.

The two foundational steps facilitate sustainable implementation of the interventions in the four pillars. They are required to raise AMR on the political agendas of countries, to ensure sustainable funding, to generate strategic data on AMR and AMC, to raise awareness and knowledge about AMR, and for implementation research to ensure evidence-based implementation and monitoring of the impact and cost-effectiveness of interventions.

3.1 Thirteen core AMR interventions and supporting priority actions

This section describes the 13 AMR interventions and the supporting priority actions at the four levels of implementation at country level (community, primary care, secondary and tertiary care, and national and/or subnational level). In addition, for each intervention, this section describes:

- **the people and system needs** that give the rationale for the intervention and its priority actions, from the perspective of people and patients identified through the AMR people journey;
- **the system prerequisites** to implement the intervention, including the dependencies to other interventions in the core package;
- **links** to broader health programmes, plans and budgets necessary to ensure efficient use of resources and sustainable implementation, and key indicators that the intervention supports.

References to relevant WHO guidance and tools for implementation are provided for each intervention.

3.1.1 **Foundational step:** Effective governance, awareness and education

Intervention 1:

AMR advocacy, governance and accountability in the human health sector in collaboration with other sectors

Priority actions

National and/or subnational level

☐ Raise political awareness by advocating for AMR, and secure political and financial commitment, and accountability from the government.

☐ Develop, cost, implement and monitor AMR interventions and activities in human health as part of the One Health NAP on AMR.

☐ Integrate human health AMR interventions into broader health sector programmes, plans and budgets, with links to relevant health system strengthening governance mechanisms.

☐ Ensure active participation of the human health sector in the national multisectoral AMR coordination mechanism.

☐ Engage civil society and communities in the multisectoral AMR coordination mechanism and in development, implementation and monitoring of the One Health NAP on AMR.

All health-care levels

☐ Strengthen the capacity of leadership functions at all health-care levels to implement AMR interventions.

People and system needs

- Political will and allocation of domestic and international funding is needed for the effective implementation of NAPs on AMR to help reduce morbidity and mortality due to AMR
- The views of people reflected in national multisectoral AMR coordination mechanisms, policies, and actions by engaging civil society and communities to tailor AMR interventions to their needs
- AMR interventions integrated into broader health system strengthening and pandemic preparedness and response plans, programmes and budgets to ensure sustainable implementation of NAPs on AMR
- NAPs on AMR planning, budgeting, implementation and monitoring need to be aligned with the wider health sector and One Health plans to increase the efficient use of financial and human resources in implementation
- Regular monitoring of NAPs on AMR implementation to evaluate progress among all relevant stakeholders to sustain action and report to the highest level of government

System prerequisites

- Strong and effective human health sector governance
- A functioning national multisectoral AMR coordination mechanism with a dedicated AMR secretariat
- A functioning health system with effective governance and financing from national and subnational health sector budgets and donors
- Legal framework or structure for inclusion of AMR-related regulations in national policies and regulations and adequate resources for enforcement

Links 🔗

- Supports advancement of IHR Joint External Evaluation (JEE) indicators: P4.1 Multisectoral coordination on AMR; P2.1 Financial resources for IHR implementation; P1.1 Legal instruments; and R5.3 Community engagement
- Links to PHC strategic and operational levers: engagement of community and other stakeholders (*strategic*); governance and policy frameworks (*strategic*); funding and allocation of resources (*strategic*; and engagement with private sector providers *(operational)*
- Effective governance, awareness and education is essential to enable the overall implementation of the people-centred core package of AMR interventions prioritized by the country

Main WHO guidance

(17, 22-26)

Intervention 2:

AMR awareness-raising, education and behaviour change of health workers and communities

Priority actions

National and/or subnational level

☐ Develop and implement a communication strategy to improve awareness and understanding of AMR among policy-makers, health workers and communities.

☐ Develop age-appropriate curricula on AMR for primary and secondary schools.

☐ Integrate AMR into pre-service educational curricula for health workers.

All health-care levels

☐ Develop, test and implement behaviour change interventions on AMR for health workers (including doctors, nurses, pharmacists, dentists etc.) at various levels of health care.

People and system needs

- Political will to invest in community awareness, education and behaviour change and development of community-owned solutions based on better understanding of AMR
- Pre-service education of health workers on the emergence and spread of AMR and how appropriate IPC and antimicrobial prescribing will strengthen delivery of good-quality health services to prevent, diagnose, treat and care for (AMR) infections
- Public awareness of AMR and its drivers to ensure understanding of when to seek care and reduce inappropriate self-treatment
- Behaviour change in the general public and among health workers to reduce inappropriate use of antimicrobials and mitigate the spread of infections

System prerequisites

- Strong and effective human health sector governance
- A functioning national multisectoral AMR coordination mechanism with a dedicated AMR secretariat
- A functioning health system with effective governance and financing from national and subnational health sector budgets and donors
- Legal framework or structure for inclusion of AMR-related regulations in national policies and regulations and adequate resources for enforcement

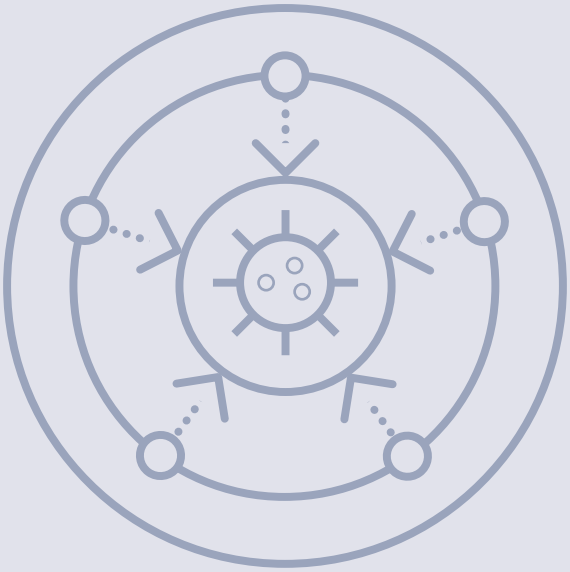
Links 🔗

- Supports advancement of IHR JEE indicator D3.3 on workforce training
- Linked to PHC strategic and operational levers: PHC workforce (*operational*)
- Inclusion of AMR-relevant curriculum in pre-service education of health workers to strengthen provision by the future health workforce of good-quality WASH, IPC, *immunization (pillar 1), diagnosis (pillar 3)* and *appropriate prescribing and use of antimicrobials (pillar 4)* to mitigate AMR

Main WHO guidance

(27-29)

3.1.2
Foundational step:
Strategic information through surveillance and research



Intervention 3:

National AMR surveillance network to generate good-quality data to inform patient care and action on AMR

Priority actions

National and/or subnational level

☐ Define and implement a national AMR surveillance strategy that produces representative and quality assured AMR data overseen and supported by a national coordination centre.

☐ Use the collected data to inform action and guidelines, and monitor the burden and distribution of AMR

Primary care

☐ Collect, collate, analyse and interpret data on infections (syndromic and AMR) as part of AMR/HAI surveillance to guide local empirical treatment.

People and system needs

- AMR data that are representative geographically, demographically and by level of care, coordinated and quality controlled at national level
- Evidence-based guidelines based on local or national epidemiology to guide appropriate diagnosis and treatment of patients with bacterial and/or fungal infections
- Need for policy makers to be aware of the magnitude of the AMR situation in their country in order to make the right policy decisions and invest in AMR interventions to reduce its burden

System prerequisites

- Sufficient financial and human resources, including health workers trained in microbiology and epidemiology dedicated to AMR/HAI surveillance (*foundational step: effective governance, awareness and education*).
- Access to good-quality laboratory services (*or possibility of referring samples*) at various health-care levels (*pillars 2 and 3*)
- Diagnostic stewardship principles developed, disseminated and implemented (*pillar 3*)
- Patient information and laboratory management information systems (*pillars 2 and 3*)

Links

- Enables reporting on the AMR Sustainable Development Goal (SDG) indicator 3.d.2: percentage of bloodstream infections due to *Escherichia coli* resistant to third-generation cephalosporins or due to methicillin-resistant *Staphylococcus aureus*
- Supports advancement of IHR/JEE indicators: P4.2 Surveillance of AMR, P4.3. Prevention of multidrug resistant organisms, D2. Surveillance
- Linked to PHC strategic and operational levers: Monitoring and evaluation (*operational*)
- National AMR surveillance data can be used to raise political commitment for action on AMR (*foundational step: governance, awareness and education*) and for research (*foundational step: strategic information through surveillance and research*) and antimicrobial stewardship (AMS) (*pillar 4*)

Main WHO guidance

(30-35)

Intervention 4:

Surveillance of antimicrobial consumption and use (AMC/U) to guide patient care and action on AMR[2]

Priority actions

National and/or subnational level

☐ Establish and/or strengthen a national AMC/U surveillance system.

☐ Conduct routine surveillance of AMC at national and subnational levels.

☐ Ensure that AMC/U data collected at all levels are analysed, reported and shared with relevant stakeholders to signal possible under- and overuse, and inform corrective actions.

