People-centred framework for addressing antimicrobial resistance in the human health sector

Draft for public consultation
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Abbreviations and acronyms

AMC/U  antimicrobial consumption and use
AMR  antimicrobial resistance
AST  antimicrobial susceptibility testing
GPW  General Programme of Work
HAI  health care associated infection
IHR  International Health Regulations
IPC  infection prevention and control
ISO  International Organization for Standardization
JEE  Joint External Evaluation
LMICs  low- and middle-income countries
M&E  monitoring and evaluation
NAP  national action plan
OTC  over the counter
PHC  primary health care
SDGs  Sustainable Development Goals
SOPs  standard operating procedures
TrACSS  Tracking AMR Country Self-Assessment Survey
UHC  universal health coverage
WASH  water, sanitation and hygiene
WASH FIT  water and sanitation for health facility improvement tool
WG  working group
WHO  World Health Organization
Summary

This document outlines the concept and structure of the World Health Organization (WHO) *draft People-centred framework for addressing antimicrobial resistance (AMR)* in human health. It consists of 13 high-level interventions that span four pillars critical to overcome people and systems challenges in addressing AMR: (1) prevention of infections, (2) access to essential health services, (3) timely and accurate diagnosis and (4) appropriate and quality-assured treatment. The pillars are supported by two foundations on effective governance and on strategic surveillance and research information. Building on the objectives of the AMR global action plan, the 13 high-level interventions and accompanying priority implementation steps are needed to address AMR in a programmatic approach that puts people at the centre of the AMR response at the community, primary care, secondary/tertiary health care and national and/or subnational level. As countries embark on developing or revising their national action plans on AMR, the people-centred framework and the core package of high-level interventions can inform prioritization of country actions in the human health sector at the different levels of implementation in a manner that is integrated with broader health system strengthening and pandemic preparedness efforts. The draft framework was developed through review of existing evidence and multidisciplinary expert opinion. It is currently going through a global online consultation ahead of testing at the country level. To support country implementation, WHO is also developing more detailed implementation guidance for each of the high-level interventions to be published by the end of 2023.
1. Introduction

Antimicrobial resistance (AMR) is a natural evolutionary response to antimicrobial exposure, which has been exacerbated by human behaviours such as the misuse and overuse of antimicrobials in humans, agriculture and animal health, and environmental pollution (1). It has far-reaching implications, namely challenging our ability to treat common infections, performing life-saving surgery and increasing the risk of future pandemics caused by resistant pathogens. AMR is now a leading cause of death for people of all ages. In 2019 AMR was responsible for 1.27 million deaths and contributed to an additional 4.95 million deaths globally, with the highest burden being estimated in western sub-Saharan Africa (2). These figures exceed those for both HIV/AIDS and malaria (3) and also outstrip earlier warnings on AMR (4, 5).

Seven years since World Health Organization (WHO) Member States endorsed the global action plan on AMR in 2015 (6), 170 countries have now developed a national action plan (NAP) on AMR. However, there is a large gap in the sustainable implementation of NAPs. For example, the latest Tracking AMR Country Self-Assessment Survey (TrACSS) shows that only 28% (47 of 166 countries reporting to TrACSS) are actively implementing and monitoring their NAPs, approximately half of which (n = 24) are low-and middle-income countries (LMICs) (7). Even when countries do actively implement their NAPs, the efforts are often fragmented and siloed. Over the past 6 years, TrACSS data show that although an increasing number of countries report having a standardized AMR surveillance system for human health, little to no progress is being made in many other areas, such as raising awareness on AMR, monitoring antimicrobial consumption (AMC), infection prevention and control (IPC) programmes and optimizing use of antimicrobials in human health (7).

To address AMR effectively and sustainably, a more comprehensive and programmatic approach is needed. While the global action plan on AMR provides high-level multisectoral strategic objectives to tackle the problem, there is a need for a sector-specific evidence-based approach that addresses the complex drivers of AMR, recognizes the interdependency of interventions to overcome these drivers and puts people and their needs at the centre. To address this gap in the human health sector, and following requests from regions to develop a core package of interventions, WHO has developed the people-centred framework described in this document.

The framework aims to address the complex challenges that people face when accessing health services along the AMR people journey (Fig. 1). For example, in many countries, people in the community and health care facilities lack access to safe and sufficient water, sanitation and hygiene (WASH), which can contribute to the development and spread of (AMR) infections and, subsequently, inappropriate antimicrobial use (AMU). Once people develop an infection and seek health care, they might not have access to affordable health services due to lack of or weak insurance coverage or absence of trained health workers locally. As their journey through the health care system continues, stock-outs or lack of essential diagnostics could lead to delays or no diagnosis at all and, subsequently, loss to follow-up, with patients leaving the health care system more likely to inappropriately self-treat with antimicrobials. The framework also aims to accelerate the sustainable
implementation of evidence-based human health AMR interventions, mainstreamed in wider health system strengthening efforts. Ultimately, the people-centred framework strives to reduce the negative impact of AMR on patients in terms of morbidity, mortality and disability, while leaving no one behind and ensuring equitable access to preventive services, timely and quality diagnosis, treatment and care.

The target audience of the framework is primarily policymakers, including country AMR leadership in the human health sector and members of AMR multisectoral coordination committees. However, the audience goes beyond policymakers and includes members of the community, community health workers, health care workers and facility managers, as well as implementation partners, the private sector and medical associations among others.

With many countries looking to revise their NAPs on AMR, and given the urgent need to accelerate sustainable implementation, this framework provides a core set of 13 high-level priority interventions that can inform the development and revision of NAPs (2.0) and should be integrated into broader health system strengthening efforts at the country level through universal health coverage (UHC) and primary health care (PHC), implementation of the International Health Regulations (IHR) and pandemic preparedness initiatives.

