

Continuum of care for noncommunicable disease management during the migration cycle



WHO Health and Migration Programme

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World Health
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Global Evidence Review on Health and Migration

Continuum of care for noncommunicable disease management during the migration cycle

Global evidence review on health and migration: continuum of care for noncommunicable disease management during the migration cycle

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Foreword

Noncommunicable diseases (NCDs), particularly cardiovascular diseases, diabetes, cancer and chronic respiratory diseases, cause 74% of all deaths worldwide and also have social and economic costs. The percentage of deaths due to NCDs is higher in the WHO European Region than in all other WHO regions, with 90% of all deaths due to NCDs. This figure is equally high for both sexes (88% for men and 92% for women).

Globally, more than 15 million people between the ages of 30 and 69 years die from an NCD every year. Although the rate of premature mortality is lower in the WHO European Region compared with other WHO regions, it remains high: nearly one in three NCD deaths occur in the 30–69-year age group and the risk of premature death due to NCDs (16%) is only slightly below the global average (18%). The WHO Global Action Plan for the Prevention and Control of Noncommunicable Diseases 2013–2020 provided a roadmap and strategies to reduce premature NCD deaths worldwide, with a target of reducing global mortality from NCDs by one third by 2030. A set of 16 best buy options outline practical and cost-effective interventions.

The worldwide burden of NCDs is further exacerbated by health inequalities hitting the poorest and most vulnerable people, which may include refugees and migrants (particularly those in irregular situations). Social, political and economic exclusion can result in poverty, homelessness and exploitation, which can create a higher risk of NCDs. Prevention of NCDs is best achieved by access to preventive services and the impact of NCDs is minimized by consistent health care. Migration itself is not a determinant of NCDs but can contribute to the poor health outcomes of untreated NCDs. NCD risk factors can be exacerbated by social determinants of health surrounding the migration process. Refugees and migrants may face particular challenges in maintaining a healthy lifestyle or have suboptimal health-seeking behaviours, and they may face barriers in accessing quality health care such as language and cultural differences, discrimination, distrust of governments when seeking health care, and limited availability of accessible, affordable and appropriate health-care services.

This Global Evidence Review on Migration and Health considers the issues in providing a continuum of care for management of NCDs in refugees and migrants. It identifies challenges and opportunities and offers policy considerations to help ensure that refugees and migrants are included in the much-needed efforts to reduce the burden of NCDs. The pressure that the COVID-19 pandemic is exerting on health services and the health workforce will undoubtedly have a long-term impact on prevention and treatment services for NCDs. Refugees and migrants are likely to be among the groups most affected by these issues in public health services.



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Preface

Noncommunicable diseases (NCDs), such as cardiovascular diseases, cancer, diabetes and chronic respiratory diseases, are the leading global cause of death and are responsible for 74% of deaths worldwide, as well as increased health-care expenditure and socioeconomic costs. These NCDs share key modifiable behavioural risk factors, such as tobacco and alcohol use, as well as unhealthy diet and lack of physical activity that can lead to overweight and obesity, raised blood pressure and cholesterol, and, ultimately, disease.

NCDs are an important public health challenge in all countries, particularly in low- and middle-income countries that lack a resilient health-care system, where more than three quarters of NCD deaths occur. They also have the greatest impact on the poorest populations globally; this includes those who are socioeconomically vulnerable in all countries, including high-income countries.

In response to global NCD burdens, the WHO Global Action Plan for the Prevention and Control of Noncommunicable Diseases 2013–2020 (NCD-GAP) provided a policy roadmap and strategies for all Member States and key actors to reduce premature NCD deaths worldwide. Progress in implementation of the recommended NCD indicators has been monitored in 151 Member States. Among these, some are developing whole-of-government policies to address NCDs, implementing measures to reduce risk factors and strengthening health systems through primary health care and universal health coverage.

Although the process of migration itself is not a determinant of NCD prevalence, NCD risk factors can be exacerbated by social determinants of health surrounding the migration process. Treatment of existing NCDs may be disrupted by the migratory journey and by issues of accessing care in new health systems, and possibly in multiple different systems during the migratory journey. Refugees and migrants have often faced extreme poverty and inadequate access to food and other essential items in their country of origin. In transit and on reaching their country of destination, they are more likely to be exposed to economic inequalities, with vulnerable living and working conditions, social exclusion and discrimination. These can create environmental, behavioural and lifestyle changes that increase the risk factors for NCDs.

In addition to the potential increase in risk factors for NCDs, refugees and migrants may face interruption or delay in initiating necessary health care. NCDs mostly require long-term management to prevent the development or exacerbation of primary health risks, provide treatment for any NCD and slow the development of complications. In countries of origin for refugees and migrants, health services for

NCD prevention, diagnosis and treatment are often not fully available. In transit, even when NCDs are diagnosed it may be difficult to maintain continuity of treatment. On arrival in the destination country, legal or migrant-specific barriers may prevent access to NCD services.

While it seems clear that refugees and migrants have a similar or increased risk of NCDs as host populations, their needs are not specifically addressed in the NCD-GAP and they are also less prioritized in Member States. However, WHO is committed to agreed policies and interventions to promote and secure mobile populations' health rights, as described in the WHO Global Action Plan for Promoting the Health of Refugees and Migrants, which was agreed by Member States at the Seventy-second World Health Assembly in 2019. The Global Action Plan was developed in the context of the United Nations 2030 Agenda for Sustainable Development and the Sustainable Development Goals, and is consistent with both the Global Compact on Refugees and the Global Compact for Safe, Orderly and Regular Migration. The 2030 Agenda, the WHO Thirteenth General Programme of Work, 2019–2023, and the WHO Director-General's Transformation Agenda all emphasize the promotion of global health and well-being through the principles of universal health coverage and leaving no one behind. Primary health care, with its emphasis on promoting health and preventing disease, is the ideal health-care service for reducing premature mortality from NCDs. Member States also need strong referral systems to other levels of care. However, because of the wide span of risk factors for NCDs, a whole-of-government and whole-of society approach is essential. It is important to ensure that refugees and migrants are included in these endeavours. This Global Evidence Review on Migration and Health examines the issue of ensuring that refugees and migrants are included in efforts to provide a continuum of care for NCDs. It discusses the barriers that can prevent refugees and migrants from accessing preventive health services and information and treatment services for NCDs.

The WHO Director-General Tedros Adhanom Ghebreyesus stressed in the 2020 evaluation report that "taking action against NCDs is, therefore, not only a moral imperative, it's an economic imperative". Such actions should include refugees and migrants along with all harder-to-reach populations.



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Document production

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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 the 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

GEHM	Global Evidence Review on Health and Migration (series)
IOM	International Organization for Migration
LMICs	low- and middle-income countries
MIPEX	Migrant Integration Policy Index
NCD	noncommunicable disease
NCD-GAP	WHO Global Action Plan for the Prevention and Control of NCDs 2013–2030
SDG	Sustainable Development Goal

Executive summary

Noncommunicable diseases (NCDs) are a major health burden, being responsible for 74% of all global mortality as well as for rapidly increasing health-care expenditure and socioeconomic costs. In response to global NCD burdens, the WHO Global Action Plan for the Prevention and Control of Noncommunicable Diseases 2013–2030 (NCD-GAP) provides a policy roadmap and strategies for all Member States and key actors to reduce premature NCD deaths worldwide, particularly those from cardiovascular diseases, cancer, diabetes and chronic respiratory diseases. However, insufficient progress in reducing the burden of NCDs against the nine voluntary targets of the NCD-GAP led to drafting of a new roadmap on NCDs 2023–2030 (EB150/7, Annex 1) to guide and support Member States to take urgent measures to accelerate progress and reorient their domestic action plans. The 2030 Agenda for Sustainable Development and its Sustainable Development Goals (SDGs) emphasize the principles of leaving no one behind, including refugees and migrants, and recognize migration as a cross-cutting issue relevant to all SDGs. Although refugees and migrants are not specifically addressed in current regional and global commitments (including the NCD-GAP), the burden of NCDs among refugees and migrants is recognized as an increasing concern by the Strategy and Action Plan for Refugee and Migrant Health in the WHO European Region in Strategic area 7: preventing and reducing the risks posed by NCDs. These efforts are also guided by the principles of equity and human rights that underscore Executive Board decision EB14O(9) on promoting the health of refugees and migrants and the subsequent resolution WHA70.15 and report, Promoting the health of refugees and migrants: draft global action plan, 2019–2023 (A72/25). All WHO regions have responded by developing regional strategies and action plans.

There are large evidence gaps regarding migration and NCDs and little empirical research is available concerning migrant-specific disparities and barriers in NCD services. This Global Evidence Review on Health and Migration (GEHM) focuses on the intersection between NCD continuum of care and the migration cycle in synthesizing the best available knowledge, evidence and practices to inform effective policy and programme development. It also outlines policy considerations to help to address the NCD burden among refugee and migrant populations.

A robust and comprehensive search strategy combined a formal systematic review of peer-reviewed articles published between 2010 and 2021 with predefined search terms for four areas of interest (migrants, NCDs (cancer, cardiovascular

diseases, diabetes and chronic respiratory diseases), policies and interventions) with a scoping review of extended scientific articles, policy documents and grey literature. A critical interpretative synthesis was performed on the identified evidence regarding NCD policies and interventions involving refugees and migrants and on relevant quantitative and qualitative literature related to access of these groups to NCD services.

Migration is a largely heterogeneous process, and the migration experience has an impact on lifestyle, life course, determinants of health, and, therefore, on the exposure to NCD risk factors. The health systems in the countries of origin, transit and destination also play a major role in the exposure to and management of NCDs. Accordingly, the identified evidence was synthesized in relation to three domains: (i) the magnitude and patterns of NCD burdens and risk factors in refugees and migrants related to gaps and barriers within NCD health services; (ii) health system and NCD policy gaps for the continuum of care across the migration cycle; and (iii) migrant-inclusive practices and interventions. The evidence showed that the multifaceted dynamics of the migration process pose major challenges for NCDs in refugees and migrants. NCD risk factors are exacerbated by social determinants of health surrounding the migration process. International migrants, including refugees, often face poverty and inadequate access to food and other essential items in their country of origin. In addition, they are more likely to be exposed to economic inequalities, social exclusion and discrimination in countries of transit or destination.

From a health system perspective, the vulnerability of refugees and migrants for NCDs will vary depending not only on the availability and affordability of health care in their countries of origin, transit and destination but also on the ability to access health care during migration. Health-care systems and the provision of health care differ substantially with the income level of countries. In low- and middle-income countries (LMICs), health system barriers for refugees and migrants are largely rooted in the lack of available and affordable NCD services for the whole population. In high-income countries with resilient health systems, there are often legal status barriers for refugees and migrants in addition to other migrant-specific barriers associated with ethnicity and a lack of linguistically and culturally relevant information. Such barriers can increase the vulnerability of refugees and migrants. Migration policies have created legal and other structural barriers in health systems, and refugees and migrants may be excluded from essential health care in many countries through a lack of health-care policies for migrant workers, lack of insurance or discrimination within migration policies.

This GEHM identified significant evidence gaps in the literature pertaining to migration and NCDs, particularly a lack of data collection and analysis on NCD

prevalence and risk factors in refugees and migrants. Although the searching strategies were inclusive for NCDs in the context of the COVID-19 pandemic, there was little evidence on direct or indirect impacts of the pandemic on NCD services for refugees and migrants; this likely reflects the short observation period since the start of the pandemic. Further research is also needed to address evidence gaps regarding specific migrant groups, such as migrants in irregular situations; underrepresented regions, particularly in resource-limited settings in LMICs; underrepresented migration stages, such as pre-migration, transit and interception (detention); and specific research areas, such as migration and chronic respiratory diseases and the COVID-19 impact on NCDs and migration.

Policy considerations

This GEHM refers to current global and regional commitments and action plans addressing NCDs and refugee and migrant health. In line with this, the following policy considerations are offered in three areas: governance and policies; research and data monitoring; and health service delivery.

Governance and policies

- Raise the priority of inclusive NCD action in global, regional and national agendas, as well as in internationally agreed development goals under the principle of leaving no one behind by promoting greater integration of refugees and migrants in policies.
- Strengthen the capacity, leadership and governance of national, regional and international actors and encourage multisectoral and transnational action and partnerships to ensure migrant-inclusive responses for the prevention and control of NCDs, including through the establishment of multinational and multisectoral mechanisms to facilitate inclusive NCD actions.
- Provide equity through policies as well as legislative and regulatory measures in order to reduce modifiable risk factors for NCDs and underlying social determinants in refugees and migrants, using migrant-appropriate environmental and multicultural health literacy approaches.
- Promote inclusive migration policy and health system integration for the prevention and control of NCDs and their underlying determinants in refugees and migrants.

Research and data monitoring

- Promote and support national and international capacity for high-quality research and development for disaggregated data collection and analysis of NCD prevalence and risk factors in refugees and migrants.
- Monitor transnational trends and determinants of NCDs in refugee and migrant populations and evaluate progress in migrant-specific approaches for NCD prevention and control.

Health service delivery

- Promote a continuum of NCD prevention and management in all phases of the migration cycle (from pre-migration to transit and destination) to protect all refugees and migrants from interruption of care.
- Strengthen inclusive approaches for NCD management in refugees and vulnerable migrants in acute or protracted humanitarian emergencies by integrating and shifting services into primary health care within existing health-care systems or by strengthening the health system of host countries; and
- Promote migrant-focused, culturally and linguistically acceptable NCD care through inclusive, people-centred primary health services to advance the achievement of universal health coverage.

1. Introduction

1.1 Background

1.1.1 Global migration and NCDs

NCDs are a major health burden in the contemporary world; they are responsible for 74% of all global mortality, as well as for rapidly increasing health-care expenditures and socioeconomic costs. Globally, more than 15 million people between the ages of 30 and 69 years die from an NCD every year. (1). In this population, 49% of all NCDs are preventable, which accounts for 2.4 million preventable deaths and 93.8 million preventable disability-adjusted life-years each year. NCDs are significantly associated with socioeconomic inequalities in both LMICs and high-income countries (2).

In response to global NCD burdens, the NCD-GAP has provided a policy roadmap and strategies for all Member States and key actors to reduce worldwide premature NCD deaths, particularly those from cardiovascular diseases, cancer, diabetes and chronic respiratory diseases (3). Member States have committed to reducing the NCD global mortality by one third by 2030. In 2015, 2017 and 2020 the WHO NCD progress monitor reports assessed progress in 18 NCD policies related to best buy options across 151 Member States (4).

People on the move may face poorer health outcomes for untreated NCDs. NCD risk factors can be exacerbated by social determinants of health surrounding the migration process. Migration is a largely heterogeneous process, and the risk of NCDs varies depending on the type of migration and the health systems in the countries of origin, transit and destination.

Migratory flows are very diverse: people may migrate within their home country for work or in response to environmental or other threats, or they may move temporarily (for example, for recreation, holidays, visits to friends and relatives, business travel, medical treatment or religious pilgrimage). This evidence review focuses on international migrants, including refugees, who have moved across international borders (Box 1).

Box 1. Definitions of international migrants forming the target population of this review

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.

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” (5). 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 term 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” (6). This grouping 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)) (7), a refugee is defined as:



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)) (8), the term refugee also applies to:



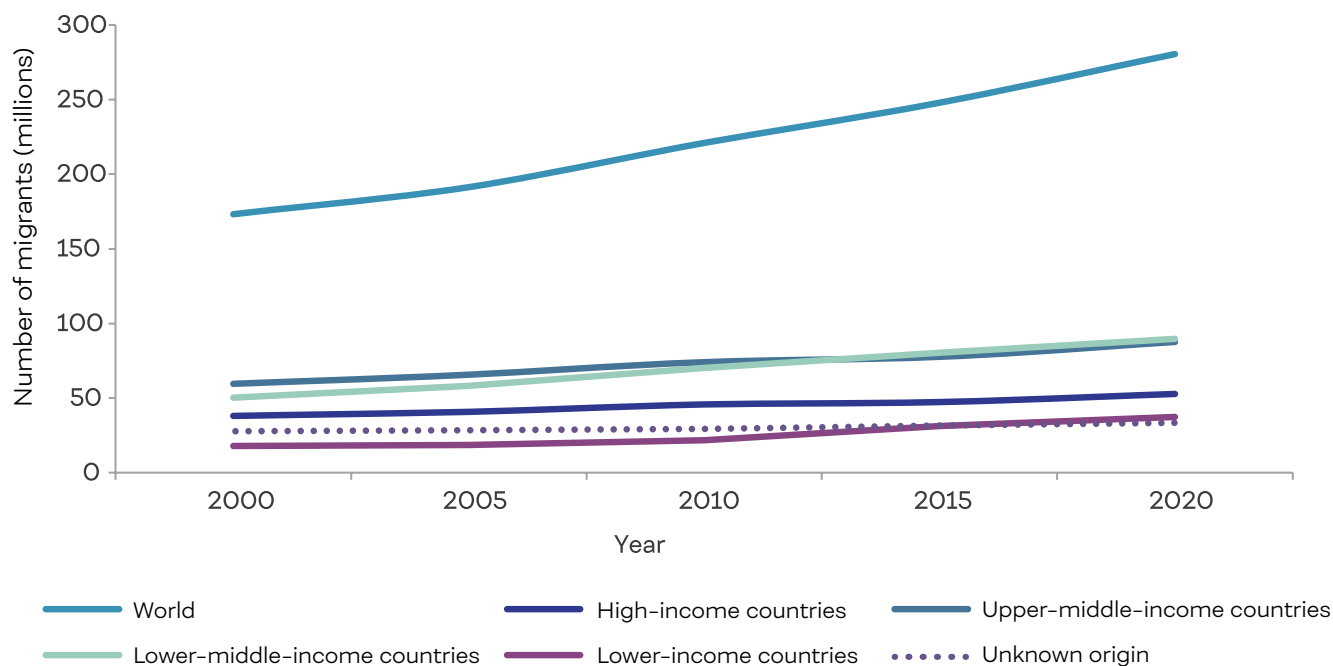
every person who, owing to external aggression, occupation, foreign domination or events seriously disturbing public order in either part or the whole of his country of origin or nationality, is compelled to leave his place of habitual residence in order to seek refuge in another place outside his country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

International migrants, including refugees, may face extreme poverty and inadequate access to food and other essential items in their country of origin. In addition, they may be more likely to be exposed to economic inequalities, social exclusion and discrimination in countries of destination or transit. These parameters can place them in vulnerable living and working conditions, leading to adverse environmental, behavioural and lifestyle changes, including unhealthy living environments, insufficient physical exercise and inadequate nutrition; all of these are risk factors for NCDs (9–13).