Secondary and tertiary care

☐ Conduct routine surveillance of AMC and selectively perform AMU surveys based on local needs.

Primary care

☐ Conduct routine surveillance of AMC and periodic AMU surveys in target populations.

People and system needs

- Policy-makers can monitor and ensure uninterrupted access to affordable, quality-assured antimicrobials at all levels of the health-care system
- Policy-makers have the information for development of appropriate standard treatment guidelines and stewardship programmes and for monitoring their implementation
- Equip public and private prescribers and dispensers with the necessary data to optimize AMU and ensure safe, appropriate treatment
- Information on the use and prescription of antimicrobials in the community and in health-care facilities based on AMC/U data

System prerequisites

- Functioning national medicines regulatory authority to ensure collection of AMC data from relevant data providers
- National medicines regulatory authority engaged in the national AMR governance mechanism (*foundational step: effective governance, awareness and education*)
- Mapping of stakeholders involved in the value chain of medicines and their role
- National registry of antimicrobials
- Sufficient financial and human resources for AMC/U surveillance (*foundational step: governance, awareness and education*)

Links

- Enables measurement of the globally agreed target *(36, 37)* ensuring that ≥ 60% of all antibiotic consumption at the national level consists of "Access" group of antibiotics as defined by the "access, watch, reserve" (AWaRe) classification of antibiotics
- Supports advancement of IHR JEE indicator P4.4, Optimal use of antimicrobial medicines in human health
- Linked to PHC strategic and operational levers: Monitoring and evaluation (*operational*) and medicines and other health products (*operational*)
- National AMC/U surveillance data can help garner political commitment on AMR (*foundational step: governance, awareness and education*) and inform research (*foundational step: strategic information through surveillance and research*) and AMS activities (*pillar 4*), underlined by AMR prevention, diagnosis and management health services made available and affordable for all (*pillar 2*)

Main WHO guidance

(12, 38, 39)

[2] Antimicrobial consumption (AMC) serves as a proxy for the actual use of antimicrobials and is estimated from aggregated data, mainly derived from antimicrobial import, sales or reimbursement databases, overseen by national medicines authorities or regulators and serving administrative purposes. Antimicrobial use (AMU) refers to data on antimicrobials taken by individual patients. Such patient-level data are more comprehensive, including information on the indication, treatment schemes and patient characteristics. While more laborious to collect, such data are more informative and important for evaluating and guiding local antimicrobial stewardship activities

Intervention 5:

AMR research and innovation including behavioural and implementation science

Priority actions

National and/or subnational level

☐ Develop a national AMR research agenda adapted from global and regional AMR agendas according to local research priorities, including behavioural and implementation research.

☐ Build capacity for implementation of AMR research priorities in collaboration with academia, the private sector and civil society.

☐ Participate in clinical trial networks and surveillance platforms, share AMR and AMC/U data, and foster public and private collaboration to ensure that vaccine, diagnostic and antimicrobial development pipelines meet unmet public health needs.

☐ Identify sustainable financing and incentives and strengthen local capacity for the development and/or production of novel and/or existing vaccines, diagnostics, and antimicrobials including appropriate paediatric and oral formulations that target priority pathogens.

People and system needs

- Evidence base for policy-makers to tailor the implementation of interventions to the local setting, including cost-benefit and effectiveness analysis, and behavioural insights
- Equitable access to effective, safe antimicrobials to treat infections, including those that are (multi)drug-resistant, and to conduct medical procedures, such as surgery and chemotherapy
- Health-care professionals need to have access to affordable, safe, accurate, sensitive, specific diagnostic tests for patient screening, pathogen detection and identification, antimicrobial susceptibility testing to inform appropriate, good-quality clinical care
- Innovation to address prevention, diagnosis, treatment and care required by patients in all resource settings, and initiatives to reduce barriers to their access

System prerequisites

- Sufficient, trained human resources dedicated to research on AMR, especially implementation research on interventions
- Involvement of academia and the private sector in the national AMR coordination mechanism (*foundational step: governance, awareness and education*)
- Governance and high-level commitment, financial resources, human capacity, and laboratory and technology infrastructure (*foundational step: governance, awareness and education and pillar 3*)
- Financial incentives and regulatory pathways to fosters innovation, research and development and support rapid, responsible adoption of new medical products
- Stewardship of existing and new vaccines (*pillar 1*), diagnostics (*pillar 3*) and antimicrobials (*pillar 4*) that enter the market including regulations (*pillar 4*) to preserve their effectiveness.

Links

- Supports advancement of the IHR JEE indicator R1.6 Research, development and innovation
- Linked to PHC strategic and operational levers: Primary health care-oriented research (operational)
- Strengthening of the evidence base can support advocacy and awareness-raising on AMR (*foundational step: governance, awareness and education*) and the overall implementation of the package of interventions

Main WHO guidance

(13, 40, 41)

3.1.3
Pillar 1: Prevention

Intervention 6:

Universal access to WASH and waste management to mitigate AMR

Priority actions

National and/or subnational level

☐ Ensure access to WASH and safe waste management in community and health facilities by appropriate planning, budgeting and financing of WASH and safe waste management infrastructure and services.

All health-care levels

☐ Assess WASH in health care facilities using standardized tools, and improve, maintain and sustain improvements in WASH and safe disposal of health care waste and antimicrobials.

Community

☐ Ensure clean drinking-water and improve sanitation and personal hygiene (including hand hygiene) through community engagement and community approaches.

☐ Develop mechanisms to return unused antimicrobials from households for safe disposal.

People and system needs

- Equitable access to adequate WASH and safe waste management to limit the transmission of infections to ultimately reduce the need for antimicrobial use in the community, regardless of gender, age, ethnicity, race and disability
- Adequate WASH and waste management services for facilities at the different levels of health care to ensure that health workers are protected, and patients are treated safely and receive good-quality care, including those with suspected AMR infections

System prerequisites

- Commitment to improve access to and funding for clean running water and basic sanitation infrastructure (*foundational step: governance, awareness and education*)
- Funding for a health care waste management system (*foundational step: governance, awareness and education*)
- Sufficient staff to manage, operate and maintain WASH services (e.g., cleaning personnel, waste handlers).

Links

- Supports advancement of the IHR JEE indicator R4.3 Safe environment in health facilities
- Linked to PHC strategic and operational levers: physical infrastructure (*operational*) and models of care (*operational*)
- Implementation of WASH enables IPC priority actions (*pillar 1*)
- Supports progress on the following SDG indicators: 6.1.1 Proportion of population using safely managed drinking water services; 6.2.1 Proportion of population using (a) safely managed sanitation services and (b) a hand-washing facility with soap and water; 6.3.1 Proportion of domestic and industrial wastewater flows safely treated; and 6.3.2 Proportion of bodies of water with good ambient water quality

Main WHO guidance

(42-54)

Intervention 7:

Implementation of IPC core components to mitigate AMR

Priority actions

National and/or subnational level

☐ Implement WHO core components for IPC, starting with the minimum requirements for improving IPC in health-care settings including the prevention of multi-drug resistant organisms.

Secondary and tertiary care

☐ Adapt health care facility IPC guidelines based on national IPC guidelines and use HAI/AMR surveillance data to guide outbreak preparedness and response.

Primary care

☐ Adapt primary care facility standard operating procedures (SOPs) for IPC based on national IPC guidelines and monitor implementation according to national IPC indicators.

Community

☐ Implement infectious disease prevention services in the community, including food safety standards.

People and system needs

- Awareness and practice of IPC in households to reduce transmission of infections and need for antimicrobials
- All people (including those with suspected infections) have the right to clean, safe, good-quality care through implementation of IPC programmes based on WHO core components, starting with IPC minimum requirements
- IPC practices at health facilities protect patients, health workers and visitors from infection to decrease the incidence of HAIs and emergence of multidrug-resistant organisms, and ultimately reduce AMR and AMU.

System prerequisites

- A designated national IPC focal point and a dedicated budget for implementing IPC strategies/plans (*pillar 1*)
- Sufficient health workers trained in IPC (*foundational step: effective governance, awareness and education*)
- Access to WASH and waste management services (*pillar 1*)
- Appropriate health facility infrastructure, e.g. a system to ensure optimal bed use and reduce overcrowding, ensure adequate ventilation, access to clean water, single isolation rooms (*pillar 1*)
- Access to appropriate sanitation supplies (soap, single-use or clean, reusable hand towels) and protective equipment (personal protective equipment, labelled bins) for hand hygiene, environmental cleaning, laundry, decontamination of medical devices, protection of health-care workers, and appropriate and safe health-care waste management (*pillar 2*)

Links

- Supports advancement of IHR JEE indicators: R4.1 IPC programmes, P4.3. Prevention of multidrug-resistant organisms
- Linked to PHC strategic and operational levers: models of care (*operational*), PHC workforce (*operational*)
- Implementation of IPC core components support AMS activities (*pillar 4*) and vice versa

Main WHO guidance

(55-68)

Intervention 8:

Access to vaccines and expanded immunization to manage AMR

Priority actions

National and/or subnational level

☐ Expand national immunization programmes and ensure that developed and licensed vaccines are available and accessible to prevent infections and subsequent use of antibiotics (and thus the emergence of AMR).

