



World Health
Organization

Capturing the evidence on access to essential antibiotics in refugee and migrant populations



Global Evidence Review on Health and Migration (GEHM) series

The GEHM series is an evidence-informed normative product of the WHO Health and Migration Programme to inform policy-makers on migration-related public health priorities. These reviews aim to respond to policy questions identified as priorities by summarizing the best available evidence worldwide and proposing policy considerations. By addressing data gaps on the health status of refugees and migrants, the GEHM series aims to support evidence-informed policy-making and targeted interventions that are impactful and make a difference in the lives of these populations.



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(Global Evidence Review on Health and Migration (GEHM) series)

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Foreword

World Health Organization (WHO) has an ambitious agenda for universal health coverage, highlighted in its Thirteenth General Programme of Work 2019–2023 and the Triple Billion Targets, that is designed to fully support the United Nations 2030 Agenda for Sustainable Development and Sustainable Development Goals (SDGs).

Much has been achieved over the last five years. Regarding communicable diseases, the SDG target on hepatitis B has been met, and since 2015 the number of people who have received treatment for hepatitis C has increased ninefold to 9.4 million, thus reversing the trend of increasing mortality for the first time.

The world may be close to our target of 1 billion people enjoying better health and well-being by 2023, although progress is only about one quarter of what is required to reach the relevant SDG targets. Unfortunately, on universal health coverage the situation is much less satisfactory, with progress of less than one quarter of what is required to reach the Triple Billion Target. Therefore, there is still much to be done.

Despite real successes in some areas, compelling challenges remain. One is antimicrobial resistance (AMR), which is the subject of this Global Evidence Review on Health and Migration (GEHM). AMR is a complex global health, socioeconomic and development challenge, with bacterial AMR alone causing over 1.27 million deaths per year worldwide. Left unchecked, AMR has the potential to derail progress towards the Triple Billion Targets and the SDGs.

AMR occurs when bacteria, viruses, fungi and parasites change over time and no longer respond to medicines, making infections harder to treat and increasing the risk of disease spread, severe illness and death. Therefore, AMR is a complex global challenge with significant implications for human health, social well-being and economic development. Systematic misuse and overuse of antibiotics and other antimicrobials in both human medicine, veterinary medicine (terrestrial and aquatic) and food production (animals and plants) have put every nation at risk. The irrational use of antibiotics during pandemics and health emergencies also contributes to the emergence and spread of AMR. Unfortunately, the development pipeline for replacement antibiotic products is very weak. Without harmonized and immediate action on a global scale, the world may well be heading back towards a pre-antibiotic era in which common infections could once again become untreatable and lethal.

Effectively addressing AMR requires a balance between access to, and appropriate use of safe and effective antimicrobial medicines. In order to promote a global multisectoral approach to addressing the emergence and spread of antimicrobial

resistance, in May 2015 the World Health Assembly adopted a global action plan on AMR, which outlines five objectives to:

- improve awareness and understanding of AMR through effective communication, education and training;
- strengthen knowledge and the evidence base through surveillance and research;
- reduce the incidence of infection through effective sanitation, hygiene and infection prevention measures;
- optimize the use of antimicrobial medicines in human and animal health; and
- develop an economic case for sustainable investment that takes account of the needs of all countries and increase investment in new medicines and diagnostic tools.

To support the implementation of the global action plan to tackle the threat of AMR, WHO is supporting countries to develop, implement and monitor their national action plans on AMR through providing guidance, tools and technical assistance. This has resulted in 157 countries and territories establishing national action plans for AMR. In addition, close to 120 countries have now enrolled in WHO's Global Antimicrobial Resistance and Use Surveillance System (GLASS), the number of countries collecting and sharing data on AMR linked to the new SDG indicator (3.d.2) has tripled, and there has been a substantial increase in the number of samples collected and analysed globally.

To expedite the implementation of national action plans, greater political commitment and financing are urgently needed. In this regard, the Global Leaders Group on Antimicrobial Resistance and AMR Multi-Partner Trust Fund have been established, the latter of which is now supporting 10 countries to implement targeted One Health activities within their national action plan.

While AMR is a global challenge, it is clear that international refugee and migrant populations may be particularly vulnerable to rising AMR. The draft WHO global action plan for promoting the health of refugees and migrants,¹ adopted by the World Health Assembly in 2019, emphasizes the importance of appropriate antibiotic use and prevention of AMR.

This Report, the fourth in the GEHM series reviews the available evidence on barriers to antibiotic access and appropriate use in refugees and migrants. It finds that the available evidence on refugees' and migrants' access to and use of antibiotics is scarce and is largely constrained to high-income contexts. For example, published evidence on access to antibiotics, comparisons with host populations, and quality of available antibiotics is almost non-existent for refugee camp settings in low and middle-income countries (LMICs).

¹ *Promoting the health of refugees and migrants: draft global action plan, 2019–2023: report by the Director-General. In: Seventy-second World Health Assembly, Geneva, 20–28 May. Geneva: World Health Organization; 2019 (document A72/25 Rev.1; <https://apps.who.int/iris/handle/10665/328690>, accessed 10 June 2022).*

This Report reviews the several barriers faced by refugees and migrants in seeking formal care, and by extension, in accessing and using antibiotics. Differences in health systems, legal entitlements and drug reimbursement programmes all contribute to variable levels of access to antibiotics for refugees and migrants across high-income countries. Unfortunately, few studies have evaluated the effectiveness of interventions to address barriers to appropriate use of antibiotics by refugees and migrants, and none have reported on interventions to address barriers to access.

Drawing on the available evidence on the existence and severity of barriers to access and appropriate use, along with evidence from previously implemented interventions, the Report provides key policy considerations for improving access to and appropriate use of antibiotics in refugee and migrant populations. Policy considerations are offered at the global and national levels along five areas: global governance, global data collection, and overcoming national-level barriers to seeking care, utilizing care and receiving adequate care.

AMR threatens the very core of modern medicine and the sustainability of an effective global public health response to the enduring threat from infectious diseases. It threatens the effective prevention and treatment of an ever-increasing range of infections caused by bacteria, parasites, viruses and fungi. Sadly, refugees and migrants share a heightened vulnerability to this threat.

Yet, today, few AMR national action plans have included interventions targeting refugees and migrants, and only 20% of national AMR action plans (most in higher-income countries) are fully funded and are being effectively implemented and monitored. The challenge of AMR is not insurmountable, but it remains daunting and complex. It will take global commitment and determination, strong multisectoral governance, a programmatic approach with a focus on strengthening health systems, ensuring equitable access to interventions dealing with prevention, diagnosis, and appropriate treatment, adequate financing, as well as good data and extended research in LMICs, to mitigate AMR.

The inclusion of refugees and migrants into the global efforts to tackle AMR is essential. It is hoped that publication of this Report will be catalytic and help in these efforts and, thereby, contribute to the achievement of the Triple Billion Targets and the ultimate objective of the SDGs to leave no one behind.



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Preface

The United Nations 2030 Agenda for Sustainable Development and the Sustainable Development Goals have a global expectation to leave no one behind in the pursuit of peace and prosperity for people and ending poverty through various strategies. In support, WHO is committed to the ambitious Triple Billion Targets that aim to achieve 1 billion more people with universal health coverage, 1 billion more people protected from health emergencies and 1 billion more people with better health and well-being by 2023.

If these goals are to be achieved, identifying and responding to the needs, including the health needs, of refugees and migrants are essential. This is the aim of WHO's 2019 draft WHO global action plan for promoting the health of refugees and migrants,² which was established to promote and secure refugees' and migrants' health rights in the context of the human right to health and universal health coverage for all. Progress needs to be equally shared if these expectations are to be met. Refugees and migrants have special needs and requirements in terms of their physical and mental health, and often face challenges in accessing public health and health care. This includes barriers to accessing essential antibiotics and information on their appropriate use.

In response, effective public health interventions and health care services need to be provided to refugees and migrants in a culturally and linguistically sensitive way, with the avoidance of exclusion, stigma and discrimination. Above all, more effective and accessible primary care is needed. The benefits of building more resilient health systems are enormous, including for promoting health, preventing diseases, advancing equity and strengthening health security.

The COVID-19 pandemic brought these issues to the fore and showed that equity is crucially important to pandemic preparedness and response measures. Refugees and migrants have been more vulnerable to severe acute respiratory syndrome coronavirus 2 infection and COVID-19-related death owing to lack of financial protection, crowded living conditions, and informal and potentially dangerous labour settings, and often have limited access to health care, including COVID-19 vaccines. At the same time, their lives have been impacted by restrictive migratory policies adopted to counter the pandemic.

If the current health situation for refugees and migrants is to improve at all levels, the generation and analysis of evidence on migration and health are essential. To contribute to fulfilling this agenda, the WHO global Health and Migration Programme launched the Global Evidence Review on Health and Migration series.

² *Promoting the health of refugees and migrants: draft global action plan, 2019–2023: report by the Director-General. In: Seventy-second World Health Assembly, Geneva, 20–28 May. Geneva: World Health Organization; 2019 (document A72/25 Rev.1; <https://apps.who.int/iris/handle/10665/328690>, accessed 10 June 2022).*

Each review addresses a policy question related to refugee and migrant health that was identified as a priority public health concern. This Report, the fourth in the GEHM series, focuses on antimicrobial resistance (AMR) and reviews the available evidence on barriers to antibiotic access and appropriate use in refugees and migrants.

AMR is a complex global health challenge with the potential to return the world to the pre-antibiotic era, when 40% of deaths were attributable to communicable diseases.³ In order to promote a global approach to ensure prevention and continued effective treatment of infectious diseases with quality-assured, safe and effective medicines, in May 2015 the World Health Assembly adopted a global action plan on AMR.

This Report synthesizes the available evidence on barriers to antibiotic access and appropriate use in refugees and migrants across the migration cycle and provides policy considerations for equitable access and appropriate use of antibiotics among refugee and migrant populations. The available data was scarce and confined to high-income contexts, thereby limiting the generalizability of the findings.

Nevertheless, it is clear that refugees and migrants face many barriers seeking and reaching health care. Aspects of the health system itself can also serve as a barrier, including high waiting times and limited service capacity, high health care costs, diagnostic uncertainty, stock-outs of essential medicines, and a lack of translated materials or interpreter services. Stigma of disease and language barriers may shape refugees' and migrants' preferences to seek treatment through informal networks, risking exposure to substandard or falsified medicines. All these factors, together with a lack of knowledge of antibiotics and their appropriate use, may contribute to inadequate, unnecessary or incorrect use of antibiotics by these populations.

Leaving no one behind requires understanding and addressing the needs of vulnerable populations, including refugees and migrants. To address this situation, a more programmatic approach to addressing AMR is required that puts people and equity at the centre of AMR mitigation efforts. This approach requires political commitment; adequate financing; and interdependent interventions that support prevention measures, access to essential health services, access to timely and quality diagnosis, and access to quality treatment and care. WHO is developing a people-centred framework to addressing AMR, linked to achieving universal health coverage through a primary health care approach; this will guide the development of the next iteration of national action plans on AMR. We envision that new people-centred national action plans on AMR will include specific policies and interventions targeting vulnerable refugee and migrant populations.

Based on the available evidence on the existence and severity of barriers to access and appropriate use and from previously implemented interventions, this Report

³ Davis S. Dame Sally Davies' speech at the Discovery Awards Launch. 18 May 2016. Longitude Prize. (<https://longitudeprize.org/blog/dame-sally-davies-speech-at-the-discovery-awards-launch/>, accessed 10 June 2022).

provides key policy considerations for improving access to and appropriate use of antibiotics in refugee and migrant populations.

Policy considerations are offered at the global and national levels along five areas: global governance, global data collection, and overcoming national-level barriers to seeking care, utilizing care and adequate care. In particular, the Report highlights the following points.

- At national level, both national action plans on AMR and migration and health plans should seek to improve access to the tools necessary for optimal case management, while removing existing barriers affecting the desire to seek formal care. This could be done through facilitating access to prevention measures, diagnosis and treatment/care by improving language accessibility; training and supporting health care personnel to be responsive to cultural preferences; reducing out-of-pocket expenses; and improving refugees' and migrants' knowledge of antibiotics through community-based initiatives.
- Efforts should be made to improve knowledge among refugees and migrants of their entitlements to health care and the means of registration. Essential antibiotics should be both available and affordable for refugees and migrants, as for all vulnerable populations; and access to WHO's "Access" group of antibiotics⁴ should be promoted.