Fig. 1. The AMR people journey
These are some of the key challenges along the journey people take from prevention measures to accessing quality diagnosis and treatment; all the challenges have an impact on the emergence and spread of AMR.

AMR: antimicrobial resistance; IPC: infection prevention and control.
Fig. 2. Levels of implementation within the framework
The challenges that people face and interventions to address them span these four levels. See Annex 1 for detailed definitions.
2. The people-centred framework

2.1 Definition of “people-centred care”

People-centred care is defined as “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,” organized around the health needs and expectations of people, rather than diseases. Such an approach “requires that people have the education and support they need to make decisions and participate in their own care” (8, 9, 10).

At the national and/or subnational level, the framework aims to ensure effective and transparent governance on AMR that involves citizens in decision-making. At the community level, the framework proposes interventions that aim to empower individuals to make effective decisions about their health through improved knowledge on AMR and infection prevention and hygiene practices, as well as to demand access to quality health care services for diagnosis and treatment of infections. At the health care level, the framework ensures that health services are people focused through affordable interventions that promote coordinated and quality health care, diagnosis and treatment services which ultimately limit the burden of AMR and improve patient outcomes. The proposed framework is aligned with the WHO Framework on integrated people-centred health services (11) and is designed to help further integrate AMR-relevant interventions into PHC strategies and to support countries in attaining their UHC goals.

2.2 Guiding principles

The framework seeks to provide a human face and to place people’s perspectives and realities at the core of the AMR response, considering five key principles: (1) equity in access to health care; (2) quality of health care; (3) affordability of health products and services; (4) sustainability in the implementation of actions to address AMR; and (5) efficiency in the allocation of resources to achieve optimal health impact (12).

2.3 Methodology

The framework structure is based on the AMR people journey, (Fig. 1), the health system building blocks (13) and four levels of implementation (Fig. 2). The challenges and needs of people and health system gaps along the people journey (prevention, access to health services, diagnosis and treatment) across the different levels of implementation of the framework were then assessed by a

1 Primary care, and secondary and tertiary health care.
A multidisciplinary working group (WG, step 1). The WG identified 119 specific interventions aimed at addressing these needs, complemented by a review of key technical documents and guidance (step 2). The interventions were then prioritized by expert opinion according to the guiding principles and consolidated into 13 high-level interventions (step 4). This step also involved combining interconnected and interdependent interventions. The people-centred framework and 13 high-level interventions will be revised based on the feedback received through the global online consultation (step 5). Throughout 2023, detailed implementation guidance will be developed for each intervention (step 6) and further refined through country testing (step 7). Annex 1 provides a detailed methodology for the development of the people-centred framework (Fig. 3).

**Fig. 3. Steps for developing the people-centred framework**

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<th>Step</th>
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<tr>
<td>1. Identification of people &amp; health system needs</td>
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<td>2. Identification of 119 AMR detailed interventions</td>
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<td>3. Prioritization of the 119 AMR detailed interventions</td>
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<td>4. Development of 13 AMR high-level interventions</td>
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<td>5. Global virtual consultation &amp; framework paper launch</td>
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<td>6. Development of implementation steps &amp; guidance</td>
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<td>7. Country testing &amp; review</td>
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AMR: antimicrobial resistance; WHO: World Health Organization.

**2.4 Structure of the framework and high-level interventions**

The framework and the 13 high-level interventions are based on people’s needs and challenges experienced along the journey of seeking AMR-related health services from the community, through primary care, to secondary/tertiary health care. Ten of the high-level interventions span the following four pillars that reflect the AMR people journey:

- prevention of infections;
- access to essential health services;
- timely and accurate diagnosis; and
- appropriate and quality-assured treatment.

In addition, three of the high-level interventions belong to two foundation steps on:

- effective governance; and
- strategic surveillance and research information.

Both of these critical foundations are required to bring AMR onto the political agenda, ensure sustainable funding and produce strategic data on AMR and AMC to support evidence-based implementation of the interventions (Fig. 4).
Fig. 4. The people-centred framework and high-level interventions
The four key pillars mirror the people’s journey, and the interventions within each pillar target the system and people’s challenges, with the interventions in the two foundation steps being key enablers to implementing the rest.

Reduced levels and slower development of AMR
Reduced mortality and morbidity due to AMR

Pillar 1: Prevention
- Implementation of IPC core components to mitigate AMR
- Universal access to improved WASH and waste management to mitigate AMR
- Access to vaccines and expanded immunization to manage AMR

Pillar 2: Access to essential health services
- AMR management included in health benefit packages
- Uninterrupted supply of essential health products for AMR
- Integrated quality AMR management services to improve patient care

Pillar 3: Timely and accurate diagnosis
- Improved laboratory and diagnostic infrastructure to enable bacteriology and mycology testing
- Awareness, education and understanding of diagnostic options and diagnostic stewardship

Pillar 4: Appropriate and quality-assured treatment
- Up-to-date evidence-based infection treatment guidelines and antimicrobial stewardship (AMS) programmes
- Implementation of regulation to restrict non-prescription antimicrobial sales

Foundation: Effective governance:
- AMR governance and accountability in the human health sector in collaboration with other sectors

Foundation: Strategic surveillance & research information:
- National AMR surveillance network to generate quality data to inform patient care and action on AMR
- National antimicrobial consumption and use surveillance to inform patient care and action on AMR

AMR: antimicrobial resistance; IPC: infection prevention and control; WASH: water, sanitation and hygiene.
2.5 Interdependent interventions

Many of the core interventions are interdependent and reinforce one another, meaning that the implementation of one is linked to or can enable implementation of another. For example, developing up-to-date evidence-based treatment guidelines (pillar 4) requires strategic surveillance and research information (foundation step), whereas the implementation of AMS programmes (pillar 4) should be supported by appropriate diagnostic infrastructure as well as education on diagnostic stewardship (both pillar 3). Likewise, the realization of diagnostic stewardship requires the availability of laboratory consumables (supply chains) and coverage of diagnosis under insurance schemes (both pillar 2). Furthermore, the collection of quality data through surveillance or operational research (foundation step: strategic surveillance and research data) generates the evidence needed for the development and evaluation of actions under each pillar, as well as for advocacy to ensure adequate government commitment and related financial and human resources (foundation step: effective governance).