☐ Update national recommendations and normative guidance to include the role of vaccines in controlling AMR.

All health-care levels

☐ Ensure that health workers are vaccinated and trained to meet national immunization programme targets for vaccines that impact AMR.

Community

☐ Raise awareness of the role of vaccines in limiting the emergence of AMR and use of antibiotics.

People and system needs

- People need access to vaccines to prevent contracting an infection or developing disease (for which there is a vaccine), including those caused by AMR pathogens
- Infection transmission decreased through herd immunity and demand for antibiotics reduced
- Vaccine hesitancy in the community and among health-care workers addressed

System prerequisites

- Collaboration on and integration of cross-cutting activities between the NAP on AMR and the national immunization programme
- Basic infrastructure for an immunization programme: procurement channels, cold supply chain, waste management, availability of trained health workers at primary care level
- An uninterrupted supply chain and national and subnational capacity for procurement and demand-forecasting for vaccines (*pillar 2*)
- Availability of data collection system (electronic or paper based) (*pillar 2*)

Links

- Supports advancement of IHR JEE indicator P8. Immunization
- Links to PHC strategic and operational levers: models of care (*operational*) and medicines and other health products to improve health (*operational*)
- Supports progress on the SDG indicator: 3.b.1 Proportion of the target population covered by all vaccines included in their national programme (DTP3, MCV2 and PCV3)

Main WHO guidance

(69-77)

DTP: Diphtheria tetanus toxoid and pertussis; MVC: Measles-containing-vaccine; PCV: Pneumococcal conjugate vaccine.

3.1.4
Pillar 2: Access to essential health services

Intervention 9:

Health services for the prevention, diagnosis and management of infectious disease syndromes are available and affordable for all

Priority actions

National and/or subnational level

☐ Ensure equitable access to and timely national and local adoption of new and existing vaccines, diagnostics and antimicrobials, including ensuring timely inclusion of products into policies, guidelines, procurement and reimbursement schemes.

☐ Ensure that access to diagnosis, treatment and care of (drug-resistant) infections is not barred by financial constrains by including the services in pooled financing schemes, such as UHC health benefit packages, while ensuring rational use.

☐ Ensure the affordability of quality-assured essential vaccines, diagnostics and antimicrobials for all including key vulnerable groups through appropriate financing and pricing policies.

☐ Improve public awareness of the coverage of health services and products related to the prevention, diagnosis and treatment of (drug-resistant) infections in health benefits packages.

All health-care levels

☐ Dedicate appropriate budget to procure essential diagnostics and antimicrobials used in facilities for diagnosis and treatment of infectious (including drug-resistant) syndromes.

☐ Ensure availability of trained health workers to prevent, diagnose, treat, and care for patients with infectious (including drug-resistant) syndromes.

Community

☐ Ensure the availability and affordability of preventive testing and counselling services for common infections (e.g. sexually transmitted infections), with engagement of the community.

People and system needs

- Affordable access to good-quality health services, antimicrobials, vaccines and other medicines without financial hardship.
- Affordability strongly influences health seeking behaviours and efforts need to be made to include health services for the prevention, diagnosis, and treatment of (drug-resistant) infections in health financing schemes and universal health coverage
- Affordable diagnostic tests and antimicrobials at the different health-care levels, through insurance coverage of infectious syndrome management and inclusion of required health products in health benefit packages and pooled public financing
- Appropriate health insurance coverage to protect patients with (drug-resistant) infections from out-of-pocket health expenditures that may create a financial barrier to accessing services or lead to financial hardship
- Improve public awareness of the health services and products included in the health benefits package so that people better understand their entitlements and are empowered to demand access to health services

System prerequisites

- Pooled financial resources for health, list of essential health services, health benefit package or other public financing mechanism for health
- Sufficient health workers trained in infectious disease management (*foundational step: governance, awareness and education*)

Links

- Supports advancement of the IHR JEE indicator R3. Health services provision
- Links to PHC strategic and operational levers: funding and allocation of resources (strategic); medicines and other health products to improve health (operational); purchasing and payment systems (operational); and models of care (operational)
- Access to quality-assured, affordable diagnostics and antimicrobials for diagnosis (pillar 3) and appropriate treatment (pillar 4)
- Supports progress on the SDG indicator: 3.8.1 Coverage of essential health services; 3.8.2 Proportion of population with large household expenditures on health as a share of total household expenditure or income

Main WHO guidance

(78-85)

Intervention 10:

Uninterrupted supply of quality-assured, essential health products for the prevention, diagnosis and management of infectious disease syndromes

Priority actions

National and/or subnational level

☐ Ensure adequate forecasting, procurement and distribution of essential diagnostics, reagents, antibiotics, and other health products for management of (drug-resistant) infections

☐ Implement policies and procedures to prevent, detect and respond to substandard and falsified medical products (vaccines, diagnostics and antibiotics) to manage (drug-resistant) infections at all levels of health care

All health-care levels

☐ Build the capacity of health workers, regulatory authorities, and procurement and supply chain authorities on effective procurement and supply of essential health products and on the prevention, detection and reporting of substandard and falsified medical products.

Community

☐ Increase community engagement in the prevention, detection and reporting of supply issues of medical products, including substandard and falsified medical products, and enhance community awareness on their impact on AMR.

People and system needs

- Health workers enabled to deliver high-quality, appropriate patient care to help reduce morbidity and mortality due to AMR and limit the emergence and spread of AMR.
- An uninterrupted supply of essential quality-assured medical products, including vaccines, diagnostics and antimicrobials for the prevention, diagnosis, treatment and care of infections, including those due to AMR infections

System prerequisites

- A body responsible for selection of essential medical and health products, such as a national essential medicines committee and national reference laboratory
- Sufficiently trained staff to manage the supply chain of medical products
- A Government entity which is responsible and accountable for supply chain management of health products related to the prevention, diagnosis, and treatment of infectious diseases (forecasting, procurement, storage, and (re)distribution) including a functioning national logistics management system to track end-to-end supply of medical products at all levels of the national supply chain
- A regulatory authority to ensure the safety and quality of products on national markets and post-market surveillance, including detecting and responding to substandard and falsified medicines and health products
- Infrastructure at each level of the national supply chain, including the cold chain, for vaccines, diagnostics and antimicrobials as necessary for effective implementation of immunization programmes (*pillar 1*), accurate diagnosis (*pillar 3*) and appropriate treatment of (AMR) infections (*pillar 4*)
- Clear coordination among relevant oversight committees, including the taskforce for substandard and falsified medicines and the multisectoral AMR coordination committee (*foundational step: governance, awareness and education on AMR*)

Links

- Supports advancement of IHR JEE indicator R1.5 Emergency logistic and supply chain management
- Links to PHC strategic and operational levers: funding and allocation of resources (strategic) and medicines and other health products (*operational*)
- Enables surveillance (*foundational step: strategic information through surveillance and research*), IPC (*pillar 1*), immunization (*pillar 1*), diagnosis (*pillar 3*) and appropriate treatment (*pillar 4*) of (AMR) infections *(78, 84-92)*

[3] Health products include IPC commodities, such as adequate personal protective equipment and other protective and security materials, vaccines, antimicrobials, laboratory reagents, consumables, and diagnostic tests.

3.1.5
Pillar 3: Timely, accurate diagnosis

Intervention 11:

Good-quality laboratory system and diagnostic stewardship to ensure clinical bacteriology and mycology testing

Priority actions

National and/or subnational level

☐ Establish or strengthen a national quality-assured bacteriology (and mycology) laboratory system, including a national bacteriology reference laboratory which supports capacity building at all levels and external quality control.

☐ Develop national guidelines for diagnostic stewardship and integrate them into pre- and in-service training for health workers at all levels of health care.

Secondary and tertiary care

☐ Strengthen clinical bacteriology and mycology testing capacity for isolation and identification of pathogens and antimicrobial susceptibility testing for clinical management.

Primary care

☐ Ensure access to laboratory diagnostics for infections and antimicrobial susceptibility testing by a referral mechanism, with rapid turnaround time for optimal patient care.

Community

☐ Raise awareness among community health workers on the importance of timely, accurate diagnosis of suspected infections.