It is hoped that this Report will support policy-makers in addressing global and national challenges related to AMR and migration and will contribute to including refugees and migrants in all global, regional and national actions designed to reduce the threat of AMR, as a vital contribution to achieving the Triple Billion Targets, including universal health coverage, and the Sustainable Development Goals.



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⁴ Of the Access, Watch and Reserve framework for antibiotic classification. Adopt AWaRe: handle antibiotics with care [website]. Geneva: World Health Organization; 2019 (<https://adoptaware.org/>, accessed 10 June 2022).

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With the overall objective of strengthening normative research and evidence and gathering works of the PHM, an Interdivisional Working Group has been established to support the overall production of the Global Evidence Review series. Representatives from Science and Data Divisions in the Interdivisional Working Group (focal points listed below) have kindly agreed to support this initiative from normative, methodological, research and data perspectives, and to advise technical staff from PHM and other relevant programme areas as appropriate in various stages of development of the Global Evidence Review series.

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Abbreviations and acronyms

AMR	antimicrobial resistance
GEHM	Global Evidence Review on Health and Migration (series)
HIC	high-income country
IOM	International Organization for Migration
LMICs	low- and middle-income countries
NGO	nongovernmental organization
TB	tuberculosis

Executive summary

Antimicrobial resistance (AMR) is a complex global health challenge, with significant implications for human health, social well-being and economic development. Bacterial AMR alone causes over 1.27 million deaths annually worldwide. Although the development of resistance in pathogens is natural and unavoidable, the emergence of AMR has been accelerated by decades of overuse of antimicrobials across sectors, prematurely rendering these drugs less effective in treating common infections.

Maintaining the ability to treat serious infections requires a balance between equitable access to and appropriate use of existing and new antimicrobial medicines for all. International refugee and migrant populations may be particularly vulnerable to rising AMR; the draft global action plan for the promotion of the health of refugees and migrants underscores the importance of appropriate antibiotic use and prevention of AMR. The number of international refugees and migrants has grown significantly since the early 2000s, reaching an estimated 281 million, or about 3.5% of the global population, in 2020. The conditions under which refugees and migrants leave their countries of origin and transit to their destination countries may lead to increased infections, as well as to disruptions and barriers to health care access.

This Report, the fourth in the Global Evidence Review on Health and Migration (GEHM) series, synthesizes the available evidence across four themes related to antibiotic access and use: (i) access, (ii) appropriate use, (iii) barriers to access and use, and (iv) interventions to improve access and use. It provides policy considerations for equitable access and appropriate use of antibiotics among refugee and migrant populations. A scoping review found scarce evidence on access and use of antibiotics by refugees and migrants and that existing research largely focuses on migrants residing in high-income contexts; therefore, generalizability of the findings is limited. However, the available evidence suggests that access to and use of antibiotics by refugee and migrant populations is heterogeneous and is significantly influenced by the health systems of the host countries, as well as by non-health policies and factors. Evidence on access to antibiotics, antibiotic use compared with the host population and quality of available antibiotics is almost non-existent for refugee camp settings and for migrants residing in low- and middle-income countries (LMICs). Differences in health systems, legal entitlements and drug reimbursement programmes have resulted in variable levels of access to antibiotics for refugees and migrants across high-income countries (HIC). Systemic factors in the countries of origin, transit

and destination play a major role in determining patient behaviours and facilitating access to and appropriate use of antibiotics. The review identified no evidence on the direct or indirect impact of the COVID-19 pandemic on access to antibiotics in refugee and migrant populations.

Given the variability in health systems across countries with different income levels, refugees and migrants face a wide range of barriers in obtaining health services and, by extension, in accessing and using antibiotics. Previous unsatisfactory experiences with formal care can act as a barrier to refugees' and migrants' desire for formal care, as can norms and preferences that encourage self-medication and the ease of informal access to antibiotics. Those refugees and migrants who do desire care may face barriers related to stigmatization, fear of deportation or language, and may also be unable to reach formal care due to financial and time constraints. Moreover, lack of knowledge about antibiotics and their appropriate use may contribute to the unnecessary or incorrect use of antibiotics. Aspects of the health system that can create barriers to access to and appropriate use of antibiotics include long waiting times and limited capacity of health services, high health care costs, diagnostic uncertainty, and lack of translated materials or interpreter services.

Policy considerations

This GEHM synthesized the available evidence on barriers to antibiotic access and appropriate use refugees and migrants, and on interventions implemented to address these barriers. Based on its findings, policy considerations are given in five areas: global governance, global data collection, and overcoming national-level barriers to seeking formal care, utilizing formal care and receiving adequate and quality care.

Global governance

- Strengthen engagement between key institutions for coordinated global governance.
- Align and integrate action plans for a coherent framework and concerted action.
- Establish financial arrangements in LMIC markets for equitable antimicrobial access and use.

Global data collection: research and surveillance

- Strengthen surveillance systems for data-driven and evidence-informed policy solutions.
- Support research to fill substantial knowledge gaps.

Overcoming national-level barriers to seeking formal care

- Facilitate access to care by improving language accessibility.
- Monitor and support the provision of migrant- and refugee-sensitive cultural training for health care personnel.
- Improve migrants' and refugees' knowledge of antibiotics through community-based initiatives.

Overcoming national-level barriers to utilizing formal care

- Remove status-related barriers to care.
- Ensure that essential antibiotics are affordable.
- Improve knowledge of and registration for entitlements to care.
- Avoid restrictions that limit access to antibiotics for vulnerable populations.

Overcoming national-level barriers to receiving adequate and quality care

- Ensure access to the tools necessary for optimal case management in vulnerable populations.

1. Introduction

1.1 Background

AMR is a complex global challenge with significant implications for human health, social well-being and economic development. Although the development of resistance in pathogens is natural and unavoidable, the emergence of AMR has been accelerated by decades of overuse of antimicrobials across sectors (1,2), prematurely rendering these drugs less effective in treating common infections (3). Bacterial AMR was the third leading cause of death in 2019, with 1.27 million deaths directly attributable to and 4.95 million deaths associated with AMR (4). Globally, the AMR burden is high and is disproportionately placed on LMICs. Regions with the highest death rates attributable to AMR are found in Africa and south Asia (4), where AMR threatens to undo years of progress towards the Sustainable Development Goals (5). The global cost of AMR has the potential to reach US\$ 100 trillion by 2050 (6). According to this trajectory, by 2030 low-income countries may lose more than 5% of their gross domestic product due to AMR and, without rapid action, an additional 24 million people in LMICs may be forced into extreme poverty (7).

The number of international refugees and migrants has grown significantly since 2000, reaching an estimated 281 million, or about 3.5% of the global population, in 2020 (8). (Box 1 provides definitions for the refugee and migrant groups discussed in this Report.) Although HICs host nearly two thirds of international migrants, most refugees are hosted by LMICs. Refugees comprise 25% and 50% of international migrants in middle-income and low-income countries, respectively, but only 3% in HICs (8). At the end of 2020, more than 80% of the estimated 24.6 million people who had been forcibly displaced across international borders were hosted by LMICs (9).



Box 1. Definitions for target populations

Asylum seeker. An individual who is seeking international protection. In countries with individualized procedures, an asylum seeker is someone whose claim has not yet been finally decided by the country in which he or she has submitted it. Not every asylum seeker will ultimately be recognized as a refugee, but every recognized refugee is initially an asylum seeker (10).

Migrant. There is no universally accepted definition of migrant. For the purpose of collecting data on migration, the United Nations Department of Economic and Social Affairs defines an international migrant as “any person who changes his or her country of usual residence” (11). It includes any people who are moving or have moved across an international border, regardless of their legal status, duration of stay abroad or causes for migration. The International Organization for Migration (IOM) considers the migration as an umbrella term covering all forms of movement within and outside a State. The IOM’s definition of a migrant includes “a person who moves away from his or her place of usual residence, whether within a country or across an international border, temporarily or permanently, and for a variety of reasons” (10). This is subdivided into:

- **documented migrant:** a migrant who entered a country lawfully and remains in the country in accordance with his or her admission criteria; and
- **migrant in an irregular situation:** a person who moves or has moved across an international border while not authorized to enter or to stay in a State pursuant to the law of that State and to international agreements to which that State is a party.

Refugee. According to the United Nations Convention relating to the Status of Refugees (Art. 1A(2)) (12), a refugee is:



a person who, owing to a well-founded fear of persecution for reasons of race, religion, nationality, membership of a particular social group or political opinions, is outside the country of his nationality and is unable or, owing to such fear, is unwilling to avail himself of the protection of that country.

For State Parties to the African Union Convention governing the specific aspects of refugee problems in Africa (Art. 1(2)) (13), the term refugee also applies to:



every person who, owing to external aggression, occupation, foreign domination or events seriously disturbing public order in either part or the whole of his country of origin or nationality, is compelled to leave his place of habitual residence in order to seek refuge in another place outside his country of origin or nationality.

Refugee and migrant populations may be particularly vulnerable to rising AMR. The conditions under which refugees and migrants leave their countries of origin and travel to destination countries may lead to increased infections, as well as to disruptions and barriers to health care. Key drivers of infection such as crowding, poor hygiene and poor sanitation may be present in detention centres, refugee camps and housing for migrant workers, leading to the spread of infection with resistant pathogens (14,15). Outbreaks of respiratory and gastrointestinal infections provide favourable conditions for spreading resistant pathogens, especially in underresourced settings with inadequate health care (14,16). Refugee and migrant populations may also have limited access to appropriate and effective antibiotics. Variable health care provision for refugees and migrants across countries poses systemic barriers to health care based on legal status, while informal barriers (such as language and cultural differences) may prevent refugee and migrant populations from accessing health care through the available pathways (15,17).

Effectively addressing AMR among refugee and migrant populations will require a balance between ensuring access to safe and effective antimicrobials and stewardship to ensure the appropriate prescription and use of antimicrobials (18). Efforts to achieve these goals will be complicated by limited access for refugees and migrants to health care services in many settings. Poor access to timely, appropriately prescribed antimicrobials may facilitate the further development of AMR.

1.2 Objectives of the Report

In line with current WHO efforts to tackle bacterial resistance, this GEHM specifically focuses on antibiotic use rather than on AMR more broadly. The aim was to synthesize the existing evidence from academic and grey literature on access to and use of essential antimicrobials in international refugee and migrant populations. Given the diverse range of migratory flows, the review focused on access to and use of essential antibiotics among international migrants, including refugees, who have moved across international borders. Within this broader objective, the evidence synthesis and analysis explored four themes:

- access to antibiotics, including availability and affordability;
- appropriate use of antibiotics, including antibiotic misuse and overuse;

- barriers to access and appropriate use of antibiotics, including disruptions caused by the COVID-19 pandemic; and
- interventions, best practices and case studies that aim to improve access to and appropriate use of antibiotics among refugee and migrant populations.

Policy considerations are provided to support policy-makers to address national and global challenges related to AMR and migration.

