Addressing gender inequalities in national action plans on antimicrobial resistance

Guidance to complement the people-centred approach

World Health Organization

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Contents

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Glossary

Gender	The socially constructed norms that impose and determine inequalities in power, roles and relations of and between women, men, boys, girls and gender-diverse people, and that underlie gender-based discrimination. Gender norms, roles and relations vary from society to society and evolve over time *(1)*.
Gender barriers (to health)	The challenges or barriers that different gender groups face when accessing health services for the prevention, diagnosis and treatment of (drug-resistant) infections *(2)*.
Gender identity	A person's deeply felt internal and individual experience of gender, which may or may not correspond with the sex assigned at birth. It includes the personal sense of the body, which may involve – if freely chosen – modification of bodily appearance or function by medical, surgical or other means. Gender identity exists on a spectrum, so it is not necessarily linked to a single gender. And it can be fluid, evolving over the course of a person's life – adapted from *(3)*.
Gender inequalities in health	A measurable difference in health across groups due to gender-related power inequalities and discrimination based on norms, roles and relations, and other gender-related barriers – adapted from *(2)*.
Gender mainstreaming	The process of assessing implications for women, men, girls, boys and gender-diverse people of any planned action including legislation, policies or programmes at all levels and ensuring that their concerns and experiences are an integral part of the design, implementation, monitoring and evaluation of policies and programmes so that women, men, girls, boys and gender-diverse people benefit equally, and inequality is not perpetuated – adapted from *(4)*.
Gender unequal	Level 1 of the WHO gender-responsive assessment scale: perpetuates gender inequality by reinforcing unbalanced norms, roles and relations and often leads to a hierarchal imbalance and inequalities in the enjoyment of rights or opportunities *(5)*.
Gender-blind	Level 2 of the WHO gender-responsive assessment scale: ignores gender norms, roles and relations and very often reinforces gender-based discrimination. By ignoring differences in opportunities and resource allocation for women, men and gender-diverse people, such policies are often assumed to be so-called fair as they claim to treat everyone the same *(5)*.
Gender-responsive	Health actions are gender-responsive when they consider gender norms, roles and inequalities with measures to actively reduce their harmful effects. The World Health Organization (WHO) defines five levels of action in its gender-responsive assessment scale with increasing value as follows: gender-unequal, gender-blind, gender-sensitive, gender-specific and gender-transformative, the last two levels indicating gender responsiveness *(5)*.
Gender-sensitive	Level 3 of the WHO gender-responsive assessment scale: considers inequality generated by unequal gender norms, roles and relations but takes no remedial action to address it. Usually indicates gender awareness *(5)*.

Gender-specific	Level 4 of the WHO gender-responsive assessment scale: considers the specific needs of women, men and gender-diverse people and specifically targets a group to achieve certain goals or meet needs. Even when inequality generated by unequal gender norms, roles and relations are considered and remedial action to address their harmful effects is taken, this may not change underlying causes of gender differences *(5)*.
Gender-transformative	Level 5 of the WHO gender-responsive assessment scale: addresses the causes of gender-based health inequities by transforming harmful gender norms, roles and relations through the inclusion of strategies to foster progressive changes in power relationships between women, men and gender-diverse people; for example, cisgender and transgender men and women, other transgender people, non-binary people and other people with different gender identities *(5,6)*.
Intersectional gender analysis	The process of analysing how gender power relations intersect with other social stratifiers (such as sex, gender, class, race, education, ethnicity, age, geographic location, religion, migration status, ability, disability and sexuality) to affect people's lives, how they create differences in needs and experiences, and how policies, services and programmes either exacerbate or mitigate these differences – adapted from *(1)*.
Intersectionality	Intersectionality is an analytical perspective that examines how different social stratifiers interact to create different experiences of privilege, vulnerability and/or marginalization. An intersectional perspective recognizes that the combination of various factors experienced at individual and group levels is influenced by societal processes and structures of power, including racism, ageism, ableism, sexism, patriarchy, heteronormativity, homo-, bi- and transphobia, economic and financial systems, colonialism, and nationalism. These factors operate within a broader context that includes shocks and disruptions, such as climate change, conflict and war, health emergencies and economic recessions. These dynamics unfold in diverse geographical settings, creating a complex interplay of vulnerabilities, advantages and disadvantages, and capacities that encompass social and physical resources, access to medicines and health services, as well as prevailing attitudes and beliefs – adapted from *(1)*.
Sex	The biological or chromosomal attributes that separate males, females and intersex people. Sex is assigned at birth based on the appearance of external genitalia and may differ from a person's gender identity *(1)*.
Sex-disaggregated indicator	An indicator that measures the differences between different sex and gender groups *(7)*.
Sex-specific indicator	An indicator that measures differences between (mostly) females and males in relation to a particular metric *(1)*.
Social determinants of health	Also referred to in this document as social stratifiers, these are the conditions in which people are born, grow, work, live and age, and the wider set of forces and systems shaping the conditions of daily life. Some examples include: income, ethnicity, social protection, education, unemployment, working life conditions, food insecurity, housing, basic amenities, the environment, and structural conflict. Social determinants influence a subpopulation's or individual's capabilities to obtain effective coverage with health services and health more broadly *(8)*.
Vulnerable groups and/or groups facing discrimination	Certain groups face increased risks or challenges and there is need for targeted efforts to address their specific needs and to promote inclusivity and equality. Marginalized populations in public health often include groups that face increased risks of health inequities due to factors such as socioeconomic status, ethnicity, race, gender, sex, age, disability, or other social determinants. These populations may experience barriers to accessing health care services, face discrimination and have poorer health outcomes compared with the general population *(9)*.

Executive summary

National action plans on antimicrobial resistance (AMR) often overlook the critical intersection of gender, despite evidence that exposure and susceptibility to infection, health-seeking behaviours, as well as antimicrobial prescribing and use patterns are all influenced by gender.

This publication provides a summary of the evidence on AMR and gender and proposes 20 recommendations for policy-makers to consider when developing, revising, implementing or monitoring their national action plans on AMR. Each recommendation should be tailored to individual country contexts and needs. Complementing the World Health Organization's (WHO's) people-centred core package of AMR interventions, the recommendations aim to support countries in addressing AMR through a more comprehensive, people-centred and gender-responsive approach.

Key findings from the AMR and gender evidence are outlined below.

- Lack of clean water and safe sanitation in the community and in health facilities puts women and girls at an increased risk of exposure to (drug-resistant) infections due to their menstrual hygiene needs and more frequent contact with the health system.
- Women face a heightened risk of contracting (drug-resistant) infections given their responsibility for household water provision and that they represent over 70% of the global health workforce.
- Male-dominated professions, including animal husbandry, industrial farming and slaughterhouses, expose men to antibiotics and (drug-resistant) infections.
- Negative experiences with the health system and stigma can deter both men who have sex with men and women from seeking specialized care to diagnose and treat sexually transmitted and urinary tract infections.
- Perceptions of masculinity, men's role as primary income earners and occupational time constraints can contribute to men delaying seeking diagnosis and treatment for infections, in particular for multidrug-resistant tuberculosis.
- Limited financial and decision-making autonomy as well as numerous household responsibilities can impede women from seeking timely health care, especially when additional travel, out-of-pocket expenditure and childcare costs are involved. These factors can contribute to women purchasing antibiotics from informal markets.
- Overall, women are 27% more likely to receive antibiotics throughout their lifetime than men.
- Female doctors tend to adopt a more conservative wait-and-see approach to prescribing antibiotics compared to their male counterparts.
- Antimicrobial stewardship recommendations made by male pharmacists are more likely to be accepted than those made by their female colleagues.
- Disaggregated data are lacking on AMR surveillance and antimicrobial use to identify gender disparities in the burden of (drug-resistant) infections and in access to quality-assured treatment that can inform tailored AMR interventions.

Summary of AMR and gender recommendations

Overarching

1. **Short term.** Capture and disaggregate data on AMR and surveillance of antimicrobial use and other relevant data by, at minimum, sex and age and, where feasible, other social stratifiers.
2. **Short term.** Review existing national plans or strategies in the health sector or other relevant areas and incorporate policies or actions that strive for gender equality into the national action plan on AMR.
3. **Medium term.** Promote research to strengthen the evidence base on the intersections between gender and AMR.

Effective governance, awareness and education

4. **Short term.** Promote equal participation of women, men and other vulnerable groups and/or groups facing discrimination in the multisectoral AMR coordination mechanism and technical working groups.
5. **Short term.** Include representation from gender experts in the multisectoral AMR coordination mechanism.
6. **Short term.** Use context-specific messages, language and images in AMR awareness and education materials that actively address harmful gender norms and promote gender equality.
7. **Short term.** Use different and tailored approaches to raise awareness on AMR among vulnerable groups and/or groups facing discrimination.
8. **Medium term.** Strengthen the knowledge of health workers at all levels of health care on gender inequalities in the prevention, diagnosis and treatment of (drug-resistant) infections.

Strategic information through surveillance and research

9. **Short term.** Report on patients' sex, age and, where feasible, other social stratifiers as part of routine surveillance systems on AMR and antimicrobial use.
10. **Medium term.** Analyse, report and act upon the key gender-related inequalities identified from sex-disaggregated surveillance data on AMR and antimicrobial use.
11. **Long term.** Invest in new diagnostics for infections that disproportionally affect women such as (drug-resistant) urinary tract infections.

Prevention

12. **Medium term.** Improve WASH and waste management infrastructure in health facilities and community settings to ensure infrastructure is available, accessible and safe for all genders, and does not perpetuate stigma and discrimination.
13. **Medium term.** Identify and address gender inequalities in the risk of exposure to (drug-resistant) infections among health care workers and in community settings.

On vaccination, evidence supports the set of recommendations in the WHO Immunization Agenda 2030: Why Gender Matters *(2021)* report of gender mainstreaming across the entire immunization programme cycle.