People and system needs

- Suspected bacterial and fungal infections and associated AMR diagnosed accurately and rapidly in order to plan appropriate treatment and care without delay
- Capacity and/or access to bacteriology and mycology testing required at all levels of health care to ensure that health workers have access to a minimum package of good-quality diagnostic results for planning optimal patient care
- Trained health workers on diagnostic stewardship to promote appropriate and timely collection of specimens and interpretation and use of diagnostic results for appropriate treatment and care

System prerequisites

- Strategic and operational guidance (including SOPs) on bacteriology and mycology
- Functional laboratory network infrastructure, which provides equitable access to quality assured bacteriology / mycology testing at all levels of the health system, supported by a national reference laboratory.
- Uninterrupted supply of essential diagnostic products based on national and local needs (*pillar 2*)
- Health workers trained in bacteriology and mycology to support laboratory and diagnostic services (*foundational step: governance, awareness and education*)

Links

- Supports advancement of the IHR JEE indicator D1. National laboratory system
- Links to PHC strategic and operational levers: Models of care (*operational*); PHC workforce (*operational*); medicines and other health products (*operational*); and digital health technologies (*operational*)
- Enables AMR surveillance (*foundational step: strategic information through surveillance and research*) and AMS activities (*pillar 4*)
- 76th World Health Assembly Resolution WHA76.5 on Strengthening diagnostics capacity
- Supports progress on the SDG indicator: 3.d.1 IHR capacity and health emergency preparedness

Main WHO guidance

(32, 80, 93-95)

3.1.6
Pillar 4: Appropriate, quality-assured treatment

Intervention 12:

Up-to-date evidence-based treatment guidelines and antimicrobial stewardship (AMS) programmes

Priority actions

National and/or subnational level

☐ Develop or revise and implement up-to-date national treatment guidelines based on AMS principles, the WHO AWaRe antibiotic book, evidence and epidemiology, and monitor compliance.

☐ Integrate the AWaRe classification into the national essential medicines list and formulary to promote appropriate selection and use of antimicrobials.

☐ Develop or adapt and implement national integrated AMS policy, standards and tools, and provide education materials and in- and pre-service training for health workers.

Secondary and tertiary care

☐ Develop, implement and monitor AMS programmes, including establishing multidisciplinary AMS teams.

Primary care

☐ Develop, implement and monitor targeted AMS activities to improve antibiotic prescribing in primary care and promote behaviour change on appropriate use of antimicrobials of health workers (including doctors, nurses, pharmacists, dentists etc.) and patients.

People and system needs

- Evidence-based treatment guidelines for infectious syndromes at all levels of health care based on AMR surveillance data, the AWaRe classification of antibiotics and the WHO AWaRe antibiotic book
- AMS programmes at all levels of health care to guide the appropriate use of antimicrobials and multidisciplinary management of (drug-resistant) infections
- Adequate infectious disease and AMR competencies among all cadres of health-care workers, from community to prescribers, to improve the quality and appropriateness of antimicrobial use and patient outcomes

System prerequisites

- AMC/U and AMR surveillance data and diagnostic and patient information available to inform AMS (*foundational step: strategic information through surveillance and research and pillar 3*)
- National essential medicines list and formulary
- Uninterrupted supply of quality-assured and affordable antimicrobials (*pillar 2*)
- National medicines regulatory authority engaged in the national AMR governance mechanism (*foundational step: effective governance, awareness and education*)
- Close link between IPC and AMS national focal points and IPC and AMS technical working groups (*pillar 1*)
- Coordination and/or integration of facility committees (e.g. on IPC, drugs and therapeutics) and AMS committees and teams (*pillars 1*)

Links

- Supports achievement of the globally agreed target *(36, 37)* of ≥ 60% of total national antibiotic consumption consist of "Access" group of antibiotics based on the AWaRe classification
- Supports advancement of IHR JEE indicator P4.4. Optimal use of antimicrobial medicines in human health
- Links to PHC strategic and operational levers: Systems for improving the quality of care (*operational*); PHC workforce (*operational*); medicines and health products (*operational*); and digital health technologies (*operational*)

Main WHO guidance

(78, 79, 84, 96-102)

Intervention 13:

Implementation of regulations to restrict non-prescription antimicrobial sales

Priority actions

National and/or subnational level

☐ Develop, implement and enforce legislation and regulation to restrict (OTC) sales of antimicrobials (including internet sales) to prescriptions from a qualified health-care professional.

☐ Restrict the inappropriate promotion and advertisement of antimicrobials, and design local solutions to increase accountability in sales of antimicrobials.

All health-care levels

☐ Strengthen the capacity and accountability to implement national legislation and regulation requirements to restrict OTC sales of antimicrobials.

Community

☐ Raise awareness of the dangers of inappropriate use of antimicrobials without a prescription and the importance of seeking and following advice on treatment from qualified health professionals.

People and system needs

- Restrict non-prescription sale of antimicrobials to prevent unsafe self-treatment practices
- Restrict inappropriate promotion of antimicrobials and raise public awareness of the importance of seeking medical advice to reduce excess prescriptions and OTC demand
- Track the movement of antimicrobials along the value chain, from production or importation to the point of sale, to increase accountability at all levels and reduce non-prescription and unauthorized sales
- Comprehensive documentation of patient health information, including prescription archives, for "Watch and Reserve" antimicrobials (in WHO's AWaRe classification) to reduce inappropriate use of second- and third-line treatment options for patients with infectious conditions

System prerequisites

- Legislative framework and mechanisms for enforcing health regulations (*foundational step: effective governance, awareness and education*)
- Dedicated human resources and digital infrastructure for enforcing regulations
- National medicines regulatory authority engaged in the national AMR governance mechanism (*foundational step: effective governance, awareness and education*)
- Inclusion of AWaRe classification in national medicines lists and formularies
- Access to facilities and trained health workers at all levels of health care (*pillar 2*)

Links

- Supports advancement of IHR JEE indicator P4.4. Optimal use of antimicrobial medicines in human health
- Increases appropriate use of antimicrobials (*pillar 4*)
- Links to PHC strategic and operational levers: Governance and policy framework (*strategic*) and medicines and health products (*operational*)

Main WHO guidance

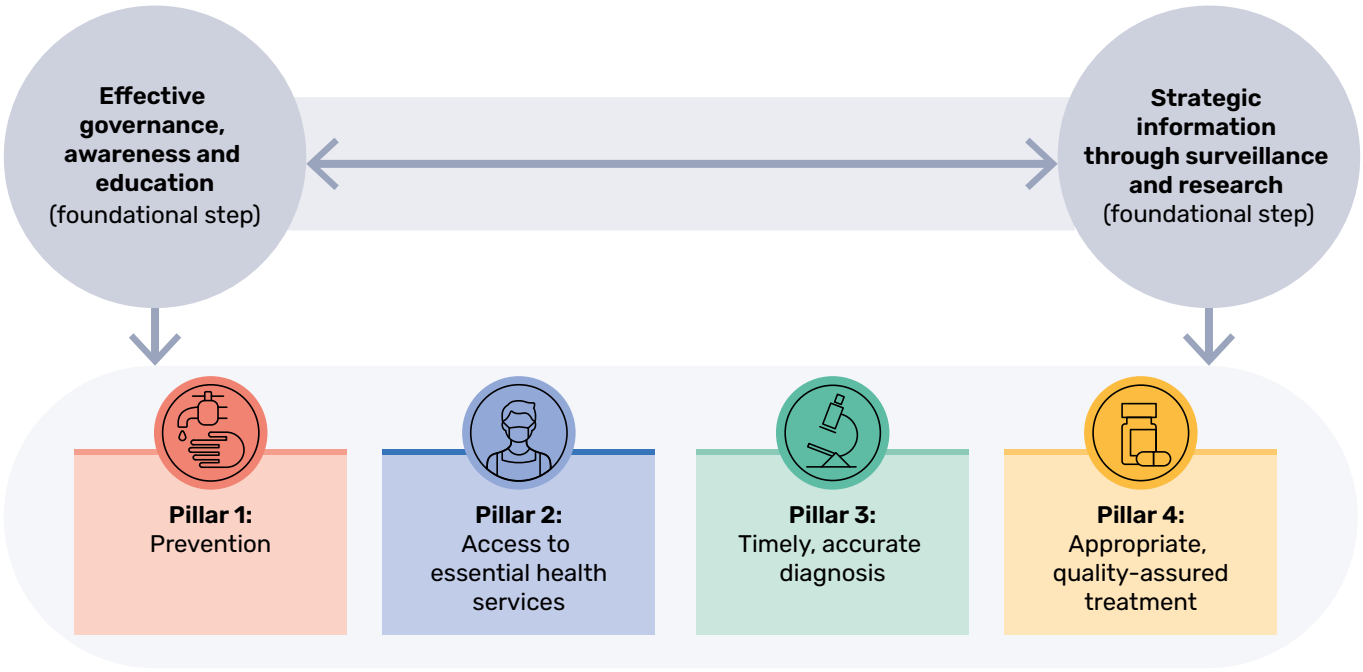
(78, 79, 84, 96)

3.2 Interdependent interventions

The core interventions in the two foundational steps and the four pillars are interdependent and reinforce one another, such that implementation of one is linked to or can enable implementation of another. Furthermore, the foundational steps are the basis for implementing interventions in the four pillars. **The interdependence should be considered when prioritizing or sequencing interventions when developing or revising a NAP or an operational plan on AMR.** For each intervention, the required or linked interventions are identified in section 3.1 under "system prerequisites" and "links." Following are some examples of interdependent interventions.