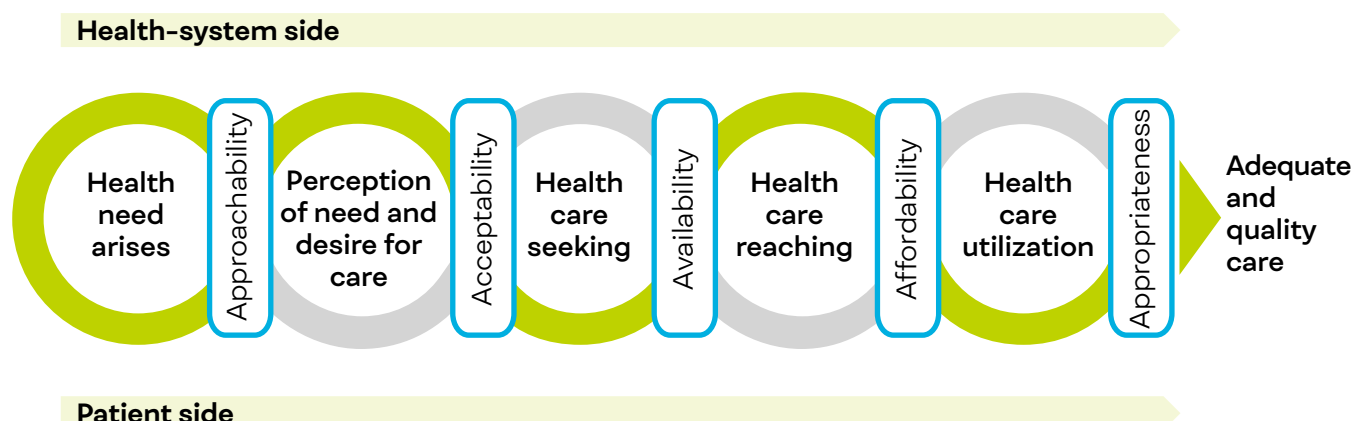
1.3 Methodology

A scoping review was carried out in January 2022 of academic and grey literature published in an official United Nations language (Arabic, Chinese, English, French, Russian or Spanish), with no restrictions on publication date. This allowed evidence to be collected on access to and use of antibiotics among refugee and migrant populations in all WHO regions. Access was defined as refugees' and migrants' ability to obtain quality-assured antibiotics when necessary, including the physical availability of antibiotics and the affordability of antibiotics (19). Appropriate use includes both patient and prescriber dimensions of appropriate treatment, such as guideline concordance, unnecessary prescriptions, self-medication, and non-adherence to prescribed treatment. Annex 1 contains full details of the search strategy and inclusion and exclusion criteria.

In total, 2823 peer-reviewed articles were identified after removal of duplicates, with a further 2209 excluded based on the title or abstract. Of the remaining 614 potentially relevant documents, 52 were included in the evidence synthesis (listed in Annex 2). These were supplemented by 18 systematic reviews obtained by snowball searching and 19 articles from grey literature searches, making a total of 89 articles, of which 88 are directly cited in this Report (20–107).

A conceptual framework was employed to structure the analysis of barriers to antibiotic use among refugees and migrants along the access pathway in five dimensions: (i) approachability, (ii) acceptability, (iii) availability and accommodation, (iv) affordability and (v) appropriateness (Fig. 1) (19). Interventions that have been implemented to address these barriers and to improve access and appropriate use of antibiotics among refugees and migrants were also explored.

Fig. 1. Conceptual framework of the access pathway for antibiotics



1.3.1 Limitations of this review

Although the review was designed with a global scope, the available peer-reviewed literature largely focused on migrants who had already settled in HICs. Only a few studies focused on refugee and migrant populations in LMICs. The methodology tried to address this limitation by including publications in all six United Nations languages and by complementing the published literature with stakeholder engagement, including in underrepresented regions. Nevertheless, in the light of the disproportionate AMR burden and large refugee and migrant populations in LMICs (4,8), this gap in the peer-reviewed literature is an important limitation. In addition, the Report focused solely on international refugee and migrant populations: other vulnerable populations, such as internally displaced people, were outside the scope of the analysis. Most of the evidence collected refer to refugees and migrants population without comparison with the host population. Therefore, there is no evidence that the findings in the refugee and migrant population are specific to these populations or reflect a more general situation.

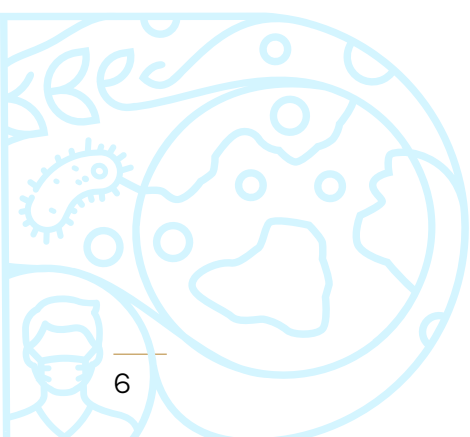
2. Results

2.1 Access to antibiotics

Overall, limited published evidence was found on access to essential antibiotics by refugees and migrants. Much of the evidence was from HICs, where access to antibiotics for refugees and migrants is highly variable, depending on the outcomes studied and on contextual and population characteristics (20–33). However, these findings are consistent with systematic reviews on refugees' and migrants' access to health care services beyond antibiotics, which found variable access depending on the type of health service, including primary care, hospitalizations, emergency services and specialist services (34–36).

Ensuring access to essential antibiotics is both necessary to alleviate the burden of infectious disease (18) and a basic human right under international law (108). Despite many normative and legislative protections for refugees' and migrants' access to health care (including essential medicines such as antibiotics), access to care varies widely across jurisdictions and contexts in practice. In some countries, antibiotics may be accessed by refugees and migrants through the same pathway as for the host population, but in others access is provided through specialized focus services (37). In refugee camps and camp-like settings and in response to sudden migrant influxes, access is often only available through limited programming that is typically coordinated and provided by intergovernmental organizations and nongovernmental organizations (NGOs) (37).

Studies on refugees' and migrants' access to antibiotics predominantly focused on whether this differs from access for host populations based on three indicators: prescription rates, dispensation or reimbursement rates, and self-reported consumption of prescription antibiotics. Evidence was largely drawn from settings where a prescription is required to obtain antibiotics. Qualitative research showed that refugees and migrants also access antibiotics through informal mechanisms in these settings (20,38–52); however, none of the included studies estimated what proportion of health complaints were treated through these informal pathways. Similarly, no evidence was found on rates of access to antibiotics for refugees and migrants in health systems where prescriptions are not required to obtain antibiotics.



2.1.1 Comparisons with host populations

Studies comparing prescription rates for antibiotics in foreign-born and host populations in Europe suggest that foreign-born patients are significantly more (25,27,28,51,52) or comparably (29,33) likely to be prescribed antibiotics than native-born patients for a broad range of infections. In contrast, the only study from the United States of America found that foreign-born patients were less likely than patients born in the United States to be prescribed antibiotics for skin lesions, despite comparable rates of methicillin-resistant *Staphylococcus aureus* in both groups and higher rates of methicillin-susceptible *S. aureus* in foreign-born patients (30). These regional differences are consistent with a systematic review, which found that migrants in Europe are significantly more likely to access primary care services compared with migrants in the United States (36). Variable access within the WHO European Region is likely to reflect myriad contextual factors, including health system governance (53,109,110) and prescribing practices (111,112). Within this limited sample of studies, prescription rates differed across age groups and care settings. In Ireland, adult asylum seekers were 2.3 times more likely than the host population to be prescribed an antibiotic at consultations with a general practitioner (28), whereas in Switzerland, asylum-seeking children were as likely as host populations to be prescribed an antibiotic in tertiary care (29). Migrants' duration of stay and acculturation into the host country may also explain differences in prescription rates. For example, in the Netherlands, first-generation migrants were more likely to be prescribed an antibiotic compared with the second-generation migrants and the host population (which had comparable prescription rates) (25). First-generation migrants were also significantly more likely to undergo diagnostic testing than the host population (25), suggesting that this migrant population may have a greater need for care or that health care providers have a biased perception of their need. Similarly, in Sweden, the rate of antibiotic prescriptions for children of foreign-born parents with good Swedish language skills was comparable to that of children of native-born parents (33).

Studies into antibiotic dispensation or reimbursement rates found significantly lower (21,23,24) or similar (22,32) antibiotic utilization rates among migrants compared with host populations. Studies into the self-reported consumption of prescribed antibiotics found that for migrants in Europe formal access to antibiotics was comparable to that of host populations (20,26); in the United States, antibiotic prescription rates were lower for migrants (30) or comparable in migrant and host populations (31). No studies were identified linking antibiotic prescription data to antibiotic dispensation or consumption data.

Systematic reviews of access to health services consistently found that international refugees and migrants experience reduced access to health care services compared with host populations (34–36), suggesting limited access to appropriately prescribed antibiotics. None of the included studies measured or investigated the availability and affordability of antibiotics among refugee and migrant populations. More generally, Box 2 describes the availability and affordability of health care for refugees and migrants and Box 3 discusses the limited evidence found on interruptions to the care cascade for these populations.

Box 2. Availability and affordability of care for refugees and migrants

Availability of care

The availability of care for refugee and migrant populations is determined by the care to which they are legally entitled, the presence of sufficient health care providers to meet demand and the physical availability of appropriate drugs (19). In many countries, entitlement to care is determined by legal status (54). Documented refugees and migrants generally access primary care under the same system as the host population or through dedicated programmes (55). However, migrants in irregular situations and asylum seekers have little or no legal entitlement to care (53,113).

The physical availability of appropriate antimicrobials is a continuing challenge (56,114,116) owing to a faltering research and development pipeline, minimal incentives to introduce products to markets (115) and fragile supply chains, leading to repeated shortages (57,116). Specialized national programmes providing tailored care to refugee and migrant populations are more likely to have strained resources and are not equipped to respond to surge conditions. In contrast, although external programmes are often designed for scale-up, they may face surges of arrivals, overcrowding or outbreaks that limit the availability of care in certain settings (58,59,117). Once procured, getting appropriate antibiotics into the right hands can be an additional challenge, particularly in rural or remote regions. As AMR rates rise, accessing the correct antibiotic for a given infection may become more difficult in such areas because of supply shortages and supply chain gaps (118).

Box 2. contd

Affordability of care

Affordability of care is determined by entitlement to coverage and its contribution mechanisms, as well as by the direct, indirect and opportunity costs faced by the patient. As with entitlement to care, entitlement to coverage is often linked to legal status (54). Many countries with national health insurance schemes do not cover refugees, although they still need to pay the same fees as nationals (55). However, legal status does not guarantee awareness or use of entitlements. A study of Mexican migrant workers in the United States found that among those reporting prohibitive cost as the primary reason for crossing the border into Mexico (for which documentation is needed) to receive cheaper care 86% were uninsured (60).

Moreover, migrant status intersects with and exacerbates the typical determinants of access to care, such as socioeconomic position (119,120). Even where care may be affordably priced, patient ability to pay is not guaranteed. For undocumented migrants, lack of coverage may be coupled to exploitive practices at work, which reduce both their earning potential and access to work-provided health insurance (61,121).

Box 3. Interruptions to the care cascade

For refugees and migrants, the care cascade is highly vulnerable to repeated interruptions; even among those who successfully reach the health care system, only a fraction complete treatment. A United States study reported that 20% of eastern Asian migrants with a confirmed diagnosis of *Helicobacter pylori* infection did not receive a prescription, despite the referring physician receiving a recommendation for treatment (62). At the four-year follow-up, most patients remained *H. pylori* positive. A systematic review of the care cascade in populations screened for latent tuberculosis (TB) infection found that, if treatment was started, only 18.8% of the overall population completed treatment, with a lower rate for migrants (14%) (63). Overall, significant losses were reported at each step of the care cascade, with the greatest losses occurring at initial testing, completing a medical evaluation, being referred for treatment and completing treatment. Migrant status was an important predictive factor in not initiating treatment (63).

2.2 Appropriate use of antibiotics

Widespread and inappropriate use of antimicrobials is a leading driver of AMR (2). Antibiotic overuse in the general population has been widely reported: for example, a review of unnecessary use by United States health care providers found that up to 89% of the antibiotics prescribed were unnecessary (122). However, limited evidence was found on antibiotic over-prescription in refugee and migrant populations.

For health care providers, inappropriate prescribing includes prescribing antibiotics for a target indication and patient when it is not clinically warranted (unnecessary use) and prescribing antimicrobials in a manner that does not comply with clinical guidelines (incorrect use). As in the general population (122), unnecessary and incorrect use of antibiotics by health care providers are also commonplace in refugee and migrant populations (64,65). The evidence suggests higher rates of antibiotic prescription for refugees and migrants than for host populations (51,52); however, little evidence was found on barriers to appropriate prescribing of antibiotics to refugees and migrants. One study reported that migrants had an increased odds of receiving an unindicated prescription, and that prescribers perceived diagnostic uncertainty, parental expectations and concerns with assuring follow-up as drivers of unnecessary prescribing (52). In humanitarian response settings, precautionary overprescribing has also been reported, with some prescribers being concerned about overburdening patients with the cost, time or distance of follow-ups (123). In resource-constrained settings, limited availability of equipment resulted in poorer diagnostic accuracy, and insufficient health care providers meant that prescribing responsibilities fell to those with less training (123).