2.6 Engagement of communities and key vulnerable populations

The proposed framework, particularly through the planned interventions at the national and/or subnational, community and health care level, will provide opportunities for engaging communities and community-led organizations in designing, delivering and monitoring these interventions. Community engagement can foster greater awareness, equitable access to and utilization of services and improve quality of care through greater accountability (14). It can also help develop solutions to address inequities, human rights and gender-related barriers, especially those faced by key vulnerable populations, including migrants and refugees.

2.7 Step-by-step implementation guidance

To support sustainable implementation of the framework, a detailed implementation guidance document for each of the 13 high-level interventions is being developed. It includes priority intervention steps with stepwise implementation guidance at the different implementation levels (community, primary care, secondary/tertiary health care, national and/or subnational). The guidance document will explain the importance of the interventions and their relevance to people and health system needs to address AMR. It will also include the minimum system requirements, indicators for monitoring and evaluating implementation progress, a description of the existing evidence and a list of relevant guidance and tools for implementation. The priority intervention steps and stepwise implementation guidance for the core interventions will also enable stakeholders to identify their current level of implementation and how to sustainably implement further actions (Fig.
5). Annex 2 outlines the people and health system needs, system prerequisites and priority steps for each intervention, based on which the detailed stepwise implementation guidance will be developed.

**Fig. 5. Proposed structure of the implementation guidance for each of the high-level interventions**

This structure is proposed to develop guidance specific to each intervention.

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<thead>
<tr>
<th>PEOPLE &amp; SYSTEM NEEDS:</th>
<th>EVIDENCE SUMMARY:</th>
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<tbody>
<tr>
<td>Patient and health system needs that are addressed by the intervention and overall importance for addressing AMR</td>
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<tr>
<th>PRIORITY STEPS AT THE NATIONAL AND/OR SUBNATIONAL, COMMUNITY AND HEALTH CARE LEVELS</th>
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<tbody>
<tr>
<td>a. System prerequisites for implementation of priority steps</td>
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<td>b. Priority steps to implement the high-level intervention in a way that addresses patient and health systems needs</td>
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<tr>
<td>c. Detailed actions, including:</td>
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<td>• references to existing guidance and tools</td>
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<td>• options for collaborative action with other programmes (e.g. immunization, PHC) and the private sector</td>
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<td>• ensuring the interventions address the needs of key populations (across genders, migrants, etc.)</td>
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<td>• community engagement</td>
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<td>d. M&amp;E indicators: key (existing) indicators for monitoring of implementation progress (including indicators from the M&amp;E framework)</td>
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<tr>
<th>ADDITIONAL INFORMATION - LINKS TO OTHER PACKAGES, EVIDENCE, GUIDANCE AND TOOLS FOR IMPLEMENTATION:</th>
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<tr>
<td>• Overlaps with and links to other intervention packages for coordinated action</td>
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<tr>
<td>• List of existing WHO guidance and tools to support the implementation of each intervention</td>
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<td>• Key existing evidence:</td>
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<td>≫ cost-effectiveness</td>
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<td>≫ public health impact</td>
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<td>≫ AMR impact</td>
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<td>≫ Antimicrobial use</td>
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AMR: antimicrobial resistance; M&E: monitoring and evaluation; PHC: primary health care; WHO: World Health Organization

For each high-level intervention, the specific guidance document will also highlight the responsibility of different stakeholders, from individuals and communities to health care professionals and policymakers in addressing AMR. For example, governance-related interventions will stress the importance of engaging the community, civil society or individuals in decision-making at the national and/or subnational level and through appropriate platforms so that they are empowered to voice their needs and influence priority setting on AMR. In addition, the proposed actions will capture the perspective of vulnerable populations and those suffering from health inequities and will be gender mainstreamed to ensure that policymakers at the national and/or subnational level leave no one behind in the AMR response.
3. Integrating PHC and health emergency preparedness and response strategies

The framework is constructed to promote embedding the AMR response in existing health system strengthening, UHC and pandemic preparedness efforts in a sustainable manner (14). Mainstreaming the AMR response into health sector strategies, programmes and budgets is essential to ensure sustainability and will strengthen efficient use of resources and the health workforce. Mainstreaming also provides opportunities to access existing funding streams at the country level (e.g. UHC, PHC and pandemic preparedness). Strengthening health system capacity across the core building blocks of health systems will support containment efforts of AMR and vice versa (15).

All pillars and interventions are closely aligned with PHC core and strategic levers as well as IHR core capacities (Fig. 6) (16, 17). For example, the intervention in the effective governance foundation step incorporates the core strategic PHC levers on political commitment and leadership, governance and policy frameworks, funding and allocation of resources, and community engagement. This intervention is also linked to important core capacities for pandemic preparedness – legal instruments, financing and human resources, risk communication and community engagement. In addition, national AMR and AMC surveillance are key interventions in the strategic surveillance and research information foundation step, which is also an important core capacity of the IHR. The interventions in pillar 2 on access to essential health services are in line with almost all PHC operational levers – purchasing and payment systems, medicines and other health products, health workforce, physical infrastructure and improving the quality of care – and the IHR core capacities related to health service provision, having a national laboratory system, and biosafety and biosecurity.
Fig. 6. Integration of the people-centred framework for addressing AMR with health system strengthening and health emergency preparedness efforts. The 13 high-level interventions are linked with PHC core and strategic levers and IHR core capacities.