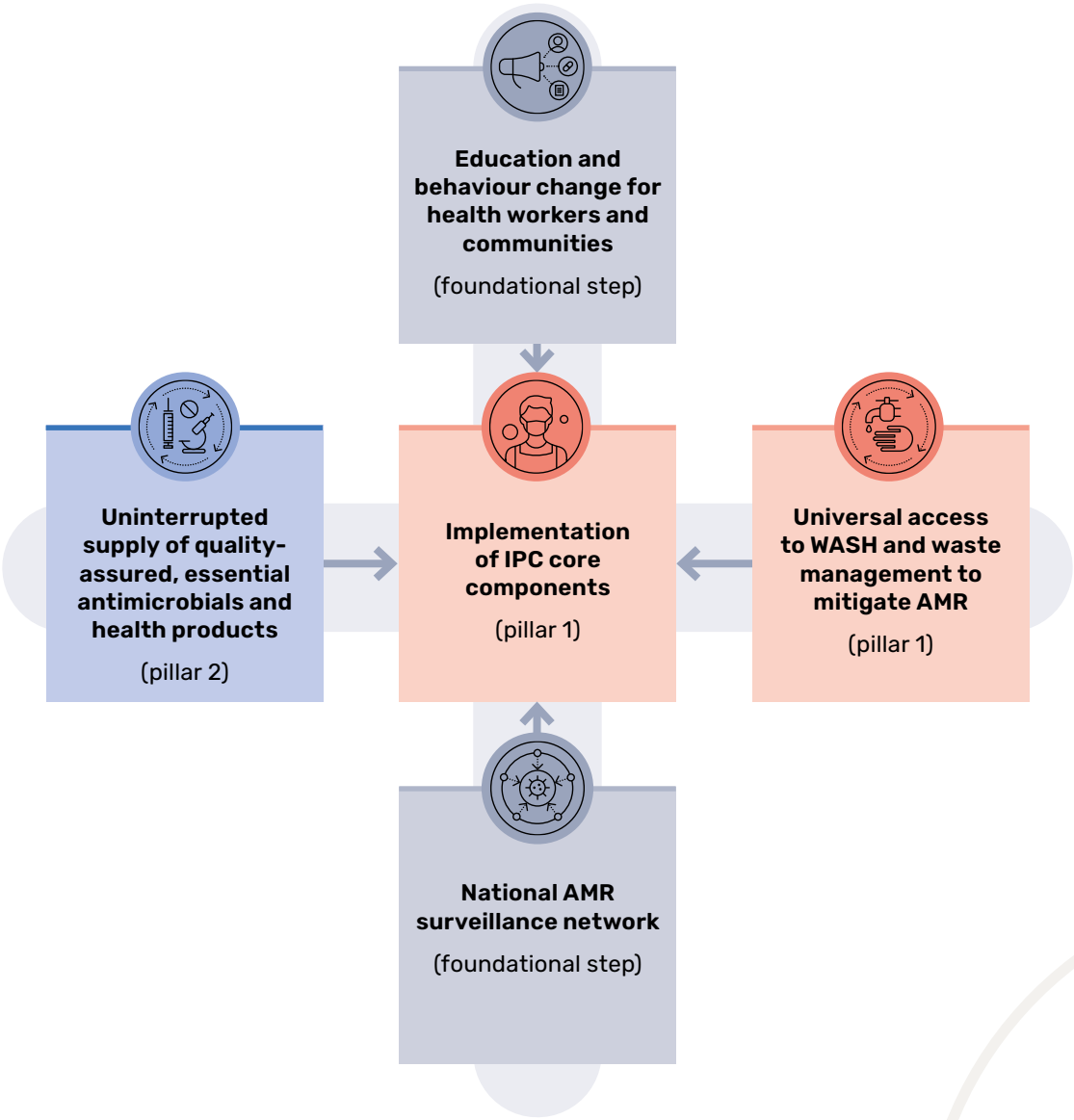
Good-quality data collected by surveillance or research (*foundational step: strategic information through surveillance and research*) provides evidence for implementation and evaluation of interventions in each pillar. The evidence can be used for advocacy to ensure government commitment and financial and human resources (*foundational step: effective governance, awareness and education*) for implementing the NAP on AMR and prioritized interventions under the four pillars. Awareness and education of stakeholders (*foundational step: effective governance, awareness and education*) is essential to ensure the technical capacity to implement activities under all four pillars of the people-centred approach (Fig. 5).

Fig. 5. Interdependent interventions under the foundational steps and pillars



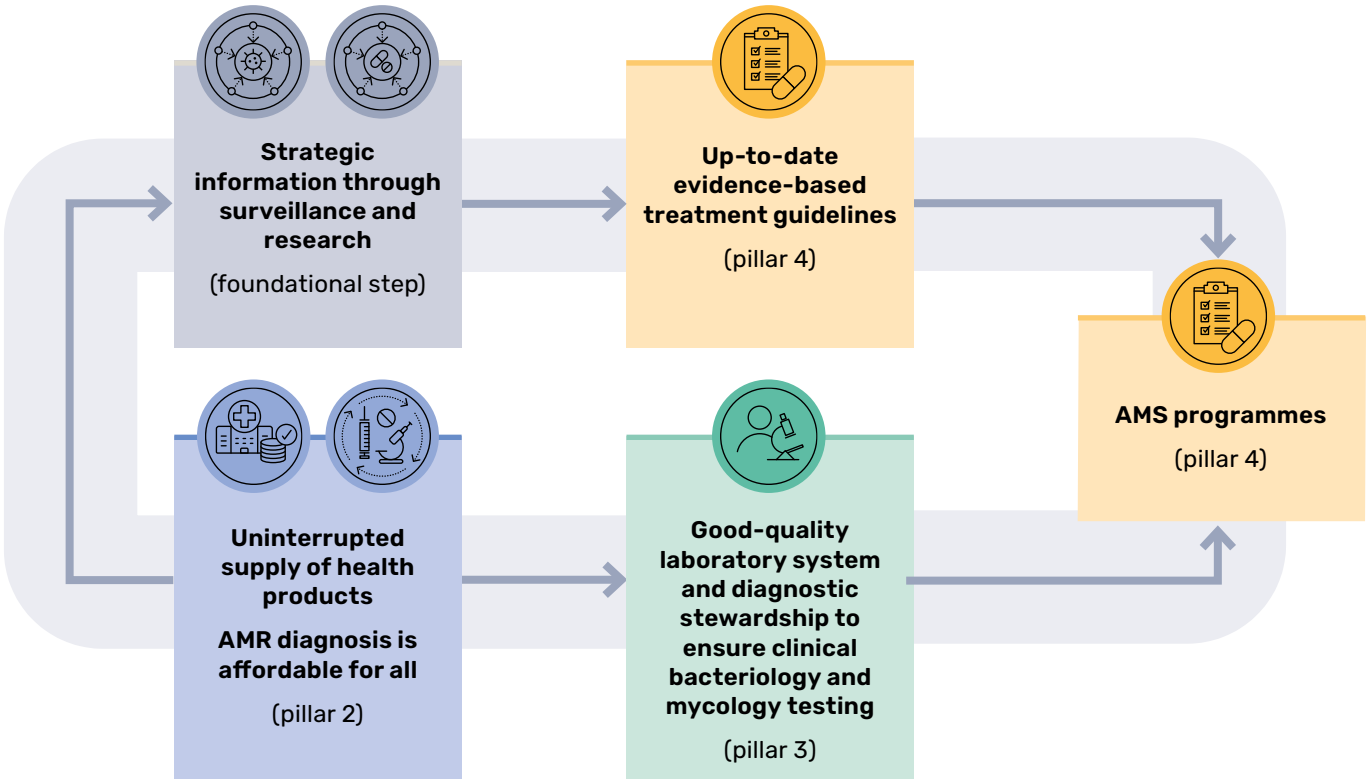
The requirements for implementation of IPC core components (Fig. 6) include an uninterrupted supply of appropriate sanitation supplies and protective equipment (*pillar 2*), access to WASH and waste management services (*pillar 1*), trained health workers (*foundational step*) and access to HAI/AMR surveillance data to guide outbreak preparedness and response (*foundational step*).

Fig. 6. Example of interdependent interventions of the core package for implementation of IPC core components



Strategic information through surveillance and research (*foundational step*) supports development of up-to-date, evidence-based treatment guidelines and AMS programmes (*pillar 4*). AMS requires laboratory and diagnostic infrastructure and in-service training in diagnostic stewardship to ensure that diagnostic results are interpreted accurately, and treatments are used appropriately (*pillar 3*). Diagnostic stewardship also requires an uninterrupted supply of laboratory consumables and inclusion of diagnostics in the health benefits packages (both *pillar 2*) (Fig. 7).