Access to essential health services

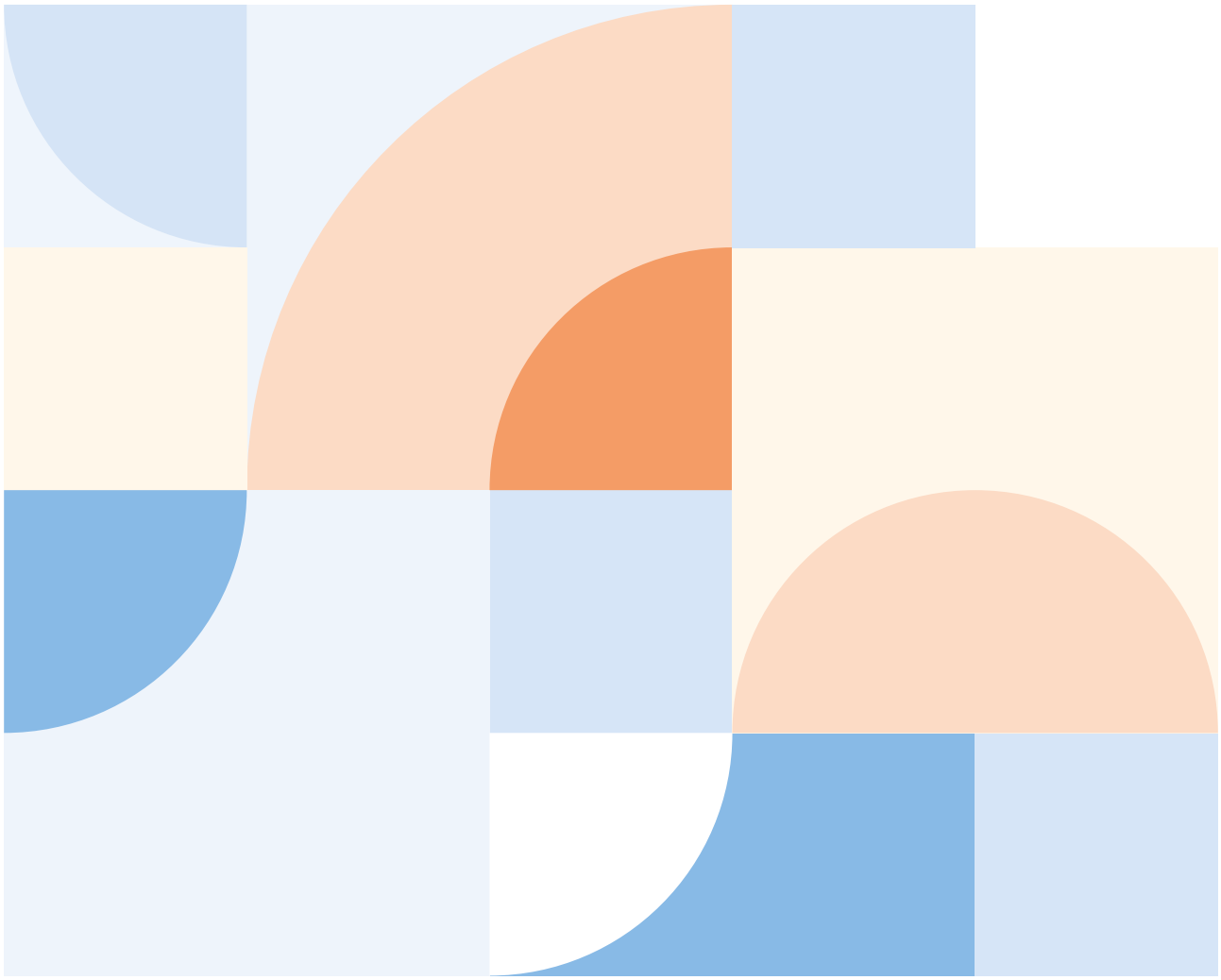
14. **Medium term.** Deliver culturally sensitive and gender-responsive health services for the prevention, diagnosis and treatment of (drug-resistant) infections.
15. **Medium term.** Ensure health insurance and/or health benefit packages cover access to health services, diagnostics and antimicrobials for the treatment of (drug-resistant) infections without leaving behind vulnerable populations.
16. **Short term.** Identify and address gender inequalities in access to quality-assured medicines including antimicrobials, focusing on specific groups of women or men who might be at a higher risk of purchasing substandard or falsified antimicrobials.
17. **Medium term.** Update and implement standards on the forecasting and procurement of medicines including antimicrobials by undertaking an assessment of the local epidemiology of infections based on sex to ensure all relevant antimicrobials are included.

Timely, accurate diagnosis

18. **Long term.** Conduct retrospective reviews of diagnostic services for different (drug-resistant) infections to identify and address any gender inequalities.

Appropriate, quality-assured treatment

19. **Medium term.** Apply a gender analysis in regular retrospective prescription audits to identify unconscious gender biases or inequalities in prescribing practices.
20. **Medium term.** Conduct a gender assessment of the unintended effect of policies or regulations that aim to reduce over-the-counter sale of antimicrobials on access to essential antimicrobials.



01

Introduction

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A family receives medical advice by a trained health worker at a maternal and neonatal clinic in Dili, Timor-Leste.

1. Introduction

1.1 Background

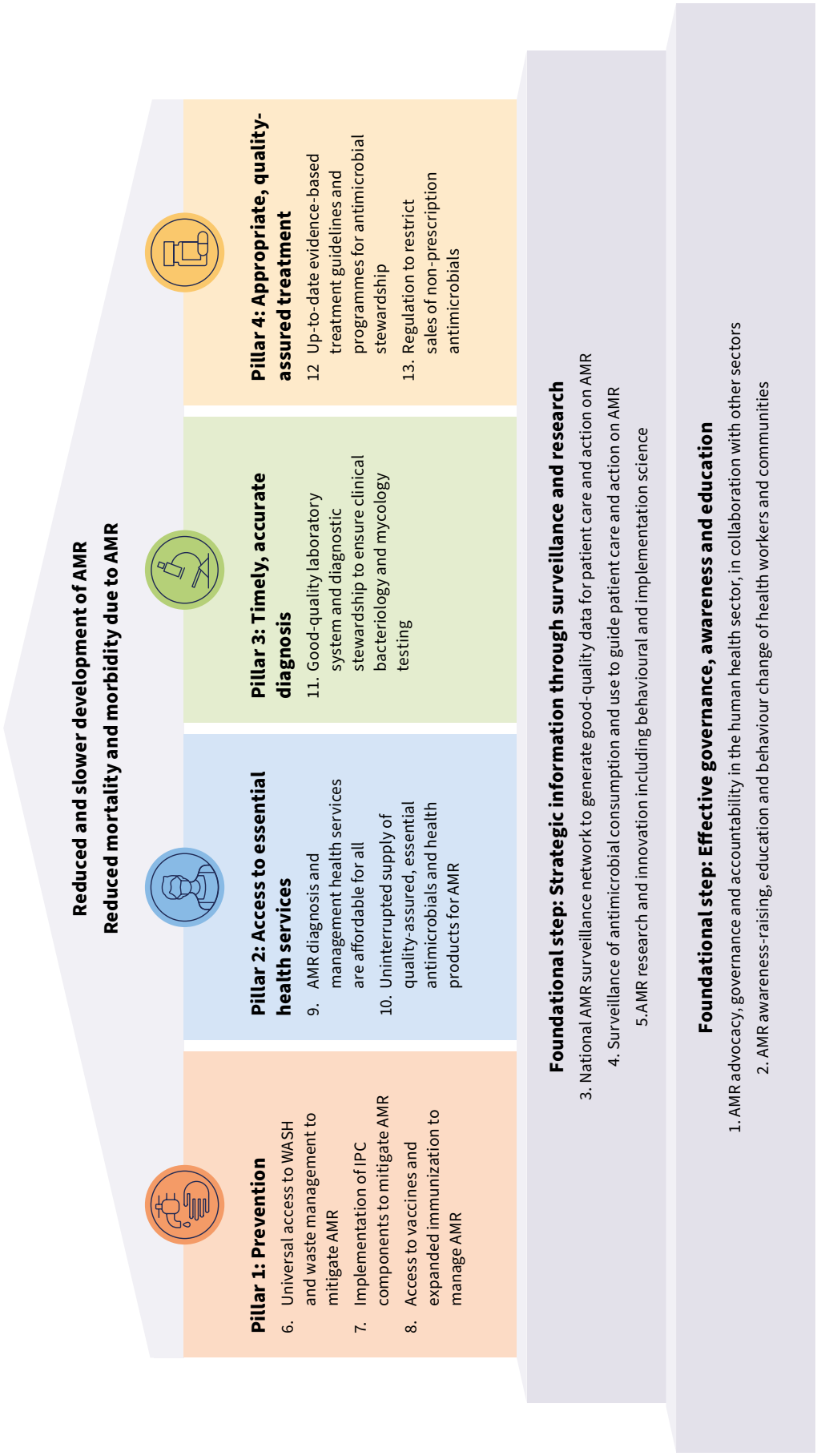
Antimicrobial resistance (AMR) is a growing public health threat. An estimated 1.27 million deaths were directly attributed to drug-resistant bacterial infections in 2019 *(10)*. In 2015, Member States of the World Health Organization (WHO) endorsed the Global Action Plan on Antimicrobial Resistance and committed to developing and implementing national action plans (NAPs) on AMR. As of November 2023, 178 countries have developed NAPs on AMR; however, there has been limited focus on the equity and gender dimensions of AMR interventions *(11,12)*.

A review of NAPs on AMR confirmed the minimal attention to gender considerations; 125 out of 145 publicly available NAPs did not mention sex or gender *(13)* (Annex 1). Despite this lack of attention to gender, research indicates that exposure and susceptibility to infection, health-seeking behaviours, as well as patterns of antimicrobial prescribing and use are all influenced by gender considerations *(14–19)*. Gender may also affect who has the resources and decision-making power to access appropriate care and treatment for (drug-resistant) infections, which contributes to differences in the quality of care received and patient outcomes *(15,19)*. Furthermore, in 2007, the World Health Assembly adopted a resolution urging Member States to "formulate national strategies for addressing gender issues in health policies, programmes and research," to apply a gender-equality perspective in health care delivery and services, and to collect and analyse sex-disaggregated data *(20)*.

To support a more comprehensive approach to the development and implementation of NAPs on AMR, WHO published the people-centred approach to addressing AMR in the human health sector *(21)*. This approach places people, and the challenges they face when seeking access to essential health services for the prevention, diagnosis and treatment of (drug-resistant) infections, at the centre of the AMR response. The people-centred approach has four pillars and 13 interventions for addressing AMR in the human health sector (Fig. 1).