Self-medication is common across populations and cultures (43,66), but self-medication with antibiotics can be especially dangerous for the user and is often accompanied by additional risky practices that are likely to drive resistance (67). The use of substandard or falsified antibiotics for self-medication, as well as errors in use such as dosing, type of antibiotic or length of treatment course, may lead to subtherapeutic dosing. This poses a danger to the health of the user and creates an opportunity for the emergence of resistance. Similarly, self-medication with excessively broad-spectrum antibiotics or unnecessary use for non-indicated illnesses creates additional selection pressure for AMR. Globally, use of antibiotics without a prescription is often associated with very short courses and inappropriate drug and dose choices, with the choice of antimicrobial often driven by financial concerns (67). These patterns of drug use increase the potential for AMR development. As explored in section 2.3, self-medication practices are shaped by many systemic and cultural factors.

Since the terms **inappropriate use**, **misuse** and **overuse** are often used interchangeably in the literature (124), for the sake of clarity, this Report defines two main types of inappropriate use of medicines: unnecessary use and incorrect use (Table 1).

Table 1. Definitions and examples of unnecessary and incorrect antibiotic use

Variable	Unnecessary use	Incorrect use
Definition	Ineffective or un-needed use, given the target indication and patient	Erroneous or non-optimal use of antimicrobials
Example by prescribers	Ordering use of antimicrobials that are not needed or ineffective for the target indication	Prescribing the use of indicated antimicrobials in a manner that does not comply with clinical guidelines, the wrong antimicrobial for the target indication and patient, or the wrong use of the correct antimicrobial
Example by patients	Using antimicrobials without a prescription or guidance from a health care provider, e.g. self-medication, using leftover antibiotics	Non-adherence to the prescribed therapy

Source: Wirtz et al. (124).

2.2.1 Prescriber behaviours

While inappropriate prescribing is widespread in many settings around the world, this study found limited evidence to suggest that providers may be more likely to unnecessarily or incorrectly prescribe antibiotics to migrant and refugee patients (51,52). An Italian study found that children with foreign-born parents had a greater chance of being prescribed antibiotics for conditions that were unlikely to be of bacterial origin (52). Similarly, a nationwide survey of children in Germany found that being a migrant or having migrant parents is significantly associated with the use of prescribed antibiotics to treat common colds or upper respiratory tract infections (51). The evidence suggests that the unnecessary or incorrect prescription of antibiotics for refugee and migrant patients is commonplace (64,65). A retrospective observational study of two primary health care wards for refugee and asylum seekers in Germany found that, contrary to national guidelines, 74% of patients diagnosed with acute bronchitis (142 out of 191) and 7.5% of those diagnosed with upper respiratory tract infections (95 out of 1271) were prescribed antibiotics (64). Moreover, 75% of tonsillitis prescriptions (134 out of 179) and nearly 50% of prescriptions for medications to treat urinary tract infections (47 out of 96) were not consistent with first- or second-line treatment recommendations (64). In addition, 42% of all patients with otitis media (60 out of 143) were prescribed an antibiotic, despite the guidelines emphasizing the principle of reluctant prescription. A similar study performed in Yumbe District (Uganda), which hosts a large refugee settlement, found that 42% of antibiotic prescriptions (155 out of 367) were not indicated (65). The top four types of diseases associated with unnecessary antibiotic prescriptions were malaria (32%; 50 out of 155), non-infectious conditions (15%; 23 out of 155), dental conditions (12%; 19 out of 155) and helminthiasis (11%; 17 out of 155).

2.2.2 Patient behaviours: adherence

Inappropriate antibiotic use in the form of non-adherence to the recommended treatment or self-medication with non-prescribed antibiotics is common worldwide (67,68). The included studies showed that adherence to antibiotic treatment is also a challenge among refugees and migrants. Two studies found that around 45% of refugee or migrant patients did not adhere to the prescribed antibiotic treatment (58,62). Among a cohort of eastern Asian migrants in the United States being treated for *H. pylori* infection, 44% (30 out of 68) failed to complete treatment (62). Having a regular doctor was the only factor to be significantly associated with completing treatment. A study of antibiotic prophylaxis for contacts of patients with diphtheria among refugees in Cox's Bazar (Bangladesh) found that 55% of contacts (22 218 out of 40 364) were adherent at the three-day follow-up (58). In interviews, some migrants living in Australia disclosed having not completed antibiotic courses because they felt "uneasy about their use" (38).

A subset of studies found that early cessation of antibiotic use was common in refugee and migrant populations. Although guidelines are shifting towards shorter antibiotic courses, early cessation of antibiotics is still considered incorrect use because it is a form of non-adherence to prescribed therapy. In a survey of Chinese migrants living in Australia, almost 70% of participants (285 out of 413) said that they would stop their course of treatment once they started feeling better (49). Similarly, in study of adolescent migrants in the United Arab Emirates, 38% of participants (124 out of 324) reported that they would not complete a course of treatment as prescribed if they felt better (69). Physicians in Germany and the Netherlands perceived treatment discontinuation due to "feeling better" as a major challenge; they stated in interviews that migrant patients frequently discontinued antibiotic courses when they were free of symptoms (70).

2.2.3 Patient behaviours: self-medication

Studies suggested that self-medication often results in the unnecessary or incorrect use of antibiotics: for example, patients may take antibiotics for viral infections (40,41,49) or non-infectious diseases (66,71) or may use inadequate doses to treat their infections (66,71). Widespread evidence was found of self-medication among refugees and migrants living in HICs: among migrants in Australia and Spain who reported having recently used antibiotics, 41% (59 out of 145) and 50% (86 out of 170), respectively, had self-medicated (72,73). In contrast, a systematic review of non-prescription antimicrobial use in the general population estimated a self-medication rate of 19% for antimicrobials in southern Europe, including Spain (67). In other surveys, 19–45% of migrants reported having previously obtained or used antibiotics without a prescription (when a prescription was required) (40,41,72,125). A 2018 study of Palestinian refugees in Jordan indicated that at least 62% of respondents had used antibiotics without a prescription (48), and a 2019 survey of household medicine chests in the Sahrawi refugee camp in Algeria found that 17% of the antibiotics identified (7 out of 42) had not been prescribed (71). Similarly, while not specific to antibiotics, an interview study of Pakistani mothers living in New Zealand found that 90% prefer to self-medicate their children before consulting a physician (39). Among Latino migrants living in the United States, injection of antibiotics, either at home or through lay injectionists, was common practice (40,43,47,66,74); interviews with the lay injectionists led to concerns about the quality or type of substance injected (74).

A study comparing the self-medication practices among different population groups in the United States found that participants born in countries where antibiotics were available over the counter were significantly more likely to self-medicate with antibiotics to treat a cough or cold than those born in the United States or in countries with comparable regulatory environments (46). In contrast, a nationwide survey in Germany found that self-medication in children was significantly associated with not having a migrant background (51). Refugees and migrants reported most often sourcing non-prescription antibiotics during trips to their country of origin or having them shipped by family or friends (20,38–46), less often by purchasing them in community stores (40–44,47) or using leftover prescriptions (20,46,48,49), and least often by ordering them online or by mail (20,50) or purchasing them directly from pharmacies (46,48). A systematic review found that non-prescribed antimicrobials were most commonly obtained through family or friends in northern and southern Europe and the Middle East, whereas in Africa, Central America and the Caribbean, and eastern and central Europe, they were most often sourced from pharmacies (67).

No specific evidence was found on the use of substandard and falsified antibiotics by refugees and migrants (Box 4).

Box 4. Quality assurance and substandard antibiotics

Antibiotics are among the most common types of medicine that fail to meet quality assurance standards. This is especially prevalent in LMICs (75), but is reported across countries of all income levels (76). A recent meta-analysis of drug samples in LMICs found that approximately 12% of antibiotics tested were substandard or falsified (77). Typically, national departments and agencies share the responsibility for ensuring procurement from legitimate manufacturers, surveillance and detection of the medical supply, and enforcement and response of substandard and falsified products (76).

Substandard or falsified medicines may be more easily accessible where quality-assured medicines are unavailable or unaffordable for individuals or health care providers. Stock-outs of medicines and antibiotics are frequently confronted in emergency settings or following large displacements of people (65,78,126). In refugee settlements in Yumbe District (Uganda; the country hosting the most refugees in Africa), a study found that on average 32% of antibiotics were not available on a given day, with some essential antibiotics (79) frequently out of stock

Box 4. contd

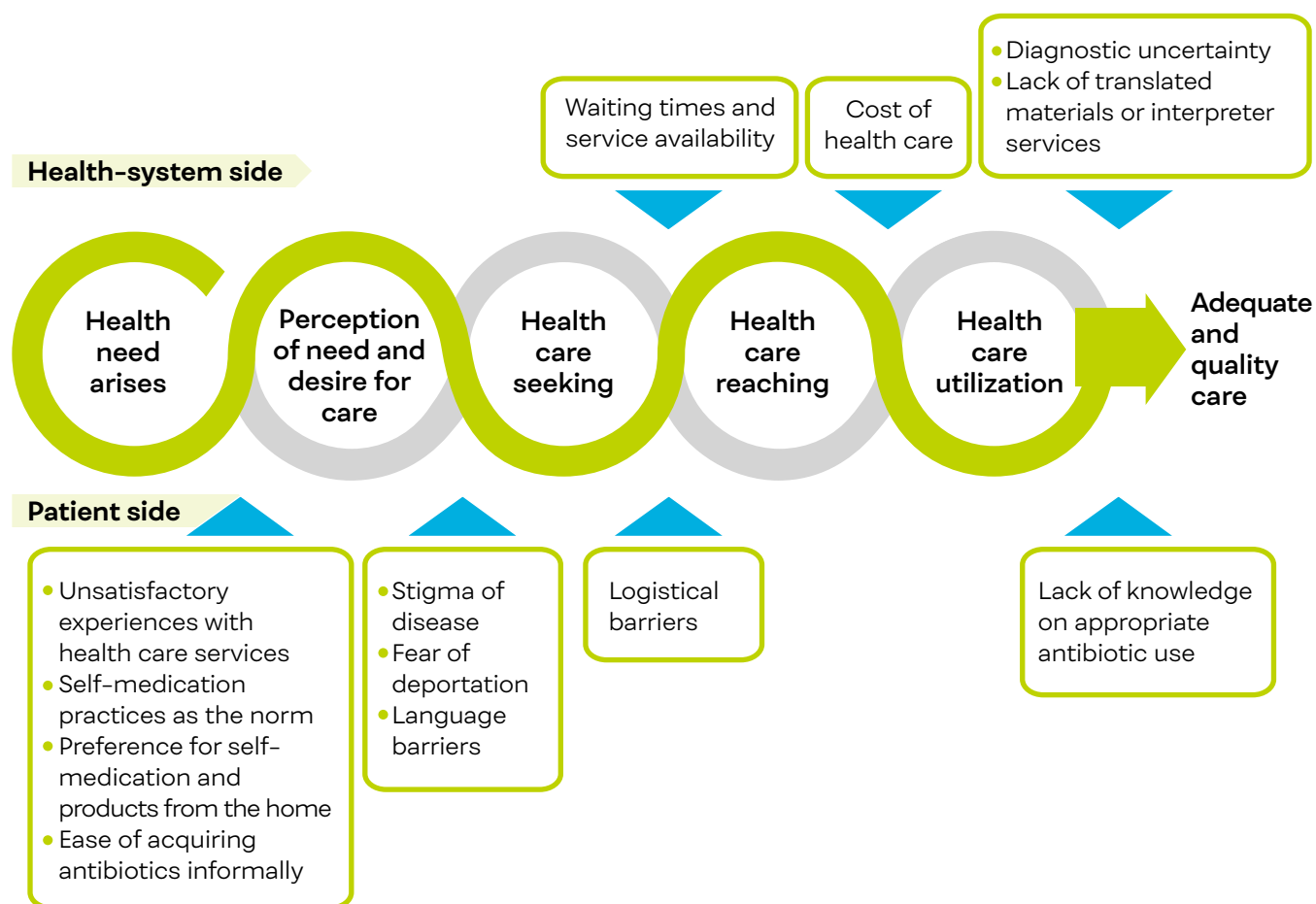
at the health facilities (65). In the absence of a valid alternative when national procurement agencies are unable to fulfil the demand, health care providers may resort to less reliable, or even illegitimate, suppliers (76). Similarly, providers may turn to alternative suppliers in an attempt to improve profitability (76). Both of these scenarios may occur in humanitarian settings such as refugee camps.