Fig. 7. **Example of interdependent interventions in the package for implementation of AMS programmes**



04

Considerations for implementation

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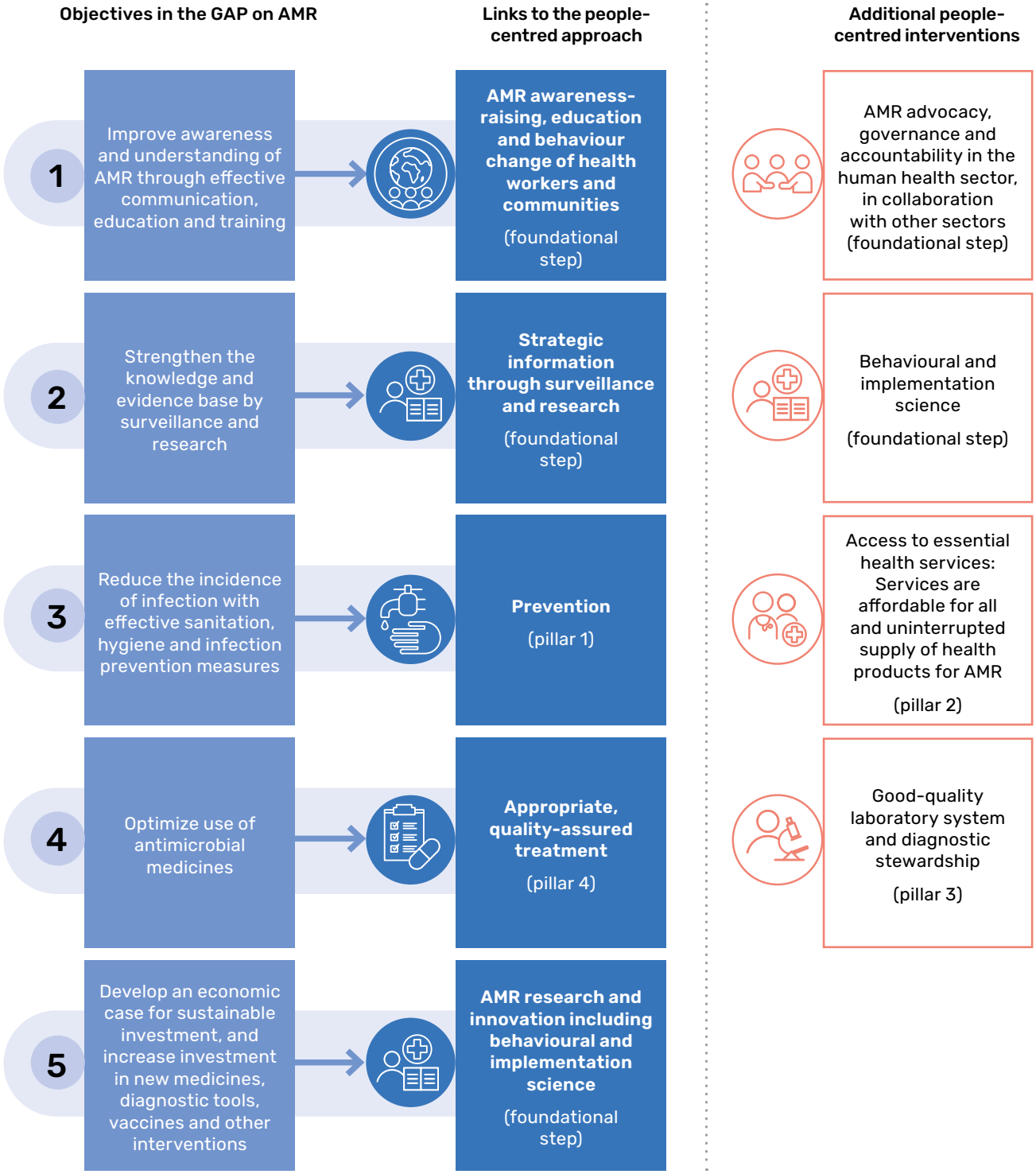
Countries that are developing or revising NAPs on AMR are encouraged to use the core package of interventions as guidance to identify and prioritize people- and system-centred interventions in the human health sector as part of their operational plan.

Fig. 8. Complementarity of the people-centred core package of AMR interventions and the strategic objectives of the Global Action Plan on AMR



Implementation of the package of AMR interventions will increase efficiency and sustainability in implementation of NAPs on AMR if activities are mainstreamed into universal health coverage, PHC and pandemic preparedness and response policies, plans and budgets (see section 4.4). In addition, the package promotes the engagement of civil society, community organizations (see section 4.2) and other non-State actors (see section 4.3) in the AMR response and thus addresses people's needs. Ultimately, by focusing on the needs and barriers faced by people, and the impact of (drug-resistant) infections on their mortality, morbidity, and socio-economic well-being, the phenomenon of AMR could receive greater political attention, commitment and resources.

4.1 Engagement of civil society and community organizations

Community engagement is defined as "developing relationships that enable stakeholders to work together to address health-related issues and promote well-being to achieve positive health impact and outcomes" *(16)*, community empowerment being the highest level of community engagement. A resilient health system places the needs of people at the centre and empowers communities to shape and participate in the delivery of health services. Community engagement can foster greater awareness, equitable access to and use of services and improve the quality of care through greater accountability *(16)*.

Addressing the complex drivers of AMR is the shared responsibility of individuals, community groups, health professionals, private-sector organizations, health service institutions, governments and others. The importance of closer community engagement in advancing work against AMR was recognized by the UN Inter-Agency Coordination Group (IACG) on AMR in 2019. The IACG stressed providing political, financial and technical support to civil society organizations to enhance their engagement, including to work effectively with governments and to ensure that their efforts are aligned with and contribute to evidence-based national policies and approaches *(103)*.

The interventions and priority actions of the people-centred package provide opportunities to engage civil society and the community in designing, delivering and monitoring AMR interventions. The aim of the package of AMR interventions is to foster good governance, community leadership, participatory decision-making, mutual understanding and communication, and resources for community engagement, which are the enabling factors of community engagement *(104)*.

For example, under the foundational step of governance, education and awareness, policy-makers in the health sector are encouraged to involve civil society and the community in developing and implementing the NAP on AMR (Fig. 9). Community engagement at national level can ensure that interventions address the needs of vulnerable populations at risk of (drug-resistant) infections (including neonates, children, immunocompromised people and people with comorbidities). Community engagement can also suggest solutions to health inequity and barriers to access associated with human rights and gender norms, roles and power imbalance. In addition, civil society and community groups can be powerful allies in implementation of interventions for prevention, access to health care, diagnosis and treatment. They can raise awareness about AMR and the appropriate use, administration, storage, availability and disposal of antimicrobials, thus empowering people to influence decisions about their health and to demand timely diagnosis and good-quality, appropriate treatment and care, which in turn can mitigate AMR. Ultimately, these actions empower individuals to protect themselves and their communities through good infection prevention practices to make effective decisions about their health and to demand access to good-quality health-care services for diagnosis and treatment of infections through better understanding of AMR.

Fig. 9. Opportunities for engaging civil society and community organizations in designing, delivering and monitoring AMR interventions in the people-centred package

Foundational step; Effective governance, awareness and education

Engage civil society and communities in the multisectoral AMR coordination mechanism and in development and implementation of the One Health nap on AMR

Foundational step; Strategic information through surveillance and research

Work together with civil society organizations in the collection of data on AMR or AMU in the community

Appropriate, quality-assured treatment

Work together with civil society organizations in the collection of data on AMR or AMU in the community

Prevention

Develop and deliver awareness-raising materials on AMR, immunization, clean water and hand and food hygiene

Access to essential health services

Ensure the availability and affordability of preventative, testing and counselling services for common infections

Timely, accurate diagnosis

Communicate the importance of timely, accurate diagnosis of suspected infections

4.2 Engagement of other non-State actors

Academia, research agencies and pharmaceutical companies in the private sector play crucial roles in research and development of novel vaccines, diagnostics and antimicrobials, identifying potential drug and vaccine targets, and commercializing health products according to global research priorities *(40, 41)*. Their engagement is also critical to train the next generation of researchers. Research and development are crucial for ensuring that patients continue to receive high-quality, effective treatment and care for management of (drug-resistant) infections. While investment in research and development of new health products to mitigate AMR is a global priority, it requires significant resources and capacity that may not be available in all countries. Nevertheless, policy-makers in all countries can engage with academia, research agencies and the private sector to ensure that research and development of health products are guided by local data and that they meet public health needs. This should include local participation in global, regional or national clinical trial networks. In addition, countries can prioritize implementation and operational research to ensure that interventions are tailored to local contexts. Further guidance on research priorities is provided in other WHO technical documents *(105, 106)*.

Private and non-profit health-care providers also play important roles in the prevention, diagnosis, treatment and care of patients with (drug-resistant) infections, especially in countries where a large proportion of the population seeks care from private providers. In most low- and middle-income countries, private providers (e.g. private for-profit providers, laboratories and facilities and non-profit organizations and facilities, including faith-based providers) account for 50–70% of care, especially primary outpatient care *(107)*. Policy-makers should engage private and non-profit health care providers in developing, implementing and monitoring NAPs on AMR, including in prioritizing and implementing interventions in the people-centred package. This will ensure that all people can access affordable, good-quality, people-centred diagnosis and management of (drug-resistant) infections without suffering economic hardship.

4.3 Integrating PHC and health emergency preparedness and response strategies

The core package promotes integration of the AMR response into health systems strengthening, universal health coverage and pandemic preparedness and response efforts *(110)*. Integrating the AMR response into health sector strategies, programmes and budgets is essential to ensure sustainability and efficient use of resources and the health workforce. It also provides opportunities to access existing national funding streams (e.g., universal health coverage, PHC and pandemic preparedness and response). Strengthening health system capacity will support work to contain AMR and vice versa *(18)*. Specifically, AMR priority actions in health care settings (section 3.1) can enhance implementation of the strategic and operational levers for national PHC programmes (Table 1).