In addition, management of primary risk factors mostly requires support across the life course. Once an NCD is diagnosed, there is also a lifelong struggle to eliminate symptoms and prevent (or at least slow) the development of complications. The multifaceted dynamics of the migration processes pose major challenges for the essential continuum of care (14). In the migration cycle from the country of origin through transit countries to a final country of destination, refugees and migrants can be exposed to a variety of health systems and socioeconomic conditions, which will influence all stages of NCD management and long-term care (2,15). Migrants are often diagnosed with NCDs in transit or while staying in intermediate countries, but treatment is either discontinued because of the transitory nature of their residence or never begun because they only have temporary residency status or local resources are limited.

Health-care coverage for NCDs is largely dependent upon the availability and accountability of health systems (16) and on a continuum of accessibility throughout the migration cycle. NCDs in migrants are problematic, particularly because services for NCDs are often lacking in the countries of origin or transit (15); even in high-income countries of destination, there can be legal or migrant-specific barriers to accessing the available NCD services. In LMICs, the problem is often that there is a lack of health services for NCD prevention, diagnosis and treatment (2,15).

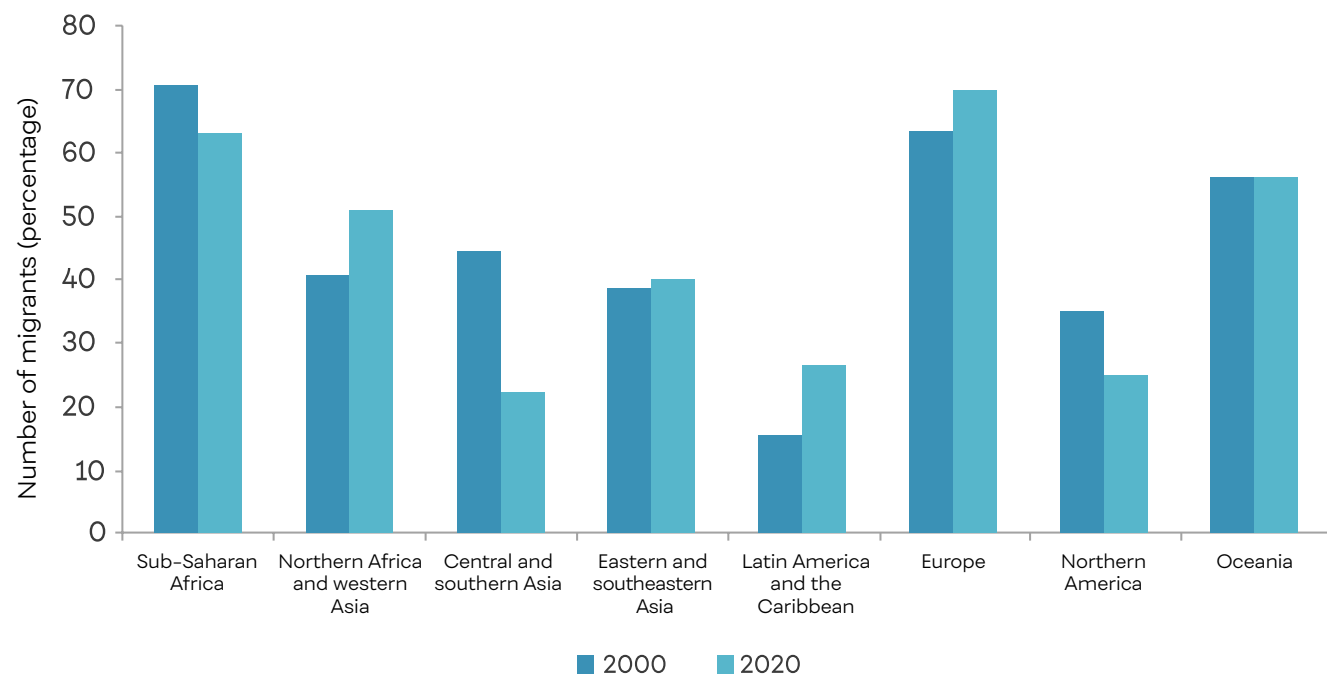
In 2020 90 million international migrants came from LMICs, making up 32% of all international migration; 37 million people, 13% of the total migrant population, were from low-income countries. Nearly half of these 37 million people were refugees and asylum seekers, with their numbers growing rapidly between 2000 and 2020 (Fig. 1) (17). Of the 20 largest countries of origin, most were LMICs: India (18 million), Mexico (11 million), the Russian Federation (11 million) and China (10 million). Two were lower-income countries: Afghanistan (8 million) and the Syrian Arab Republic (8 million).

Fig. 1. Country of origin of refugees and international migrants by World Bank income group

Source: United Nations Department of Economic and Social Affairs, 2020 (17).

Regarding countries of destination, 80% of refugees were hosted by LMICs. Refugee populations make up 25% of the mobile population in middle-income countries and 50% in low-income countries. Nearly 30% of all international migrants live in middle-income countries and around 4% in low-income countries (17). Specifically, within international migration to LMICs, there are large global intraregional migrant populations, including the second largest share of migrant populations found in sub-Saharan Africa (Fig. 2) (17). In 2020 of all international migrants from sub-Saharan Africa, 63% moved to another country or area in the region, and one third of the regional migrants were refugees and asylum seekers.

Fig. 2. Percentage of intraregional migrants among all refugees and international migrants by region of origin, 2000 and 2020



Source: United Nations Department of Economic and Social Affairs, 2020 (17).

1.1.2 Global NCDs action gaps for refugees and migrants

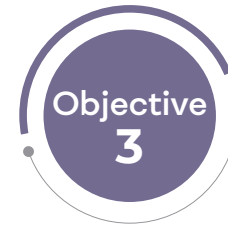
As the burden of NCDs became more prioritized globally, the Sixty-sixth World Health Assembly approved the NCD-GAP (3). The NCD-GAP provides strategic roadmaps and policy options to support all Member States and other stakeholders in taking action at all levels, from regional to global, to reduce premature NCD deaths worldwide, particularly for cardiovascular diseases, cancer, diabetes and chronic respiratory diseases. Member States committed to reduce the NCD global mortality by one third by 2030. In 2015, 2017 and 2020 WHO NCD progress monitor reports assessed the progress of 151 Member States in 18 NCD policies related to best buy options (4). The NCD-GAP has six strategic objectives (3).



To raise the priority according to the prevention and control of NCDs in global, regional and national agendas and internationally agreed development goals through strengthened international cooperation and advocacy.



To strengthen national capacity, leadership, governance, multisectoral action and partnerships to accelerate the country response for the prevention and control of NCDs.



To reduce modifiable risk factors for NCDs and underlying social determinants through the creation of health-promoting environments.



To strengthen and orient health systems to address the prevention and control of NCDs and the underlying social determinants through people-centred primary health care and universal health coverage.



To promote and support the national capacity for high-quality research and development for the prevention and control of NCDs.



To monitor the trends and determinants of NCDs and evaluate progress in their prevention and control.

Universal health coverage and its inclusiveness to ensure that no one is left behind have been addressed in the aim of the 2030 Agenda for Sustainable Development (18) and the SDGs (19) and continued in the New York Declaration for Refugees and Migrants (20), Promoting the health of refugees and migrants: draft global action plan, 2019–2023 (document A72/25) (21) and global action plans on NCDs and on migration. Despite progress in the NCD-GAP, NCDs of refugees and migrants have not been prioritized.

The review of progress of the NCD-GAP is not captured by the NCD monitor but rather by a mid-point evaluation of the implementation of the NCD-GAP: the mid-point evaluation recommended that Member States and the WHO Secretariat increase their focus on how NCDs differentially affect various groups, including refugees and migrants, in line with the principles of no one left behind, as specified in the 2030 Agenda (22). The mid-point evaluation addressed three areas:

- disaggregated data collection and analyses of NCD prevalence and risk factors in vulnerable groups;
- interventions addressing the determinants of health including gaps and barriers that affect identified groups; and
- promotion of health literacy for both NCD prevention and NCD management, including greater focus on patient-centred communication as well as the development of easy-to-understand and easy-to-act-on material to support self-management.

WHO has been working to address the health risks associated with migration and promote the health of refugees and migrants. In 2017 following Executive Board decision EB140(9) (23), the World Health Assembly endorsed resolution WHA70.15, Promoting the health of refugees and migrants (24) and in 2019 the World Health Assembly endorsed the Global Action Plan for Promoting the Health of Refugees and Migrants (21), which identified six priority areas:

- promote the health of refugees and migrants through a mix of short-term and long-term public health interventions;
- promote continuity and quality of essential health care, while developing, reinforcing and implementing occupational health and safety measures;
- advocate the mainstreaming of refugee and migrant health into global, regional and country agendas and the promotion of refugee- and migrant-sensitive health policies and legal and social protection; the health and well-being of refugee and migrant women, children and adolescents; gender equality and empowerment of refugee and migrant women and girls; and partnerships and intersectoral, intercountry and interagency coordination and collaboration mechanisms;

- enhance capacity to tackle the social determinants of health and to accelerate progress towards achieving the SDG, including universal health coverage;
- strengthen health monitoring and health information systems; and
- support measures to improve evidence-based health communication and to counter misperceptions about refugee and migrant health.

The Global Action Plan was aligned with the WHO Framework of Priorities and guiding Principles to Promote the Health of Refugees and Migrants, agreed in 2017 (25). Both are consistent with the Global Compact on Refugees (26) and the Global Compact on Safe, Orderly and Regular Migration (27). The latter addresses the agreement and commitment of providing access to basic services for migrants by strengthening a migrant-inclusive service delivery system while minimizing any differential treatment, in accordance with international human rights law. Specifically with regard to health needs, the Global Compact states:



Incorporate the health needs of migrants in national and local health care policies and plans, such as by strengthening capacities for service provision, facilitating affordable and non-discriminatory access, reducing communication barriers, and training health care providers on culturally sensitive service delivery in order to promote the physical and mental health of migrants and communities overall.

The Global Compact for Refugees also addressed the health of refugees by focusing on their integration into the health systems of countries of destination (or services that can be accessed during the transit phase) in order to facilitate health-care access for those with chronic illnesses and disabilities (26). The programme of action includes key components of NCD prevention, including health promotion activities such as participation in physical activity and preventive measures, as well as components of NCD management such as affordable and equitable access to adequate quantities of medicines, medical supplies and diagnostics.

WHO regions have responded to World Health Assembly resolution WHA70.15 (24) and the subsequent report, Global Action Plan for Promoting the Health of Refugees and Migrants (21) by developing regional strategies and action plan.

Preventing and reducing the risks posed by NCDs in refugee and migrant population is a strategic area of the Strategy and Action Plan for Refugee and Migrant Health in the WHO European Region (28). To prevent and reduce the risks posed by NCDs, key objectives were identified to ensure that refugees and migrants form part of Member States' national strategies for the prevention and control of NCDs in the population as a whole.

The Pan American Health Organization developed a Guidance Document on Migration and Health to propose interventions that incorporate approaches based on health equity, gender and ethnic equality, and the right to health (29). The document highlights five strategic lines of action and recognizes the need to bridge the short-term emergency response and medium- to long-term actions for integrating the health needs of migrant population, while ensuring the sustainability of actions currently being implemented.

On 7 July 2021 echoing global and regional commitments to prioritizing refugee and migrant health on the international agenda, the WHO Eastern Mediterranean Region prepared a draft strategy to advocate for international cooperation between Member States regarding the right to health of these populations (unpublished). The draft strategy is aligned with the Global Action Plan (21).

Global NCD responses have yet to fully cover the needs of refugees and migrants. In particular, they have failed to address migrant-specific barriers and risks. In this sense, inclusion of refugees and migrants in the NCD-GAP is critical.

While the 2030 Agenda has emphasized the principles of no one left behind (18), NCDs of refugees and migrants have not been specifically addressed in the NCD-GAP, and are also less prioritized in Member States. The mid-point evaluation of the implementation of the NCD-GAP strongly recommended that Member States and the WHO Secretariat address disparities in NCDs, in particular, how NCDs differentially affect various groups, including refugees and migrants (3). As recently summarized in the Political declaration of the third high-level meeting of the General Assembly on the prevention and control of noncommunicable diseases (EB150/7, Annex 6 (30)), no countries are on track to achieve all nine of the voluntary global targets for 2025 set by the World Health Assembly in 2013 against a 2010 baseline, and only 14 countries are on track to meet SDG target 3.4 for 2030 (measured by indicator 3.4.1: mortality rate attributed to cardiovascular disease, cancer, diabetes or chronic respiratory diseases) (31), as set by the United Nations General Assembly against a 2015 baseline. The limited progress towards SDG target 3.4 led to the draft implementation road map 2023–2030 for the NCD-GAP (document EB150/7,

Annex 1 (30)). The first strategic direction for implementing the NCD-GAP prioritizes understanding NCD epidemiology and risk factors and the identified barriers and enablers. Countries should systematically examine their progress in introducing evidence-based national guidelines, protocols and standards for the prevention and management of NCDs, including policies for the inclusion of migrants and other vulnerable groups.

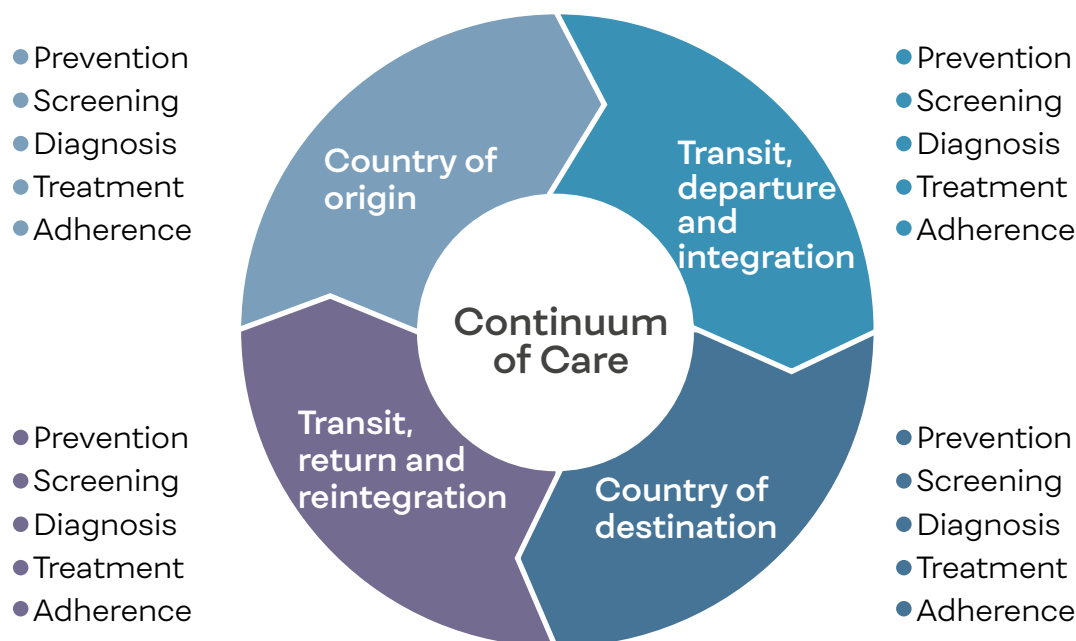
1.2 Conceptual framework: continuum of care during the migration cycle

The concept of continuum of care is used in this report as a comprehensive framework that identifies potential gaps and barriers that cycles of NCD management and migration generate. The continuum of care framework is used to capture the gaps at each stage of NCD prevention and management:

- prevention of NCD risk factors with lifestyle modification, disease screening and risk assessment;
- diagnosis and treatment decisions, initial treatment and adherence to long-term care; and
- monitoring and management of complications, rehabilitation and palliative care.

The framework of the continuum of care is applied to the migration cycle: country of origin, departure, country or countries of transit, country of destination, returning to country of origin or movement to a further country. In this framework, each stage of the migration cycle is a primary unit for gap and barrier analysis in order to emphasize the need for continuity of care across stages.

This framework interprets gaps and barriers of NCD prevention and management through understanding the social forces and determinants in the migration cycle while accounting for specific clinical and public health interventions required for NCD disease etiology and progress. This integrative approach to the dual continuum of care in migration and NCDs is essential to prevent risk factors and manage NCDs among refugees and migrants (Fig. 3).

Fig. 3. Continuum of NCD care in the migration cycle

1.3 Objectives of the report

Migration is a heterogeneous process, and various social determinants of health surrounding the migration process can aggravate the vulnerability of migrants to NCDs. In response, this GEHM addresses the following policy question: "What is the evidence available on refugees' and migrants' access to services for NCDs?" Given the potential impacts of the COVID-19 pandemic on NCD services, this policy question includes addressing how the COVID-19 pandemic has impacted access and services.

This review has focused on the evidence available on migration and NCDs worldwide and examined health policies and care service practices for refugees and migrants. It provides an overview of barriers and gaps for the continuum of NCD care as well as policy and practices across the migration cycle. Based on the findings, policy considerations are put forward to strengthen information about NCD services for refugees and migrants as well as to support future evidence-informed policy-making with regards to migration and health. The three objectives of the review were to:

- examine magnitude and patterns of NCD burdens and risk factors in refugees and migrants, particularly related to gaps and barriers of NCD health services;
- examine health system and NCD policy gaps for the continuum of care across the migration cycle; and
- identify migrant-inclusive practices and interventions.

Among diverse flows of migration, this GEHM has focused on international migrants, including refugees: those who have moved across an international border. In line with the NCD-GAP, the review also focused on four major NCDs: cancer, cardiovascular diseases, diabetes and chronic respiratory diseases. Population-wide preventive measures for lifestyle modification (such as tobacco and alcohol regulation or dietary salt, fat and sugar reduction) were not included if the measures did not specifically target NCDs and risk factors in refugees and migrants.