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<tr>
<td>AMR governance and accountability in the human health sector in collaboration with other sectors</td>
<td>National AMR surveillance network to generate quality data to inform patient care and action on AMR</td>
<td>Implementation of IPC core components</td>
<td>AMR included in health benefit packages</td>
<td>Improved laboratory and diagnostic infrastructure to enable clinical bacteriology and mycology testing</td>
<td>Up-to-date evidence-based infections treatment guidelines and antimicrobial stewardship programmes (AMS)</td>
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<tr>
<td>• Antimicrobial consumption and use surveillance to inform patient care and action on AMR</td>
<td>Universal access to improved water, sanitation, and hygiene (WASH)</td>
<td>• Access to vaccines and expanded immunization</td>
<td>• Uninterrupted supply of essential antimicrobials, vaccines and diagnostics for AMR</td>
<td>• Awareness, education and understanding of diagnostic options and diagnostic stewardship</td>
<td>• Implementation of regulation to restrict non prescription antimicrobial sales</td>
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<td>People-centred framework: 13 high-level interventions</td>
<td>Political commitment and leadership</td>
<td>Governance and policy frameworks</td>
<td>Funding and allocation of resources</td>
<td>Engagement of community and other stakeholders</td>
<td>Physical infrastructure; models of care; systems for improving the quality of care; Monitoring and evaluation</td>
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<td>PHC core &amp; strategic levers</td>
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<td>IHR core capacities</td>
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| AMR: antimicrobial resistance; IHR: International Health Regulations; IPC: infection prevention and control; PHC: primary health care.
4. Conclusion and way forward

Experience in tuberculosis has shown that analysing the challenges along the people and patient pathway can be an important tool in informing prioritization of domestic and donor investments for greater impact at the country level (18, 19). In applying this approach to AMR, current efforts need to shift the focus away from targeting a solely biological phenomenon (drug resistance) towards addressing the health needs and expectations of people and communities along the AMR people journey from exposure to infection, through to their attempts to access health services, quality diagnosis and appropriate treatment.

After inputs from the global online consultation that will take place from 14 February to 1 March 2023, the people-centred framework and its 13 high-level interventions will be piloted in several countries across the different WHO regions in 2023.

Countries moving towards NAP 2.0 are encouraged to use this framework as guidance to identify and prioritize people- and system-centred interventions in the human health sector that link and integrate with resilient health systems strengthening initiatives, including for PHC, pandemic preparedness and response, and IHR core capacities.

Implementation of this framework at the country level aims to enhance efficiency and sustainability in implementing NAPs on AMR by mainstreaming AMR-specific interventions into UHC, PHC and pandemic preparedness and response plans and budgets. The framework will also foster meaningful engagement of communities and community-led organizations in the AMR response and will address inequities. In addition, it enables the opportunity to secure funding for addressing AMR through global avenues such as the UHC Partnership, the Global Fund’s Resilient and Sustainable Systems for Health packages, the World Bank’s Pandemic Fund and other such funding streams.

Working closely with countries and implementing partners, the three levels of WHO will support roll-out of this framework at the country level to support the development and sustainable implementation of a more programmatic AMR NAP 2.0 that is people centred and that strengthens health systems. The People-centred framework for addressing AMR in the human health sector is a critical guidance document to ensure that no one is left behind in the fight against AMR, which is fundamental to reaching the 2030 Agenda for Sustainable Development and its Sustainable Development Goals (SDGs) (20).
Annex 1.

Detailed methodology for developing the people-centred framework

The people-centred framework was developed following a seven-step process (Fig. A1.1). A WHO multidisciplinary technical WG was formed, covering the various AMR-related disciplines of the people-centred framework and the global, regional and national levels of the organization.

In step 1, the WG agreed on the people-centred framework consisting of the four pillars, the foundation steps and the implementation levels. The four pillars represent the journey of people seeking preventative services and accessing quality diagnosis and treatment of infections, including AMR infections, in health care, supported by the two foundation steps of effective governance and surveillance and research information. The implementation levels provide an additional dimension to the pillars and foundation steps, where interventions can be implemented to address people or health system needs specific to each level and supports identification of the primary implementor of the intervention (e.g. national-level authorities or policymakers, community health workers, PHC workers). The pillars and implementation levels were defined based on existing WHO definitions, with inputs from the WG to reflect patient management, diagnosis, treatment and care relevant to infectious diseases (Fig. A1.2). Step 1 also included an assessment of the people and system challenges and needs along an individual’s AMR journey.
In step 2, the multidisciplinary WG identified specific interventions that can address these needs, supplemented by a targeted review of key technical documents and guidance. This exercise resulted in a set of 119 AMR interventions across the four pillars, foundation steps and the different implementation levels.

In step 3, the identified AMR interventions were independently prioritized by the WG based on the following guiding principles:

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

In step 4, 10 high-level interventions across the four pillars and three high-level interventions under the two foundations were identified based on their prioritization scores. The prioritization exercise also resulted in combining several interconnected interventions into high-level interventions. The interconnected sub-interventions often reflect the priority steps that need to be taken at the

*The subnational level can refer to the state, province or municipality. WHO: World Health Organization.*
different implementation levels, as further detailed in Annex 2. A draft paper describing the people-centred framework was developed.