Table 1. Examples of people-centred AMR interventions for advancement of PHC

Interventions by pillar and foundational step	Priority action and implementation level	PHC lever for action (strategic (S) or operational (O))
Effective governance, awareness and education AMR advocacy, governance and accountability in the human health sector, in collaboration with other sectors	***National and/or subnational:*** Develop, cost, implement and monitor AMR interventions and activities in human health as part of the One Health NAP on AMR.	**S: Engagement of community and other stakeholders** Engagement of communities and other stakeholders from all sectors to define problems and solutions and prioritize actions through policy dialogue
	Engage civil society and communities in the multisectoral AMR coordination mechanism and in the development and implementation of the One Health NAP on AMR.	**S: Governance and policy frameworks** Governance structures, policy frameworks and regulations to support PHC by building partnerships within and across sectors and promoting community leadership and mutual accountability **S: Funding and allocation of resources** Adequate funding for PHC that is mobilized and allocated to promote equity in access, to provide a platform and incentives to ensure high-quality care and services and to minimize financial hardship
Effective governance, awareness and education AMR awareness-raising, education and behaviour change of health workers and communities	***National and/or subnational:*** Develop and implement a communication strategy to improve awareness and understanding of AMR for policy-makers, health workers and communities. ***All health-care levels:*** Develop, test and implement behaviour change interventions on AMR for health workers at various levels of health care.	**O: Primary health-care workforce** Adequate numbers, competence and distribution of a committed, multidisciplinary PHC workforce that includes health workers in facilities, for outreach and in communities, supported by effective management, supervision and appropriate compensation

Table 1. (continued) Examples of people-centred AMR interventions for advancement of PHC

Interventions by pillar and foundational step	Priority action and implementation level	PHC lever for action (strategic (S) or operational (O))
Strategic information through surveillance and research National AMR surveillance network to generate good-quality data for patient care and action on AMR	***Secondary and tertiary care:*** Collect, collate, analyse and interpret data as part of AMR and HAI surveillance and to inform local empirical treatment, guidelines, and to monitor local AMR trends.	**O: Monitoring and evaluation** Monitoring and evaluation through well-functioning health information systems that generate reliable data and support the use of information for improved decision-making and learning by local, national and global actors
Strategic information through surveillance and research Surveillance of AMC/U to guide patient care and action on AMR	***National and/or subnational:*** Ensure that AMC/U data collected at all levels are analysed, reported and shared with relevant stakeholders to signal possible under- and overuse, and inform corrective actions.	
Strategic information through surveillance and research AMR research and innovation including behavioural and implementation science	***National and/or subnational:*** Develop a national AMR research agenda adapted from global and regional AMR agendas according to local research priorities, including behavioural and implementation research.	**O: Primary health care-oriented research** Research and knowledge management, including dissemination of lessons learnt, and use of knowledge to accelerate the scaling-up of successful strategies to strengthen PHC-oriented systems
 ***Pillar 1: Prevention of infection*** Universal access to WASH and waste management to mitigate AMR	***All health-care levels:*** Assess WASH in health care facilities using standardized tools, and improve, maintain and sustain improvements in WASH and safe disposal of health care waste and antimicrobials.	**O: Physical infrastructure** Secure, accessible health facilities to provide effective services with reliable water, sanitation and waste disposal or recycling, telecommunication connectivity, a power supply and transport systems to connect patients to other care providers
 ***Pillar 2: Access to essential health services*** Health services for the prevention, diagnosis and management of infectious disease syndromes are available and affordable for all	***All health-care levels:*** Dedicate an appropriate budget to procure essential antimicrobials and diagnostics used in facilities for diagnosis and treatment of infectious (including AMR) syndromes. Ensure availability of trained health workers to prevent, diagnose, treat, and care for patients with infectious (including AMR) syndromes.	**O: Purchasing and payment systems** Purchasing and payment systems in reoriented models for the delivery of integrated health services, with primary care and public health at the core **S: Funding and allocation of resources** Adequate funding for PHC mobilized and allocated to ensure equity in access, to provide a platform and incentives for high-quality care and services and to minimize financial hardship **O: PHC Workforce** Adequate number, competence and distribution of a committed, multidisciplinary PHC workforce that includes workers in facilities, for outreach and in communities, supported by effective supervision and appropriate compensation

Table 1. (continued) Examples of people-centred AMR interventions for advancement of PHC

Interventions by pillar and foundational step	Priority action and implementation level	PHC lever for action (strategic (S) or operational (O))
Pillar 2: Access to essential health services  Uninterrupted supply of quality-assured, essential health products for the prevention, diagnosis and management of infectious disease syndromes	***National and/or subnational:*** Ensure adequate forecasting, procurement and distribution of essential diagnostics, reagents, antibiotics, and other health products for management of (AMR) infections. Implement policies and procedures to prevent, detect and respond to substandard and falsified medical products (vaccines, diagnostics and antimicrobials) to manage (AMR) at all levels of health care.	**O: Medicines and other health products** Availability and affordability of appropriate, safe, effective, high-quality medicines and other health products through transparent processes
Pillar 3: Timely, accurate diagnosis  Good-quality laboratory system and diagnostic stewardship to ensure clinical bacteriology and mycology testing	***Primary care:*** Ensure access to laboratory diagnostics for infections and antimicrobial susceptibility testing by a referral mechanism, with rapid turnaround time for optimal patient care.	**O: Models of care** Models of care that promote high-quality, people-centred primary care and essential public health functions as the core of integrated health services throughout the life course **O: PHC workforce** Adequate number, competence and distribution of a committed, multidisciplinary PHC workforce that includes workers in facilities, for outreach and in communities, supported by effective supervision and appropriate compensation
Pillar 4: Appropriate, quality-assured treatment  Up-to-date evidence-based treatment guidelines and AMS programmes	***Primary care:*** Develop, implement and monitor targeted AMS activities to improve antibiotic prescribing in primary care and promote behaviour change on appropriate use of antimicrobials of health workers and patients.	**O: Systems for improving the quality of care** Local, subnational and national systems continuously assess and improve the quality of integrated health services

Source: WHO, UNICEF *(112)*
An exhaustive list is provided in section 3.1.

AMR is one of the technical areas of the IHR JEE *(108)* for assessing a country's core capacity to protect lives threatened by the spread of diseases and other risks. To support countries in increasing their IHR capacity for AMR, IHR AMR benchmarks *(109)* have been defined for AMR-related indicators (P4.1–5), so that countries can progress from 1 (no capacity) to 5 (sustainable capacity). Several core AMR interventions are aligned with the AMR benchmarks to guide countries in action on specific priorities, with tools to increase their capacity in those areas. AMR interventions directly support achievement of the IHR JEE indicators for AMR, as do interventions related to other IHR core capacities, such as laboratory systems, health systems and immunization programmes (Table 2, and as indicated in section 3.1). Policy-makers should ensure that AMR-related interventions and activities are also included in NAPs on health security *(110)*, which include national priorities for health security, addressing gaps in capacity and the resources required for development of IHR core capacities. The clear link between AMR and the IHR also creates funding opportunities. For example, the World Bank Pandemic Fund *(111)* called for proposals to improve capacity for and implementation of pandemic prevention, preparedness and response in line with relevant IHR JEE targets, including surveillance of AMR and laboratory strengthening.

National policy-makers responsible for AMR and PHC policies, plans and budgets should find synergies for implementation of interventions and actions to ensure efficient use of resources for both PHC and AMR and ensure access to affordable prevention, diagnosis, treatment and care services in the community and in primary care.

Table 2. People-centred core AMR interventions for the advancement of IHR core capacities

Pillar or foundational step	People-centred intervention	IHR JEE core capacity
Effective governance, awareness and education	AMR advocacy, governance and accountability in the human health sector in collaboration with other sectors	P4.1. Multisectoral coordination on AMR P1.1. Legal instruments R5.3. Community engagement P2.1. Financial resources for IHR implementation
	AMR awareness-raising, education and behaviour change of health workers and communities	D3.3. Workforce training
Strategic information through surveillance and research	National AMR surveillance network to generate good-quality data to inform patient care and action on AMR	P4.2. Surveillance of AMR P4.3. Prevention of multidrug-resistant organisms
	Surveillance of AMC/U to guide patient care and action on AMR	P4.4. Optimal use of antimicrobial medicines in human health
	AMR research and innovation including behavioural and implementation science	R1.6 Research, development and innovation
Pillar 1: Prevention 	Universal access to WASH and waste management to mitigate AMR Implementation of IPC core components to mitigate AMR	R4.3. Safe environment in health facilities P4.3. Prevention of multi-drug-resistant organisms R4.1. IPC programmes
	Access to vaccines and expanded immunization to manage AMR	P8. Immunization
Pillar 2: Access to essential health services 	Health services for the prevention, diagnosis and management of infectious disease syndromes are available and affordable for all	R3. Health services provision
	Uninterrupted supply of quality-assured, essential health products for the prevention, diagnosis and management of infectious disease syndromes	R1.5 Emergency logistic and supply chain management
Pillar 3: Timely, accurate diagnosis 	Good-quality laboratory system and diagnostic stewardship to ensure clinical bacteriology and mycology testing	D1. National laboratory system
Pillar 4: Appropriate, quality-assured treatment 	Up-to-date evidence-based treatment guidelines and AMS programmes	P4.4. Optimal use of antimicrobial medicines in human health
	Implementation of regulation to restrict sales of non-prescription antimicrobials	P4.4. Optimal use of antimicrobial medicines in human health

Source: WHO *(108,109)*

As the people-centred package of AMR interventions addresses interventions in the human health sector, the IHR indicator P4.5, Optimal use of antimicrobial medicines in animal health and agriculture, was not included.