1.4 Methodology

A scoping review was carried out of peer-reviewed literature, policy documents and grey literature published in English between 2010 and 2021 (with documents prior to 2010 included if relevant in the grey literature). This allowed exploration of the potential impacts of the COVID-19 pandemic on services for NCDs and access to these. A critical interpretative synthesis of a wide range of qualitative evidence was performed on NCD policies and interventions for migrants as well as on relevant literature related to their access to NCD services.

Predefined search terms and strategies were employed for the four areas of interest:

- migrants
- NCDs (cancer, cardiovascular diseases, diabetes and chronic respiratory disease)
- policies
- interventions.

Annex 1 contains full details of the search strategy and the inclusion and exclusion criteria.

The systematic review yielded 1251 articles after removal of duplicates. A further 917 articles were excluded based on their title or abstract (see Annex 1). Among the remaining 334 potentially relevant documents, 175 met the eligibility criteria and were included in the synthesis. Annex 2 outlines the data extracted and summarized from each paper. The tables in Annex 2 give a descriptive overview of (i) 137 articles covering refugees and migrants in developed countries of destination (32–168) and (ii) 38 articles covering refugees and migrants in developing countries of destination or transit (11,169–205). Although the search terms were inclusive of results for SARS-CoV-2 infection and COVID-19 impacts, only five of the 175 selected papers in the systematic review pertained to the COVID-19 pandemic period; consequently, information is limited about the impact of COVID-19 on access to NCD services for refugees and migrants.

The scoping review of policy documents and grey literature on migration and NCDs yielded 185 documents. United Nations reports and documents were extensively integrated for policy consideration if they included direct or indirect evidence related to NCDs in refugees and migrants (more widely defined than those targeted in the systematic review). Again, because of the urgent nature of the COVID-19 pandemic, there was a lack of specific evidence on NCD care for refugees and migrants during the pandemic.

1.4.1 Limitations

This review was based on the synthesis of extensive evidence from a systematic review of academic literature with a strict inclusion criterion of NCD gaps and barriers for refugees and international migrants, in addition to an extended review of peer-reviewed literature, policy documents and grey literature with wider inclusion criteria related to migration and NCDs. The available research mostly included refugees and migrants in countries of destination, with fewer articles dealing with countries of origin or transit. Evidence on migrants in irregular situations was rare because of the limited accessibility of these hidden populations. While the searched evidence was primarily articles written in English, this limitation was mitigated by requesting and receiving inputs from all WHO regional offices and professionals involved in this work.

A subtopic of the impact of the COVID-19 pandemic on access to NCD services for these population groups was included at the beginning of the search. However, the preliminary findings, which included COVID-19 as a search term in the search string, indicated a dearth of published research on the direct and indirect impact of COVID-19 on NCD services for refugees and migrants, probably due to the short observation period since the start of the pandemic.

Consequently, this review pertains to the pre-COVID-19 era, and the initial objective of exploring the impact of COVID-19 on NCD services could not be addressed. However, a few reflections on refugees and migrants have been included by using indirect evidence of COVID-19 as it relates to other disease burdens for refugees and migrants or from health system research outside migration. This has allowed some interpretation on the potential impacts of COVID-19 on NCDs in migration.

2. Results

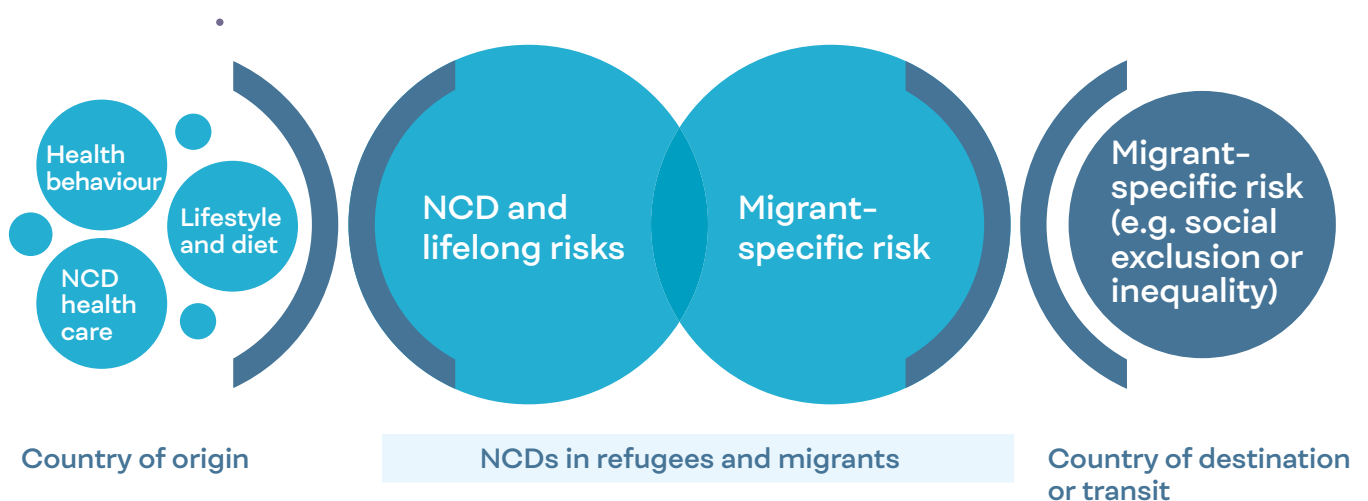
The following critical interpretative synthesis refers specifically to some but not all of the documents identified in the search strategy but all are listed in the reference list.

2.1 NCD determinants and burden in refugees and migrants

2.1.1 NCDs and their determinants in global migration

The risk of NCDs varies within migrant groups, with the type of migration (164) and with the countries of origin, stages of transit and destination; all of which generate specific socioeconomic determinants of NCDs (2,15). As NCDs have a chronic nature, the risks of NCDs encountered at certain stages of the migration cycle can be embodied in migrants and later result in burdens of diseases in countries where the refugees or migrants settle (Fig. 4). The continuum of NCD risks in refugees and migrants across the migration cycle requires an equal continuum of NCD care. Compared with host populations, migrant workers are usually at a higher risk of NCDs because of lifestyle issues, including lack of exercise, along with alcohol consumption, smoking and central obesity (11). Economic status is also a major concern for refugees and migrants in accessing NCD care; populations with lower economic status in countries of destination have a much higher likelihood of developing an NCD than those in higher income groups (15). Therefore, because refugees and migrants often have a lower socioeconomic status compared with host populations, they are more likely to experience NCD burdens, although there is still little empirical evidence on the association between socioeconomic status and NCDs in refugee and migrant populations.

Fig. 4. NCD risk factors in refugees and migrants



Prevalence of NCDs within countries is heterogeneous, varying with genetic, biological, lifestyle and environmental factors; therefore, a large variation was found across subgroups of migrants having similar ethnicity, culture, diet and lifestyle factors. Variation was also found across and within different groups of migrants with regard to the distribution of NCD risk factors. In Member States of the WHO European Region, for example, refugees and migrants tended to have a higher prevalence of cardiovascular diseases compared with the host population. There was large difference in prevalence in migrants originating from southern Asia, eastern Europe and the Middle East compared with other migrants.

All-cause mortality was often reported to be lower than that of the host population in many migrant groups: the so-called healthy migrant effect (164,206). However, the prevalence of NCDs such as cancer and its related morbidity tends to be lower in the early phase of settlement but rapidly increases to match the prevalence in the host population over time (205,207,208). A higher risk of type 2 diabetes, hypertension and cardiovascular diseases in refugees and migrants was reported in several studies, although results varied across the subgroups (209–212); however, it was not clear what role NCD risk factors played.

Furthermore, access to health care for NCDs varied with the migration experience as well as the countries of origin, transit and destination; in many journeys, migrants had inadequate access to shelter, food insecurity and lower income, all of which are associated with an increased likelihood of NCDs (10–13). In Thailand, for example, a higher occurrence of NCDs was observed along with elevated lifestyle-related problems among migrant workers, including a lack of exercise, increased alcohol consumption and smoking, and central obesity (11,203,204). Conversely, when compared with psychosocial stressors among Ghanaians living in Europe, rural and urban Ghanaian populations had a higher proportion of negative life events due to permanent stressors resulting from life in Ghana (77).

Without global estimates of NCDs in refugees and migrants measuring NCD burdens for refugees and migrants and generalizing their patterns are difficult based on country data. In particular, little is known about the NCD burden in migrants in irregular situations, most of whom are marginalized from health-care systems and often hidden from health surveillance systems in host countries. Furthermore, there was a lack of evidence regarding NCDs for refugee and other migrant populations outside of traditional countries of destination such as Australia, Europe and North America.

2.1.2 COVID-19 and NCDs in refugees and migrants

People with NCDs have a higher risk of hospitalization and complications in COVID-19, resulting in higher mortality. Undiagnosed or untreated NCDs are common in refugees and migrants and, therefore, are problematic in the context of COVID-19. For example, refugees and migrants with diabetes are less likely to properly control their glucose levels; lack of such control can impair immune function, which leads to a higher risk of morbidity and mortality with COVID-19 than for those with controlled diabetes or without diabetes. NCD risk factors such as high-risk occupations, economic instability, poor nutritional status and overcrowded accommodation are additional risks for refugee and migrants, making them more vulnerable to COVID-19 impacts.

While global incidence data for COVID-19 in refugees and migrants are still quite limited, refugees and migrants in many countries have been shown to have a higher risk of SARS-CoV-2 infection, resulting in an overrepresentation in COVID-19 cases and deaths. For example, in Denmark, Norway and Sweden, migrants had higher incidence rates in the first peak of the pandemic than the host population, representing 19% of all reported cases in Norway (211), 32% in Sweden (212) and 18% in Denmark (213). Migrants in detention facilities have a higher risk of SARS-CoV-2 infection due to overcrowding in reception and detention centres (214). Although COVID-19 mortality in migrants is low, ethnic minorities are at an increased risk of hospitalization and death from COVID-19. In Denmark, hospitalization with COVID-19 was higher in ethnic minorities than in the host population (15% and 9%, respectively) (213). In Italy, the rate of late diagnosis and hospitalization was higher in migrants than in the host population, accounting for a higher risk of hospitalization (adjusted relative risk, 1.39; 95% confidence interval, 1.33–1.44) and of admittance to an intensive care unit (adjusted relative risk, 11.19; 95% confidence interval, 1.07–1.32) (215). In Sweden, migrants had higher risk of dying with COVID-19 after adjusting for other sociodemographic variables (216). Mortality from COVID-19 was two times higher in migrants than in the host population in France (217) and 47% higher in the Netherlands.

2.1.3 Disease-specific evidence: gaps and barriers in screening and treatment adherence

There were significant disparities in NCD barriers among refugees and migrants (37,43,49,54,73,90,103,117). In Australia, North America and Europe, those disparities were associated with migrant-specific determinants related to culture

(79,85,110,153,163), health knowledge and belief (68,77,80,168), communication (86), health literacy (56,74,89) and language (149,154–156,158,159,161). In resource-limited settings, financial barriers were identified for refugees, particularly Syrian refugees in Jordan, Lebanon and other Middle Eastern countries (172,173,186,187,198), in addition to other migrant-specific barriers such as culture and language (196,205).

2.1.3.1 Cancer

Migrants are exposed to the same risks of developing multiple types of cancer as host populations; however, certain types of cancer are more prevalent in migrants from specific areas of endemic viral infection, such as with hepatitis C virus or human papillomavirus. In Bangladesh, Rohingya refugees had 10 times the incidence of hepatitis C virus infection compared with the host population and this was associated with a greater likelihood of hepatocellular carcinoma (218). By comparison, in Australia, a lower risk of breast cancer (and resulting deaths) was observed in female migrants from China, the Philippines and Viet Nam compared with the host population (219). However, refugees and migrants were more likely to present late and be diagnosed with cancer at an advanced stage; this is most likely due to gaps and barriers in cancer screenings in countries of origin and destination (37,38,220,221). Cancer, particularly in those with a late diagnosis, creates substantial economic burdens for host countries and global health actors in humanitarian contexts (38,86,106,220). For example, the financial burdens of cancer care for 4.74 million Syrian refugees in Jordan, Lebanon and Turkey were estimated as €140.23 million, €79.02 million and €33.68 million, respectively, based on a cost per capita, age-standardized incidence and age-standardized incidence approach (222).

In migrants, however, significant gaps in cancer screening and treatment were observed across the regions (32,37,38,43,61,64,65,67,80,82,85,86,88, 106, 110,115,117,128,131,133,135,139,140,149,152,153,158,159,161,202,220,221,223–229). Compared with host populations, cancer screening rates were significantly lower in migrants, with wide variation depending on ethnicity, country of origin and type of cancer, such as cervical cancer (32,140,223,224,226) and breast cancer (65,161,187,225). In Australia, for example, a study reported that only 27.4% of migrant women attended clinical breast examinations annually (161,219). Additional studies found that Korean and African migrant women had lower rates of breast cancer screening and clinical examinations, and African refugee women had lower

cervical cancer screening rates than the Australian host population (150,230–232). In Canada, cancer screening rates were significantly lower for southern Asian women (48.5%) than for Caribbean and Latin American women (63.7%) (233). Significant disparities were also found in cancer treatment (223,227). A study of 213 320 Norwegians and 8324 migrants found that treatment of lung and breast cancer tended to be delayed in migrants (223). Asian migrants were less likely to receive breast-conserving surgery among patients with breast cancer (223). Childhood cancer survival was also significantly lower in the migrant population of Finland (224). There were delayed diagnoses and treatments in Syrian refugees with cancer (220). In the WHO Eastern Mediterranean Region, significant gaps and barriers were observed in cancer screening and treatment (234–236). In Pakistan, for example, 25.4% of Afghan migrants with cancer received chemotherapy and radiation, but more than half were lost to follow-up (235).

Lack of health literacy was identified as a key barrier to cancer screening across the WHO regions and has been attributed to a variety of factors, such as knowledge, language and cultural familiarity among refugees and migrants. Knowledge of cancer symptoms and screening was much lower among refugees from African and Middle Eastern countries, often linked to low socioeconomic status (85,140). Culture and ethnicity were associated with access to cervical cancer prevention services among black migrants in the United States (117). In Uganda, single refugee women from South Sudan who lived farther than 1 km from the nearest health-care facilities were significantly less knowledgeable about symptoms of cervical cancer than married women and those who lived near health-care facilities (205). In Australia, breast cancer awareness and screening rates were low among migrant women: only 19% of the women demonstrated an understanding of breast cancer and 27.4% attended clinical breast examinations annually (237).

There are also disparities in cancer treatment between refugee and migrant groups and host populations (128,139,158). Cancer awareness was also associated with treatment among Syrian refugees in Lebanon (139). Scandinavian studies reported language difficulties, a lack of screening information and low compliance with preventive care as barriers to cancer screening (238–241). Cultural norms are also associated with the acceptance of health information, as illustrated with the cultural challenges in understanding western medicine in Chinese migrants (89,242–244). In North America, studies also found that migrant women had less knowledge of cancer and cancer screening, particularly those of southern Asian descent (89). For these women, breast cancer was considered a white woman's disease, cervical cancer was often not understood, or cancer was deemed to be incurable. Among refugees, financial difficulties were reported as primary barriers, together with lack of knowledge. Among Syrian refugees in Jordan, the most common barrier was having no medical insurance (83.4%) due to financial

difficulties (97,173). A study of 733 refugees referred to the United Nations High Commissioner for Refugees in Lebanon (2015–2017) and Jordan (2016–2017) indicated the need for a holistic response to humanitarian crises, including education, screening, treatment and palliative care for both refugees and nationals, with an emphasis on breast cancer and childhood cancers (245).

2.1.3.2 Cardiovascular diseases

Cardiovascular diseases have complex risk factors related to ethnicity, socioeconomic conditions and lifestyle factors; therefore, refugees and migrants who have different countries of origin and destination, and duration of stay, can have quite different patterns of diseases (194,181,246–252). In the WHO European Region, a higher risk of stroke has been observed in migrants from sub-Saharan Africa and southern Asia, as well as a higher risk of coronary heart disease in migrants from southern Asia (251,252). In Jordan and Lebanon, the cardiovascular risk ranged from 8.2% to 20.9% in the Syrian refugee population (181,253,254). In a survey of Syrian refugees in Turkey, the most common condition among men was cardiac disease (29.1%) and the second most common condition for women was hypertension (35.9%), followed by diabetes (42.8%) (255). Socioeconomic disparity was also linked to stroke events in refugees and migrants. A nationwide cohort study in the Netherlands found that within the same ethnic populations, the low-income group had higher incidence rates than the high-income group. This study reported that stroke incidence was significantly higher among low-income groups of Indonesian, Moroccan Surinamese and Turkish migrants in the Netherlands (49).

With regard to treatment or secondary prevention, use of antihypertensive drugs and other measures to control blood pressure is low in refugees and migrants, even though hypertension is a major risk factor for cardiovascular diseases. Among Palestinian refugees in Lebanon, there was a high prevalence of undiagnosed hypertension (23% of those reporting no hypertension) and uncontrolled hypertension (64% of participants with hypertension) (256). With Filipino migrants in the United States, hypertension was poorly managed without appropriate awareness (134). Asian migrants in the United States were also less likely to be treated for hypertension than the host population, although risk factors and management were similar in both groups over time (263). Compared with the host population, migrants from sub-Saharan Africa were more likely to have higher blood pressure, which indicates a need for migrant-specific hypertension strategies (247). Similar to cancer and diabetes, language limitation, financial difficulties, suboptimal living conditions and access to health care were reported as barriers to the effective management of cardiovascular diseases, with health literacy related to language limitation reported as the main barrier. In Australia, Arabic-speaking migrants with cardiovascular diseases reported the need

for privacy, effective communication between the health-care provider and patient, and pharmacist-physician collaboration (148). Another study identified late presentation and diagnosis, poor living conditions, financial difficulty, and shortages of specialized centres and personnel as barriers to cardiovascular diseases management (174). In Jordan, Syrian refugees were less likely to benefit from health education than the host population and, therefore, less able to modify or avoid the risk factors (181).