Using the four pillars of the people-centred approach as a guiding framework, this document draws on expert opinion and a rapid synthesis of evidence to outline 20 policy recommendations and monitoring indicators for countries to support the development and implementation of gender-responsive NAPs on AMR.

Fig. 1. The people-centred core package of AMR interventions



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

Source: World Health Organization; 2023 *(21)*.

1.2 Why are gender-responsive national action plans on AMR important?

Gender is an important determinant of health which can influence people's experiences of and access to health services. Gender norms, roles and relations can affect health-related behaviours and health sector responses, which contributes to different groups of women, men, and gender-diverse populations experiencing differing degrees of privilege and inequality in access to health services and health outcomes *(1,22)*.

AMR is similarly affected by gender inequalities, where gender norms, roles and relations influence exposure and vulnerability to infection (e.g. through occupational and household roles and nutritional status), participation in infection prevention and health-seeking behaviours, access to health care, prescribing patterns and appropriate use of antimicrobials. This relationship is compounded by other intersectional factors that shape the identities of individuals based on social stratifiers such as age, ethnicity, religion, education, occupation, geography and migration status *(14–16,19,23)*. Ensuring that policy-makers recognize the intersectional gender differences in the risk of infection, and in experiences and health outcomes, is crucial to tailor interventions that can more equitably and effectively mitigate the burden and spread of AMR, while helping to achieve the health- and equality-related Sustainable Development Goals (SDGs).

This document primarily focuses on the risk of acquiring drug-resistant infections and experiencing health outcomes associated with one's gender and provides recommendations to mitigate inequalities related to gender. It is important to recognize that sex and gender are interdependent. Sex at birth influences how an individual's life is shaped within societal and cultural gender norms. The language around gender has evolved over time and in different settings. Gender and sex are often used interchangeably, despite having different meanings.

- **Gender** refers to socially constructed norms, roles and relations that determine or impose differences in behaviour, distribution of resources and power between women, men, girls, boys and gender-diverse populations.
- **Sex** refers to biological characteristics (e.g. chromosomes, hormone levels and functions, and reproductive anatomy) and often categorizes individuals as female or male.

Furthermore, in the area of AMR, sex- and/or gender-disaggregated data are scarce, and disentangling the individual effects of gender and sex on risk of infection or health outcomes is challenging. Biological factors related to sex can influence an individual's susceptibility to infection, immune response, disease severity, and response to treatment and vaccination *(24–26)* (Box 1).

Box 1. Examples of sex as a risk factor for (drug-resistant) infections

- **Anatomical differences between the sexes.** These can drive differences in susceptibility to infection. For example, women are more susceptible to urinary tract infections, due to a shorter urethra, proximity of the urethra to the rectum and vagina, and vaginal dysbiosis *(17)*. Females have a 10% prevalence of bacteriuria compared with 0.1% in males *(27)*. Urinary tract infections can lead to major complications, such as organ damage and kidney infections.
- **Immune response differences.** Men are generally more susceptible to infectious diseases than women. However, women often experience a heightened immune response to pathogens, with more severe disease symptoms *(24)*. Because of their stronger antibody response and local and systemic reaction, in general, women have stronger acquired immunity from bacterial and viral vaccines than men *(24)*.
- **Physiological changes.** Over the life course, there are also important age-dependent differences between the sexes. In populations older than 65 years, the risk and prevalence of urinary tract infections in female and male populations are more balanced *(27)*. Pregnant or postnatal women are at a higher risk of infection including sepsis compared with the general population *(28)*. Such infections can lead to premature birth and neonatal infections.

The lack of nationally representative antimicrobial susceptibility data disaggregated by sex makes it difficult to draw conclusions about sex as a risk factor for antimicrobial resistance and points to the need for more evidence.

1.3 Aims and objectives

Drawing on evidence from the literature and expert opinion, this publication aims to synthesize the evidence on AMR and gender and provide a set of country recommendations to address gender inequalities through more gender-responsive AMR policies and interventions. The specific objectives are to:

- raise awareness among policy-makers of the existing evidence on intersections between AMR and gender, including inequalities in exposure and vulnerability to infection, and access to and use of essential health services related to the prevention, diagnosis and appropriate treatment of (drug-resistant) infections;
- provide practical country-level recommendations on how to address these inequalities through gender-responsive AMR interventions as part of developing, implementing and monitoring NAPs on AMR, in line with the WHO people-centred approach; and
- outline monitoring indicators to track and evaluate progress on implementing the recommendations.

1.4 Target audience

The primary audience for this publication is national or subnational policy-makers responsible for developing, implementing and monitoring NAPs on AMR. The secondary audience is a broad range of stakeholders involved in implementing NAPs on AMR interventions, including but not limited to civil society or community organizations, health care professionals and associations, health care facility managers, academia and the private sector. This publication will also be of interest to other professionals working in the development and implementation of NAPs on AMR from other sectors in the context of a One Health approach.

02

Methods

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Health worker examines specimens at a primary health clinic in Debaga 2 camp in the Makhour District of northern Iraq.

2. Methods

The recommendations presented in this publication were informed by: (i) a review and synthesis of the evidence on the influence of gender-related factors on vulnerability to drug-resistant infections and on access to and use of health services for their prevention, diagnosis and treatment (Box 2); and (ii) expert opinion from the WHO informal expert group on AMR and gender (see Web Annex A for a detailed description of the methodology). An existing gender analysis matrix was adapted based on input from the WHO informal expert group and was used to define the scope of the evidence review and facilitate the evidence synthesis *(1,5,29)*.

The evidence review and synthesis focused on how, and to what extent, different gender analysis domains (Box 2) influence the AMR people's journey and the pillars of the people-centred approach, including: vulnerability to infection, prevention, access to health services, diagnosis, and treatment of (drug-resistant) infections. This approach enabled a better understanding of the root causes of the gendered inequalities of AMR.

Box 2. Gender analysis domains

The following gender analysis domains were the basis of the analytical matrix used for the literature review and evidence mapping *(29)*.

- **Access to resources**, for example, accessibility of education, information, skills, income, employment, services, benefits, time, space and social capital.
- **Distribution of labour and roles**, that is, the division of labour roles and tasks within and beyond the household.
- **Norms and values**, that is, shared expectations and behaviours within a society that relate to gendered norms and beliefs.
- **Decision-making power**, that is, the ability to influence decision-making processes at household and community levels.
- **Policies, laws and institutions**, that is, government policies, laws and institutions that affect systemic gender inequities.

Where evidence exists, the effect of social stratifiers that interact with gender to shape a person's journey through life were examined, such as age, education and income. From 15 776 titles and abstracts, 130 articles were identified for coding and data extraction. Evidence from the academic and grey literature was mapped on to the gender analysis matrix (Web Annex A) and thematically analysed to assess the causes of AMR inequalities and identify entry points for mainstreaming gender in AMR policies and interventions *(5,29)*.

The findings from the evidence synthesis were discussed at a meeting of the WHO informal expert group on AMR and gender on 30 November and 1 December 2023. Based on the evidence, the expert group developed a set of practical country-level recommendations aligned with the people-centred approach core package of 13 AMR interventions. The recommendations were further refined through two rounds of feedback provided by the expert group and technical teams at WHO headquarters and regional offices. The country-level recommendations will support progress on four of the 17 Sustainable Development Goals (SDGs) (Box 3).

Box 3. Antimicrobial resistance and gender-relevant SDGs

- SDG 3: ensure healthy lives and promote well-being for all at all ages
- SDG 5: achieve gender equality and empower all women and girls
- SDG 6: ensure availability and sustainable management of water and sanitation for all
- SDG 8: promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

SDG: Sustainable Development Goal.

Drawing on the monitoring indicators of the SDGs *(30)* and the global action plan on AMR *(31)*, a list of relevant indicators was compiled and adapted to the recommendations of the expert group (Annex 2). These indicators can be integrated in national monitoring and evaluation frameworks for NAPs on AMR to track progress on mainstreaming gender in the AMR response.

03

Key finding and recommendations

Gerbert Oosterlaken from the Hoeve de Hulsdonk pig farm and veterinarian John Vonk from the veterinary practice Varkenspraktijk in the Kingdom of the Netherlands meet to discuss the animal health and welfare plan and standards at the farm, decreasing the need to use antimicrobials.

3. Key findings and recommendations

This section outlines the key findings and recommendations that apply to each of the 13 AMR interventions in the core package of the people-centred approach. Countries can adapt these recommendations based on their local context when developing, implementing and monitoring NAPs on AMR. Key target stakeholders and examples of actions or entry points are outlined. In addition, Annex 3 provides a technical toolbox of existing guidance, tools and materials to support countries in their efforts to mainstream gender in AMR interventions.

For each recommendation, an implementation timeframe is proposed as follows:

- **short-term** – recommendations that are relatively feasible and can be implemented in the next 1–2 years;
- **medium-term** – recommendations that require longer timeframes to be implemented such as in the next 3–4 years due to, for example, capacity constraints or scale of change; and
- **long-term** – recommendations that are more aspirational and may require 5 or more years to achieve.

It should be noted that the exact timeframe for implementation will depend on the country context and duration of the NAP on AMR.

3.1 Overarching recommendations

The following overarching recommendations call for a stronger evidence base on gender and AMR and alignment of the national AMR response with existing health strategies for gender equality in line with efforts to achieve targets under SDG 3 and SDG 5. The overarching recommendations are important prerequisites for the remaining recommendations and are based on the evidence outlined in each subsequent subsection.

1. Short term

Capture and disaggregate data on AMR and surveillance of antimicrobial use and other relevant data by, at minimum, sex and age and, where feasible, other social stratifiers.

- **National AMR policy-makers** (e.g. the AMR multisectoral coordination committee and technical working groups) and **implementing stakeholders** should revise existing methods to collect and report routine or survey data, such as on the prevalence and incidence of (drug-resistant) infections, diagnostic testing for AMR detection, surveillance of antimicrobial use, vaccination status, and access to clean water and safe sanitation, disaggregated, at minimum, by sex and age and, where feasible, other social stratifiers including gender identity, income, ethnicity, geographic location, education and employment status. Collecting, analysing and reporting data disaggregated by sex, age and other social stratifiers will allow countries to identify key populations that are being left behind by the AMR response and will inform tailored interventions on AMR.