In step 5, the people-centred framework paper and 13 high-level interventions will be revised based on the feedback received through the global online consultation. In the next phase (step 6), detailed implementation guidance will be developed for each of the 13 high-level interventions and further refined through country testing (step 7).
Annex 2.

The package of 13 high-level interventions and priority implementation steps

This annex provides the suggested priority steps for sustainable implementation of the 13 high-level interventions. The order of the implementation steps may vary in countries based on the country context, but often starts at the national and/or subnational level and then spans across the community, primary care and secondary/tertiary health care level.

Each intervention listed in Table A2.1 starts with a short summary of the specific people and health care system needs, followed by the minimum system requirements to support implementation of the high-level intervention, and the priority implementation steps.

The priority implementation steps are a summary of the highest-scoring interventions (out of a total of 119), prioritized by multidisciplinary expert opinion. These will be further refined based on the global online consultation and country testing as outlined in Fig. A1.1. A detailed implementation guidance document will be developed for each high-level intervention, expanding on the specific intervention required to achieve the priority steps. Importantly:

- Specific cross-cutting interventions such as promoting awareness, education and training on AMR and quality health services are required for many of the high-level interventions. Rather than being stand-alone interventions, related actions are highlighted under the priority steps, most notably at the community and health care levels.
- The detailed interventions under each priority step will consider gender, equity and human rights perspectives and strive to ensure inclusivity of vulnerable subpopulations.

For the methodology on how the 13 high-level interventions were developed, please refer to Annex 1.
Table A2.1. Priority steps for sustainable implementation of the 13 high-level interventions

Three foundation interventions

1. **Effective governance:** AMR governance and accountability in the human health sector in collaboration with other sectors

   - People & system needs
     - Community engagement, awareness and political will to secure funding and action on AMR.
     - The views of people are reflected in national AMR coordination committees, policies and actions to ensure interventions address their needs.
     - Policies that ensure that people have access to a health system where AMR interventions are integrated and are part of the available health care.
     - Sustainable implementation of NAPs on AMR requires integration of AMR interventions in broader health system strengthening and pandemic preparedness plans and programmes.
     - Alignment of NAP on AMR planning, budgeting, implementation and monitoring with wider health sector and One Health plans will enhance efficiency in implementation and avoid duplication.
     - *This intervention will enable national reporting against the IHR/JEE indicator (P4.1 Multisectoral coordination on AMR).*

   - System prerequisites
     - Legal framework/structure that would enable inclusion of AMR-related regulations in national policies and regulations
     - Functioning health system with sustainable financing

   - Priority steps

     **National and/or sub-national level**
     - Step 1: Secure political commitment from ministry of health, financial and human resources to integrate AMR in the health system.

     **National and/or sub-national level**
     - Step 2: Develop, operationalize and implement the NAP on AMR through the multisectoral coordination mechanism and active monitoring.

     **Health care levels**
     - Step 3: Strengthen the AMR capacity of leadership functions at the different health care levels to implement AMR interventions.

     **National and/or sub-national level**
     - Step 4: Develop an AMR communication strategy to improve government and community awareness and understanding of AMR.
### 2. Strategic surveillance and research information:
National AMR surveillance network to generate quality data to inform patient care and action on AMR

| People & system needs | ▪ Patients with bacterial/fungal infections need to receive the appropriate treatment based on guidelines that take local/national epidemiology into account.  
▪ Policymakers need to have a good understanding of the magnitude of the AMR situation in their country to be able to address and invest in AMR interventions to reduce its burden.  
▪ To collect relevant AMR data, a network of AMR surveillance sites at health care facilities is needed which is coordinated and quality controlled at the national level.  
▪ *This intervention will enable global reporting of the SDG indicator on the level of AMR: proportion of bloodstream infections due to Escherichia coli resistant to third-generation cephalosporins and methicillin-resistant Staphylococcus aureus as well as national reporting against the IHR/JEE indicator (P4.2 Surveillance of AMR).* |
|---|---|
| System prerequisites | □ Sufficient availability of trained health workers dedicated to AMR/HAI surveillance (foundation: effective governance)  
□ Access to quality laboratory services (or the possibility to refer samples) at the different health care levels (pillar 2: access to essential health services and pillar 3: timely and accurate diagnosis)  
□ Patient information system/laboratory management information system (pillar 2: access to essential health services and pillar 3: timely and accurate diagnosis) |

### Priority steps

<table>
<thead>
<tr>
<th>National and/or sub-national level</th>
<th>Secondary/tertiary health care level</th>
<th>Primary care level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1: Implement and strengthen a national AMR/HAI surveillance system with a network of AMR surveillance sites overseen by a national coordination centre.</td>
<td>Step 2: Capture and report data on AMR/HAI surveillance as part of surveillance system reporting.</td>
<td>Step 3: Capture and report data on infections (syndromic and AMR) as part of surveillance system reporting.</td>
</tr>
</tbody>
</table>
### 3. Strategic surveillance and research information:
Antimicrobial consumption and use (AMC/U) surveillance to inform patient care and action on AMR