2.1.3.3 Diabetes

Diabetes is a prominent NCD that is constantly higher in migrants than in host populations across most WHO regions. Migrant populations in the WHO Western Pacific Region, for example, experienced a disproportionate burden of NCDs compared with host populations, particularly of diabetes (136,258–263). Factors that can influence this increased risk include sociocultural influences, lifestyle changes driven by the migration experience, and access to health information (258,264). In the WHO European Region, all ethnic minority groups had a higher prevalence and odds ratio for diabetes compared with the host populations, and this was consistently associated with the length of stay in the countries of destination (265–269). Experiences of avoidable hospitalizations and complications, such as diabetic retinopathy, were also reported to be higher in migrants compared with host populations in Denmark (270) and Italy (271), likely due to inadequate access to quality primary health care. In the WHO Eastern Mediterranean Region, the prevalence of diabetes ranged from 8.3% to 15.8% (171,184,272–275). In Jordan, among Palestinian refugees over 40 years of age, 11% had diabetes and only 45% of those with diabetes were in control of their condition (276).

Diabetes management aims for the elimination of symptoms and the prevention of complications through monitoring and control of glycaemia, which requires self-management, education, controlled diet, smoking cessation, diagnosis and treatment of vascular complications, and pharmacological interventions. Therefore, health literacy is important for these systematic approaches in diabetes management (39,103,156,157) and also crucial for self-management (156). Similar to cancer screening, a lack of health literacy related to culture and language barriers in refugee and migrant populations was identified as a key barrier in diabetes screening and management (39,77,101,156,157). Compared with host populations, migrants in Italy were less likely to follow the diabetes screening guidelines for an annual assessment of glycated haemoglobin and at least two-yearly appointments for eye examinations, serum lipids measurements and microalbuminuria assessment (276). In Norway, migrants from eastern Europe, southern Asia, the Middle East and northern Africa had lower adherence and

lower achievement of treatment targets compared with the host population (277). Furthermore, cultural factors were significantly associated with adherence to diabetes management. In Australia, Arabic-speaking migrants were less adherent to diabetes self-care activities than European English-speaking populations because of their negative beliefs and scepticism about prescribed diabetes treatment (278). Elderly migrants with language and cultural barriers experienced obstacles to effective engagement with the health system and this weakened their ability to manage their health conditions (156). Samoan migrants reported another layer of barriers, including pride in their heritage and their roles within their families, which prevents the head of family from showing weakness and consequently makes them hesitant to seek health services (157). It should be noted that these factors could also play a positive role in the management of diabetes if they were utilized in tandem with the interventions (157).

In more vulnerable populations, financial difficulties, including a lack of health insurance, were identified as barriers to diabetes management. In the United States, agricultural labour migrants with hypertension and diabetes reported poverty (80%) and lack of health insurance (71%) as financial barriers with regards to accessing health care (120). Among Palestinian refugees in Lebanon, a substantial proportion had undiagnosed diabetes (14% of those reporting no diabetes) or uncontrolled diabetes (79% of participants with diabetes) (256). Among those refugees in Jordan, adherence to diabetic treatment decreased with seeking care at multiple providers, while adherence increased alongside explanations of the disease and its treatment and trust in health-care staff (179).

2.1.3.4 Chronic respiratory diseases

Limited literature has addressed the gaps and barriers to the treatment of chronic respiratory diseases in refugees and migrants. In Lebanon, 10% of Palestinian refugees from the Syrian Arab Republic were reported to have chronic respiratory diseases, which were more prevalent among those residing in refugee camps than in those residing outside the camps (256). In the study of Danish Civil Registration data, ethnic minority children were less likely to be prescribed anti-asthmatic medications for both relief and preventive purposes than children from the host population (34). Among the migrant children, low treatment adherence was observed in Latino migrant children from Mexico and Puerto Rico. Another study of Congolese refugees in the Kiziba refugee camp in Rwanda examined the use of solid biomass for fuels, which affected respiratory health (279).

2.1.4 COVID-19 pandemic: impact of economic deterioration on NCDs

In the global response to the COVID-19 pandemic, preventive measures such as border control, lockdown and social distancing have had substantial impacts on local economies, which has disproportionately affected the livelihood of socially marginalized groups. In both high-income countries and LMICs, there is robust epidemiological evidence for an association between socioeconomic status and NCDs (280). The economic determinants of NCDs are particularly significant for refugees and migrants, whose livelihoods may have become particularly unstable during the pandemic. Refugees and migrants, particularly daily-wage workers or those with temporary employment contracts, have faced more challenges in the labour market, given the negative impact of the COVID-19 pandemic on their long-term employment (281). Economic recession has had a disproportionate impact on the livelihood of newly arrived migrants because of the limited employment opportunities. In addition, the pandemic has affected the service sectors, such as hospitality, security and cleaning services, where migrants are overrepresented (281,282). Although there have been extensive policies and benefits to support businesses and individuals facing hardship from the COVID-19 pandemic, including direct financial subsidy, employment insurance, emergency response benefits, tax exemption, wage subsidy, rent subsidy and mortgage supports (283), there is no clear evidence as yet on how effective these measures have been for refugees and migrants. Despite emergent consensus on the need to include refugees and migrants in mitigation measures, these groups have had less overall access to financial supports and subsidies due to their legal status, language barriers and social exclusion. Refugees and migrants with NCDs may have pre-existing economic burdens from catastrophic health expenditure, especially those who were uninsured (284).

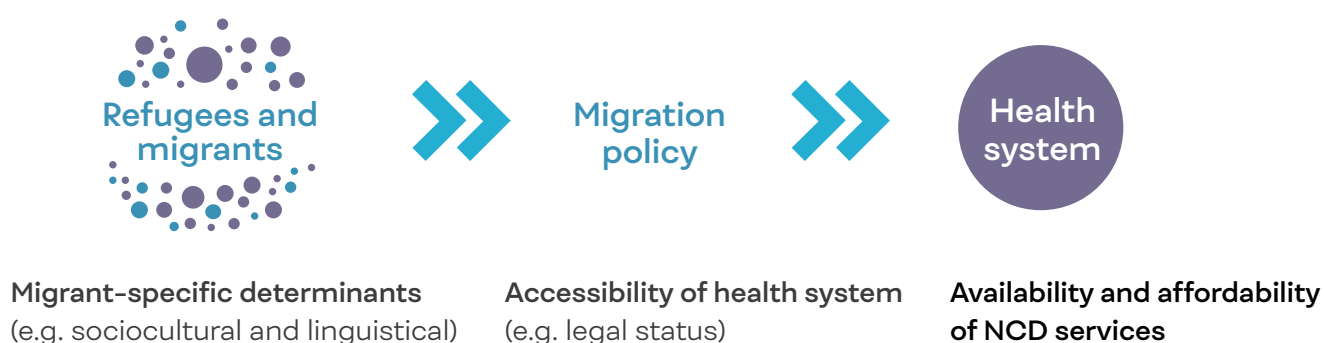
2.2 Health system and NCD policy gaps for the continuum of care across the migration cycle

2.2.1 Interruption in continuum of NCD care within the migration cycle

NCD services are required across the life course for treatment to prevent (or at least slow) the development of complications and to mitigate symptoms that affect quality of life. The multifaceted dynamics of the migration process pose major challenges in the continuum of care for NCDs. During their journey, refugees and migrants can be exposed to various health systems and socioeconomic environments that will influence NCD management and long-term care. Health-care coverage for NCDs for refugees and migrants is largely dependent upon the

accessibility of the health system and its ability to deliver a continuum of care during the migration cycle. In addition to issues of absent or inadequate NCD services in countries of origin and during phases of transit, migration-specific barriers to NCD services exist in many countries of destination, often of a legal nature (Fig. 5).

Fig. 5. Simplified health system determinants in migration and NCDs



Most refugees and migrants who originate from LMICs have faced a lack of health services for NCD prevention, diagnosis and treatment in their countries of origin (15). Their NCDs are often diagnosed in transit countries, but treatment is either discontinued when they move on or never started due to their temporary status or local resource-limited situations. For example, primary health-care surveys (2014–2016) at the Thailand–Myanmar border reported a low adherence rate in migrant patients for NCD treatment (10,11,13). During the early integration phases in countries of destination, access to NCD prevention and treatment services can be limited for refugees and migrants because of their lack of knowledge regarding their entitlement to care or cultural and language barriers. Refugees and migrants are also exposed to the existing socioeconomic barriers to accessing health services related to health inequalities in host communities after they settle in the host countries. NCD treatment initiated in countries of destination is often discontinued when migrants return to their country of origin or move on to other countries.

From the health system perspective, refugees and migrants may share geographical and socioeconomic disparities and health-care barriers and enablers with the local population in host or transit countries (2,14,15). In addition, there may be migrant-specific barriers such as ethnicity and a lack of linguistically and culturally relevant information, as well as related health system barriers created by lack of intercultural competence and diversity sensitivity in the health workforce, which can lead to additional vulnerabilities for refugees and migrants (285). Unfortunately, migration policies have caused both legal and other structural

barriers in the health system. There is evidence that refugees and migrants in some countries may be excluded from essential health care as they are uninsured, they may be discriminated against under policies antagonistic to migration, and there may be a lack of health-care policies for migrant workers (11,69,205). Furthermore, because there are no clear systems for transnational sharing of health information or personal health records, essential health information such as diagnosis or treatment history for the continuum of NCD care is not easily available for health-care providers in host countries. Interruptions in NCD care can further increase the risk of serious complications, resulting in catastrophic health outcomes and additional health expenditures for migrant populations (220).

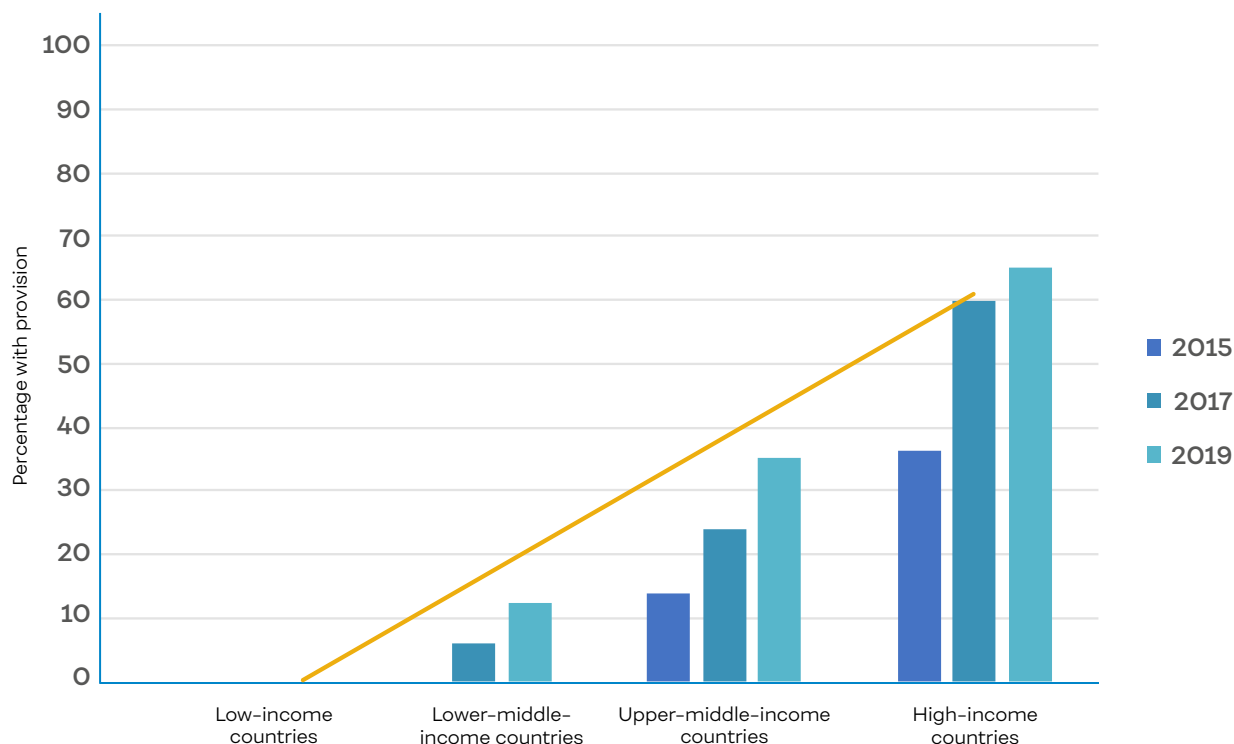
2.2.2 Availability and affordability of health care across the migration cycle

Health-care systems and the provision of health care differ substantially between high-income countries and LMICs (2,15). Notwithstanding the progress made in implementing the NCD-GAP, universal health-care coverage for NCDs is still far from actualization in many LMICs as well as in some high-income countries, and NCD services are largely unavailable for refugees and migrants who move to and from those countries (2,15).

In general, LMICs that lack a resilient health-care system have seen rising burdens of NCDs, which account for four fifths of NCDs worldwide (2,15). Middle-income countries with the largest migrant populations such as China and India have undergone fast economic development and rapid urbanization, leading to rapid lifestyle changes and epidemiological transitions and resulting in an increased burden of NCDs and infectious diseases (217,285). In LMICs, essential medicine and diagnostic technologies for NCDs, such as hypertension or diabetes are still much less available or affordable (16,286).

Despite recent progress identified in the mid-point evaluation of the NCD-GAP, disparities in the availability and affordability of NCD diagnosis and treatment still exist between countries of high and low income (22). No low-income country had fully achieved access to drug therapy and counselling, including for glycaemic control (Fig. 6). In sub-Saharan Africa, health system barriers for refugees and migrants were largely rooted in the lack of available and affordable NCD services that were shared with the host population. Refugees and migrants in the Middle East, the least developed countries in sub-Saharan Africa and other major countries of origin (such as Afghanistan or the Syrian Arab Republic) were faced with severe health system constraints in destination countries, and greatly reduced access to prevention, diagnosis and treatment services for NCDs and their risk factors, resulting in a hidden burden of NCDs.

Fig. 6. Percentage of countries that have fully achieved having provision of drug therapy in primary health care by World Bank income group



Source: United Nations Department of Economic and Social Affairs, 2020 (17).

2.2.3 Accessibility: migration policy and health system integration

Nearly two thirds of international migrants have moved to high-income countries during 2020, primarily to common destination states in North America and the WHO European Region (17). In countries where NCD services are relatively available, accessibility is mainly determined by the legal status of migrants. Large variations in refugee and migration policies were observed across countries and within national boundaries. The Migrant Integration Policy Index (MIPEX) is a tool for evaluating policies for the integration of migrants, including refugees, into national health-care services (287,288). MIPEX contains key policy indicators that allows a score to be obtained for a country. The MIPEX Health strand compares the scores for 52 countries (287). Twelve core migrant health indicators were selected from four dimensions to achieve change: entitlements, accessibility, responsiveness and measures (287,288). Health systems and integration policies were relatively migrant-friendly in countries such as Australia, Austria, Belgium, Canada, Chile, Finland, Ireland, Italy, New Zealand, Norway, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States (288).

For refugees and migrants, access to primary health-care services varied across the WHO European Region as well as within national boundaries. In Germany, which has restrictive policies for migrants' health access, medical services other than emergency care were permitted only for acute symptoms during the first 15 months of a refugee's stay while applying for asylum seeker status (289). Furthermore, adult refugees were significantly less likely to visit their general practitioners and specialists (290). According to a study conducted among Afghan, Iraqi and Syrian asylum seekers and refugees in Austria and Germany, there were significant differences in the numbers of patients in reportedly good health between the two countries and a lower attendance for health care in Germany than in Austria (291). The main difference between the two countries was likely to be the inclusiveness of health-care systems for migrants. While Austria provided unrestricted access to health services upon the arrival of refugees and migrants, Denmark, France, Germany and Norway did not; as a result, in these countries, health-care utilization rates were reported to be lower for migrants than for the host population (292–295).

A few central and southern European countries as well as Brazil, China, India, Indonesia and the Russian Federation were identified by the MIPEX Health strand as having less-inclusive policies for the integration of migrants into health systems (288). This will also mean that access to NCD services is restricted for global migrants. Coupled with lower political and social attention to migration flows, migrants are excluded from national NCD policies, leaving them to gain access through their own financial resources, civil society assistance or insurance programmes. In Bangladesh, while comprehensive coverage plans to respond to NCDs were successfully created as a part of responses to the NCD-GAP, migrants were not included in this plan (296). In Thailand, access to health-care services for NCDs was more limited for refugees and asylum seekers; almost half of the population reported no formal treatment of their NCDs, mainly due to lack of health insurance (297).

In many countries, access to health-care services is conditional on the legal status of migrants, who require residence permits to allow them the same access to health facilities as the host population. Access was mostly free of charge for the diagnosis and treatment of specific communicable diseases under a list of health security concerns, such as HIV, viral hepatitis, tuberculosis and Middle East respiratory syndrome (14,297). However, a study in the United Kingdom found that a patient had to be a legal resident in order to access free-of-charge outpatient care or surgery in secondary care, mostly for NCDs and injuries (298). Therefore, regardless of whether a host country had migrant-friendly policies, migrants in irregular situations were mostly excluded from the health system of host countries and, therefore, would lack access to NCD care. In countries

of destination, the irregular status of migrants could cause health-care barriers through fear of deportation, concerns about payment for services and uncertainties about rules for access (299). In transit countries, access to health care was often extremely limited for refugees and migrants as a result of taking remote migration routes to avoid arrest, incarceration or deportation (300). Compared with the host population and regular migrants, health-care utilization was significantly lower among irregular migrants regardless of the country of origin or length of stay (301,302).

There is large variation among health financing mechanisms for mitigating financial barriers to NCD services and protecting patients with NCDs from catastrophic health expenditure. Many Member States of the WHO European Region employ a national health insurance network within the public health system; other countries such as the United States require private insurance or direct out-of-pocket payments (303). If refugees and migrants are excluded from health financing systems, they may also be excluded from NCD health care through prohibitive treatment costs, transportation costs and loss of income as a result of taking time off to receive care (303–311).

A wide range of barriers have been reported for migrant access to primary health care, specialized care and/or emergency care; these can stem from gaps in the health systems in host countries and/or migrant-specific determinants related to their socioeconomic status (307–311). In addition to a lack of health financing, other constraints on access to health systems in countries of destination (or transit) have been reported for refugees and migrants, such as limited availability, funding, prioritization of specific health-care services, a lack of health system coordination among health-care providers (limiting referrals to specialized NCD care) and conflicts between health-care opening hours and working hours (307–311).