Furthermore, where national agencies are unable to satisfy sudden surges in demand, external organizations providing humanitarian relief may supply medicine to local health care providers free of charge. When such programmes end, local providers may perceive the cost of procurement through the national agency to be excessive, and instead opt for poorly regulated suppliers (78).

2.3 Barriers to access to and appropriate use of antibiotics

A patient's ability to access care, including antibiotics, can be disrupted or facilitated at any point along the continuum of care. To successfully proceed along the continuum, requirements must be satisfied on both the health system and patient sides (Fig. 1). Across different regional contexts, refugees and migrants face numerous, often interrelated, barriers to accessing health systems (80,81,127) and are likely to face more barriers to care than host populations (128). Fig. 2 shows the types of barriers identified to appropriate antibiotic use along the continuum of care. Most of the evidence focused on patient-side barriers at the early stages of the continuum of care, with less available on barriers at the later stages of the continuum of care or on health system barriers.

Fig. 2. Barriers to antibiotic access and appropriate use along the continuum of care



Studies consistently found that barriers along the continuum of care cause refugee and migrant populations to seek out antibiotics through informal networks. In a study of non-prescribed antibiotic use among Chinese migrants in Australia, participants who reported experiencing no barriers to health care services were less likely to use non-prescribed antibiotics compared with participants who reported at least one barrier, such as lack of time or language difficulties (72). Similar perceptions were reported among Mexican migrant workers in the United States, where structural barriers, such as precarious working conditions or lack of health insurance, were cited as the main reasons for self-medicating (43). These conditions increase the risk that patients will use an incorrect, unnecessary or lower-quality antibiotic.

2.3.1 Patient barriers

The review identified patient barriers to antibiotic access and appropriate use in the dimensions of approachability, acceptability, availability and appropriateness (summarized in Table 2).

Table 2. Summary of studies on patient-side barriers

Dimension: framework stage	Barrier	Description	References
Approachability: desire for formal health care	Unsatisfactory experiences with health care services	Lack of satisfaction with a doctor and their assessment or with a health care service, e.g. feelings of not being taken seriously or not being prescribed the desired medication	39,40,42,43,72,82
	Self-medication practices as the norm	The practice of resorting to self-diagnosis, self-prescription and self-medication based on previous experiences of similar symptoms	39,41,45,47,66,83
	Preference for self-medication and products from home	The preference for medications or medical practices (such as lay injection) from the country of origin	38,40,41,43,44,47,66,74,84
	Ease of acquiring antibiotics informally	Acquiring antibiotics through informal networks, including from trips abroad, ethnic stores (e.g. tiendas, bodegas), online purchases, or relatives or friends who either post antibiotics or bring them from their own trips abroad	20,38–40,42,44,47,50,66,70,72,83,85
Acceptability: health care seeking	Stigma of disease	Preferring to acquire antibiotics from nonmedical sources due to stigma or embarrassment when attending primary health care services	44,74
	Fear of deportation	Lack of a legal migratory status and fear of deportation leading to inability to access to the formal health care system	47,50,74,84
	Language barriers	The inability of a patient to be treated by someone who can communicate in their native language	20,41,47,66,72,74,84,85
Availability: health care reaching	Lack of time or transportation	Lack of transportation or time hindering access to health care services, including the inability to miss work or being unable to make child-care arrangements	43,47,50,66,72
Appropriateness: adequacy and quality of care	Lack of knowledge of appropriate antibiotic use	Lack of knowledge of appropriate antibiotic use as the reason for the lack of treatment completion, antibiotic overuse or lay injection	20,38,40,42–44,47,48,70,74,85

2.3.1.1 Approachability: a desire for formal care

Patient barriers were identified in four categories: unsatisfactory experiences with health care services, self-medication practices as the norm, preference for self-medication and products from home, and ease of acquiring antibiotics informally.

Unsatisfactory experiences with health care services. Several studies suggested that migrants' dissatisfaction with doctor consultations and with the host country's prescription requirements for antibiotics plays a role in their frustration and avoidance of these health systems (39,40,42,43,72,82). In two United Kingdom-based qualitative studies, participants expressed frustration at not being prescribed antibiotics and instead being told to take paracetamol (42,82). Consequently, participants felt that their health concerns were not being taken seriously by doctors (42,82) and some reported that their dissatisfaction led them towards informal routes to accessing antibiotics (42).

Self-medication practices as the norm. There is ample evidence on self-medication practices among refugee and migrant populations (section 2.2.3). Six studies investigated the reasons for this practice (39,41,45,47,66,83); of these, five focused on the self-medication practices of Latino migrants in the United States (41,45,47,66,83). For example, in interviews Latino migrants in South Carolina stated that they felt comfortable with self-diagnosis and relied on their experiences of previous diagnoses by health care workers to inform their decisions (83). Pakistani mothers in New Zealand also commonly employed self-medication practices on their children for a wide range of symptoms, and reported feeling confident in their ability to diagnose and treat such symptoms (39). The mothers also reported bringing medicines from Pakistan when they first arrived in New Zealand, which they intended to use if their children got sick and they were not able to get these medicines in the host country (39).

Preference for self-medication and products from home. Several qualitative studies investigating self-medication practices among migrant communities highlighted the preference of some migrants to use self-medication and products from their country of origin (38,40,41,43,44,47,66,74,84). Latino migrants living in the United States preferred medications from Mexico because they believed them to be stronger and more effective (84). However, the preference for self-medication and products from the country of origin was sometimes linked to additional barriers that hindered access to medications (including antibiotics) in the host country. Although many Mexican migrant farm workers perceived Mexican medications to be stronger and more effective than those from the United States, six out of eight uninsured interviewees stated that if it were affordable they would prefer to take medications under a doctor's supervision (43).

Ease of acquiring antibiotics informally. Studies across different geographical contexts revealed that migrants have easy access to non-prescribed antibiotics through a variety of informal methods (20,38–40,42,44,47,50,66,70,72,83,85). These alternative methods of acquiring antibiotics and other medications enable refugee and migrant populations to bypass formal health care settings, which are often perceived to be excessively regulated compared with those of the country of origin (44,50,66,82,83).

2.3.1.2 Acceptability: health care seeking

Patient barriers were identified in three categories: stigma of disease, fear of deportation and language barriers.

Stigma of disease. Two studies found that the stigma of disease – specifically for sexually transmitted infections – shaped migrants' preferences to seek treatment through informal networks in order to relieve their symptoms in private (44,74). For example, a study of Latino migrants in the United States described how the embarrassment and stigma of sexually transmitted infections shaped their preference to obtain penicillin and creams from non-prescribed sources before approaching health care providers (44). Similarly, a systematic review of TB in migrant populations found that experiences of stigmatization were common and influenced migrants' attitudes towards prevention, diagnosis and treatment (129).

Fear of deportation. Several studies found that undocumented migration status or lack of legal registration posed barriers to health care seeking (47,50,74,84). In qualitative studies into the reasons for self-medication, migrants in the United States mentioned fear of deportation as a barrier to accessing formal health care services (47,50,74,84). A systematic review of barriers to seeking TB treatment found that migrants in irregular situations may delay seeking treatment because of fear of immigration authorities and deportation (129).

Language barriers. Studies investigating self-medication practices among refugee and migrant populations found that language barriers were a significant obstacle to accessing formal health systems (20,41,47,66,72,74,84,85). These barriers hindered the ability of these groups to communicate their health problems but also pushed migrants towards seeking sources of medication that were more linguistically accessible (41,47,66,84). All studies into the self-medication practices of Latino migrants in the United States noted that one reason for their preference to obtain antibiotics from informal sources was the availability of Spanish-language instructions and labels in medicines (41,47,66,84).

2.3.1.3 Availability: reaching health care

Several studies of migrant populations identified logistic barriers (lack of personal time or transportation) to reaching health care services (43,47,50,66,72). In an Australian study, lack of time was the most-cited barrier to consulting a general practitioner service by migrants (72).

2.3.1.4 Appropriateness: obtaining adequate and quality care

Several studies noted that lack of knowledge of appropriate antibiotic use among refugee and migrant populations could lead to unnecessary or incorrect use of antibiotics (Box 5) (20,38,40,42–44,47,48,70,74,85). Six studies in the United States (five on Latino migrants and one on Haitian migrants) revealed that some migrants preferred injectable – and often non-prescribed – antibiotics because they believe that they are more effective when administered via this route rather than via a pill (40,43,44,47,66,74). An investigation of rational antibiotic use among Turkish citizens and among Turkish migrants in three European countries found that migrants mainly accessed antibiotics via prescription, but some had used leftover pills from their own previous treatments or those of their family or friends (20). A qualitative study of antibiotics use and AMR in first-generation migrant communities in Australia found that some interviewees were reluctant to use antibiotics because they perceived them as being too strong for their bodies; one mother admitted that she had not allowed her child to complete a prescribed course because of this belief (38); however, another study found that Latino migrants in the United States perceived antibiotics as weak and ineffective (43). Both of these opposing perceptions have the same consequence of reducing the desire for formal care.

Box 5. Lack of knowledge drives incorrect antibiotic use

European comparative studies of antibiotic knowledge in migrants and host populations found that migrant status was significantly associated with poorer knowledge of antibiotic use (86–88). In contrast, a United States study found no significant difference in knowledge between these populations (31). A recent meta-analysis found that, among the general population, over half of the participants were unaware that antibiotics are not effective against viruses (89). Poor antibiotic knowledge has also been significantly associated with inadequate health literacy levels (90) and was linked to inappropriate antibiotic use in the general population (130).

2.3.2 Health system barriers

The review identified health system barriers to antibiotic access and appropriate use in the dimensions of availability, affordability and appropriateness (summarized in Table 3).

Table 3. Summary of studies on health system barriers

Dimension: framework stage	Barrier	Description	Studies
Availability: health care reaching	Waiting times and service availability	Institutional barriers present in health systems, specifically long waiting times to see a doctor or delayed diagnosis	39,43,48,50,62,72,91
Affordability: health care utilization	Lack of affordable health care	The financial cost of health care as a barrier to accessing medications, including being left out of the host country's health care coverage scheme	24,39–41,43,45,47,60,66,72,74,83,84
Appropriateness: adequacy and quality of care	Diagnostic uncertainty	Inappropriate prescription of antibiotics owing to physicians' lack of information on whether an illness is caused by viral infection	52
		Lack of written or oral language support services as an obstacle to accessing health care services	70

2.3.2.1 Availability: reaching health care

Health system barriers in this category were mainly related to waiting times and service availability. Several studies investigated the link between barriers to health care services (for example long waiting times, having regular access to a doctor) and antibiotic misuse among refugee and migrant populations (39,48,62). In a New Zealand study, all participating Pakistani migrant mothers revealed that they had previously faced challenges in accessing health care services (such as unavailability of a general practitioner appointment on the same day and long waiting times at after-hours or emergency services), leading them to rely on self-

medication practices (39). Similarly, a study of antibiotic use among Palestinian refugees in health centres in Jordan run by the United Nations Relief and Works Agency for Palestine Refugees in the Near East found that patients who perceived waiting times as long were almost twice as likely to self-medicate (48). Patients were also 1.7 times more likely to purchase antibiotics directly from the pharmacy if they perceived waiting times to be long (48). In addition, a study of *H. pylori* treatment completion by eastern Asian migrants in the United States found that participants who had a regular doctor were 5.6 times more likely to complete treatment than those who did not (62).