<table>
<thead>
<tr>
<th>People &amp; system needs</th>
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<tbody>
<tr>
<td>▪ AMC/U data provide insight in the way antimicrobials are prescribed in community and health care facilities.</td>
</tr>
<tr>
<td>▪ The data are needed to monitor and ensure uninterrupted access to affordable and quality-assured antimicrobials at all levels of health care facilities.</td>
</tr>
<tr>
<td>▪ The data are needed to inform prescribers to optimize use and ensure safe and appropriate treatment of patients.</td>
</tr>
<tr>
<td>▪ <em>This intervention enables measuring the globally agreed target of ≥ 60% of total antibiotic consumption being Access (AWaRe classification) group antibiotics at the national level (WHO GPW13 target 4b) as well as national reporting against the IHR/JEE indicator (P4.2 Surveillance of AMR).</em></td>
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<thead>
<tr>
<th>System prerequisites</th>
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<tbody>
<tr>
<td>□ National medicines agency or mandated department to collect, analyse and disseminate AMC/U data</td>
</tr>
<tr>
<td>□ Sufficient availability of health workers dedicated to AMC/U surveillance (foundation: effective governance)</td>
</tr>
<tr>
<td>□ National registry for antimicrobials</td>
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<tr>
<td>□ Availability of data collection system (electronic or paper based) or integrated into existing health information system</td>
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<tr>
<th>Priority steps</th>
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<tbody>
<tr>
<td><strong>National and/or sub-national level</strong>&lt;br&gt;Step 1: Establish and/or strengthen a national antimicrobial AMC/U surveillance system.</td>
</tr>
<tr>
<td><strong>National and/or sub-national level</strong>&lt;br&gt;Step 2: Implement and enforce legislation for monitoring AMC/U in all or selected health care facilities.</td>
</tr>
<tr>
<td><strong>Primary care level</strong>&lt;br&gt;Step 3: Ensure antimicrobial prescription data are collected and reported to the national system.</td>
</tr>
<tr>
<td><strong>Secondary/tertiary health care level</strong>&lt;br&gt;Step 4: Establish and/or strengthen AMC/U surveillance and reporting to the national AMC/U surveillance system.</td>
</tr>
</tbody>
</table>
Ten core interventions

Pillar 1: Prevention of infections

1. Implementation of IPC core components to mitigate AMR

| People & system needs | ▪ Patients with suspected AMR infections have the right to clean, safe and quality care, enabled through the implementation of IPC programmes that incorporate WHO core components and minimum requirements.  
▪ Implementing IPC practices at health facilities protects patients, health workers and visitors from acquiring an infection, decreases the incidence of HAIs, including those resistant to antimicrobials, and ultimately reduces AMU.  
▪ *This will support national reporting against the IHR/JEE indicators (P4.2 Surveillance of AMR and R4.1 IPC programmes).* |

| System prerequisites | □ Sufficient availability of health workers (foundation: effective governance)  
□ Access to WASH and waste management services (pillar 1: prevention of infections)  
□ Appropriate health facility infrastructure: e.g. a system to ensure optimal bed use and reduce overcrowding, adequate ventilation, access to clean water, single isolation rooms (pillar 1: prevention of infections)  
□ Access to appropriate sanitation supplies and equipment for hand hygiene (soap, single-use or clean, reusable hand towels), environmental cleaning, laundry, decontamination of medical devices, and appropriate and safe health care waste management (labelled bins) (pillar 2: access to essential health services) |

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<th>Priority steps</th>
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<tbody>
<tr>
<td>National and/or sub-national level</td>
</tr>
<tr>
<td>Step 1: Implement national IPC programmes and policies and monitor WHO core components and minimum requirements.</td>
</tr>
<tr>
<td>Secondary/tertiary health care level</td>
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<tr>
<td>Step 2: Adapt national IPC guidelines to facility-level IPC standards of practice (SOPs) and use HAI/AMR surveillance data to guide outbreak preparedness and response.</td>
</tr>
<tr>
<td>Primary care level</td>
</tr>
<tr>
<td>Step 3: Adapt national IPC guidelines to primary care-level IPC SOPs and monitor implementation based on national IPC indicators.</td>
</tr>
<tr>
<td>Community level</td>
</tr>
<tr>
<td>Step 4: Implement infectious disease prevention services in the community, including implementation of food safety standards.</td>
</tr>
</tbody>
</table>
## 2. Universal access to improved WASH and waste management to mitigate AMR

### People & system needs

- People should have access to adequate WASH and safe waste management to limit the transmission of infections, including those caused by pathogens resistant to antimicrobials, and to ultimately reduce AMU.
- Facilities at the different levels of health care should have adequate WASH and waste management services to ensure that patients with suspected AMR infections are treated safely and receive quality care.
- *This will support national reporting against the IHR/JEE indicator (R4.3 Safe environment in health facilities).*

### System prerequisites

- Commitment to improve access to and funding for clean running water and basic sanitation infrastructure (foundation: effective governance)
- Funding for health care waste management system (foundation: effective governance)

### Priority steps

- **National and/or sub-national level**
  - Step 1: Expand universal access to WASH and safe waste management in both community and health facilities.

- **Health care levels**
  - Step 2: Complete the WASH FIT assessment tool and act to improve WASH and safe disposal of health care waste and antimicrobials.

- **Community level**
  - Step 3: Improve clean drinking water, sanitation and hand hygiene practices through community engagement and community-based approaches.

- **Community level**
  - Step 4: Develop behaviour change approaches and mechanisms to return unused antimicrobials from households for safe disposal.
### 3. Access to vaccines and expanded immunization to manage AMR

**People & system needs**
- Vaccines help to prevent people from contracting an infection or developing disease, including those caused by AMR pathogens, and decrease transmission through herd immunity.
- Vaccines decrease infections and therefore also decrease the need for antimicrobials.
- People need to have access to vaccines, and vaccine hesitancy in the community and among health care workers needs to be addressed.