2.2.4 Availability and accessibility of health services during the COVID-19 pandemic

Because of the need to control SARS-CoV-2 infections, many countries have adopted health policies that are inclusive for socially marginalized populations, with out-of-pocket payments not being required for COVID-19 diagnosis and treatment (312). Refugees and migrants have been included in essential COVID-19 health services, including vaccination. During the COVID-19 pandemic, most Member States of the WHO European Region as well as Argentina, the Republic of Korea and Thailand have provided basic or emergency health services regardless of a person's legal status (313). Free emergency health services have been guaranteed for irregular migrants with COVID-19-related health problems in

Belgium, Croatia, Cyprus, Estonia, Finland, France, Greece, Israel, Italy, Lithuania, Luxembourg, Malta, Mexico, Poland, Slovakia, Slovenia, Spain, Sweden and Switzerland (312). In Peru, health insurance systems were temporarily opened to migrants with a COVID-19 diagnosis. Given the potential risk of deportation for migrants in irregular situations, no data were shared with the immigration authorities in Columbia and Republic of Korea. The Government of Saudi Arabia implemented a health amnesty reform in March 2020 allowing undocumented migrants access to health care for COVID-19 without the risk of legal arrest, deportation or other civil, criminal or economic sanctions (314).

From a health system perspective, however, the COVID-19 pandemic has resulted in a substantial disruption of health services for NCD prevention, diagnosis and treatment in most countries as resources have been reallocated to efforts in combating the pandemic. Although there are large differences in migration policy related to health-care inclusion for migrants, refugees and migrants have equally suffered from the disrupted health systems. Continuity of NCD care in primary health-care systems was interrupted by service closures and restricted movement (312). Furthermore, migrant/refugee programmes within civil society organizations were substantially reduced and infection prevention and containment policies made migrant-specific barriers related to language, culture and legal status more of an issue (312,313). Migrants in irregular situations could not access NCD services (315). Disruption of language-learning or cultural support programmes made refugees and migrants more vulnerable to cultural and language barriers in NCD health care. This disruption also impeded social integration and employment; lack of both is linked to NCD risks.

2.3 Migrant-inclusive practices and interventions

While the 2030 Agenda has emphasized the principle of leaving no one behind, NCDs in refugees and migrants are not specifically addressed in the NCD-GAP, and are also less prioritized in Member States. The mid-point evaluation of the implementation of the NCD-GAP strongly recommended that Member States and the WHO Secretariat should address disparities in NCDs, in particular how NCDs differentially affect various groups, including refugees and migrants (22).

In response to gaps and barriers identified in NCD prevention and management, there has been an increase in literature on NCD interventions and practices aimed at improving accessibility to specific NCD services (40,44–48,51–53,55,71,93–96,104,107, 114,116,136,138,141–146,150,151,162,163,165,167,316). These interventions have targeted gaps and barriers related to health literacy, such as a lack

of knowledge as well as awareness, practice, culture and language through behavioural and cultural frameworks. The literature focuses on cancer screenings, such as for cervical cancer (104,317–319), breast cancer (320) and colorectal cancer (321) and on lifestyle modification such as weight loss and diabetes prevention (322), obesity prevention (322) and cardiovascular health promotion (323–326). These migrant-specific interventions contribute to filling the gaps identified in the NCD-GAP relating to objective 3 (to reduce modifiable risk factors for NCDs and underlying social determinants through creation of health-promoting environments) and objective 4 (to strengthen and orient health systems to address the prevention and control of NCDs and the underlying social determinants through people-centred primary health care and universal health coverage).

2.3.1 Health literacy for knowledge, awareness and practice

Some interventions on health literacy with culturally and linguistically relevant information have shown improved migrant access to screening for cervical cancer, breast cancer and colorectal cancer (104,317–319,321,327). Many studies demonstrated that culturally tailored health education programmes for refugees and migrants effectively improved cancer knowledge and access to screenings (50,63,102). Educational interventions were widely used and their effectiveness was demonstrated in strengthening knowledge, awareness and perceptions/behaviours regarding screening for cancer across WHO regions, including in Jordan (185), Nepal (202) and Turkey (63,328). Educational interventions were also used in multicultural contexts and evaluated for refugees and migrants from diverse countries of origin including Haiti (100), Iraq and the Syrian Arab Republic (107), Mexico (99), Myanmar (160) and Somalia (113), among others (84,92). In Norway, for example, a large cluster-randomized clinical trial including 10 360 women of an educational intervention targeting primary health-care providers found that cervical cancer screening rates were improved in migrants from Pakistan, Poland and Somalia (50). The health literacy interventions helped to improve both specific disease knowledge and general health literacy in migrants (326).

2.3.2 People-centred communication with culturally and linguistically tailored interventions

A lack of communication capacity due to language issues is a significant health-care barrier (329). Community-based health education programmes using the language of refugees and migrants have proved to be an effective intervention in NCDs (33,35,103,156,166). For example, programmes targeting knowledge of breast cancer screening led to improvements in mammography uptake (97,98). In a study examining whether providing health education for Syrian

refugee women can overcome language limitations, health education in the women's own language significantly affected their awareness of cervical and breast cancer (63). Personal information and cultural changes in the community were positively associated with attitudes and motivation to attend screening services (63). Similarly, another study showed that a community-based educational programme improved breast cancer knowledge and screening among refugee and migrant women (92). Another study reported contradictory findings: providing Spanish language educational group sessions on cervical cancer screening for migrant farmworkers in Florida, United States improved cervical cancer knowledge but did not result in an increased screening attendance (99). This study suggested that more intensive interventions using patient navigation approaches or conducting one-on-one sessions would facilitate an increase in screening attendance (99). To improve the management of chronic hepatitis B among Afghan, Rohingya and Sudanese refugees in Australia, a peer-educator intervention was delivered through radio programmes and community forums in their own language; this proved to be a cost-effective health promotion strategy in building knowledge and dispelling misconceptions within the communities (160).

A lack of capacity for cross-cultural communication has led to significant barriers between health-care providers and migrant populations, which can hinder the capacity of migrants to receive appropriate health care (239,330,331) and contributes to ethnic differences in the self-management of NCDs (332). Patient navigator intervention programmes have proved to be an effective approach (105,147,327,333). A systematic review found that health outcomes were substantially improved in migrant and ethnic minority communities in the United States who used community navigators and guides from ethnic communities for chronic disease prevention and management, undertaking cancer screening and accessing primary health care (316).

Culturally tailored management and treatment strategies were recommended for minority populations (112,134). These interventions showed positive results in promoting NCD management. Culturally and linguistically tailored interventions are the common method to improve accessibility for health-care services. In a study of Latino and Somali migrants, culturally and linguistically tailored educational videos motivated migrants to increase specific health behaviours for type 2 diabetes self-management (146). In the United States, for example, a mobile clinic with a multidisciplinary team showed an improved surrogate end-point for cardiovascular diseases in underserved, low-income, foreign-born Haitian populations (143). Some strategies to promote colorectal cancer screening have been effective among Asian migrant communities and lay

health workers (334,335). Specifically, with regard to Latino migrant populations, Spanish-speaking promoters positively improved the prevention of NCDs through lifestyle changes (336) and effectively promoted colorectal cancer screening (337). In the United States, a trusting relationship with health providers was reported to be a significant facilitator for access to care among Spanish-speaking Latino adults with poorly controlled diabetes (338).

2.3.3 Appropriate and innovative tools for refugees in resource-limited settings

There is increased evidence for NCD interventions for refugees in resource-limited settings, such as among Palestinian or Syrian refugees in Lebanon or Jordan, and Bhutanese refugees in Nepal (175,179,181,188–192,197,200,201). These interventions were mostly conducted by primary health-care providers (177,178,180,183,184,193–195). For example, in a mixed-methods study among Syrian refugees in northern Jordan, Médecins Sans Frontières evaluated risk-based guidance for the prevention of cardiovascular diseases in humanitarian settings and found four priority areas: practical training for health workers, supporting the use of risk charts as a communication tool and for task sharing, contextualizing risk scoring, and targeting popular health myths among the community (181). Using a cohort analysis of routine operational data, another Médecins Sans Frontières study of Syrian refugees showed the effectiveness of multidisciplinary NCD programmes in primary care by demonstrating that using context-adapted guidelines and generic medications gave a higher probability of achieving treatment targets during a visit: 63–75% for cardiovascular diseases, diabetes and chronic respiratory diseases (190).

Techniques such as e-health and m-health (mobile health) were widely used as innovative tools among Palestinian refugees in the Near East and other regions (126). In Lebanon, a randomized controlled trial of innovative, low-cost m-health technology to enhance outcomes of NCD care in underserved communities in rural and refugee camp settings showed significant improvements in blood pressure control in the intervention group (190). Another study of e-health in Lebanon evaluated referral rates using a low-cost e-health tool for diabetes and hypertension detection with an e-health netbook application (189). The study found the application to be effective in identifying new cases of NCDs and establishing appropriate referrals not only in the refugee populations (107) but also in other rural and refugee settings in Lebanon (189). The cohort study of Palestinian refugees also reported improved treatment outcomes for diabetes using e-health (339). In addition, m-health interventions using the provided smartphone app were shown to increase the likelihood of recording body mass index and blood pressure in a pilot study and showed some improvement in measurements of body mass index, lifestyle counselling and medication compliance (340,341).

2.3.4 Social and economic integration for continuum of care

Social integration into the host community is essential for the continuum of care, but this can be challenging for refugees and migrants, especially for those in irregular situations. The ethnic community may offer protection and social support to irregular migrants. This support is crucial in overcoming fear or distrust in irregular migrants when accessing a hospital or health-care facility in the host country. For example, a project to create a screening centre hosted by the Chinese community in Italy demonstrated that community integration is effective (342–345). Furthermore, a tailored intervention for cervical screening in migrant women was found to strengthen the integration of those migrants into the host society (44). In addition, of importance given the financial barriers to NCD care (173,187), the integration of refugees and migrants into the health financing systems of host countries (particularly into health insurance programmes) led to improved NCD care (108,122).

3. Discussion

3.1 Knowledge gaps in migration and NCDs

There were significant evidence gaps in the literature pertaining to migration and NCDs, particularly regarding the lack of data collection and analysis of NCD prevalence and risk factors in refugees and migrants. Given the heterogeneity of refugees and migrants, disaggregated data on the prevalence of NCDs and their risk factors in different segments of the population on the move are rarely collected, hindering the identification and design of targeted interventions. The evidence gaps identified here are particularly related to objectives in the NCD-GAP: objective 5 (to promote and support national capacity for high-quality research and development for the prevention and control of NCDs) and objective 6 (to monitor the trends and determinants of NCDs and evaluate progress in their prevention and control).

To provide evidence for better NCD policy for refugees and migrants, the following evidence gaps should be addressed in further research, disease surveillance and monitoring.

- Evidence was lacking for specific migrant groups, such as migrants in irregular situations or other hard-to-reach groups (including victims of human trafficking), elderly people and populations whose movement is driven by climate change. For example, no data on undocumented migrants were available in a Health Survey for England programme. For many in these hidden populations, health care is provided by nongovernmental and civil society organizations or by private health-care providers (without insurance coverage) and, therefore, health information was extremely limited (346,347).
- Regions outside of Australia, Europe and North America were underrepresented in the documents identified in this review, particularly resource-limited LMICs. Nearly one third of all refugees and migrants in 2020 moved to LMICs. Most of the available literature about resource-limited settings mostly pertained to NCDs in refugee populations.
- Despite the importance of a continuum of care, the available research mostly dealt with refugees and migrants in countries of destination, with much less literature from countries of origin or stages of transit. The migration framework is rarely used for NCDs in the pre-migration or return phases of the migration cycle.
- There was also little information on NCDs in migrant detention centres, although some literature covers infectious diseases and mental health (315,348,349).

- Published research was lacking for specific areas of interest, such as the impact of COVID-19 and the effects of migration policy on access to health care for NCDs. Among the four major NCDs, least is known about chronic respiratory diseases in refugees and migrants. This is a critical gap since evidence shows a strong link with poor working conditions, to which labour migrants are commonly exposed.
- Few studies also addressed gaps and barriers in NCD services that did not adopt behavioural and cultural frameworks.

3.2. Policy considerations

This GEHM examined a wide range of evidence from peer-reviewed articles, policy documents and grey literature. A critical interpretative synthesis of the identified evidence was combined with existing global frameworks, guidelines and recommendations to suggest policy consideration in three areas, together with the key challenges for their implementation: governance and policies, research and data monitoring, and health service delivery.

3.2.1 Governance and policies

Raise the priority of migrant-inclusive NCD policies and action in global, regional and national agendas, as well as in internationally agreed development goals, by:

- establishing or strengthening a coherent institutional framework for transnational coordination mechanisms for NCD prevention and management in refugee and migrant populations;
- supporting international cooperation on the governance of international migration and the implementation of the Global Compact on Safe, Orderly and Regular Migration, specifically of Objective 15 on the inclusion of basic services, including NCD services for migrants; and
- promoting the dissemination of good practices, lessons learned, experiences and models of inclusive NCD actions for refugee and migrant populations.

Key challenges include:

- a lack of governance, legal framework, commitment, capacity and action for NCD service provision to the refugee and migrant populations; and
- a lack of evidence-informed good practices on NCD management for people on the move as part of prioritized health agendas.

Strengthen capacity, leadership, governance, multisectoral and transnational action and partnerships to ensure migrant-inclusive responses for the prevention and control of NCDs by:

- strengthening the partnership of key national, regional and global actors between NCD services and migration, including specialized organizations such as the IOM and United Nations High Commissioner for Refugees;
- instituting transnational surveillance mechanisms covering all phases of the migration cycle;
- strengthening data collection and information systems to ensure a continuum of care throughout the process of migration and settlement;
- establishing multinational and multisectoral mechanisms to facilitate inclusive NCD people-centred services;
- creating multisectoral expert groups across organization boundaries to share knowledge; and
- ensuring multisectoral occupational health and safety measures.

Key challenges include:

- a lack of policies and plans for including people on the move in health-care services;
- lack of a migration framework to manage NCDs in a transnational manner; and
- national governance gaps for refugees and migrants within host populations.

Provide equity policies as well as legislative and regulatory measures to reduce modifiable risk factors for NCDs and underlying social determinants in refugees and migrants by:

- establishing people-centred and migrant-sensitive interventions for the prevention of NCD risk factors;
- integrating health literacy principles and approaches into the design and implementation of WHO-recommended interventions and policy options to enhance the reach and acceptability of NCD measures;
- establishing health navigators in community health services to support refugees and migrants in overcoming barriers to accessing health care and integrating into the new health system;
- establishing multicultural health literacy approaches to support health literacy and health system literacy;

- improving communication at all levels to reduce discriminative policies and social exclusion at community level; and
- promoting intercultural competence and diversity sensitivity in the health-care workforce to ensure appropriate health care for refugees and migrants and responsive, people-centred health systems.

Key challenges include:

- political, social and economic inequalities and their association with NCDs
- a lack of migrant-specific policies for NCD risk factors.

Promote inclusive migration policy and health system integration for the prevention and control of NCDs and their underlying determinants in refugees and migrants by:

- integrating migration policies and health systems
- including NCDs and their determinants in all migration policies
- evaluating and monitor NCD gaps and barriers within exclusive migration policies
- ensuring that irregular migrants have access to health care
- ensuring that migration policies have a focus on equity.

Key challenges include:

- a lack of political will, commitment, capacity and action for NCD-inclusive migration policies;
- issues of legal status for undocumented migrants or other hidden migrant groups, such as trafficked people;
- existence of stigma and discrimination;
- lack of financing mechanisms to cover NCD burdens; and
- lack of a transnational health information system for the continuum of care for NCDs.

3.2.2 Research and data monitoring

Promote and support national and international capacity for high-quality research and development for disaggregated data collection and analysis of NCD prevalence and risk factors in refugees and migrants by:

- promoting system research and knowledge management;

- developing information systems; and
- developing longitudinal cohort studies of NCDs and clinical trials of NCD intervention for refugees and migrants.

Key challenges include:

- insufficient technical and operational capacities for managing research and development for people on the move;
- insufficient multinational funding schemes for research and development that consider refugees and migrants outside their country of origin or destination;
- difficulty in accessing hard-to-reach populations for data collection; and
- limited longitudinal cohort studies or clinical trials of NCDs in refugees and migrants.

Monitor transnational trends and determinants of NCDs in refugee and migrant populations and evaluate progress in migrant-specific approaches for NCD prevention and control by:

- developing and promote transnational surveillance mechanisms for all phases of the migration cycle; and
- instituting transnational referral systems with adequate information to support the continuity of care.

Key challenges include:

- lack of an international monitoring mechanism to evaluate NCD burdens in populations during the migratory cycle; and
- a lack of international health information systems to monitor the trends and changing determinants of NCDs during the migration cycle.

3.2.3 Health service delivery

Promote a continuum of NCD prevention and management in all phases of the migration cycle to protect all refugees and migrants from interruption of care by:

- ensuring universal health coverage and inclusive health services for refugees and migrants in all phases of the migration cycle;
- developing and promoting transnational health information systems powered by digital transformation of patient health records and information systems;

- integrating approaches to NCDs between local health-care providers and national health systems of host countries for those affected by forced migration, particularly in the early phase of displacement;
- making clear recommendations on provision of NCD care and surveillance systems in detention centres; and
- strengthening NCD–migration working groups to promote and coordinate migrant-specific NCD action and research and provide technical support to global, regional and national actors.

Key challenges include:

- global policy gaps in the prevention and management of NCDs in refugees and migrants;
- insufficient technical and operational capacities for transnational prevention and management of NCDs;
- insufficient financing and lack of financing mechanisms to respond to NCD burdens of people on the move;
- a lack of transnational health information systems to support a continuum of care; and
- a lack of political will, commitment, capacity and action for NCD prevention and management in detention centres, including ensuring a continuum of care for those who are forcibly repatriated to their country of origin or moved to a third country or who are in protracted detainment.