05

Conclusions and next steps

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Experience with tuberculosis has shown that analysis of challenges along the people and patient pathway can signal and build the evidence base for rational, specific and impact driven priority setting for domestic and donor investment *(19, 20)*. In using this approach for AMR, the focus should be moved from the solely biological phenomenon of drug resistance to the health needs and expectations of people and communities along the AMR people journey, including exposure to infection, access to health services, the quality of diagnosis and appropriate treatment.

Working together at local, national, regional and global levels to implement the people-centred package of AMR interventions in NAPs on AMR will accelerate sustainable implementation and integration into broader health system strengthening and pandemic preparedness. Putting people and their needs at the centre of the AMR response is essential to ensure that no one is left behind in the fight against bacterial infections and AMR.

To support sustainable implementation of the core package a compendium of resources is being prepared that will include short, practical implementation guidance for each of the 13 core interventions. For example, guidance on governance-related interventions will stress the importance of whole of Government coordination and leadership, while engaging the community, civil society, the private sector and other stakeholders in national and subnational decision-making, with appropriate platforms for participation. The compendium of resources will also include considerations for addressing the needs of vulnerable populations (for gender, equity and disability inclusion), provide available evidence on the impact of the interventions, and propose existing indicators for monitoring, including from the Tracking AMR Country Self-assessment Survey. Finally, the compendium will include support for countries to track their progress in implementing the 13 core interventions and decide on their priorities.

Use of the package of AMR interventions in NAPs on AMR and links with other health initiatives will also provide opportunities to mobilize both domestic resources through health sector plans and budgets and international funding from global and regional sources, such as the Resilient and Sustainable Systems for Health packages of the Global Fund to Fight AIDS, Tuberculosis and Malaria, the World Bank's Pandemic Fund, global and regional development banks, intergovernmental organizations and national donors.

The Quadripartite[4] is developing a global investment case for AMR that will include estimates of the return on investment of implementing AMR interventions in various sectors (including the 13 people-centred core AMR interventions for human health in this document) compared to a "business-as-usual" scenario. The investment case will provide the evidence for interventions to tackle AMR to attract national and international political and financial commitments.

The three levels of WHO (headquarters, regional and country offices) will work with countries and implementing partners to roll out the package of AMR interventions and support the development, revision and sustainable implementation of comprehensive NAPs on AMR that are people-centred and that strengthen health systems.

[4] The Food and Agriculture Organization of the United Nations, the United Nations Environment Programme, WHO and the World Organisation for Animal Health

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Annex.
Detailed methods

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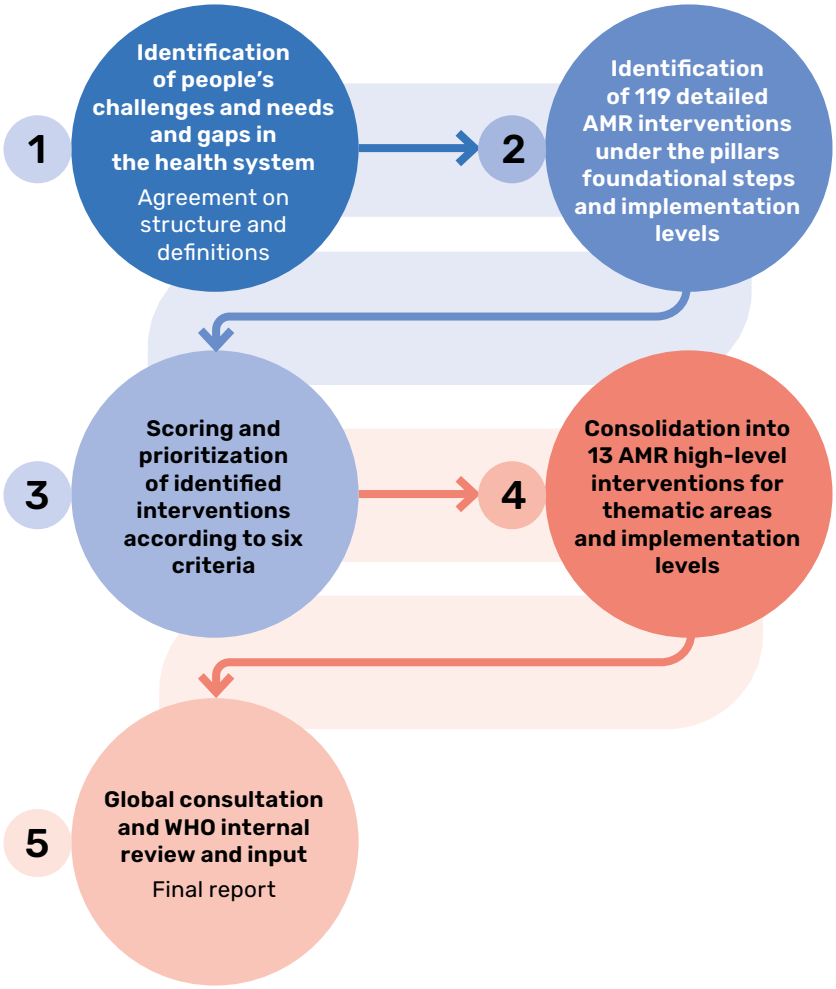
The people-centred core package of AMR interventions was developed following the steps in Fig. A1.1 and based on an agreed WHO definition of a "people-centred approach" (see Box 2 in the main text). An internal multidisciplinary working group formed from the global, regional and national levels of the Organization was convened that covered the AMR-related disciplines of the people-centred framework at the global, regional and national levels of the organization, including IPC, WASH, food safety, immunization, health financing, access to medicines, pricing of medicines, essential medicines, substandard and falsified health products, sexual and reproductive health, diagnostics, surveillance of AMR and AMC, AMS, governance, awareness, health workforce, regulations, PHC, research and development.

Fig. A1.1. Steps in developing the people-centred core package of AMR interventions



Step 1. The group identified the challenges and needs of people and gaps in health systems along the AMR people journey (prevention, access to health services, diagnosis and treatment) at different levels of implementation. The approach was adapted from similar exercises in programmes for tuberculosis and HIV/AIDS *(19, 20)*. The exercise guided the structure of the package, which consists of four pillars, two foundational steps and the four implementation levels. The four pillars represent the journey of people seeking preventive services and good-quality diagnosis, treatment and care of infections, including drug-resistant infections. The two foundational steps of effective governance, awareness and education, and of surveillance and research are necessary for implementation of interventions in the four pillars.

The working group agreed on four implementation levels to identify where interventions should be implemented to address the requirements of people and health systems. The pillars and implementation levels were based on WHO

definitions as described in the main text with additions from the working group to reflect patient management, diagnosis, treatment and care relevant to infectious diseases and consideration of the different health care systems in countries.

Step 2. The group identified interventions to address the challenges and needs of people and systems and reviewed key technical documents and guidance. This exercise resulted in 119 AMR interventions in the four pillars, foundational steps and implementation levels.

Step 3. The AMR interventions were scored independently, and up to 10 interventions were prioritized by each working group member according to the following criteria:

- mitigates the burden and impact of AMR on public health;
- promotes health equity;
- represents a cost–effective investment;
- can be implemented in resource-limited settings;
- enables implementation of other interventions in a stepwise manner; and
- is supported by available evidence.

Step 4. The prioritized AMR interventions were grouped when they addressed the same thematic area at different implementation levels (sub-interventions). This resulted in the 13 core interventions in the people-centred package of AMR interventions. The sub-interventions were categorized as supporting priority actions at different implementation levels, as described in section 3. The secretariat then checked whether the remaining interventions should be considered essential priority actions for implementation of an intervention, and these were then reviewed by the working group.

Step 5. A draft version of this paper was prepared, in consultation with the working group, and submitted for a global online consultation from 14 February to 14 March 2023. Responses were received from individuals and organizations including governments, professional associations and ministries of health, the private sector, medical and civil society organizations, coalitions and patient groups. Declaration of interest forms were collected from all those who submitted comments, which were assessed and managed by the WHO secretariat following WHO standard protocol for the management of conflict of interest.

The people-centred package of AMR interventions was then finalized from the feedback received in the consultation, with input from the working group members.

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