**System prerequisites**
- □ Basic infrastructure for an immunization programme - procurement channels, (cold) supply chain, availability of trained health workers at the PHC level
- □ Availability of data collection system (electronic or paper based) (pillar 2: access to essential health services)

**Priority steps**

<table>
<thead>
<tr>
<th>National and/or sub-national level</th>
<th>National and/or sub-national level</th>
<th>Health care levels*</th>
<th>Community level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1: Expand immunization programmes and ensure access to vaccines to reduce the demand for antibiotics and prevent AMR infections.</td>
<td>Step 2: Update national recommendations and normative guidance to include the role of vaccines to control AMR.</td>
<td>Step 3: Ensure health workers are immunized and trained to deliver on national immunization programme targets.</td>
<td>Step 4: Raise awareness on the role of vaccines in limiting the emergence of AMR and use of antimicrobials.</td>
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Pillar 2: Access to essential health services

<table>
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<tr>
<th>4. AMR management included in health benefit packages</th>
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<tbody>
<tr>
<td><strong>People &amp; system needs</strong></td>
</tr>
<tr>
<td>▪ People need affordable access to health services, antimicrobials, vaccines and other medicines, and diagnostic tests at the different health care levels, through insurance coverage of infectious syndrome management and inclusion of required health products in health benefit packages.</td>
</tr>
<tr>
<td>▪ Appropriate health insurance coverage protects patients with suspected AMR infection from experiencing catastrophic out-of-pocket health expenditure.</td>
</tr>
<tr>
<td>▪ By improving public awareness of the health services and products included in the health benefits package, people better understand their entitlements and are empowered to demand access to health services.</td>
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<table>
<thead>
<tr>
<th><strong>System prerequisites</strong></th>
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<tbody>
<tr>
<td>□ Health insurance coverage with a minimum health benefit package is in place</td>
</tr>
<tr>
<td>□ Sufficient availability of health workers trained in infectious disease management (foundation: effective governance)</td>
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<thead>
<tr>
<th><strong>Priority steps</strong></th>
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<tbody>
<tr>
<td><strong>National and/or sub-national level</strong></td>
</tr>
<tr>
<td>Step 1: Include access to health services, antimicrobials and diagnostic tests for prevention, diagnosis, treatment and care of infectious syndromes in health benefit packages.</td>
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<thead>
<tr>
<th><strong>Health care levels</strong></th>
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</thead>
<tbody>
<tr>
<td>Step 2: Enhance the affordability of essential antimicrobials and diagnostics through appropriate financing, catastrophic expenditure protection and pricing policies.</td>
</tr>
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<thead>
<tr>
<th><strong>Community level</strong></th>
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<tbody>
<tr>
<td>Step 4: Ensure the availability of preventative testing and counselling services for common infections.</td>
</tr>
</tbody>
</table>
## 5. Uninterrupted supply of essential health products for AMR

### People & system needs
- Health workers need to be able to deliver high-quality, appropriate patient care to help reduce morbidity and mortality due to AMR and limit the emergence and spread of AMR.
- This requires an uninterrupted supply of essential health products (antimicrobials, vaccines and diagnostics/laboratory reagents and equipment) for the prevention, diagnosis, treatment and care of infections, including those caused by AMR infections.

### System prerequisites
- The infrastructure for a functioning (cold) supply chain for health products
- A functioning national logistics management system and a stock management system at health care facilities to track the supply and the efficient and accurate management of stock levels of health products
- Sufficient availability of health workers for supply management of health products (foundation: effective governance)

### Priority steps

<table>
<thead>
<tr>
<th>National and/or sub-national level</th>
<th>National and/or sub-national level</th>
<th>Health care levels*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1: Strengthen routine procurement and supply of health products for management of (AMR) infections (including a national logistics management information system).</td>
<td>Step 2: Implement a system for monitoring, reporting and recall of substandard and falsified health products at all levels of health care.</td>
<td>Step 3: Build the capacity of health workers, supply chain managers and storage managers on detection and reporting of substandard and falsified health products.</td>
</tr>
</tbody>
</table>
6. **Integrated quality AMR management services to improve patient care**

### People & system needs

- For people to receive high-quality care, management of patients with suspected and confirmed AMR infections should be coordinated across and within the different health care levels to ensure continuity of care and follow-up.
- The improved flow of patient information across the different levels of care and disciplines gives health workers access to the full patient history and supports the safety and quality of care received.

### System prerequisites

- A tiered level of health care (primary, secondary and tertiary health care) within the country

### Priority steps

**National and/or sub-national level**

**Step 1:** Develop/adapt guidelines on interdisciplinary management of patients with AMR infections, including referral of patients/specimens across levels of care and follow-up.

**National and/or sub-national level**

**Step 2:** Develop/implement guidelines for health facility administrators on implementing a basic information management system to track patient information relevant for AMR.

**Secondary/tertiary health care level**

**Step 3:** Ensure interdisciplinary communication and management of patients with AMR infections and appropriate referral and follow-up.

**Primary care level**

**Step 3:** Ensure health worker awareness of the referral process from primary to secondary/tertiary and vice versa for patients with suspected and confirmed AMR infections.
Pillar 3: Timely and accurate diagnosis

7. Improved laboratory and diagnostic infrastructure to enable clinical bacteriology and mycology testing

People & system needs
- Patients with suspected AMR infections need to be accurately and timely diagnosed to receive appropriate treatment and care without delay.
- For this, bacteriology and mycology testing capacity (including AST) and/or access is required at the different levels of health care.
- To ensure health workers have access to quality diagnostic results and are empowered to deliver high-quality patient care, accreditation and standardization of diagnostic services is essential.
- This will support national reporting against the IHR/JEE indicator (P4.3 Prevention of multidrug resistant organism).

System prerequisites
- Basic laboratory infrastructure and availability of essential diagnostic products (pillar 2: access to essential health services)
- Sufficient availability of health workers to support laboratory and diagnostic services (foundation: effective governance)

Priority steps

National and/or sub-national level
Step 1: Establish/strengthen a national quality-assured bacteriology (and mycology) network, including adequate referral mechanisms, ISO registration and accreditation.