2. Short term

Review existing national plans or strategies in the health sector or other relevant areas and incorporate policies or actions that strive for gender equality into the NAP on AMR.

- **National AMR policy-makers** should review key national documents in the health sector or other relevant areas (e.g. specific policies to address SDG 5) and adapt or incorporate actions that strive for gender equality in the NAPs on AMR. It is important to align NAPs on AMR with existing plans or strategies within or outside the health sector to create a coherent approach to addressing gender inequalities.

3. Medium term

Promote research to strengthen the evidence base on the intersections between gender and AMR.

- **Funding bodies (bilateral and/or multilateral)** have a role to play in funding research to fill existing knowledge gaps and should include gender and AMR research topics in funding calls (e.g. gendered risks of exposure and vulnerability to AMR, barriers to accessing sexual and reproductive health services, research and development into new diagnostics and antimicrobials, and over-the-counter sales and misuse of antimicrobials). Addressing gender equality should also be included as a core principle in donor agreements *(32)*.
- **Academic institutions or researchers**, where feasible, should consider intersections with gender in their AMR research and promote multidisciplinary, diverse and gender-balanced research teams *(1)*.
- **National AMR policy-makers** should include gender and AMR research priorities in the national research agenda (e.g. adapting priorities from the WHO global research agenda for AMR in human health) *(33)*. In addition, they should consider key quantitative and qualitative research findings on gender inequalities in the revision, prioritization and implementation of AMR interventions as part of the NAPs on AMR.

3.2 Findings and recommendations aligned with interventions in the people-centred approach to AMR

3.2.1 Foundation step: effective governance, awareness and education

People-centred approach intervention 1: AMR advocacy, governance and accountability in the human health sector in collaboration with other sectors

Summary findings. Having effective national or subnational multisectoral AMR coordination mechanisms strengthens the comprehensive implementation of NAPs on AMR *(34)*. The views of women, men and gender-diverse populations should be reflected in these coordination mechanisms. The benefits of strengthening gender balance in global health leadership have been widely recognized, including greater responsiveness to the health needs of different groups of people *(35)*. Furthermore, the engagement of women and gender-diverse populations in the design and implementation of water, sanitation and hygiene (WASH) interventions is crucial to ensuring that interventions meet their needs *(36,37)*. While women make up 70% of the global workforce, they remain underrepresented in top leadership levels, global policy, governance fora, leadership panels, and decision-making structures in the public and private sectors *(14,35,38)*. Experience from other programmes has also highlighted the importance of including gender experts and listening to the voices of different populations for comprehensive gender mainstreaming of health programmes *(39)*.

Recommendations

4. Short term

Promote equal participation of women, men and other vulnerable groups and/or groups facing discrimination in the multisectoral AMR coordination mechanism and technical working groups.

- **National AMR policy-makers** should promote equal participation of and make efforts to recruit diverse groups of women, men and other vulnerable groups and/or groups facing discrimination in leadership and decision-making positions across: national/subnational multisectoral AMR coordination committees and technical working groups; facility-level infection, prevention and control and antimicrobial stewardship committees and teams; and others. This can ensure that the experience and needs of diverse groups of people are considered in the development and implementation of NAPs on AMR.

5. Short term

Include representation from gender experts in the multisectoral AMR coordination mechanism.

- **The multisectoral AMR coordination mechanism** should include a member with expertise on gender, either from the ministry of health or other responsible ministries. Their perspective will inform the development and implementation of AMR interventions and monitoring indicators as part of the NAP on AMR.

People-centred approach intervention 2: AMR awareness-raising, education and behaviour change of health workers and communities

Summary findings. Gender affects the extent and pathways through which people access knowledge and information about AMR, which can shape their attitudes towards antimicrobial use. However, the evidence on the effect of gender is mixed and highly context-specific. For example, in low-resource settings, women are often responsible for household health care decision-making and tend to have better access to information about AMR than men due to their greater contact with health care facilities *(40)*. Nevertheless, qualitative studies in pregnant women or mothers in low-income settings report a lack of understanding of appropriate antimicrobial use, unnecessary use of antimicrobials for mild coughs, fevers or diarrhoea, and limited understanding of their harmful side-effects *(41,42)*. Education is an important cross-sectional factor as evidenced by studies on multidrug-resistant tuberculosis in India *(43)* and female sex workers in Brazil *(44)* where women without formal education were found to have less access to information than men. Age is also an important factor – older men and women may be equally unaware of the risks associated with antibiotic use and AMR *(45)*. Such evidence highlights the importance of context-specific, tailored interventions to raise awareness of AMR.

In community settings, a scoping review of gender differences in knowledge and practices related to antibiotic use in South-East Asia found that interventions have the most success when they are designed with an understanding of the contextual gender norms and roles that affect antibiotic use *(40)*. Effective dissemination of information also requires that factors such as educational level, preferred information channels and campaign messaging are considered *(46)*. Adopting a participatory approach to tailor and test interventions to ensure they are appropriate for the intended user, and assessing their long term behavioural outcomes through research can enhance the effectiveness of these interventions *(16,47)*.

Health care workers' knowledge, attitudes and gender biases can also affect their prescribing behaviour and the quality of care they provide to patients *(48)*. Institutional stigma and discrimination can lead to lack of trust in patients and hesitation to seek care. This, and evidence under interventions nine and 12, underscore the importance of addressing gender norms and raising awareness among health care workers of gender inequalities in access to effective and quality-assured prevention, diagnosis and treatment for (drug-resistant) infections.

Recommendations

6. Short term

Use context-specific messages, language and images in AMR awareness and education materials that actively address harmful gender norms and promote gender equality.

- **National AMR policy-makers, civil society** organizations and **other implementing partners** should use messages, language and images that have been tested locally, are context-specific and actively address harmful gender norms and promote gender equality (e.g. avoid portraying women only as mothers or men as primary income providers) when developing AMR awareness materials, age-appropriate curricula on AMR as part of education curricula in schools or universities, and training materials for health workers.

7. Short term

Use different and tailored approaches to raise awareness on AMR among vulnerable groups and/or groups facing discrimination.

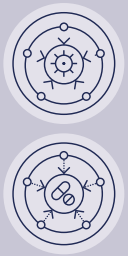
- **Technical leads on AMR awareness campaigns** should use different and tailored communication methods, channels and spaces to transmit information about AMR, infection prevention in the community and appropriate antimicrobial use. They should consider gender differences in literacy, and access to health information, financial resources and technology to effectively target vulnerable groups and groups facing discrimination (including migrant workers, seasonal farm workers and men who have sex with men). The effectiveness of these tailored approaches can be evaluated periodically to further refine the approaches.

8. Medium term

Strengthen the knowledge of health workers at all levels of health care on gender inequalities in the prevention, diagnosis and treatment of (drug-resistant) infections.

- **Professional associations or universities** responsible for developing and implementing AMR modules in pre- and in-service education and training for health workers should include information on gender inequalities in the prevention, diagnosis and treatment of (drug-resistant) infections, as well as mitigation strategies.

3.2.2 Foundation step: strategic information through surveillance and research



People-centred approach interventions 3 and 4: national AMR surveillance network to generate good-quality data to inform patient care and action on AMR, and surveillance of antimicrobial consumption and use to guide patient care and action on AMR

The following recommendations build on the overarching recommendations related to disaggregating data on AMR by sex and promoting research to strengthen the evidence base. They aim to address the general lack of gender evidence on AMR infections and antimicrobial use and the consideration of sex and gender in innovation and implementation research.

Summary findings: Gender, sex, age and other social stratifiers can influence the risk of infection, health-seeking behaviour and access to services for (drug-resistant) infections, and thus may affect patient health outcomes *(14)*. Evidence from other infectious diseases, such as coronavirus disease 2019 (COVID-19), human immunodeficiency virus infection, Ebola virus disease, and Zika virus disease supports this finding *(32,49,50)*. For example, during the COVID-19 pandemic, sex-disaggregated data showed that risk of infection was affected by sex and occupation, which had a gender bias with three out of four workers in the most highly exposed occupational groups being female *(49)*. Despite a global call on WHO Member States to collect disaggregated health data according to sex and, where relevant, apply a gender analysis *(20)*, the sex of the individuals from whom samples are collected as part of routine AMR surveillance is reported in only a few countries. A modelling study using such data from 29 European countries found a higher risk of resistance in men than women, which was age- and pathogen-dependent *(51)*. A meta-analysis of 11 studies of antibiotic prescriptions in primary care found that women were more likely to receive antibiotic prescriptions over their lifetime than men *(52)*.

Lack of disaggregated data in surveillance of AMR and antimicrobial use is a key limitation to further understanding the epidemiology of drug-resistant infections and the effect of AMR interventions. Adapting methods and data collection protocols to include at least disaggregation by sex and age, including these in routine data collection at health facilities and analysing the collected data can help build the evidence base and improve understanding of the gender and sex differences in vulnerability to infection and health care use. This information can help identify vulnerable populations, target AMR interventions and ensure their implementation is effectively monitored.

Recommendations

9. Short term

Report on patients' sex, age and, where feasible, other social stratifiers as part of routine surveillance systems on AMR and antimicrobial use.

- **Antimicrobial use and AMR surveillance technical leads, facility-level prescribers, antimicrobial stewardship teams, infection prevention and control teams, microbiologists** and **others** involved in surveillance of AMR, health care-associated infections and antimicrobial use should follow best practices on reporting patient characteristics including sex, age and, where feasible, other social stratifiers *(53)*.

10. Medium term

Strengthen the knowledge of health workers at all levels of health care on gender inequalities in the prevention, diagnosis and treatment of (drug-resistant) infections.

- **National policy-makers and technical leads involved in AMR and antimicrobial use surveillance** should regularly analyse and use available sex-disaggregated data on AMR and antimicrobial use to tailor AMR interventions.