Strengthen inclusive approaches for NCD management in acute or protracted humanitarian emergencies by:

- ensuring that provision is created to deal with NCDs within surge responses to acute or protracted humanitarian emergencies;
- creating multicluster and multisectoral collaborations between humanitarian actors and national governments to ensure a continuum of care and shift the provision of care to primary health-care systems;
- triaging and providing life-saving care for patients with life-threatening presentations of NCDs, such as diabetic ketoacidosis, acute severe asthma and acute heart failure;
- moving NCD management into primary health care within functioning national systems (and support strengthening of the host health systems); and

- ensuring collaboration between health-care providers and local health authorities for a continuum of care.

Key challenges include:

- the dual burdens of displacement and disrupted health systems, including the destruction of health infrastructure and lack of medical supplies and essential medicines;
- comorbidity or multimorbidity of NCDs with infection, injuries or mental illness;
- degradation of living conditions, including a lack of shelter, washing and hygiene facilities, healthy foods and employment;
- a lack of consensus, commitment, capacity and action for NCD care in acute emergencies;
- issues of resistance to considering NCDs of refugee populations as a priority of the humanitarian response;
- a lack of technical and operational capacities to manage and maintain the continuum of NCD care in humanitarian emergencies (particularly in acute emergencies);
- a lack of integrated health information systems in humanitarian crises; and
- insufficient financing and lack of financing mechanisms to respond to the NCD burdens of people on the move.

Promote migrant-inclusive, culturally and linguistically acceptable NCD care through people-centred primary health care to advance achieving universal health coverage by:

- promoting a continuum of care across the migration cycle;
- promoting rights to access NCD care that are carried across borders through innovative international regulations;
- ensuring that health financing mechanisms are inclusive for refugee and migrant populations in order to protect them from catastrophic health expenditures;
- creating multidisciplinary primary care teams trained in aspects of language- and culture-based knowledge;
- creating portable systems for health information to support a continuum of NCD care through digital innovation;

- creating community-based approaches for refugees and migrants in the primary care services;
- providing outreach services through mobile units, transport systems and m-health for migrants in temporary hosting camps;
- ensuring that advanced care pathways for NCDs are available for refugees and migrants; and
- raising awareness in and build the capacity of health-care providers for refugees and migrants.

Key challenges include:

- disparities in access to NCD care between migrant and host populations, as well as between subgroups of migrants (with or without documentation); and
- the exclusion of refugees and migrants from measures to ensure people-centred primary health care and universal health coverage.

4. Conclusions

The multifaceted dynamics of migration processes pose major challenges for the treatment of NCDs in refugees and migrants. Lifestyle risk factors, such as diet, physical activity or alcohol use, can change with new socioeconomic environments in host countries. Any risks that become embodied during the migration journey can later appear as burdens of disease. In general, there was often a lack of NCD services in countries of origin and during phases of transit. Compared with host populations, refugees and migrants are less likely to access NCD services of prevention, screening, diagnosis and treatment, resulting in untreated NCDs that are linked to poor health outcomes and catastrophic health expenditure.

From the health system perspective, the vulnerability of refugees and migrants to NCDs depends not only on the availability and affordability of health care in the countries of origin, transit and destination but also on the type of migratory journey. In LMICs, health system barriers for refugees and migrants were largely rooted in a lack of available and affordable NCD services, as was the case for the local population. In high-income countries with resilient health systems, migration policies can create legal and other structural barriers for accessing the health system in addition to migrant-specific barriers, such as culture, language, ethnicity and lack of health literacy and health system literacy. In many countries, refugees and migrants may be excluded from essential health care through a lack of health-care policies for migrant workers, a lack of insurance or discriminating migration policies. NCD risk factors can be exacerbated by changing social determinants of health during the migration cycle, particularly with regard to economic inequality, social exclusion, cultural differences and discrimination in the host societies, all of which are also related to migration policy.

Significant evidence gaps in the literature pertaining to migration and NCDs were identified, particularly regarding data collection and analysis of NCD prevalence and risk factors. Given the heterogeneity of refugees and migrants, disaggregated data on the prevalence of NCDs and their risk factors would help in identifying issues and designing targeted interventions. Evidence was also sparse on certain migrant groups (such as migrants in irregular situations); on regions outside Australia, Europe and North America, particularly resource-limited settings in LMICs; on certain stages of the migration cycle (such as detention); and for specific NCDs (such as chronic respiratory diseases).

NCDs are a major health burden, and a number of global initiatives (such as the 2030 Agenda and the NCD-GAP) and specific actions in Member States target the reduction of risk factors for NCDs and increase in detection and treatment of NCDs in order to reduce premature deaths worldwide linked to NCDs. However, refugees and migrants have not been specifically included in these initiatives and few actions currently address migrant-specific barriers and risks. This GEHM supports the inclusion of refugees and migrants in NCD care at all stages of the life course for all people.

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Annex 1. Search strategy

A scoping review of academic and grey literature published between 2010 and 2021 in English was carried out between July and August 2021.

Searches were performed of PubMed/MEDLINE, Scopus and Web of Science for relevant articles published between January 2010 and August 2021.

PubMed was examined for case reports, classical articles, clinical trials, clinical trial phases 1–4, comparative studies, controlled clinical trials, government publications, guidelines, introductory journal articles, journal articles, meta-analyses, observational studies, practice guidelines, reviews, scientific integrity reviews, technical reports, editorials and validation studies.

Scopus was examined for review articles, editorials and data papers.

A scoping review of documents from the United Nations, international nongovernmental organizations, governments and grey literature added articles if they included direct or indirect evidence related to NCDs in refugees and migrants (more widely defined than those targeted in the systematic review).

Grey literature was searched using the Centre for Agriculture and Bioscience International global health database; Google and Google Scholar; Health Policy Reference Centre; OpenGrey; OpenSIGLE; websites of ministries of health, foreign affairs and immigration; and websites of international organizations, nongovernmental organizations, health departments, research institutes, research networks and universities. This included the Danish International Development Agency, the Department for International Development of the United Kingdom, Doctors of the World, the International Federation of Red Cross and Red Crescent Societies, Islamic Relief, Médecins Sans Frontières, North American Aerospace Defense Command, Save the Children, United Nations agencies, World Vision and other leading aid and humanitarian agencies and regional governing bodies, as well as reports by public health agencies in each of the Member States. Some peer-reviewed articles were also identified during this search.

Search terms

Predefined search terms and strategies for each of the four areas of interest were employed: migrants, NCDs, policies and interventions. All of the predefined terms within each interest area and the Boolean operator "OR" were used to combine multiple search terms to identify articles on a topic that covered all four areas. Each of the four areas of interest were then combined using the Boolean operator

“AND”. The language “English” and the document types were selected for the search parameters using the following terms:

- international refugees and migration: migrant*[tw] OR migration[tw] OR immigration*[tw] OR refugee*[tw] OR asylum[tw] OR foreign born[tw] OR foreign-born[tw] OR Emigration and Immigration [MeSH] OR Refugees[MeSH] OR Emigrants and Immigrants[MeSH] OR Human Migration[MeSH]
- NCD-related terms: NCDs [MeSH] OR noncommunicable disease [tw] OR NCD [tw] OR cardiovascular [tw] OR chronic respiratory disease [tw] OR cancer [tw] OR diabetes [tw] OR heart attacks [tw] OR stroke [tw] OR hypertension [tw] OR COPD [tw] OR asthma [tw]
- policy, health service and intervention related terms: access [tw] OR services [tw] OR policy [tw] (OR prevention [tw] OR diagnosis [tw] OR treatment [tw]).

Tables A1.1–A1.3 outline the search terms used.

Table A1.1. Searching terms: international refugees and migrants

Plain text/natural language	Controlled vocabulary (MeSH)
<ul style="list-style-type: none"> • migration^a • in-migration^a • out-migration^a • transient^a • squatter^a • migrant^a • premigrant^a • nomad^a • immigr^a • foreigner^a • alien^a • emigr^a • newcomer^a • new-comer^a • adopt^a citizen^a • incomer^a • naturalized citizen^a • settlemen^a • resettlemen^a • border cross^a • cross^a border • expatriate^a • foreign-born • foreign born 	<ul style="list-style-type: none"> • foreign worker^a • foreign student^a • international student^a • unauthorized immigrant^a • unauthorized worker^a • refugee^a • asylum • asylees • displace^a • departee^a • evacuee^a • human trafficking • people trafficking • trafficking in people^a • sex trafficking • woman trafficking • child trafficking • people trafficking • trafficked people^a • trafficked women^a • trafficked female^a • trafficked men • trafficked male^a • trafficked child^a
	<ul style="list-style-type: none"> • human migration • transients and migrants • emigrants and immigrants • emigration and immigration • undocumented immigrants • refugees • human trafficking

^a Non-international migration such as internally displaced people or urban migration excluded.

Table A1.2. Search terms: NCDs

NCD ^a	Plain text/natural language	Controlled vocabulary (MeSH)
Cardiovascular disease	<ul style="list-style-type: none"> • cardiovascular disease^b • cardiovascular mortality • myocardial infarct^b • cardiovascular stroke^b • heart attack^b • coronary disease^b • coronary heart disease^b • stroke^b • cerebrovascular accident^b • cerebrovascular apoplexy • brain vascular accident^b • brain ischemia^b • ischemic encephalopath^b • cerebral ischemia^b • sudden cardiac death • cardiac sudden death • sudden cardiac arrest • heart disease^b • cardiac disease^b • heart disorder^b (coronary[TIAB] AND (artery[TIAB] OR disease^b[TIAB])) 	<ul style="list-style-type: none"> • cardiovascular diseases[majr:noexp] • myocardial infarction[majr] • coronary disease[majr] • stroke[majr] • brain ischemia[majr:noexp] • death, sudden, cardiac[majr] • heart diseases[majr:noexp]
Cancer	<ul style="list-style-type: none"> • neoplasia^b • neoplasm[*] • tumor^b • cancer^b • malignanc^b 	<ul style="list-style-type: none"> • neoplasms
Diabetes	<ul style="list-style-type: none"> • type 2 diabete^b • type ii diabete^b • type two diabete^b • ketosis-resistant^b diabete^b • ketosis resistant^b diabete^b • non-insulin-dependent^b diabete^b • noninsulin-dependent^b diabete^b • noninsulin dependent^b diabete^b • niddm • stable^b diabete^b • maturity-onset diabete^b • maturity onset diabete^b • slow-onset diabete^b • slow onset diabete^b • adult-onset diabete^b • adult onset diabete^b 	<ul style="list-style-type: none"> • diabetes mellitus, type 2

Table A1.2. contd

NCD	Plain text/natural language	Controlled vocabulary (MeSH)
Chronic respiratory disease	<ul style="list-style-type: none"> • chronic obstructive lung disease^b • chronic obstructive pulmonary disease^b • copd • chronic obstructive airway disease • coad • chronic airflow obstruction^b • interstitial lung disease^b • diffuse parenchymal lung disease^b • interstitial pneumoni^b • asthma^b • chronic respiratory disease^b • obstructive airway^b disease^b 	<ul style="list-style-type: none"> • pulmonary disease, chronic obstructive • lung diseases, interstitial • asthma

^a Other NCDs outside the four major NCDs (cardiovascular diseases, cancer, diabetes, chronic respiratory disease) excluded but comorbidity was included.

^b For case study of eye diseases: (AND retinopathy[tw] OR eye[tw] OR ophthalmologic[tw] OR vision[tw]).

Table A1.3. Searching terms: policy, health service and intervention^a

Plain text/natural language	Controlled vocabulary (MeSH)
<ul style="list-style-type: none"> • legislation^b • law^b • jurisprudence • amendment • senate bill • court decision^b • government^b regulation^b • statute^b • lawsuit^b • litigation^b • ordinance^b • civil suit^b • public polic^b • social polic^b • population polic^b • social protection • government^b polic^b • immigrat^b polic^b 	<ul style="list-style-type: none"> • health polic^b • health care polic^b • healthcare polic^b • health care reform^b • healthcare reform^b • (usage[TIAB] AND ("health service"^b[TIAB] OR "health care"[TIAB] OR healthcare[TIAB])) • (access^b[TIAB] AND ("health service"^b[TIAB] OR "health care"[TIAB] OR healthcare[TIAB])) • (disparit^b[TIAB] AND ("health service"^b[TIAB] OR "health care"[TIAB] OR healthcare[TIAB])) • (barrier^b[TIAB] AND ("health service"^b[TIAB] OR "health care"[TIAB] OR healthcare[TIAB]))
	<ul style="list-style-type: none"> • legislation as topic • legislation and jurisprudence [subheading] • public policy • policy making • health care reform • health services accessibility • healthcare disparities • health literacy • counseling • life style • reminder system • risk reduction behavior • patient education as topic • patient compliance • disease management • preventive health services • self care • outcome assessment, health care

Table A1.3. contd

Plain text/natural language	Controlled vocabulary (MeSH)
<ul style="list-style-type: none"> • (use[TIAB] AND ("health service"^b[TIAB] OR "health care"[TIAB] OR healthcare[TIAB])) • (facilitat^b[TIAB] AND ("health service"^b[TIAB] OR "health care"[TIAB] OR healthcare[TIAB])) • (availab^b[TIAB] AND ("health service"^b[TIAB] OR "health care"[TIAB] OR healthcare[TIAB])) • (utili?ation[TIAB] AND ("health service"^b[TIAB] OR "health care"[TIAB] OR healthcare[TIAB])) • (patient[TIAB] AND navigat^b[TIAB]) • counsel^b • lifestyle^b • life style^b • reminder system^b • risk reduction^b • patient^b educat^b • education of patient^b • patient complianc^b • treatment complianc^b 	<ul style="list-style-type: none"> • therapeutic complianc^b • patient non-complianc^b • treatment non-complianc^b • therapeutic non-complianc^b • patient noncomplianc^b • treatment noncomplianc^b • therapeutic noncomplianc^b • patient non-complianc^b • treatment non-complianc^b • therapeutic non-complianc^b • patient adheren^b • patient non adheren^b • patient nonadheren^b • patient non-adheren^b • patient cooperat^b • diseas^b manag^b • manag^b diseas^b • preventive health • self care • self-care • outcome^b • measure^b

^aQuality assessed based on relevance to the research question; the term refugees and migrants or migrants and refugees will be used to refer to all international migrants, including refugees, unless otherwise specified.

^bScreening should be conducted by the reviewer on the basis of characteristic of the policies, implementation of the policies, evidence of success or failure of policy, and possible policy implications.

Selection strategy for the peer-reviewed literature

Articles were included if they were:

- published since 2010;
- on health and/or factors affecting health of international migrants including refugees; and
- in English.

Articles were excluded if they:

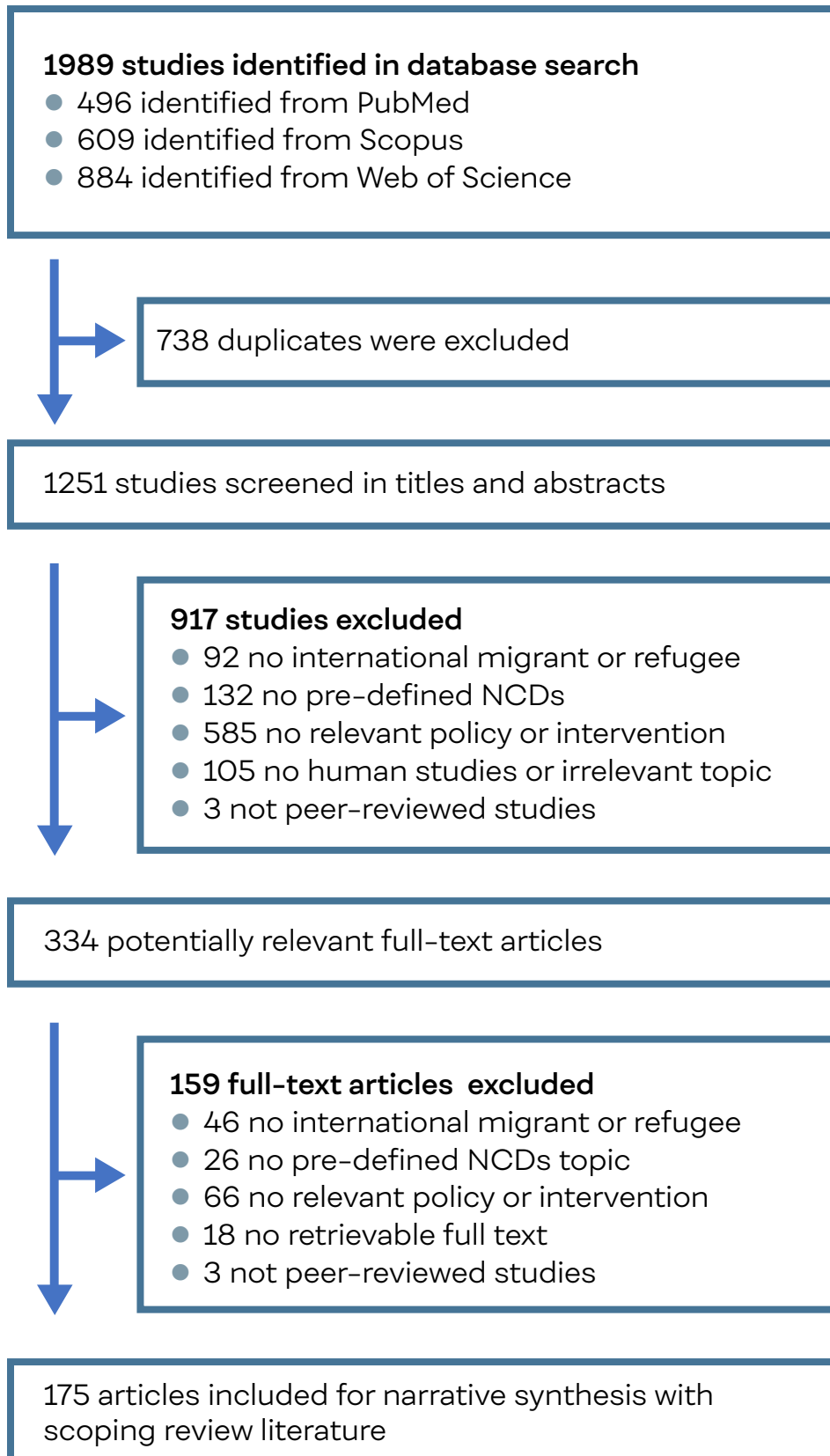
- were unrelated to refugees or international migrants;
- were unrelated to the four predefined NCD types (cancer, cardiovascular diseases, diabetes and chronic respiratory diseases);
- were related to internal migration including internally displaced people;
- were on families left behind by migrants;
- were from newspapers, magazines or their websites;
- referred to second-generation migrants or permanent migrants with citizenship (if specified in the documents); or
- were systematic reviews, unless NCD policy and practice were clearly addressed in refugees and migrants.