Secondary/tertiary health care level
Step 2: Strengthen clinical bacteriology and mycology testing capacity for isolation and identification of pathogens and AST to inform patient care and treatment.

Primary care level
Step 3: Ensure access to laboratory diagnostics for infections and AST through referral mechanism with rapid turnaround time of quality results.

## 8. Awareness, education and understanding of diagnostic options and diagnostic stewardship

### People & system needs
- People need to be aware and understand that timely and accurate diagnosis of infections can provide them with more effective treatment and appropriate care.
- Health workers need access and training on diagnostic stewardship guidelines to accurately collect specimens and interpret and use diagnostic results to inform appropriate treatment and care of infectious syndromes.

### System prerequisites
- Basic diagnostic infrastructure (pillar 2: access to essential health services)
- Sufficient availability of health workers (foundation: effective governance)

### Priority steps

#### National and/or sub-national level

**Step 1:** Develop and monitor implementation of national/subnational diagnostic stewardship guidelines for health workers at all levels of health care.

#### Health care levels*

**Step 2:** Strengthen capacity of health workers and laboratory technicians/microbiologists on diagnostic stewardship across all levels of health care through pre- and in-service training.

#### Community level

**Step 3:** Raise awareness of the general public and community health workers on the importance of timely and accurate diagnosis of suspected infections.
**Pillar 4: Appropriate and quality-assured treatment**

### 9. Up-to-date evidence-based infection treatment guidelines and antimicrobial stewardship (AMS) programmes

<table>
<thead>
<tr>
<th>People &amp; system needs</th>
<th>System prerequisites</th>
<th>Priority steps</th>
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</thead>
</table>
| ▪ Developing and implementing evidence-based treatment guidelines for infectious syndromes at the different levels of health care can ensure that health workers follow a standardized treatment regimen for effective, efficient and quality patient care. | □ AMC/U and AMR/diagnostics and patient information (foundation: strategic surveillance and research information, pillar 3: accurate and timely diagnosis) | National and/or sub-national level  
Step 1: Develop and implement up-to-date national treatment guidelines based on AMS principles, the AWaRe antibiotic book, evidence and epidemiology, and monitor compliance. |
| ▪ These treatment guidelines need to be based on AMR surveillance data and the AWaRe classification of antibiotics to reduce inappropriate use of antimicrobials and mitigate the emergence of AMR in the long term. | □ Sufficient availability of capacitated health workers | National and/or sub-national level  
Step 2: Integrate the AWaRe classification into the national essential medicines list and formulary to promote appropriate use of antimicrobials. |
| ▪ AMS programmes and actions at the national and health care levels support appropriate use of antimicrobials and multidisciplinary management of (AMR) infections. | □ Existing national essential medicines list and formulary | National and/or sub-national level  
Step 3: Develop and implement national integrated AMS policy, standards and tools as well as education materials and pre-service training for health workers and community. |
| ▪ *This will enable reaching the globally agreed target of at least 60% of total AMC being Access (AWaRe classification) group antibiotics at the national level (WHO GPW13 target 4b) and national reporting against the IHR/JEE indicator (P4.4 Optimal use of antimicrobial medicines in human health).* | □ Uninterrupted supply of quality-assured and affordable antimicrobials (pillar 2: access to essential health services) | Secondary/tertiary health care level  
Step 4: Develop, implement and monitor AMS programmes, including establishment of AMS multidisciplinary teams and capacity building on AMS. |
| □ Where feasible, an existing committee (e.g., IPC or drug and therapeutics committees) in facilities where AMS responsibility can be integrated (pillar 1: prevention of infections and pillar 2: access to essential health services) | | Primary care level  
Step 5: Develop, implement and monitor AMS activities with capacity building on AMS. |
10. Implementation of regulation to restrict nonprescription antimicrobial sales

People & system needs

▪ Restricting the nonprescription sale of antimicrobials can prevent unsafe self-treatment practices by people in the community, reduce use of antimicrobials and thus mitigate the emergence of AMR.
▪ Restricting inappropriate promotion of antimicrobials and raising public awareness of the need to seek medical advice can reduce excess prescriptions and OTC demand, ultimately reducing inappropriate AMU and the emergence of AMR.
▪ This will support national reporting against the IHR/JEE indicator (P4.4 Optimal use of antimicrobial medicines in human health).

System prerequisites

☐ Existing legislative framework and mechanisms for enforcing health regulations (foundation: effective governance)
☐ Dedicated human resources for enforcing regulations
☐ Access to health care facilities and trained health workers at all levels of health care (pillar 2: access to essential health services)

Priority steps

**National and/or sub-national level**

Step 1: Implement and enforce regulation that restricts OTC sales of antimicrobials to prescriptions from a qualified health care professional.

**National and/or sub-national level**

Step 2: Restrict inappropriate promotion and advertisement of antimicrobials to both health workers and the public.

**Community level**

Step 3: Raise awareness of the dangers of inappropriate self-medication of antimicrobials without a prescription and the importance of seeking and following treatment advice from qualified health professionals.

*Includes primary care and secondary and tertiary health care facilities.

AMR: antimicrobial resistance; AMU: antimicrobial use; AST: antimicrobial susceptibility testing; AWaRe: Access, Watch, Reserve; GPW: General Programme of Work; HAI: health care associated infection; IHR: International Health Regulations; IPC: infection prevention and control; ISO: International Organization for Standardization; JEE: Joint External Evaluation; NAP: national action plan; OTC: over the counter; SDG: Sustainable Development Goal; WASH: water, sanitation and hygiene; WASH FIT: water and sanitation for health facility improvement tool; WHO: World Health Organization.
References