People-centred approach Intervention 5: AMR research and innovation including behavioural and implementation science

Summary findings. Limited research is conducted on the effect of gender, socioeconomic status, race, disability, age and sexuality on AMR risks and vulnerabilities as well as the effect of AMR interventions on different populations *(18,54,55)*. Failing to consider sex and gender differences in the design and implementation of research, policies and interventions limits the generalizability and applicability of research findings and has the potential to put women and children at greater risk of infection, morbidity and mortality *(32,56–58)*. In line with the third overarching recommendation, a practical resource document on the integration of gender and equity in AMR research has already been published *(59)*. Guidelines on sex and gender equity in research and an accompanying checklist to ensure the appropriate reporting of sex and gender information in the design, analysis, reporting and interpretation of study results are also available *(32,60)*.

Furthermore, women have been underrepresented in clinical trials for medicines and medical devices, which has caused delays in medical knowledge and health product development for women *(56–58,61)*. In a study in Viet Nam, women seeking abortions were at increased risk of developing complicated reproductive tract infections because existing diagnostic tools lacked accuracy *(62)*. Investment in rapid point-of-care diagnostics that are affordable and have enhanced accuracy in the diagnosis of drug-resistant infections is a priority *(21,56,57,63)*.

Recommendation

11. Long term

Invest in new diagnostics for infections that disproportionally affect women such as (drug-resistant) UTIs.

- **National governments, the private sector** and **academia** should invest in research and development of new diagnostics for infections that disproportionally affect women (e.g. drug-resistant urinary tract infections). When developing target product profiles, women's preferences for the design characteristics of such diagnostics, including self-testing, should be considered. In addition, existing diagnostics should be better used to guide appropriate antimicrobial use and surveillance of pathogens causing infections such as urinary tract infections.

3.2.3 Pillar 1: prevention

Prevention of infections is influenced by gender and driven by the unequal distribution of labour in community and health care settings, which in turn is grounded in social norms and values. Recommendations here offer gender-responsive actions that can be taken to mitigate the effect of gender on risk of exposure to (drug-resistant) pathogens.

People-centred approach intervention 6: universal access to WASH and waste management to mitigate AMR

Summary of findings. Access to WASH across health facilities and community settings is essential to reduce the emergence and spread of AMR *(64)*. Yet one in five health care facilities globally lacks basic water services, one in 10 facilities has no toilets and only one third of health facilities in the least developed countries have basic hygiene services *(65)*. Children and women in low-resource settings are disproportionately affected *(66)*, for example, fewer than a third of delivery rooms in east African countries have access to clean running water *(67)*. Women are at higher risk of exposure to (drug-resistant) pathogens in health care settings that lack hygienic conditions and clean water since they come in more frequent contact with health care settings during pregnancy, childbirth, abortion and postnatal care. This exposure may increase the risk of miscarriage, maternal and neonatal sepsis, surgical site infections and maternal mortality *(54,68)*. Poor access to WASH also disproportionally affects women and girls in terms of their safety, dignity and experience of health care. Prioritizing investments in appropriate WASH and waste management infrastructure in maternal and neonatal units can help limit the spread of infections, avoid unnecessary antibiotic use and protect the lives of mothers and children *(69)*.

WASH and waste management infrastructure in community settings are also essential to control AMR. While 2.2 billion and 3.5 billion people lacked safely managed drinking water and safely managed sanitation services, respectively, in 2022 *(65)*, families with limited access to WASH services, including proper water storage facilities, have greater vulnerability to waterborne diseases. The risk is greater for women and girls as they are often responsible for fetching water, food preparation and caretaking in many low-resource settings *(14)*. Inadequate access to clean water at the household level can also result in suboptimal menstrual hygiene for women and girls *(19,66,70)*, and lead to a rise in urogenital infections *(14,54)*. In schools, insufficient WASH infrastructure can perpetuate menstrual stigma, driving girls to avoid attending school while menstruating *(37)*. Menstrual hygiene management at schools, such as hygiene-responsive and sex-separated toilets, is also critical to reduce hygiene-related infections for women and adolescent girls *(71,72)*.

Recommendation

12. Medium term

Improve WASH and waste management infrastructure in health facilities and community settings to ensure infrastructure is available, accessible and safe for all genders, and does not perpetuate stigma and discrimination.

- **National policy-makers, health-facility managers, community leaders** and **funding bodies** should prioritize investments in safe and inclusive WASH and waste management infrastructure to limit the spread of (drug-resistant) infections across health facilities and community settings, while ensuring women's participation in WASH-related decision-making. Depending on the country context, some examples include the provision and disposal of menstrual hygiene products (or a space for women to wash), sex-separated toilets in health care facilities and the community or improving WASH in maternal and neonatal units in hospitals to reduce maternal and neonatal morbidity and mortality due to (drug-resistant) infections.

People-centred approach intervention 7: implementation of infection prevention and control core components to mitigate AMR

Summary of findings. Exposure to (drug-resistant) infections in community and health care settings as well as engagement in infection prevention and control practices is influenced by distribution of labour and roles, gendered cultural norms and values. Globally, 70% of nurses and community health care workers are women *(14)*. Evidence suggests that health care facilities often have inadequate implementation of infection prevention and control measures. In particular, women's training and safety needs are often inadequate *(54)*. Provision of suitable personal protective equipment for different genders is an important element of infection prevention and control in hospital settings. Some regions, such as sub-Saharan Africa, report notable shortages of personal protective equipment; and where such equipment is accessible, the standard equipment generally available is often tailored to larger-sized users, making it too big for smaller individuals, primarily women. For example, standard-sized gowns may be too long for women, gloves might not be offered in a range of sizes to accommodate smaller hands, and ill-fitting facemasks and goggles may fail to properly seal and protect smaller faces, all potentially leading to increased spread of infection in women *(14)*.

Occupational differences related to gender in the community setting can produce inequalities in the risk of exposure to (drug-resistant) infections. For example, animal husbandry, industrial farming and working in slaughterhouses are typically male-dominated occupations and were found to increase workers' exposure to antibiotics and active pharmaceutical ingredients administered to animals as well as the likelihood of acquiring drug-resistant bacteria *(73,74)*. In many countries, women are more likely to engage in sex work or experience sexual violence, which increases their exposure to (drug-resistant) infections as they are often unable to negotiate safe sex practices or may not be able to afford condoms for financial reasons *(14,44)*.

Recommendation

13. Medium term

Identify and address gender inequalities in the risk of exposure to (drug-resistant) infections among health care workers and in community settings.

- **Infection prevention and control** and/or **antimicrobial stewardship teams** at **health facilities** should use (facility-level) surveillance data or surveys on health care-associated infections that are disaggregated by sex to identify and address any gender inequalities in the risk of exposure to (drug-resistant) infections among health care workers and take corrective action.
- **National policy-makers** responsible for setting labour standards should identify gender inequalities in risk of community-acquired (drug-resistant) infections in high-risk settings, such as animal husbandry.
- Preventative actions may include increasing awareness of occupational risks, procuring appropriate personal protective equipment or implementing relevant infection prevention and control minimum requirements in health facilities to ensure the safety of patients and health workers *(75)*.

People-centred approach intervention 8: access to vaccines and expanded immunization to manage AMR

Summary of findings. Vaccination can reduce the emergence and spread of AMR *(76)*. Often women, and mothers in particular, play an important role in making decisions to immunize children *(77)*. While existing evidence does not suggest strong sex inequalities in child immunization, the distribution of household roles, where women carry most of the child-caring responsibilities, especially in low- and middle-income countries, was cited as a barrier to accessing immunization services *(78)*. In addition, women may also require permission from their husbands to take their children to immunization clinics *(78)*. Direct fees and the cost of transportation associated with accessing vaccinations, especially for women who have limited household financial autonomy, may prevent mothers from taking their children to get immunized *(78–80)*.

The evidence supports the recommendations in the WHO 2021 report Why gender matters: immunization agenda 2030, which highlight the importance of gender mainstreaming across the entire immunization programme cycle – from policy, management and design of immunization systems through to implementation, monitoring and evaluation of the services *(4)*. Recommendations include investing in sex- or gender-disaggregated data, undertaking analysis and research to inform decision-making and implementing gender-responsive immunization services *(4)*.

3.2.4 Pillar 2: access to essential health services

Access to essential, quality-assured health services, including diagnostic services and appropriate treatment for (drug-resistant) infections, is still inequitable in many countries for different population groups *(14,81–84)*. Gender norms, roles and relations can affect economic and social factors, supporting or challenging women's, men's, and gender-diverse population's access to essential health care services. The inability to access quality health care can contribute to the spread of (drug-resistant) infections and suboptimal patient outcomes through the misdiagnosis of infections, delay in treatment, or through inappropriate self-medication. Overall, there is a need to provide access to affordable and culturally sensitive health care services and strengthen supply chains for health products.

People-centred approach intervention 9: health services for the prevention, diagnosis and management of infectious disease syndromes are available and affordable for all

Summary of findings. Access to health services for the prevention, diagnosis and management of infectious diseases can be influenced by harmful norms, unconscious bias, stigma and discrimination towards women, men and gender-diverse populations, thus affecting AMR and patient outcomes. Societal and personal norms and values can shape health care seeking behaviour in women and men. For example, gender norms on masculinity and the perception that seeking treatment is a sign of weakness were found to contribute to men delaying treatment, self-medicating or discontinuing treatment early in low- and middle-income countries *(81)*. Stigma was found to be a barrier to accessing health care services for women with multidrug-resistant tuberculosis, urinary tract infections, or sexually transmitted infections, who would delay seeking advice from a qualified health care professional or self-medicate *(18,19,23,81,85–87)*. Similarly, men and transgender populations reported avoiding formal health care for sexually transmitted infections because of stigma, increasing their risks for drug-resistant gonorrhoea *(36,83)*. Legislation criminalizing homosexual relationships, sexual practices and identities, and policies discriminating against lesbian, gay, bisexual, transgender, intersex, queer, asexual and other sexually or gender-diverse (LGBTIQ+) populations are obstacles to seeking access to health care services for the prevention and management of infections, particularly for sexually transmitted infections *(14,88)*. Among other factors, health care costs, social stigma and discrimination, and prohibitive laws may compel women to undergo an unsafe abortion, making them prone to developing septic complications which are responsible for about 10% of maternal deaths globally *(89)*.