The systematic review of PubMed, Scopus and Web of Science databases yielded 1251 articles after removal of duplicates. Two researchers independently identified the literature. A further 917 articles were excluded based on their title or abstract: 92 with no mention of refugees and international migrants, 132 not covering the predefined NCDs, 585 lacking relevant policy or intervention information, 105 on non-human studies or irrelevant topics, and three non-peer-reviewed studies. Among the remaining 334 potentially relevant documents, 175 met the eligibility criteria and were included for the synthesis; 137 articles covering refugees and migrants in developed countries of destination and 38 in developing countries of destinations or transit (Annex 2).

Although the search terms would identify COVID-19 impacts, only five of the 175 selected papers pertained to the COVID-19 pandemic period.

Fig. A1.1 outlines the selection of studies based on the PRISMA statement (1).

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



Selection strategy for the grey literature

Articles were included if they were:

- key documents related to:
 - refugees and international migrants;
 - global NCD policy; or
 - predefined NCD types (cancer, cardiovascular diseases, diabetes and chronic respiratory diseases) in refugees and migrants; and
- published since 2010 (but documents dated prior to 2010 could also be considered).

A total of 185 papers were included from the scoping review of policy documents and grey literature on migration and NCDs. United Nations reports and documents on migration and health and NCDs were extensively integrated for policy consideration if they included direct and indirect evidence related to NCDs in refugees and migrants (more widely defined than those targeted in the systematic review). Again, because of the urgent nature of COVID-19 pandemic, there was less attention on NCDs in refugees and migrants, leading to a lack of specific evidence on NCDs and migration during the pandemic. Little empirical research has addressed the impacts of the COVID-19 pandemic on access to NCD services specifically for refugees and migrants.

Reference

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Annex 2. Studies identified in the systematic review

NB: references are given in the main reference list.

Table A2.1. Descriptive overview of 138 articles of refugees and migrants in developed countries of destination

Study	Country/ region	Country, territory/area	Policy characteristics	Study design	Number of migrants	Study year(s)
Brzoska et al., 2021 (32)	Austria	Europe	Barrier	Cross-sectional	755	2020
Van Hemelrijck et al., 2019 (33)	Belgium	Morocco	Intervention: communication	Semistructured focus group interviews	23	2014
Cantarero- Arévalo L et al., 2014 (34)	Denmark	Iraq, Lebanon, Turkey	Barrier: ethnicity	Cross-sectional	-	2008
De Jesus et al., 2021 (35)	France	Africa, Eastern Mediterranean, Europe, South-east Asia	Intervention: communication	Semistructured qualitative interviews	164	2019–2020
Sargent & Kotobi, 2017 (36)	France	Africa, Europe	Barrier	Review	158	2017
Berens et al., 2019 (37)	Germany	-	Barrier: disparities	Cross-sectional	5 387	2013–2014
Brzoska & Abdul-Rida, 2016 (38)	Germany	-	Barrier	Cross-sectional	11 709	September 2008–July 2009
Plöckinger et al., 2010 (39)	Germany	Africa, Eastern Mediterranean, South-East Asia, Greece, India, North Macedonia, Poland, Russian Federation, Turkey, United Kingdom	Barriers	Prospective cohort study	2 318	2001–2007
Zeissig et al., 2015 (40)	Germany	-	Intervention	Descriptive	383	1994–2004

Table A2.1. contd

Study	Country/ region	Country,territory/area	Policy characteristics	Study design	Number of migrants	Study year(s)
Klein & von dem Kneesebeck, 2018 (41)	Germany	Unspecified	Barrier	Systematic review	-	2017
Jervelund et al., 2019 (42)	Greece	Afghanistan, Syrian Arab Republic	Barrier	Cross-sectional survey	267	2016
Bianco et al., 2017 (43)	Italy	LMICs	Barrier: disparities	Cross-sectional (survey)	464	2012–2013
Camprostrini et al., 2019 (44)	Italy	Africa, Europe, South-East Asia, United States	Intervention	Cross-sectional	228 201	2008 and 2013
Baglio et al., 2010 (45)	Italy	Africa, Americas, Europe, South- East Asia, Western Pacific, India, Romania	Intervention	Descriptive	63 371	2005
Sacchi et al., 2021 (46)	Italy	Albania, Chile, Romania, Saudi Arabia, Ukraine	Intervention	Semistructured interviews	9	2016–2017
van de Vijver et al., 2015 (47)	Netherlands	Africa	Intervention	Development research (model framework design)	>1 000	-
Vlaar et al., 2012 (48)	Netherlands	South-East Asia (Hindustani, Surinamese)	Intervention	RCT	2 307	2009–2010
Agyemang et al., 2014 (49)	Netherlands	Antilles, Indonesia, Morocco, Suriname, Turkey	Barrier: disparities	Nationwide registered-based cohort study	2 397 446	1998–2010
Møen et al., 2020 (50)	Norway	Africa, Europe, South-East Asia, Western Pacific	Intervention: general practitioner education	Cluster-RCT using the 20 subdistricts of Bergen, Norway	10 360	2017–2018
Telle-Hjellset et al., 2013 (51)	Norway	Pakistan	Intervention	RCT	198	2006– 2008

Table A2.1. contd

Study	Country/ region	Country,territory/area	Policy characteristics	Study design	Number of migrants	Study year(s)
Abuelmagd et al., 2019 (52)	Norway	Eastern Mediterranean (Kurdish)	Intervention	Qualitative focus group interview	18	2016–2017
Andersen et al., 2012 (53)	Norway	Pakistan	Intervention	RCT	150	2012
Bhargava et al., 2019 (54)	Norway	Africa, Americas, Europe, South-East Asia, Western Pacific, Australia, New Zealand	Barrier: disparities	Population-based screening programme	153 026	1996–2015
Diaz et al., 2017 (55)	Norway	Africa, Americas, South-East Asia, Afghanistan, China, Republic of Korea, Pakistan, Turkey, Viet Nam	Intervention	Systematic review and meta-analysis (scoping review)	–	2015
Dias et al., 2021 (56)	Portugal	Asia, Brazil, Portuguese-speaking African countries	Barrier: health literacy	Mixed-method	240 963	2018–2020
Prats-Urbe et al., 2020 (57)	Spain	–	Barrier	Retrospective population-based cohort study	116 870	2011–2013
Hadziabdic et al., 2020 (58)	Sweden	–	Intervention: education model	Development of a diabetes education mode	–	2014–2017
Saha et al., 2018 (59)	Sweden	Eastern Mediterranean	Intervention: lifestyle	RCT	96	–
Saha et al., 2013 (60)	Sweden	Iraq	Intervention: lifestyle	RCT	308	–
Koyi et al., 2016 (61)	Sweden	Syrian Arab Republic	Barrier: health brief	Mixed methods (follow-up interviews)	43	2016
Abbas et al., 2018 (62)	Switzerland	–	Barrier	Expert consultation	–	2017

Table A2.1. contd

Study	Country/ region	Country,territory/area	Policy characteristics	Study design	Number of migrants	Study year(s)
Erenoğlu & Sözbir, 2020 (63)	Turkey	Syrian Arab Republic	Intervention: education	RCT with control and intervention groups	60	2017–2018
Tuzcu & Bahar, 2015 (64)	Turkey	-	Barrier	Focus group interviews	39	2011
de Cuevas et al., 2018 (65)	United Kingdom	Pakistan, South-East Asia (Bangladesh, Bhutan, India, Maldives, Nepal, Sri Lanka)	Barrier	Systematic literature review	-	2018
Crawshaw & Kirkbride, 2018 (66)	United Kingdom	-	Intervention: guideline	Short communication	-	2017
Jackowska et al., 2012 (67)	United Kingdom	Europe, Poland, Romania, Slovakia	Barrier: reasons	Qualitative	31	2008– 2009
Ibragimova & Žužak, 2020 (68)	Europe (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Italy, Netherlands, Norway, Spain, Sweden, Switzerland, Turkey, United Kingdom)	-	Barrier: knowledge and brief	Mapping review	-	2015–2019
Theodosopoulou et al., 2021 (69)	Europe	Unspecified (refugees and migrants travelling by sea)	Barrier	Systematic review	-	2014–2020

Table A2.1. contd

Study	Country/ region	Country,territory/area	Policy characteristics	Study design	Number of migrants	Study year(s)
Terragni et al., 2018 (70)	Europe	South-East Asia, Western Pacific	Intervention: lifestyle	Qualitative	-	2018
Greenaway et al., 2018 (71)	EU/EAA	Brazil, Cameroon, China, Egypt, India, Italy, Japan, Malawi, Republic of Korea, Spain, Thailand, United States, Zimbabwe	Intervention	Systematic review	-	2016
Rosano et al., 2017 (72)	EU	Belgium, Italy, Malta, Portugal, Spain	Barrier: access	Retrospective period prevalence study	151 311	Malta 2008, Spain 2011, Italy 2012–2013, Belgium 2013, Portugal 2014
Testa et al., 2016 (73)	EU	Africa, Europe, South-East Asia, Western Pacific, Bangladesh, India, Pakistan	Barrier: disparities	Review	-	2015
Wernly et al., 2020 (74)	EU	-	Barrier: health literacy	Narrative review	-	2020
Schrier et al., 2019 (75)	EU/EAA	Austria, Finland, Germany, Italy, Netherlands, Spain, Switzerland, United Kingdom	Barrier: guideline	Systemic review	-	2016–2017
Adjei et al., 2019 (76)	Germany, Netherlands, United Kingdom	Ghana	Barrier: reasons	Cross-sectional	5 659	2012–2015
de-Graft Aikins et al., 2019 (77)	Germany, Netherlands, United Kingdom	Ghana	Barrier: knowledge and perception	Focus group discussion	66	2012–2014
Blair et al., 2019 (78)	Canada	-	Intervention: primary care physician	Cross-sectional	408 (white), 659 (others)	2003, 2005, 2007–2014

Table A2.1. contd

Study	Country/ region	Country,territory/area	Policy characteristics	Study design	Number of migrants	Study year(s)
de Sequeira et al., 2019 (79)	Canada	Bangladesh, India, Pakistan, Sri Lanka	Barrier and intervention: culture	Qualitative interviews	13	2019
Hippman et al., 2016 (80)	Canada	China, Japan, Republic of Korea, Philippines, Viet Nam	Barrier: knowledge and brief	Cross-sectional, self-report, questionnaire based	98	2016
Schoueri-Mychasiw et al., 2012 (81)	Canada	Australia, Canada, United Kingdom	Intervention: review	Systemic review	2 064	-
Sun et al., 2010 (82)	Canada	Asia	Barrier	Quantitative (logistic regression)	508	2003
Abdelaal et al., 2021 (83)	Canada	Africa	Intervention: care coverage	Case report	1	2021
Dahal et al., 2014 (84)	Canada	Americas, India, Nepal, Somalia	Intervention: education and care	Focus group interviews	34	2011
Racine et al., 2021 (85)	Canada	Syrian Arab Republic	Barrier: culture	Mixed methods	-	-
Raynault et al., 2020 (86)	Canada	Haiti	Barrier: communication	Qualitative focus group interview	22	2020
Swinkels et al., 2011 (87)	Canada	Africa, Americas, Europe, Eastern Mediterranean, South-East Asia, Pacific Islands	Intervention: primary care physician	Delphi consensus	40	2007
Vahabi et al., 2019 (88)	Canada	Africa, Americas, Eastern Mediterranean, Europe, South-East Asia, Western Pacific	Barrier	Retrospective cohort study	3 692 291	2013-2015
Wang et al., 2019 (89)	Canada	Americas, Eastern Mediterranean, South-East Asia, China, Viet Nam	Barrier: health literacy, culture	Scoping review	-	2002-2017

Table A2.1. contd

Study	Country/ region	Country/territory/area	Policy characteristics	Study design	Number of migrants	Study year(s)
Vahabi et al., 2016 (90)	Canada	South-East Asia, Australia, New Zealand, Pacific islands, United States	Barrier: disparities	Cross-sectional	183 332	2010–2012
Elmore et al., 2021 (91)	United States	Afghanistan, Bhutan, Colombia, Iran (Islamic Republic of), Democratic Republic of the Congo, Iraq, Myanmar, Nepal, Russian Federation, Syrian Arab Republic	Intervention: vaccination	Describe the presence/type of national cervical cancer screening programme, screening coverage percentage, human papillomavirus vaccination programme presence and coverage	525	-
Gondek et al., 2015 (92)	United States	Afghanistan, Angola, Brazil, Dominican Republic, Eritrea, Ethiopia, Iran (Islamic Republic of), Iraq, Lebanon, Myanmar, Nepal, Panama, Puerto Rico, Somalia, Spain, Thailand, Yemen, other Eastern Mediterranean countries	Intervention: education programme	Language-matched pre- and post-test assessments	348	2012–2015
Guerrero et al., 2016 (93)	United States	Mexico	Intervention	Review	2 441	2013
Hasnain et al., 2014 (94)	United States	Eastern Mediterranean, South-East Asia	Intervention	Cross-sectional	207	2008–2010
Hosler et al., 2015 (95)	United States	Guyana (Indo-Guyanese)	Intervention	Questionnaire based	6	2013
Islam et al., 2018 (96)	United States	Bangladesh	Intervention	Two-arm RCT	336	2007–2013

Table A2.1. contd

Study	Country/ region	Country,territory/area	Policy characteristics	Study design	Number of migrants	Study year(s)
Kamaraju et al., 2019 (97)	United States	Afghanistan, Albania, India, Iran (Islamic Republic of), Iraq, Myanmar, Nigeria, oPt, Pakistan, Somalia, Turkey	Intervention: community	Community-based organizations, mobile mammography unit, Wisconsin Well Woman Program, a state-supported programme providing free mammograms	360	2014–2016
Kamaraju et al., 2018 (98)	United States	Afghanistan, Albania, India, Iran (Islamic Republic of), Iraq, Myanmar, Nigeria, oPt, Pakistan, Somalia, Turkey	Intervention: community	Developed a model	374	2014–2017
Luque et al., 2017 (99)	United States	Americas, Mexico	Intervention: education	Two-arm, quasi- experimental	90	2014–2015
Moise et al., 2017 (100)	United States	Haiti	Intervention: education	Focus group interviews	10	2017
Njeru et al., 2016 (101)	United States	Latin America, Somalia	Barrier/intervention	Cohort	78	2005–2007
Rodriguez-Torres et al., 2019 (102)	United States	Unspecified (Arabic, Bosnian and Somali speakers)	Intervention: patient navigation	Logistic regression	126	2012–2016
Njeru et al., 2015 (103)	United States	Latin America, Somalia	Barrier: disparities	Focus groups	78	2014
Ornelas et al., 2018 (104)	United States	Bhutan, Myanmar (Karen Burmese and Nepali-Bhutanese)	Intervention	Pilot	40	-

Table A2.1. contd

Study	Country/ region	Country,territory/area	Policy characteristics	Study design	Number of migrants	Study year(s)
Percac-Lima et al., 2012 (105)	United States	Bosnia and Herzegovina	Intervention: patient navigation	Chi-square test	91	-
Raines Milenkov et al., 2020 (106)	United States	Afghanistan, Angola, Bhutan, Burundi, Chad, Democratic Republic of the Congo, Egypt, Eritrea, Ethiopia, Iraq, Jordan, Kenya, Liberia, Myanmar, Nepal, Rwanda, Senegal, Somalia, Sudan, Syrian Arab Republic, Tanzania, Thailand, Uganda	Barrier	Focus groups and chart reviews	874	2014–2018
Sacca et al., 2020 (107)	United States	Iraq, Syrian Arab Republic	Intervention: education	-	-	-
Sadarangani et al., 2019 (108)	United States	Unspecified	Intervention: insurance	Secondary cross-sectional analysis	1 920	2007–2012
Santos et al., 2014 (109)	United States	Asia, Latin America	Intervention: health literacy	Pilot test	116	2008–2012
Seay et al., 2015 (110)	United States	Americas, Cuba	Barrier: compliance	Large, randomized intervention	234	2011
Shi et al., 2019 (111)	United States	Africa, Americas, Eastern Mediterranean, South-East Asia	Intervention: education	Cohort study	133	-
Shirazi et al., 2015 (112)	United States	Afghanistan	Intervention: culture	Pilot	-	2007
Watanabe-Galloway et al., 2018 (113)	United States	Somalia	Intervention: education	Pilot	52	2016–2017
Yeh et al., 2016 (114)	United States	China	Intervention	RCT	60	2012–2014

Table A2.1. contd

Study	Country/ region	Country,territory/area	Policy characteristics	Study design	Number of migrants	Study year(s)
Adunlin et al., 2019 (115)	United States	Africa, Americas, Eastern Mediterranean, Europe, South- East Asia, Western Pacific	Barrier	Systematic review	-	2016
Agrawal et al., 2020 (116)	United States	Africa, Americas, Eastern Mediterranean, South-East Asia	Intervention	Descriptive analysis	366	2014–2017
Amuta-Jimenez et al., 2020 (117)	United States	Africa, Americas	Barrier: disparities	Cross-sectional, descriptive	115	2020
An et al., 2020 (118)	United States	Republic of Korea	Intervention: health literacy	Cross-sectional survey	233	2016
Bini et al., 2017 (119)	United States	Africa, Asia, Central America, Europe, South America	Intervention: essential medicine	Retrospective, observational	628	2015
Bogges & Bogue, 2016 (120)	United States	Americas, Asia, Pacific islands	Barrier: access	Descriptive	793 188	2012
Bruno et al., 2014 (121)	United States	-	Intervention: HPV vaccination	Cross-sectional survey	-	2010–2012
Buckley et al., 2015 (122)	United States	Africa, Asia, Caribbean, Europe	Intervention: insurance: free clinic	Longitudinal	192	2012–2014
Adekeye et al., 2018 (123)	United States	Africa	Barriers	Cross-sectional	144	2015