2.3.2.2 Affordability: utilizing care

Numerous studies highlighted the cost of health care (low affordability of health care services and lack of access to health insurance coverage) as a major health system barrier to health care and prescription services for refugees and migrants (24,39–41,43,45,47,60,66,72,74,83,84,131–133). Many of these studies were from the United States (40,41,43,45,47,60,66,74,83,84), with others based in Australia, New Zealand, Spain and Thailand (24,39,72,131). In the United States – where there is no universal health coverage – financial barrier to health care access often pushed migrants to utilize informal health care networks, leading to the use of non-prescribed antibiotics (40,41,43,45,47,60,66,74,83,84). A 2001 study of cross-border health care strategies used by migrants in the United States found that the low cost of health care in Mexico was the main reason that participants had crossed the border for care in the previous year; six of the seven who cited this reason (86%) were uninsured (60). Cost was a significant barrier to accessing formal care: most respondents who had crossed the border for care (seven out of 10) stated that they would have preferred to obtain medical care in the United States (60). In a study of 23 Mexican migrant workers, six cited the cost of health care and lack of insurance as reasons for self-medicating (43). Another survey of Latino migrants in South Carolina (United States) found that those without insurance were more likely than those with insurance to believe that non-prescribed antibiotics should be available in the United States (45). Studies into access to health care services also showed that refugees who receive care from NGOs in camp-like settings face fewer challenges in accessing care, including lower costs, than those in the same region who do not live in camps (132,134,135).

2.3.2.3 Appropriateness: obtaining adequate and quality care

Health system barriers were related to diagnostic uncertainty and a lack of translated materials or interpreter services.

Diagnostic uncertainty. Evidence was limited on barriers to antibiotic access and use along the health care utilization dimension of the continuum of care. A study of antibiotic prescription practices by Italian paediatricians found that children with at least one parent who had been born abroad had an increased likelihood of being unnecessarily prescribed an antibiotic (52). In interviews with these paediatricians, diagnostic uncertainty (that is, situations where physicians inappropriately opt for antibiotic therapy because they lack information on the cause of the symptoms) was the most frequently reported cause of unnecessary prescriptions (52). Diagnostic uncertainty has also been associated with inappropriate prescribing in non-migrant populations (92), but may be more likely when language barriers limit patient-provider communication about symptoms (136).

Lack of translated materials or interpreter services. Many articles cited language barriers as an obstacle to access to and appropriate use of antibiotics (see section 2.3.2); however, limited evidence exists on this barrier from the health system perspective. In a study on rational antibiotic use by Turkish migrants in European countries, pharmacists in Germany and Sweden reported that in order to bypass language barriers they would ask staff, other customers or the patient's relatives to explain the dosages and side-effects of medications (70). The pharmacists also stated that materials on rational antibiotic use were not usually available in Turkish, and physicians in Germany, Sweden and Türkiye emphasized the importance of having brochures available in different languages (70).

2.4 Interventions to improve access to and use of antibiotics

Despite the unique health care needs and numerous barriers to accessing and appropriately using antibiotics for refugees and migrants, evidence was scarce on specific interventions to overcome these barriers. The review identified no interventions, best practices or case studies on improving access to effective antibiotics for refugee and migrant populations. However, several evaluated interventions aimed at improving antibiotic use were identified, including stewardship programmes (137) and awareness campaigns for both health care providers (88) and patients (83,85,93). These interventions were implemented in a range of health care settings in host countries (from primary care clinics to specialized hospitals for war injuries) for specific communities of refugees and migrants. Although they appeared somewhat effective within their study setting, the quality of evidence was weak and generalizability limited.

In the general population, knowledge and attitudes can be shaped by awareness campaigns (138), but evidence for an association between behavioural outcomes and interventions targeting knowledge is weak (94,95,139).

2.4.1 Targeting patients: increasing public awareness

Interventions to improve knowledge, attitudes or behaviours around appropriate antibiotic use have been implemented in specific migrant communities in Germany and the United States. One United States study evaluated the use of a portfolio of translated materials from the Centers for Disease Control and Prevention on the knowledge, attitudes and behaviours of selected Latino migrant populations regarding upper respiratory illness (93). After the intervention, respondents scored significantly higher on most knowledge items, including knowledge about who should take antibiotics (for example, patients should not take antibiotics for cold, flu or asthma) and reported better hand hygiene practices and a higher uptake of influenza vaccines (93). Similarly, a qualitative study in Germany evaluated a leaflet on the use of antibiotics for coughs in the context of upper respiratory illness that had been translated into Turkish (85). Interviews with Turkish migrant patients showed that messages in the leaflet had been understood by all, irrespective of age, gender or educational background and that patients began to re-examine their attitudes after reading the leaflet even if they did not always agree with the message (85). In both cases, addressing language accessibility barriers through translated materials appeared to be a useful element of the intervention design. A qualitative study to elicit insights from a Latino migrant community into positive strategies to decrease antibiotic self-medication suggested that encouraging a visit to the doctor instead of self-treatment might be effective in reducing the likelihood of self-medicating and the consequent risk of drug complications and allergic reactions (83).

2.4.2 Targeting health care providers: stewardship programmes and educational interventions

Antibiotic stewardship interventions are common across health care settings, and have been effective in optimizing antibiotic prescribing, controlling costs and improving patient outcomes in hospitals (96,140). However, limited evidence was found on interventions aimed at improving the appropriate use of antibiotics among health care providers in refugee and migrant settings. In one example, an antibiotic stewardship programme was implemented in a Médecins

Sans Frontières hospital in Jordan treating Iraqi, Syrian and Yemeni refugee patients with chronic, often multidrug-resistant, infections (137). Evaluation of the programme showed a considerable decline in antibiotic use compared with the year before its implementation, despite a similar volume of hospital activity. Subsequent antibiotic cost savings of nearly 40% were attributable to a reduction in the inappropriate use of broad-spectrum antibiotics. Therefore, implementation of a simple antibiotic stewardship programme appears to be a feasible and effective way to reduce inappropriate prescribing and use of antimicrobials and antibiotic expenditure in hospitals. An Italian study found that children with parents born abroad had a higher odds of receiving an unnecessary antibiotic prescription (52). Physicians suggested that rapid diagnostic tests and the development and implementation of antibiotic guidelines were effective interventions to reduce this type of inappropriate antibiotic use.

Educational interventions have been effective in influencing prescriber knowledge, attitudes and behaviours in some contexts (97,98). For international migrants working in health care, an informational seminar in a Danish nursing home setting aimed to improve knowledge of antibiotics in foreign and native health care workers (88). The study found an improvement in the knowledge-of-antibiotics score for both foreign- and native-born health care workers.

3. Discussion

Access to health care, including antibiotics, is often tied to legal status and entitlements at national level, and the availability and affordability of health care for refugees and migrants varies by jurisdiction. Similarly, access to antibiotics can change along the continuum of care and may be vulnerable to repeated interruption. Barriers to access often become barriers to appropriate use, for example, when distrust in formal care pushes individuals to self-medicate. The analysis showed that poor access redirects consumers towards informal markets and inappropriate use as a means to bypass the host country's health system barriers (43,69,99).

Self-medication is a norm across different socioeconomic groups and cultures (66,141,142). Therefore, some self-medication practices for refugees and migrants are likely to be driven by experiences in their country of origin that shape their expectations of access to care (23,46), trust in other health care systems (110) or perceptions of antibiotics (38,43). Refugees and migrants who are accustomed to obtaining over-the-counter antibiotics in their country of origin may not be inclined to seek them through the formal system. Qualitative studies reported that refugees and migrants access antibiotics through informal mechanisms across many settings (20,38–50), but none estimated the proportion of health complaints that are treated informally. Refugees and migrants who rely on informal markets to obtain antibiotics are more likely to obtain incorrect, substandard or falsified antibiotics (Box 4). This is particularly true for migrants whose legal status constrains the mode of informal access (Box 2): whereas documented migrants may be able to obtain licensed antibiotics over the counter by travelling abroad, migrants in irregular situations may instead obtain them from non-pharmacy community stores (43) or from friends and family (45).

3.1 Implications for global governance and surveillance

Both AMR and migrant health are inherently transnational phenomena that require global collective action. So far, progress is inadequate and has suffered from failures of global governance, including poor coordination between actors, a significant compliance gap, limited political leadership and a lack of resources (143). Engagement and coordination among global organizations are needed to harmonize strategies and objectives, rally commitments to global solidarity, and capitalize on data, knowledge and best practices. To harmonize action, global action plans for refugee and migrant health and for AMR (144,145) – and their national counterparts – must be aligned and integrated with one another. Supporting policy coherence across these plans and at all levels of governance will facilitate the mainstreaming of refugee and migrant health and the prioritization of migrant-sensitive action into AMR policy and governance.

Efforts to reinvigorate the antibiotic pipeline have shifted the focus to pull incentives to bring drugs from late-stage clinical trials into the market (146). However, most proposed market-shaping mechanisms focus on HICs, and fail to reflect the realities of LMICs, which may not be able to afford novel antibiotics (147,148) but host a third of all international migrants and over 80% of refugees (8). Developing specific financial arrangements in LMICs to encourage availability and access could further incentivize antibiotic development by expanding the existing markets and guarantee sustainable access to antibiotics.

Lastly, knowledge gaps related to cost-effectiveness or generalizability of interventions have stalled progress in tackling AMR (149). Significant knowledge gaps on antibiotic access and use by refugees and migrants identified in this GEHM should be highlighted in the upcoming global AMR research agenda to mobilize concerted and targeted funding of research efforts. Stronger national and regional monitoring and surveillance systems will be needed to capture AMR spread, antimicrobial use, AMR-associated health outcomes and the role of relevant risk factors, including refugee and migrant status (150). Broad multisectoral and multilevel global collaboration is needed to ensure harmonized data collection, data sharing, and the effective integration and linkage of migrant health data in national and international surveillance systems (151,152).

3.2 Implications for improving antibiotic access and use at national level

3.2.1 Improving a desire for formal care

In countries with universal health coverage, migrants' dissatisfaction with and distrust of formal care (42,72), preferences for informal care (38,40,41,43,44,47,66,74,84), mistrust and concerns for their privacy (44,74,129), unsatisfactory previous experiences in health care systems (39,40,42,43,66,82), or inability to communicate (20,41,47,66,72,74,84,85) are likely to drive lower use of primary care and specialized care compared with host populations (34). This suggests the need for health systems to facilitate access to health services by increasing the use of interpreters or bilingual staff (153) and by monitoring and supporting the provision of context-specific cultural competency training for health care personnel that recognizes the specific cultural needs and preferences of refugees and migrants (154) and aims to improve access and continuity of care for these populations (155–157). With many refugees and migrants turning to informal sources of antibiotics, targeted and culturally appropriate educational interventions that aim to improve knowledge of antibiotics have the potential to increase the desire for formal care (158). However, to be successful, awareness campaigns must be complemented with interventions to rectify the systemic barriers that impede access to and appropriate use of antibiotics (138,159).

3.2.2 Increasing the use of formal care

Status-based availability of and reimbursement for prescription drugs result in substantial variability in access between types of migrant (34), which in turn is reflected in health care use and health outcomes (100,160,161). In many countries, legal status is a foundational determinant of health for migrants (162). Coverage for migrants in irregular situations and, less commonly, for asylum seekers (54), can be limited to specific forms of health care (163,164), while fear of deportation and mistrust of the health system further deters these populations from seeking care (47,50,74,84). Access to basic services needs to be legally available and should not be compromised by cooperation between immigration authorities and health care providers (165,166).

Unaffordability of care and poor health insurance coverage are major barriers to accessing antimicrobials for refugees and migrants (24,39–41,43,45,47,60,66,72,74,83,84,131–133). The incidence of catastrophic spending has continuously increased in recent years, and is more common where health systems primarily rely on out-of-pocket payments (167,168). This suggests that countries should introduce equity-focused pre-payment mechanisms (169) and ensure that these do not disproportionately burden refugees and migrants (170). However, insurance programme coverage alone is not enough to ensure equitable access to care. Even in countries where migrants in irregular situations are eligible for care and insurance, migrants are either unaware of their eligibility or do not participate (60,171). Vulnerable populations must be equipped with the knowledge and tools to make informed decisions about their care, and health care providers must be made aware of entitlements to care to effectively advocate for the rights of their patients.