Furthermore, gender inequalities in access to financial resources and in distribution of labour and roles were also a barrier to seeking health care. Evidence suggests that women might be disproportionately affected, especially when additional travel, childcare costs or out-of-pocket medical expenditure are required because they typically lack financial and decision-making autonomy *(41,54,78,79,90)*. In addition, qualitative studies from low- and high-income countries have found that numerous household responsibilities can make it difficult for women to access health services, so they opt to delay diagnosis or treatment *(15,16,91)*. On the other hand, men are often the sole or dominant income earner for the household. Occupational responsibilities and loss of income due to missed work put financial constraints on families and may affect men's decision to access and use timely health care services. For example, for tuberculosis, delayed access to treatment, self-medication or prematurely stopping treatment to return to work can increase men's risk of complications and emergence of drug resistance *(92)*.

Recommendations

14. Medium term

Deliver culturally sensitive and gender-responsive health services for the prevention, diagnosis and treatment of (drug-resistant) infections.

- **National policy-makers** should ensure that **health service providers** are well equipped to provide culturally sensitive and gender-responsive health services for the prevention, diagnosis and treatment of (drug-resistant) infections to all people, regardless of their gender identity or sexual orientation. This can be achieved, for example, by raising awareness among or training health workers through pre- or in-service training of gender health inequalities and the importance of addressing harmful norms, unconscious bias, stigma and discrimination.

15. Medium term

Ensure health insurance and/or health benefit packages cover access to health services, diagnostics and antimicrobials for the treatment of (drug-resistant) infections without leaving behind vulnerable populations.

- **National health financing policy-makers** should conduct an analysis of the health insurance and/or health benefit package coverage of health services, diagnostics and antimicrobials for (drug-resistant) infections that disproportionately affect women or other vulnerable groups. Where gaps exist, coverage should be expanded to limit out-of-pocket expenditures and reduce inequalities.

People-centred approach intervention 10: uninterrupted supply of quality-assured, essential health products for the prevention, diagnosis and management of infectious disease syndromes

Summary findings. Accessibility to formal health care can shape the use of services by women, men and gender-diverse populations. In low-resource settings, location, cost and availability of the right antimicrobials are key factors. Stock-outs of essential antimicrobials in health care facilities or overall lack of essential antimicrobials or diagnostics that cater for women's needs, combined with gender barriers to financial resources, distribution of household responsibilities and decision-making autonomy create gender barriers to accessing quality-assured health products for the diagnosis and treatment of (drug-resistant) infections. For example, women have been found to more often seek informal care or treatment advice, self-diagnose and purchase antibiotics from informal markets which puts them at risk of being given substandard and falsified medicines. These medical products may contain no active ingredients, or the incorrect active ingredient and/or dosage, and thus may harm patients, result in treatment failures and drive the emergence of AMR *(41,93–96)*.

Recommendations

16. Short term

Identify and address gender inequalities in access to quality-assured medicines including antimicrobials, focusing on specific groups of women or men who might be at a higher risk of purchasing substandard or falsified antimicrobials.

- **National policy-makers** should identify and address gender inequalities in access to good-quality and safe antimicrobials, focusing on specific groups of women or men who might be at a higher risk of purchasing substandard or falsified antimicrobials through informal markets. Data can be gathered from qualitative surveys on patient knowledge and attitudes on where antimicrobials are purchased, and sex- and age-disaggregated antimicrobial use from pharmacies. Interventions include targeted awareness-raising and strengthening of supply chains to prevent entry of substandard or falsified antimicrobials.

17. Medium term

Update and implement standards on the forecasting and procurement of medicines including antimicrobials by undertaking an assessment of the local epidemiology of infections based on sex to ensure all relevant antimicrobials are included.

- **National policy-makers** and **health-facility managers** should update standards on the forecasting and procurement of antimicrobials for health care facilities by including an assessment of the local epidemiology of infections based on sex. The standards should be implemented through dissemination and training of hospital procurement teams, with the aim of ensuring that all relevant antimicrobials are included.

3.2.5 Pillar 3: timely, accurate diagnosis

Timely and accurate diagnosis of (drug-resistant) infections is essential for antimicrobial stewardship and positive patient outcomes by guiding appropriate treatment *(10,97)*. Yet almost half of the world's population has limited or no access to diagnostics and only one in five people in low- and middle-income countries has access to simple diagnostic tests at the primary care level to guide prescriptions *(98)*. Additionally, some evidence points to gender inequalities in access to diagnosis.

People-centred approach intervention 11: good-quality laboratory system and diagnostic stewardship to ensure clinical bacteriology and mycology testing

Summary findings. Systemic factors, including limited numbers of laboratory staff, high patient loads and distance to facilities, were found to delay diagnostic testing for infectious diseases for both women and men in low-resource settings *(99,100)*. Furthermore, women experienced delays because of stigma, limited financial resources, household responsibilities and lack of decision-making power *(5,54,99–104)*. Gender norms, such as the need for women to be accompanied or treated by female physicians, or not being able to provide bodily fluids for samples as it is seen as unfeminine, can impede women's access to diagnostic services *(36)*.

In low-resource settings, men can also face difficult choices between paid labour or getting a proper diagnosis, as they are the ones primarily responsible for household income, and mechanisms to recoup lost income are generally not available *(92)*. For example, research in China found that men were often unable to obtain timely tuberculosis diagnosis due to their work responsibilities *(92)*. Men who have sex with men and transgender individuals reported stigmatization, fear of discrimination and marginalization as factors delaying or preventing their seeking diagnoses for sexually transmitted infections *(36)*.

In the absence of self-testing options for drug-resistant infections, prescribers are important decision-makers in ensuring timely and accurate diagnosis. A global observational study of maternal sepsis found that blood culture samples were taken in only 30% of all cases and 15% of abortion-related uterine infections, despite recommendations to test all suspected sepsis cases *(105)*. These findings also apply in high-income countries where pathogen identification was done for less than two thirds of women with suspected sepsis *(106,107)*. In another study, physicians in Sweden were given 120 patient cases with the same clinical presentation where only the patient sex differed. The study found that male sepsis cases were less often correctly identified and treated *(108)*. However, in an emergency department study, women were more likely than men to progress from sepsis to septic shock *(109)*.

It is desirable to include patient's sex in laboratory request forms *(110,111)*; however this is often not reported, especially in paper-based systems *(112)*. Yet, indication of the patient's sex can help in the diagnosis and management of infectious diseases *(113)*, and inform the analysis of cumulative antibiograms to determine sex-specific trends in the emergence of resistance.

Recommendation

18. Long term

Conduct retrospective reviews of diagnostic services for different (drug-resistant) infections to identify and address any gender inequalities.

- **Health-facility managers, health workers** and **laboratory staff** could conduct retrospective reviews of diagnostic services for different (drug-resistant) infections to identify and address differences in infection other than those due to sex.
- This requires that laboratory request forms include patient's sex and gender identity and that prescribers consistently fill these out, which will also enable **laboratory staff** to provide more accurate diagnoses. The **microbiological unit** in health facilities can also use this information when analysing cumulative antibiograms to identify trends in the emergence of resistance disaggregated by sex.
- Actions to address or mitigate any observed inequalities due to biological sex or gender include updating diagnostic stewardship guidelines with sex-specific advice (e.g. on cut-off values) and in-service training for prescribers on the appropriateness of diagnostic tests in specific cases. This can improve the overall quality of care provided to patients.
- **Policy-makers and social scientists** also have a role to play in funding and conducting research to complement findings from the clinical setting with qualitative evidence that can help untangle gender-related factors driving any observed inequalities in access to diagnosis for (drug-resistant) infections.

3.2.6 Pillar 4: appropriate, quality-assured treatment

Gender norms and values, access to resources and decision-making power can influence the antimicrobial prescribing practices of health care workers for women, men and gender-diverse populations, and the inappropriate use of antimicrobials in informal health care settings. Recommendations under this pillar aim to mitigate gender biases in prescription and over-the-counter sales of antimicrobials to support appropriate and quality-assured treatment for (drug-resistant) infections.

People-centred approach intervention 12: up-to-date evidence-based treatment guidelines and antimicrobial stewardship programmes

Summary findings. Women are 27% more likely to receive an antibiotic prescription than men over their lifetime, with those of childbearing age receiving almost 40% more antibiotic prescriptions than their male counterparts *(52)*. Evidence suggests that men receive fewer inappropriate antibiotic prescriptions than women *(14,52,114)*. This is corroborated by findings from observational studies that show that women were less likely than men to receive antibiotic treatment for sepsis or septic shock within 3 hours of diagnosis *(115)* and 15% of pregnant or recently pregnant women did not receive antibiotic treatment on the day an infection was suspected in both high- and low/middle-income settings *(105)*. There is also some evidence of inappropriate antibiotic prophylaxis in postnatal mothers despite established global guidelines *(116)*.

Differences in prescribing patterns can be influenced by a prescriber's gender and underlying social norms. A study from the Kingdom of the Netherlands reported female doctors were more likely to adopt a wait-and-see policy, while male doctors were more likely to prescribe antibiotics *(54)*. Pharmacists' gender was also reported to affect the implementation of antimicrobial stewardship guidance by doctors. A study found that when pharmacists made antimicrobial stewardship recommendations on doctor's antibiotic prescription, the pharmacists' gender affected whether the guidance was followed. Recommendations made by male pharmacists were followed almost 80% of the time, while only one in three recommendations by female pharmacists was accepted *(117)*. Such evidence highlights the need to apply a gender lens when conducting prescription audits or designing and implementing antimicrobial stewardship interventions.

Pregnancy may also put women at risk, not only due to the pathophysiological changes and immune adaptations that occur to accommodate the fetus, but also due to the side-effects and contraindications of some antibiotics during pregnancy, which limits potential treatment options. Treatment guidelines should acknowledge the risk associated with prescribing certain antibiotics during pregnancy and provide alternative options *(118)*.

Recommendation

19. Medium term

Apply a gender analysis in regular retrospective prescription audits to identify unconscious gender biases or inequalities in prescribing practices.

- **Antimicrobial stewardship teams involved in surveillance of antimicrobial use** at the **health-facility level** should apply a gender analysis in regular retrospective prescription audits at the health-facility level to identify unconscious gender biases and inequalities in prescribing practices and patterns. This is particularly important in settings where data on antimicrobial use are captured and disaggregated by sex, age and other social stratifiers. Antimicrobial stewardship actions to address any biases or inequalities can include sensitizing and providing feedback to prescribers on gender biases or inequalities in prescribing practices through general ward rounds or in-service training.