Table A2.1. contd

Study	Country/ region	Country,territory/area	Policy characteristics	Study design	Number of migrants	Study year(s)
Adel et al., 2019 (124)	United States	Africa, Afghanistan, Bangladesh, Bhutan, Cameroon, Central African Republic, Chad, Colombia, Congo, Cuba, Ethiopia, India, Iran (Islamic Republic of), Iraq, Jordan, Lebanon, Liberia, Morocco, Myanmar, Rwanda, Somalia, South Africa, Sri Lanka, Sudan, Syrian Arab Republic, Thailand	Barriers	Descriptive analysis	448	2012–2016
Ahmad et al., 2013 (125)	United States	South-East Asia	Barrier	Semistructured focus group interviews	35	2010
Ballout et al., 2018 (126)	United States	oPt	Intervention: e-health	Descriptive	–	2017
Beasley et al., 2021 (127)	United States	South-East Asia	Intervention: primary health care with community health workers	RCT	292	2011–2019
Crown A, et al., 2020 (128)	United States	Africa, Americas, South-East Asia, Western Pacific	Barriers: communication	Retrospective review	26	2018
Rodriguez, 2015 (129)	United States	–	Intervention: dialysis	Editorials	–	2015
Sadarangani, 2015 (130)	United States	Americas, Mexico	Intervention: insurance	Systematic review	–	2015
Shahidi et al., 2013 (131)	United States	–	Barriers: language barrier	Cross-sectional	30 434	2007
Sharif et al., 2019 (132)	United States	Cambodia	Barrier	Cross-sectional	390	2015

Table A2.1. contd

Study	Country/ region	Country,territory/area	Policy characteristics	Study design	Number of migrants	Study year(s)
Siddiq et al., 2020 (133)	United States	Africa, Eastern Mediterranean, Iraq, Somalia, Sudan	Barrier	Systematic review	-	1980–2019
Ursua et al., 2014 (134)	United States	Philippines	Barrier	Cross-sectional survey	566	2006–2010
Van Manh et al., 2020 (135)	United States	Africa, South-East Asia, Western Pacific	Barrier	Cross-sectional	1 298	2016
Wagner et al., 2015 (136)	United States	Cambodia	Intervention	Review	-	2015
Wagner et al., 2013 (137)	United States	Cambodia, Viet Nam	Barrier	Cross-sectional	229	2012
Zhang et al., 2017 (138)	United States	Africa, Europe, South-East Asia, Western Pacific	Intervention	Qualitative (interviews)	21	2015
Alawa et al., 2020 (139)	United States	Somalia	Barrier	Focus group discussion	31	2016
Allen et al., 2019 (140)	United States	Somalia	Barrier and intervention	Focus group discussion	31	2016
Saadi et al., 2015 (141)	United States	Bosnia and Herzegovina, Iraq Somalia	Intervention	Qualitative, descriptive	57	2010–2011
Scarinci et al., 2012 (142)	United States	Americas	Intervention	Qualitative and quantitative	202	2012
Singh-Franco et al., 2013 (143)	United States	Haiti	Intervention: primary care physician	Retrospective chart review	114	2003– 2008
Thompson et al., 2015 (144)	United States	Americas	Intervention	Cross-sectional	66	2012
White et al., 2012 (145)	United States	Americas	Intervention	Framework	782	2003– 2009

Table A2.1. contd

Study	Country/ region	Country,territory/area	Policy characteristics	Study design	Number of migrants	Study year(s)
Wieland et al., 2017 (146)	United States	Americas, Somalia	Intervention	Cross-sectional structured interview	25	2015–2016
Shommu et al., 2016 (147)	North America	Unspecified	Intervention	Systematic scoping review	–	2016
Abdelmessih et al., 2019 (148)	Australia	Egypt, Iraq, Lebanon, oPt, Sudan, Syrian Arab Republic	Barrier: unmet needs	Semistructured qualitative interviews	29	2018
Alananzeh et al., 2018 (149)	Australia	Eastern Mediterranean	Barrier: linguistic	Qualitative focus group interview	11	2016–2017
Anaman et al., 2016 (150)	Australia	Africa (Congo, Ghana, Liberia, Nigeria, Sierra Leone, Sudan, Zimbabwe)	Intervention	Cross-sectional survey	144	2014
Anaman et al., 2018 (151)	Australia	Africa (Congo, Ghana, Liberia, Nigeria, Sierra Leone, Sudan, Zimbabwe)	Intervention	Cross-sectional survey	254	2014
Anaman- Torgbor et al., 2017 (152)	Australia	Africa (Congo, Ghana, Liberia, Nigeria, Sierra Leone, Sudan, Zimbabwe, etc.) Zimbabwe)	Barrier and intervention	Focus group interviews	19	2014
Broom et al., 2019 (153)	Australia	–	Barrier: culture	Qualitative focus group discussion	–	2017
Butow et al., 2012 (154)	Australia	Unspecified (Arabic, Chinese, Greek speakers)	Barrier: linguistic	Focus group interviews	30	2012
Jiwrajka et al., 2017 (155)	Australia	Myanmar (Rohingya)	Barrier: linguistic	Case report	1	2009

Table A2.1. contd

Study	Country/ region	Country/territory/area	Policy characteristics	Study design	Number of migrants	Study year(s)
Jowsey et al., 2011 (156)	Australia	China, France, Germany, Hungary, Malaysia, Philippines, Samoa, Turkey	Barrier: linguistic/ cultural	Qualitative (semistructured interviews)	32	2007–2008
Shahab et al., 2019 (157)	Australia	Samoa	cultural	Semistructured qualitative interviews	13	2019
Shaw et al., 2015 (158)	Australia	China, Greece, Saudi Arabia	Barrier: culture	Semistructured focus group interviews	91	2006
Shaw et al., 2016 (159)	Australia	China, North Macedonia, Saudi Arabia	Barrier: linguistic/ cultural	Focus group interviews, telephone interviews	18	2015
Sievert et al., 2018 (160)	Australia	Afghanistan, Myanmar (Rohingya)	Barrier: linguistic	Semistructured interviews	25	2015–2016
Suwankhong & Liamputtong, 2018 (161)	Australia	Thailand	Intervention: education	Qualitative	25	2017
Choi, 2013 (162)	Republic of Korea	–	Barrier: linguistic/ location	Pretest/post-test	57	2012
Andreeva & Pokhrel, 2013 (163)	Australia, Canada, Denmark, Germany, Israel, Netherlands, Spain, Switzerland, United Kingdom, United States	–	Intervention	Systematic review	–	2013

Table A2.1. contd

Study	Country/ region	Country territory/area	Policy characteristics	Study design	Number of migrants	Study year(s)
Agyemang & van den Born, 2019 (164)	Australia, Europe, North America	Africa, South-East Asia, Netherlands, Ghana, Indonesia, Morocco, Turkey	Intervention: review	Narrative review	-	2018
Cudjoe et al., 2021 (165)	Australia, Canada, Finland, Italy, Norway, Spain, United States	Africa	Barrier: lifestyle	Systematic review	-	2018
Riza et al., 2020 (166)	Australia, Canada, Europe, Latin America, Middle East, United States, etc.	Africa, Eastern Mediterranean	Intervention: review	Systematic review and meta-analysis (scoping review)	-	2018
Kokab et al., 2018 (167)	Norway, United Kingdom, United States	Pakistan	Intervention and barrier: linguistic/culture	Systematic review and meta-analysis	594	2013–2015
Ben-Arye et al., 2018 (168)	Europe, Egypt, Germany, Iran (Islamic Republic of), Israel, Italy, Jordan, Lebanon, oPt, Sudan, Turkey	Africa, Eastern Mediterranean	Intervention	Workshop dialogue	-	2017

EAA: European Economic Area; EU: European Union; RCT: randomized controlled trial.

Note: "occupied Palestinian territory" or "oPt" should be understood to refer to the "occupied Palestinian territory, including east Jerusalem".

Table A2.2. Descriptive overview of 38 articles of refugees and migrants in developing countries of destinations or transit

Study	Country	Country/territory/area	Policy characteristics	Study design	Number of migrants	Study years
Divkolye & Burkle, 2011 (169)	Iran (Islamic Republic of)	Afghanistan	Barrier: disparities	Systematic review	-	2016
Lyles et al., 2021 (170)	Jordan	Syrian Arab Republic	Intervention: education	Quasi-experimental prospective cohort study	861	2018–2020
Rehr et al., 2018 (171)	Jordan	Syrian Arab Republic	Barrier	Snowball sampling two-stage cluster methodology	17 579	2016
Al Gadiire et al., 2019 (172)	Jordan	Syrian Arab Republic	Barrier: insurance	Descriptive cross-sectional survey	241	2017
Al Gadiire & Alomari, 2020 (173)	Jordan	Syrian Arab Republic	Barrier: financial	-	-	-
Al-Ammouri & Ayoub, 2016 (174)	Jordan	Syrian Arab Republic	Barrier: reasons	Follow-up study	119	2012–2014
Al-Ammouri et al., 2020 (175)	Jordan	Syrian Arab Republic	Intervention	Follow-up study	415	2019
Alduraidi et al., 2021 (176)	Jordan	Occupied Palestinian territory	Intervention: review	Systematic review	-	2021
Ansbro et al., 2020 (177)	Jordan	Syrian Arab Republic	Intervention: primary care physician	Descriptive	5 045	2015–2017
Ansbro et al., 2021 (178)	Jordan	Syrian Arab Republic	Intervention: primary care physician	Mixed methods, retrospective evaluation	-	2017
Canali et al., 2018 (179)	Jordan	Occupied Palestinian territory	Intervention	Cross-sectional	763	2018

Table A2.2. contd

Study	Country	Country/territory/area	Policy characteristics	Study design	Number of migrants	Study years
Ansbro et al., 2021 (180)	Jordan	Syrian Arab Republic	Intervention: primary health care	Retrospective cohort study	4 044	2014–2017
Collins et al., 2017 (181)	Jordan	Syrian Arab Republic	Intervention	Mixed methods	2 907	2015
Doocy et al., 2016 (182)	Jordan	Syrian Arab Republic	Barrier: reasons	Cluster survey	1 363	2014
Parmar et al., 2021 (183)	Jordan	Syrian Arab Republic	Intervention: primary care physician	Casual loop diagram	–	2019
Ratnayake et al., 2020 (184)	Jordan	Syrian Arab Republic	Intervention: primary care physician	Cross-sectional	59 617	2019
Powell et al., 2021 (185)	Jordan	Jordan, Syrian Arab Republic	Intervention: education	Laboratory tests	598	April 2017–April 2018
Abdul-Khalek et al., 2020 (186)	Jordan, Lebanon, Turkey	Syrian Arab Republic	Burden: financial	Population-based modelling	4 742 079	2017
Akik et al., 2019 (187)	Jordan, Lebanon, Turkey	Syrian Arab Republic	Barrier: financial	Descriptive review	–	2017
Kishk et al., 2019 (188)	Jordan, Lebanon, West Bank and Gaza Strip	Occupied Palestinian territory	Intervention	Quasi-experimental	50	2013–2015
Saleh et al., 2018 (189)	Lebanon	Beirut, oPt	Intervention	Cross-sectional	3 481	2015
Saleh et al., 2018 (190)	Lebanon	Occupied Palestinian territory	Intervention	RCT	1 433	2014–2016

Table A2.2. contd

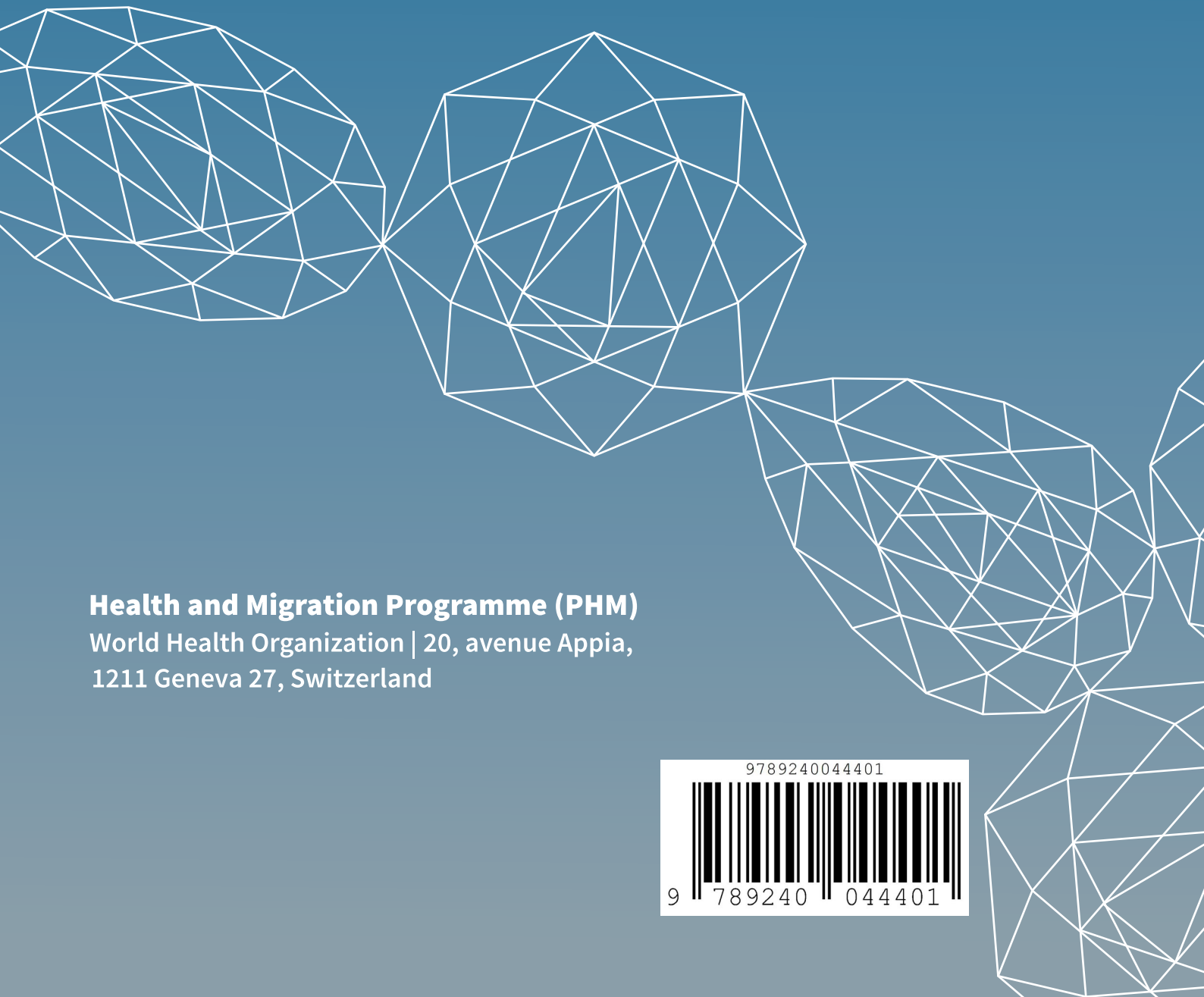
Study	Country	Country/territory/area	Policy characteristics	Study design	Number of migrants	Study years
Saleh et al., 2018 (191)	Lebanon	Occupied Palestinian territory	Intervention	Mixed methods	1 390	2016–2017
Sethi et al., 2017 (192)	Lebanon	Syrian Arab Republic	Intervention	Random survey, using lot quality assurance sampling	320	2015–2016
Truppa et al., 2019 (193)	Lebanon	Syrian Arab Republic, Lebanon	Intervention: primary care physician	Cross-sectional, quantitative analysis	1 179	2017
Boulle et al., 2019 (194)	Lebanon	Syrian Arab Republic	Intervention: primary care physician	Descriptive	514	2017
Haderer et al., 2021 (195)	Lebanon	Syrian Arab Republic	Intervention: primary care physician	Qualitative	29	2019
Karaki et al., 2021 (196)	Lebanon	Syrian Arab Republic	Barrier: linguistic/cultural	Descriptive analysis	101	2017
Sibai et al., 2020 (197)	Lebanon	Syrian Arab Republic	Intervention	Mixed methods	1 876	2014–2015
Alawa et al., 2019 (198)	Middle East	Syrian Arab Republic	Barrier: financial	Review	–	2019
Basu et al., 2018 (199)	Middle East (Jordan, Lebanon, Syrian Arab Republic, West Bank and Gaza Strip)	Occupied Palestinian territory	Intervention: food aid	Individual-level microsimulation	5 340 443	2017
Tahir et al., 2020 (200)	Malaysia	Myanmar (Rohingya)	Intervention	Cross-sectional, mixed methods	29	2017

Table A2.2. contd

Study	Country	Country/territory/area	Policy characteristics	Study design	Number of migrants	Study years
Parajuli et al., 2020 (201)	Nepal	Bhutan	Intervention	Face-to-face interview	30	2016
Bhatta et al., 2020 (202)	Nepal	Bhutan	Intervention: health camp	Cross-sectional	90	2014
Phaiyarom et al., 2021 (203)	Thailand	Afghanistan, Cambodia, China, Iraq, Pakistan, oPt, Somalia, Sri Lanka, Syrian Arab Republic, Viet Nam	Barrier: disparities	Cross-sectional	3 122	2019
Aung et al., 2020 (11)	Thailand	Myanmar	Barrier: lifestyle	Cross-sectional survey	414	2017
Charoensa et al., 2021 (204)	Thailand	Myanmar	Barrier: lifestyle (smoking)	Case study	300	2021
Adoch et al., 2020 (205)	Uganda	Sudan	Barrier: knowledge and perception	Cross-sectional	815	2019

RCT: randomized controlled trial.

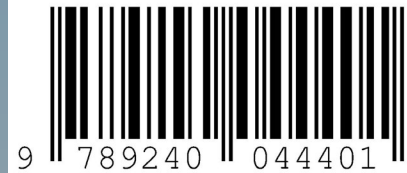
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