3.2.3 Improving the adequacy of care

Unrestricted access to antibiotics accelerates the emergence of AMR, thereby rendering antibiotics ineffective in the long term. Inadequate access to diagnostic tools is a major barrier to appropriate prescribing (172), and limited availability of equipment in resource-constrained settings results in poorer diagnostic accuracy (123). Limited access to diagnostic tools due to laboratory infrastructure, equipment or capacity can restrict prescribers' ability to determine the cause of symptoms, leading to unnecessary and incorrect prescribing (18). Integrated interventions, such as guidelines coupled with increased diagnostic capacity (18) or point-of-care diagnostics (173), can reduce the unnecessary and incorrect use of antibiotics, leading to improved health outcomes.

To complement this scoping review, disruptions to antibiotic provision caused by the COVID-19 pandemic were explored through a non-systematic literature search (Box 6).

Box 6. COVID-19-related disruptions to antibiotic provision

Shortages

Antibiotic shortages were not unusual when the COVID-19 pandemic erupted onto the global stage in 2020 (57,116). However, problems related to globalization of the already fragile supply chain were compounded by the pandemic, triggering greater and more frequent shortages (101): countries that were heavily reliant on imported antibiotics reported more shortages than usual (102); and those that produce and/or export antibiotics and active pharmaceutical ingredients reduced or banned exports, stockpiled antibiotics, or experienced large-scale industry closures (103–105).

Besides impeding access to essential medicines, reactive clinical and regulatory management of shortages and resource constraints are further drivers of AMR. During shortages, alternative therapeutic options often replace absent drugs, leading to more prescribing errors (174) and shifts to broader-spectrum antibiotics or less effective alternatives (175). Additionally, constrained resources and travel restrictions (176) during crises may reduce regulatory control of the supply chain and undermine the quality assurance of medicines (177).

Health service disruptions

Antibiotic shortages affect all population groups alike, but refugees and migrants may face additional unique challenges during crises. During the COVID-19 pandemic, health systems, especially those in resource-constrained settings, have had to cut or delay various services in an attempt to manage resource constraints (178). Among these are specific programmes for diseases that disproportionately burden refugee and migrant populations. For example, the suspension of TB treatment programmes significantly disrupted access to care those who rely on these programmes (179). Similarly, humanitarian aid groups working in in camp-like settings have had to prioritize COVID-19 management, leading to programme cuts and patient triage for antimicrobial treatments that are in short supply (178).

Box 6. contd

Effects on care-seeking behaviour

The COVID-19 pandemic also affected patients' care-seeking behaviour, and consequently access to antibiotics. The economic consequences of the pandemic led to significant financial hardship for individuals, with exacerbated effects for migrants (180), thereby heightening the cost barrier to care (106). This may have led individuals to abstain from prescribed medication or to seek cheaper alternative sources. Care-seeking behaviour also changed owing to increased inconvenience or mistrust in services or to fear of infection. During the pandemic, many people avoided hospitals and primary health care settings (107). A study of Rohingya refugees in Cox's Bazar, Bangladesh, reported that perceived risk of infection was a significant factor in reducing access to care (181). These combined barriers to accessing care may result in reduced use or a shift towards greater use of informally sourced antibiotics.

3.3 Policy considerations

This GEHM synthesized the available evidence on barriers to antibiotic access and appropriate use refugees and migrants, and on interventions implemented to address these barriers. Policy considerations based on the findings of this review are to:

- **build global governance for AMR action by:**
 - ensuring significant investment to strengthen engagement between key international organizations and NGOs and intersectoral alignment for coordinated global governance;
 - aligning and integrating WHO global action plans for refugees and migrants and for AMR into a coherent framework for concerted action; and
 - establishing financial arrangements in LMIC markets to ensure equitable antimicrobial access and use and to further incentivize antibiotic development;

- **improve global data collection by:**

- strengthening surveillance systems for data-driven, evidence-informed policy solutions, with a particular focus on marginalized populations; and
- supporting research through concerted and targeted funding to fill substantial knowledge gaps, including to quantify the accessibility of formal and informal care for refugees and migrants;

- **tackle national-level barriers to seeking formal care by:**

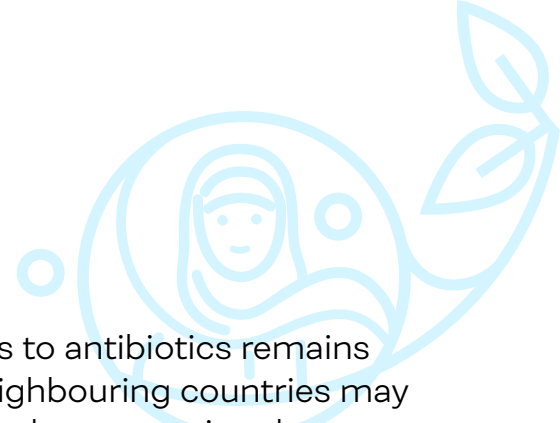
- facilitating access to care by improving language accessibility (including through interpreters or bilingual staff) and health literacy for refugees and migrants;
- monitoring and supporting the provision of migrant- and refugee-sensitive cultural competency training for health care personnel; and
- improving migrants' and refugees' knowledge of antibiotics through community-based initiatives;

- **tackle national-level barriers to utilizing formal care by:**

- removing systemic barriers to care based on legal status;
- ensuring that essential, quality-assured antibiotics are affordable through implementing equity-focused pre-payment programmes;
- improving knowledge of and registration for entitlements to care (including health insurance) in vulnerable populations and health care providers; and
- avoiding policies that restrict antibiotic access for vulnerable populations; and

- **overcome national-level barriers to adequate and quality care by ensuring access to point-of-care diagnostic tools for optimal case management in vulnerable populations.**

4. Conclusions



Despite improvements over the last two decades, access to antibiotics remains heterogeneous and inequitable. Within WHO regions, neighbouring countries may experience disparate access, and within countries, access has grown in urban centres while access in rural and remote regions remains fragile. The extent of refugees' and migrants' access to antibiotics is unclear. This review found that the available evidence on refugees' and migrants' access to and use of antibiotics is scarce and is largely constrained to high-income contexts where differences in health systems, legal entitlements and drug reimbursement programmes have resulted in variable levels of access. However, in LMICs and refugee camp settings, published evidence was almost non-existent on access to antibiotics, the quality of the available antibiotics, or the direct or indirect impact of the COVID-19 pandemic on access to antibiotics. This represents a significant research and knowledge gap that should be included in the forthcoming global research agenda on AMR to mobilize concerted and targeted funding of research efforts.

It is clear that refugees and migrants face significant barriers to access and appropriate use of antibiotics along the care continuum. They are likely to have poorer perceptions of formal care due to previous experiences, norms and preferences and, even if a desire for formal care is established, the evidence suggests that refugees and migrants are less likely to use formal care and face legal and financial accessibility barriers. Refugees and migrants often resort to informal networks to obtain antibiotics, which may be of poorer quality or inappropriate for the illness in question. Moreover, misperceptions about antibiotics are common across all populations and may lead to further inappropriate use. Given that international refugee and migrant populations may be particularly vulnerable to rising AMR, additional efforts are needed at national level to align action plans on AMR with those on migrant and refugee health and access to health care more broadly. Ongoing efforts are needed to ascertain the accessibility of antibiotics through formal and informal pathways for refugees and migrants and to identify evidence-informed solutions to the many barriers to access faced by refugees and migrants around the world.

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Annex 1. Search strategy

Data collection

A scoping review of academic literature in three electronic databases (Ovid MEDLINE, Scopus and Web of Science) was conducted in January 2022 to identify peer-reviewed literature on access to and use of antibiotics among migrant and refugee populations, with no restriction on publication date.

Since access to and use of antibiotics is embedded within the larger question of health system organization and access to services, snowball searches and grey literature searches were conducted in January 2022 to identify other relevant articles to contextualize or supplement the primary evidence synthesis. Targeted searches of grey literature in English, French and Spanish were performed in CABI Global Health (a dedicated public health database of worldwide publications) and the IGO Custom Search Engine (an automated search engine of publications from hundreds of intergovernmental organization websites). Supplementary evidence (case studies and best practices for policy considerations and interventions) was obtained by contacting experts working on AMR or on migrant and refugee health at key agencies and institutions, including WHO regional offices, the IOM, Médecins Sans Frontières, the Office of the United Nations High Commissioner for Refugees and ReAct.

Search terms

For searches of peer-reviewed literature, structured search strings were developed in collaboration with a research librarian (Table A1).

The grey literature search was conducted using a combination of key search terms, including "refugees", "migrants", "antimicrobial resistance", "antibiotic resistance", "drug-resistant infection", "access", "misuse" and "barriers".

Table A1. Terms for peer-reviewed literature database search

Database	Terms
Ovid MEDLINE	Core search terms
	<ol style="list-style-type: none"> 1. (migrant? Or refugee? Or emigra* or immigra* OR migrat* or asylum or alien? Or foreigner? Or foreign-born or foreignborn Or (Displaced ADJO (individual? OR person? OR people? OR population?)) or (count* ADJ2 (birth OR origin))).mp 2. "Emigrants and Immigrants"/ OR "Transients and Migrants"/ OR "Emigration and Immigration"/ OR Refugees/ OR "Human Migration"/ 3. (AMR OR XDR OR XDR-TB OR XDRTB OR MDR OR MDR-TB OR MDRTB OR DRI OR (resistan* ADJ2 (drug? OR multi-drug OR multidrug OR extensively-drug OR infection?)) OR anti-viral? OR antiviral? OR anti-fungal? OR antifungal? OR anti-bacterial? OR antibacterial? OR anti-biotic? OR antibiotic? OR anti-infective? OR antiinfective? OR anti-microbial? OR antimicrobial? OR anti-parasitic? OR antiparasitic? OR non-susceptib* or nonsusceptib* OR ESBL OR extended spectrum beta-lactamase OR MRSA or methicillin-resistant staphylococcus aureus).mp 4. Drug Resistance, Microbial/ OR Drug Resistance, Viral/ OR Drug Resistance, Fungal/ OR Drug Resistance, Multiple/ OR Drug Resistance, Bacterial/ OR Drug Resistance, Multiple, Bacterial/ OR Anti-Infective Agents/ OR Anti-Bacterial Agents/ OR Antifungal Agents/ OR Antiparasitic Agents/ OR Antiviral Agents/ OR Antitubercular Agents/ OR Methicillin-Resistant Staphylococcus aureus/ 5. (access* OR afford* OR availab* OR sale? OR market? OR supply OR supplies OR funding OR pric* OR cost* OR reimbursement).mp 6. Health Services Accessibility/ OR Delivery of Health Care/ OR Patient Care/ OR Health care Disparities/ OR Needs Assessment/ OR Culturally Competent Care/ OR "Health Services Needs and Demand"/ 7. (stewardship OR ("use" OR usage) ADJ1 (irrational OR rational OR nonrational OR no#-rational OR inappropriate OR appropriate OR no#-appropriate OR off-label* OR off-li?en?e? OR unapprove? OR non-indicate? OR nonindicate?)) OR ((Substandard* OR counterfeit* OR fals*) ADJ1 (drug? OR medication?)) OR overuse OR misuse OR consum* OR prescri* OR overprescri*).mp
Search limits	
<ol style="list-style-type: none"> 8. Health Services Misuse/ or Medical Overuse/ or Health Knowledge, Attitudes, Practice/ or Potentially Inappropriate Medication List/ or Inappropriate Prescribing/ or Medication Errors/ or Diagnostic Errors/ or "Off-Label Use"/ or Substandard Drugs/ or Counterfeit Drugs/ or "Treatment Adherence and Compliance"/ or (Practice Patterns, Physicians'/) 9. Exp animals/ not humans/ 10. Drug-resistance, neoplasms/ or Anti-neoplastic agents/ or neoplasms/ or brain neoplasms/ or colonic neoplasms/ or Cell proliferation/ or cell movement/ or Angiogenesis inhibitors/ 11. ((1 OR 2) AND (3 OR 4) AND (5 OR 6 OR 7 OR 8)) not (9 or 10) 	