People-centred approach intervention 13: implementation of regulations to restrict non-prescription antimicrobial sales

Summary findings. As already discussed under interventions nine and 10, marginalization, cultural norms and stigma create barriers to accessing formal health care services and can influence people's tendency to self-diagnose, self-medicate and seek informal health care. Distance and time required to access formal health care services, limited financial resources, lack of decision-making autonomy and household or occupational responsibilities shape women's behaviours. Namely, women tend to resort to buying antimicrobials over the counter in pharmacies or from informal markets for themselves and their children, especially in low-resource settings. In addition, women share left-over antimicrobials among family members and stop treatment early when symptoms disappear *(41,42,82)*. Among women, stigma and discrimination related to certain infections (e.g. multidrug-resistant tuberculosis, urinary tract infections and sexually transmitted infections) and feelings of embarrassment were associated with inappropriate self-medication practices *(86,119)*. Nevertheless, buying over-the-counter antimicrobials was also common among men. A study found that working as daily labourers limited men's time to seek treatment in formal health care settings if they wished to avoid financial loss due to taking time off work. Particularly in low-resource settings where men are the primary income earners, self-medicating with over-the-counter antimicrobials was common so as to quickly return to work *(14,15,120)*.

This issue highlights the need for improved awareness of AMR, appropriate antimicrobial use, and the importance of following the treatment advice of health care professionals, which are covered under the recommendations related to intervention 2. Furthermore, in the face of societal norms and barriers related to gender that go beyond the AMR response, the unintended effect of regulations or policies that restrict access to potentially life-saving treatment needs to be assessed from a gender perspective.

Recommendation

20. Medium term

Conduct a gender assessment of the unintended effect of policies or regulations that aim to reduce over-the-counter sale of antimicrobials on access to essential antimicrobials.

- **National policy-makers** including the **national regulatory authorities** should commission or conduct a gender assessment of the unintended consequences of policies or regulations that aim to reduce over-the-counter sales of antimicrobials. This assessment can draw on qualitative insights on patient knowledge, attitudes and practices on the over-the-counter purchase of antimicrobials without a prescription and review of sex- and age-disaggregated data on antimicrobial use from community and private pharmacies. Information can also be gathered through the inclusion of specific questions in national health surveys. **Policy-makers** should report key findings to the general public and use them to help design and implement such regulations and policies so that they do not lead to gendered inequalities in accessing essential antibiotics.

04

Theory of change for addressing gender inequalities in NAPs on AMR

Mildred Fernando Pancho is a survivor of multi-drug resistant tuberculosis and a mother of two children. Today, she raises awareness about AMR through sharing the story of her 10-year treatment and struggles she and her family endured.

4. Theory of change for addressing gender inequalities in NAPs on AMR

If adapted to the local context and integrated as part of NAPs on AMR, the recommendations proposed in section 3 can help advance progress towards the following goals:

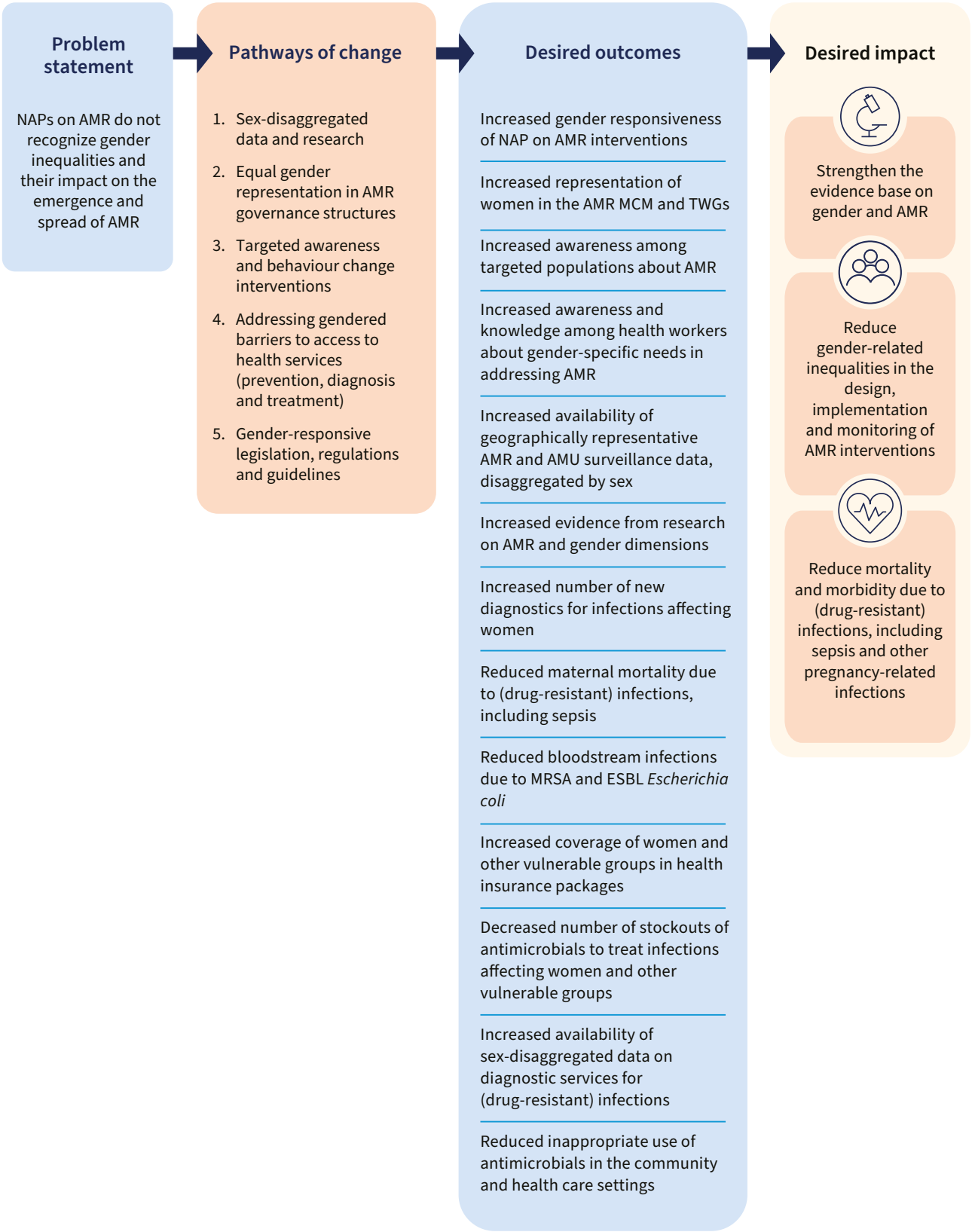
- strengthening the evidence on gender and AMR;
- reducing gender-related inequalities in the design, implementation and monitoring of interventions on AMR; and
- reducing mortality and morbidity due to (drug-resistant) infections, including sepsis and other pregnancy-related infections.

This is explained by the theory of change model (Fig. 2) which links the overarching pathways of change based on the evidence review and expert advice to the intended outcomes and overall impact of the recommendations at the country level.

To measure progress in implementing the recommendations, countries can adapt and incorporate proposed output indicators (Annex 2) as part of the routine monitoring and evaluation of NAPs on AMR. These indicators need to be tailored to the local context as well as available data. Outcome indicators can also be developed to track the short- and long-term effect of gender-responsive policies and actions on AMR (Fig. 2).

Many of the proposed output indicators recognize and aim to address the lack of AMR data disaggregated by sex to inform the design of targeted AMR interventions. The indicators are thus sex-specific (focusing on only one sex or gender) or sex-disaggregated (measuring the differences between different sex and gender groups) *(7)*. However, these two types of indicators are only a starting point and may be insufficient to provide a full account of the gender-related causes of inequalities and those related to the intersection of gender with other social stratifiers. As monitoring and evaluation systems mature, further gender dimensions can be integrated that consider the needs, rights, preferences, or power relations of and between individuals *(7)* as well as other socioeconomic measures related to race, ethnicity, income and geography that can also affect health outcomes.

Fig. 2. Theory of change for addressing gender inequalities in NAPs on AMR



AMR: antimicrobial resistance; AMU: antimicrobial use; ESBL: extended spectrum beta lactamase; MCM: multisectoral coordination mechanism; MRSA: methicillin-resistant *Staphylococcus aureus;* NAP: national action plan; TWG: technical working group.

05

Way forward

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Ministry of Health workers outside the Chemelil Gok Health Centre, a vaccination clinic, in Kisumu County, Kenya.

5. Way forward

Gender barriers and needs related to AMR exist and can lead to gender inequalities in the impact of AMR and patient health outcomes. To achieve a comprehensive people-centred approach to AMR that is equitable and effective for all populations, policy-makers, programme managers, health professionals, academia, the private sector, funding bodies and other stakeholders need to consider the gender implications of their activities – for example, how their actions may result in gender inequalities in: access to awareness-raising and education on AMR; exposure and susceptibility to infection; and access to essential health services including diagnosis and treatment of (drug-resistant) infections.

Furthermore, the recommendations outlined on AMR and gender can be applied in NAPs on AMR, together with proposed indicators to monitor the outputs, outcomes and impact of the interventions (Annex 2). These recommendations and monitoring indicators need to be adapted to the country context and integrated within existing efforts to achieve gender equality in health in line with SDG 5.

A gender-responsive approach to AMR also relies on a health workforce that is empowered to actively address unconscious biases, harmful stigma and discrimination in the provision of good-quality health services. Promoting gender equality among health workers and strengthening the representation of women in clinical governance, leadership and decision-making positions in health facilities and committees can also help overcome structural gender barriers. Efforts to attain universal health coverage should pay attention to gender, as women face disproportionately higher financial barriers to accessing health care and safe antimicrobials than men. Pandemic preparedness and response efforts should also address gender inequalities to build resilient and equitable health systems. While these actions are beyond the scope of NAPs on AMR, they are important considerations for policy-makers.