Database	Terms
Scopus	<p>Core search terms</p> <ol style="list-style-type: none"> 1. (TITLE-ABS-KEY((migrant OR refugee OR emigra* OR immigra* OR migrat* OR asylum OR alien OR foreigner OR "foreign-born" OR foreignborn OR (displaced W/O (individual OR person OR people OR population)) OR (countr* W/2 (birth OR origin)))) 2. TITLE-ABS-KEY((amr OR xdr OR "xdr-tb" OR xdrtb OR mdr OR "mdr-tb" OR mdrtb OR dri OR (resistan* W/1 (drug OR "multi-drug" OR multidrug OR "extensively-drug" OR infection)) OR anti-viral OR antiviral OR anti-fungal OR antifungal OR anti-bacterial OR antibacterial OR anti-biotic OR antibiotic OR anti-infective OR antiinfective OR "anti-microbial" OR antimicrobial OR "anti-parasitic" OR antiparasitic OR "non-susceptib*" OR nonsusceptib* OR esbl OR "extended spectrum beta-lactamase" OR mrsa OR "methicillin-resistant staphylococcus aureus")) 3. TITLE-ABS-KEY(((access* OR afford* OR availab* OR sale OR market OR supply OR supplies OR funding OR pric* OR cost* OR reimbursement) OR (stewardship OR ("use" OR usage) W/1 (irrational OR rational OR nonrational OR "no?-rational" OR inappropriate OR appropriate OR "no?-appropriate" OR off-label* OR off-li?en?e? OR unapprove? OR "non-indicate?" OR nonindicate?)) OR ((Substandard* OR counterfeit* OR fals*) W/1 (drug OR medication)) OR overuse OR misuse OR consum* OR prescri* OR overprescri*))))
	<p>Search limits</p> <ol style="list-style-type: none"> 1. (LIMIT-TO (EXACTKEYWORD,"Antibiotic Agent") OR LIMIT-TO (EXACTKEYWORD,"Migration") OR LIMIT-TO (EXACTKEYWORD,"Immigrant") OR LIMIT-TO (EXACTKEYWORD,"Tuberculostatic Agent") OR LIMIT-TO (EXACTKEYWORD,"Antibiotic Resistance") OR LIMIT-TO (EXACTKEYWORD,"Antibiotic Therapy") OR LIMIT-TO (EXACTKEYWORD,"Antitubercular Agents") OR LIMIT-TO (EXACTKEYWORD,"Anti-Bacterial Agents") OR LIMIT-TO (EXACTKEYWORD,"Migrant") OR LIMIT-TO (EXACTKEYWORD,"Multidrug Resistance") OR LIMIT-TO (EXACTKEYWORD,"Emigrants And Immigrants") OR LIMIT-TO (EXACTKEYWORD,"Multidrug Resistant Tuberculosis") OR LIMIT-TO (EXACTKEYWORD,"Drug Resistance") OR LIMIT-TO (EXACTKEYWORD,"Emigration And Immigration") OR LIMIT-TO (EXACTKEYWORD,"Refugee") OR LIMIT-TO (EXACTKEYWORD,"Health Care Access") OR LIMIT-TO (EXACTKEYWORD,"Tuberculosis, Multidrug-Resistant") OR LIMIT-TO (EXACTKEYWORD,"Immigration") OR LIMIT-TO (EXACTKEYWORD,"Antivirus Agent") OR LIMIT-TO (EXACTKEYWORD,"Transients And Migrants") OR LIMIT-TO (EXACTKEYWORD,"Antiviral Therapy") OR LIMIT-TO (EXACTKEYWORD,"Health Care Policy") OR LIMIT-TO (EXACTKEYWORD,"Health Services Accessibility") OR LIMIT-TO (EXACTKEYWORD,"Refugees") OR LIMIT-TO (EXACTKEYWORD,"Antiviral Agents") OR LIMIT-TO (EXACTKEYWORD,"Antibiotics") OR LIMIT-TO (EXACTKEYWORD,"Antibiotic Prophylaxis") OR LIMIT-TO (EXACTKEYWORD,"Health Program") OR LIMIT-TO (EXACTKEYWORD,"Health Service") OR LIMIT-TO (EXACTKEYWORD,"Antibiotic Sensitivity") OR EXCLUDE (EXACTKEYWORD,"Nonhuman") OR EXCLUDE (EXACTKEYWORD,"Animals") OR EXCLUDE (EXACTKEYWORD,"Cell Migration") OR EXCLUDE (EXACTKEYWORD,"Animal") OR EXCLUDE (EXACTKEYWORD,"Cell Proliferation")) 2. 1 AND 2 AND 3 AND 4

Database	Terms
Web of Science	Core search terms
	<ol style="list-style-type: none"> <li data-bbox="354 293 1471 427">1. (migrant\$ Or refugee\$ Or emigra* or immigra* OR migrat* or asylum or alien\$ Or foreigner\$ Or foreign-born or foreignborn Or (Displaced NEAR/O (individual\$ OR person\$ OR people\$ OR population\$)) or (countr* NEAR/2 (birth OR origin))) (TOPIC) <li data-bbox="354 450 1471 725">2. (AMR OR XDR OR XDR-TB OR XDRTB OR MDR OR MDR-TB OR MDRTB OR DRI OR (resistan* NEAR/2 (drug\$ OR multi-drug OR multidrug OR extensively-drug OR infection\$)) OR anti-viral\$ OR antiviral\$ OR anti-fungal\$ OR antifungal\$ OR anti-bacterial\$ OR antibacterial\$ OR anti-biotic\$ OR antibiotic\$ OR anti-infective\$ OR antiinfective\$ OR anti-microbial\$ OR antimicrobial\$ OR anti-parasitic\$ OR antiparasitic\$ OR non-susceptib* or nonsusceptib* OR ESBL OR "extended spectrum beta-lactamase" OR MRSA or "methicillin-resistant staphylococcus aureus") (TOPIC) <li data-bbox="354 748 1471 987">3. (access* OR afford* OR availab* OR sale\$ OR market\$ OR supply OR supplies OR funding OR pric* OR cost* OR reimbursement) OR (stewardship OR ("use" OR usage) NEAR/1 (irrational OR rational OR nonrational OR no?-rational OR inappropriate OR appropriate OR no?-appropriate OR off-label* OR off-li?en?e\$ OR unapprove\$ OR non-indicate\$ OR nonindicate\$)) OR ((Substandard* OR counterfeit* OR fals*) ADJ1 (drug\$ OR medication\$)) OR overuse OR misuse OR consum* OR prescri* OR overprescri*) (TOPIC)
	Search limits
<ol style="list-style-type: none"> <li data-bbox="354 1122 1471 1211">1. NOT Web of Science Categories: Oncology or Biochemistry Molecular Biology or Cell Biology or Veterinary Sciences or Zoology or Plant Sciences or Marine Freshwater Biology <li data-bbox="354 1234 1471 1267">2. 1 AND 2 AND 3 AND 4 	

Selection strategy for the peer-reviewed literature

Articles were included if they:

- were peer-reviewed primary studies of any methodological design;
- reported an outcome measure related to access or use of antibiotics, barriers to accessing antibiotics, and interventions to improve access or use of antibiotics; and
- investigated these outcomes in the population of interest, that is, international migrants, asylum seekers or refugees, in a way that is consistent with the definitions summarized in Box 1.

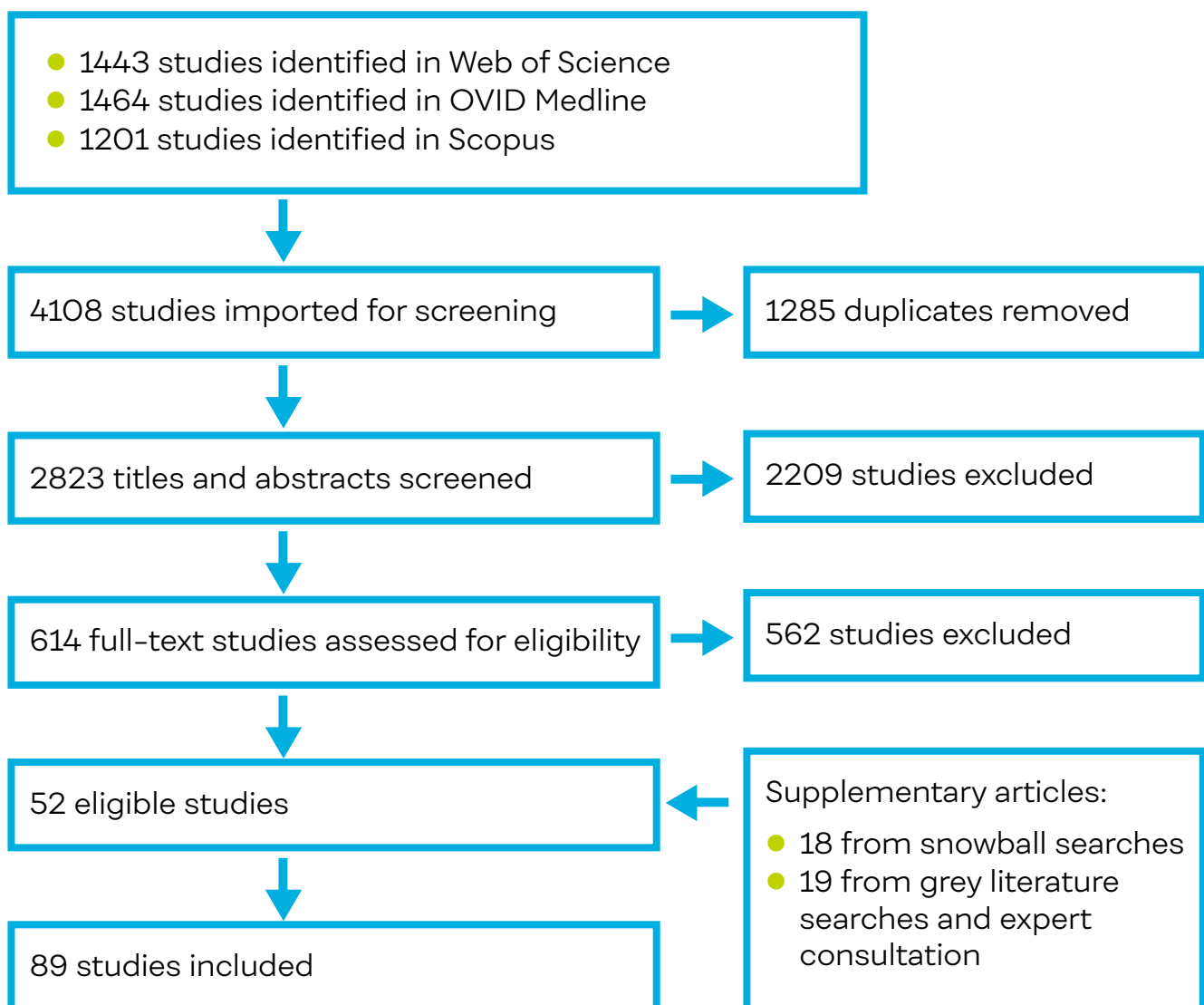
Articles were excluded if they:

- were not written in one of the six official United Nations languages (Arabic, Chinese, English, French, Russian or Spanish);
- did not use reliable indicators to determine migrant or refugee status (1); or
- only assessed access or use of non-antibiotic antimicrobials (e.g. antivirals and antitubercular drugs).

The searches of Ovid MEDLINE, Scopus and Web of Science yielded 2823 articles after deduplication, of which 2209 studies were excluded based on their title or abstract. The remaining 614 full-text studies were assessed for eligibility, with 52 articles eligible for inclusion, including qualitative, quantitative and mixed-methods studies, and systematic reviews (outlined in Fig. A1.1) (2).

Snowball searching and expert consultations yielded a further 18 systematic reviews and the grey literature searches a further 19 relevant articles.

Fig. A1.1. Selection of studies in the scoping review



Analysis and conceptual framework

This evidence was synthesized across four themes related to antibiotic use: (i) access, (ii) appropriate use, (iii) barriers to access and use and (iv) interventions to improve access and use. Framework analysis of the barriers to access and use of antibiotics among refugees and migrants across a continuum from a need for care through to the consequences of the care provided incorporated five dimensions of accessibility of health services: (i) approachability, (ii) acceptability, (iii) availability and accommodation, (iv) affordability and (v) appropriateness (adapted from Levesque et al. (3)).

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Annex 2. Studies identified in the literature search⁷

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