Overall, more context-specific evidence on the gender inequalities related to AMR is needed to better guide policy design and implementation. Furthermore, two additional guidance documents on equity and disability inclusion and AMR are being developed to address the needs of other vulnerable populations. Ultimately, actions to address the prevention, diagnosis and treatment of (drug-resistant) infections through the NAPs on AMR should be guided by the principles of health for all and leaving no one behind.

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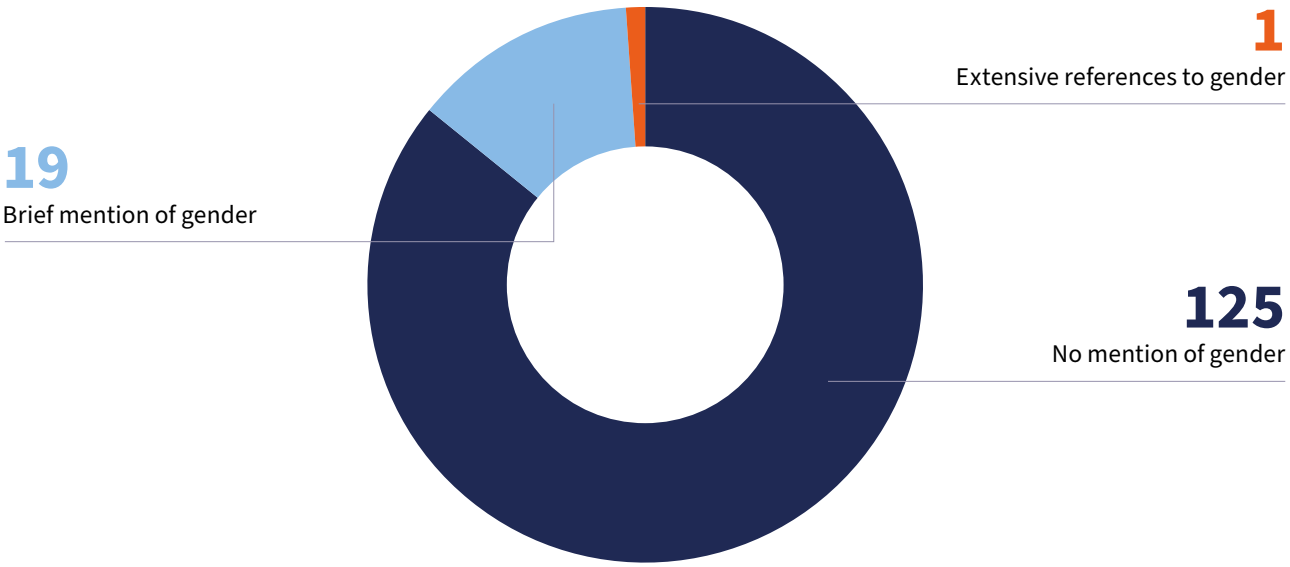
Annex 1. Analysis of national action plans on antimicrobial resistance for gender content

The development of second-generation national action plans (NAPs) on antimicrobial resistance (AMR) provides an opportunity to gender-mainstream the AMR response. Currently engagement with gender in existing NAPs is limited. An analysis of all 145 publicly available NAPs was conducted and only 20 mentioned gender (Figure A1.1) *(1)*. In all, 19 NAPs had a brief mention of gender but no specific policies or goals related to mainstreaming gender.

For example, the need for sex- or gender-disaggregated data was mentioned in Ghana's NAP, and the need for balanced gender representation on technical working groups or multisectoral coordination mechanisms was included in the NAP of Côte d'Ivoire. Only Malawi had extensive references to gender in its NAP, including a discussion of the barriers to gender equity, with equitable access to AMR services identified as a core value.

Figure A1.1. Number of national action plans on antimicrobial resistance that mention gender



Source: World Health Organization *(1)*.

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Annex 2. Proposed output indicators and intended outcomes

The following table links the recommendations outlined in this document with a set of proposed output indicators that can be incorporated in national-level monitoring and evaluation frameworks of national action plans on antimicrobial resistance. These indicators are an entry point for gender-responsive monitoring. At a global level, through the annual Tracking AMR country self-assessment survey (TrACSS), country responses are collected on whether the monitoring and evaluation framework includes the collection of data disaggregated by sex, geographic location, income and other characteristics (question 2.3.f). As of 2023, only 30 countries collected disaggregated data out of the 106 countries that responded *(1)*.

Foundation/ pillar	Summary recommendations	Proposed output indicators	Intended outcomes
Foundation step: effective governance, awareness and education	Policies or actions that strive for gender equality in the national action plan on AMR (recommendation 2) and equal participation and representation from gender experts (recommendations 4 and 5)	Number of women or gender-diverse individuals included in the multisectoral AMR coordination mechanism and technical working groups Number of gender experts included in the membership of the multisectoral AMR coordination mechanism and technical working groups Number of committees on infection prevention and control and antimicrobial stewardship in health care facilities with equal gender representation	Increased gender responsiveness of the national action plan on AMR interventions Increased representation of women in the multisectoral AMR coordination mechanism and technical working groups
	Context-specific AMR awareness and education materials, different approaches to raise awareness and strengthened knowledge of health workers on AMR gender inequalities (recommendations 6, 7 and 8)	Number of AMR awareness campaigns that include gender-specific or transformative language Number of AMR education materials that include gender-specific or transformative language Number of AMR awareness survey results that are disaggregated by sex, age and other social stratifiers	Increased awareness among targeted populations about AMR Increased awareness and knowledge among health workers about gender-specific needs in addressing AMR

Foundation/ pillar	Summary recommendations	Proposed output indicators	Intended outcomes
Foundation step: strategic information through surveillance and research	Collection, analysis and reporting of data on AMR surveillance, antimicrobial use and other types of data, disaggregated by sex and age (recommendations 1, 9 and 10)	Number of standard operating procedures that incorporate sex and age data for: (i) diagnostic sampling; (ii) AMR surveillance and (iii) patient-level antimicrobial use in health facilities	Increased availability of geographically representative data on surveillance of AMR and antimicrobial use, disaggregated by sex
	Research to strengthen the evidence on the intersections between gender and AMR and investment in new diagnostics for infections that disproportionally affect women (recommendations 3 and 11)	Number of AMR research proposals that include dimensions on gender and biological sex Number of target product profiles or diagnostic tests in development that focus on infections affecting women	Increased evidence from research on AMR and gender dimensions Increased number of new diagnostics for infections affecting women
Pillar 1: prevention	WASH and waste management infrastructure available, accessible and safe for all genders without perpetuating stigma and discrimination (recommendation 12)	Percentage of health care facilities with a basic sanitation services Percentage of health facilities with an improved water source Percentage of health facilities with functional hand hygiene facilities Percentage of health facilities where waste is safely segregated into at least three bins, and sharps and infectious waste are treated and disposed of safely	Reduced maternal mortality due to (drug-resistant) infections, including sepsis Reduced bloodstream infections caused by: (i) MRSA; and (ii) ESBL[1] in *Escherichia coli*, disaggregated by sex and age
	Identification of and response to gender inequalities in the risk of exposure to (drug-resistant) infections (recommendation 13)	Number of infection prevention and control interventions in the community and health care setting to address gender-related risk of exposure	
	Gender mainstreaming of the immunization programme – in line with WHO's immunization agenda 2030 on why gender matters *(2)*	Number of immunization analysis reports disaggregated by sex and age Number of community engagement immunization campaigns that address gender norms	

[1] Third-generation cephalosporin resistance as a proxy.

Foundation/ pillar	Summary recommendations	Proposed output indicators	Intended outcomes
Pillar 2: access to essential health services	Culturally sensitive and gender-responsive health services for (drug-resistant) infections (recommendation 14)	Number of analyses of existing coverage by health insurance and/or benefit packages to identify populations that are not covered Percentage of women aged 15–49 years with a live birth in a given time period who received antenatal care four or more times (proxy indicator)	Increased coverage of women and other vulnerable groups in health insurance packages
	Equity in access to diagnosis and quality-assured treatment of (drug-resistant) infections (recommendations 15, 16 and 17)	Number of standard operating procedures for forecasting and procurement of health products at health facilities that include consideration of disease epidemiology by sex and age Proportion of health facilities with a core set of relevant essential antibiotics available and affordable on a sustainable basis	Decreased number of stockouts of antimicrobials to treat infections affecting women and other vulnerable groups
Pillar 3: timely, accurate diagnosis	Retrospective review of diagnostic services for different (drug-resistant) infections to identify and address any gender inequalities (recommendation 18)	Proportion of health facilities that have laboratory request forms that include a field for the patient's sex out of the total number of health facilities surveyed Number of diagnostic stewardship guidelines that incorporate local sex and age differences in the prevalence of (drug-resistant) infections	Increased availability of data on diagnostic services received for (drug-resistant) infections, disaggregated by sex and age Increased number of (recently) pregnant women with a suspected infection for which: (i) a blood sample was taken and/or (ii) antimicrobial susceptibility testing was done

Foundation/ pillar	Summary recommendations	Proposed output indicators	Intended outcomes
Pillar 4: appropriate, quality-assured treatment	Identification of and response to gender biases or inequalities in antimicrobial prescribing through prescription audits (recommendation 19)	Number of antimicrobial prescription audits that incorporate a gender analysis	Reduced inappropriate use of antimicrobials in the community and health care settings
	Gender assessment of the effect of policies or regulations that aim to reduce over-the-counter sale of antimicrobials on access to essential antimicrobials (recommendation 20)	Number of impact assessments of regulations on over-the-counter sales of antimicrobials that include a gender analysis Number of policies or regulations on antimicrobial stewardship that are designed based on gender analysis	

AMR: antimicrobial resistance; ESBL: extended-spectrum beta-lactamases; MRSA: methicillin-resistant *Staphylococcus aureus*; WASH: water sanitation and hygiene; WHO: World Health Organization.

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Annex 3. Technical toolbox for gender mainstreaming

Background on sex, gender and antimicrobial resistance interventions

WHO

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Others

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Integration of gender into programmes and research

WHO

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Gender-responsive awareness and behaviour change

WHO

- A guide to tailoring health programmes: using behavioural and cultural insights to tailor health policies, services and communications to the needs and circumstances of people and communities. Geneva: World Health Organization; 2023 (https://iris.who.int/handle/10665/367041).
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WHO

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