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Improving access to vaccination for newly arrived migrants in European Countries

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Table of contents

Summary

Ensuring equitable access to vaccinations for Newly Arrived Migrants (NAMs) has become a crucial public health issue across Europe. Due to diverse backgrounds and healthcare system disparities, many migrants face significant barriers to vaccination, including legal restrictions, language barriers, logistical challenges, and limited access to healthcare resources. These barriers not only affect individual health outcomes but also pose broader public health risks by increasing the vulnerability of populations to infectious diseases. Based on ECDC recommendations which underline the critical importance of a widespread cultural sensitivity and a community-based approach in the system of services, the thesis design is grounded on the centrality of health care system and of all health professionals, with particular reference to the integration into and the support to National Vaccination Plans. On several occasions WHO suggested that Member States improve and strengthen the quality of professional training, while DG SANTE provided financial support for training of healthcare and other workforce working with migrants. Moreover, the importance of intercultural competence and cultural sensitivity in health care systems is being increasingly recognized as integral to the provision of equitable and adequate health care.

The approach adopted in this thesis is linked to the studies on public health literacy, which shift the focus from the ways treatment is provided to the ways in which a health system organizes and allows a real enjoyment of the right to health for every person. The development of a critical extension of health literacy (HL) concerns both professionals and the system to which they belong, through the four dimensions of HL: access - understand - appraise - apply. In this framework, the objective will be to support above all Vaccination Literacy (VL). VL is not simply knowledge about vaccines but is also about developing a system with decreased complexity to communicate and offer vaccines as sine qua non of a functioning health system. Developing specific VL strategies for migrants means that specific migrant-friendly strategies can make systems more responsive to migrant needs. The organization of common problems and barriers in a conceptual framework at supranational level and the identification of local suitable solutions to overcome local and national barriers and implement the national policy are the other key approach of the project. The “Access to Vaccination for Newly Arrived Migrants” (AcToVax4NAM) project, co-funded by the European Commission, addresses these barriers and emphasizes the importance of inclusive and effective vaccination programs for NAMs across the continent. The AcToVax4NAM project introduces a structured conceptual framework with five stages - Entitlement, Reachability, Adherence, Achievement, and Evaluation - to tackle the various challenges that NAMs encounter within the

vaccination process. Each stage identifies specific barriers, proposing targeted solutions to address them in diverse contexts. The framework emphasizes the need to understand and monitor vaccination uptake, a critical metric in public health that reflects both access and adherence rates. By focusing on vaccination uptake, the project assesses the unmet health needs within migrant populations, promoting tailored strategies to enhance overall healthcare accessibility. Vaccination effectiveness goes beyond individual immunization; it encompasses the collective impact on public health by reducing disease transmission, hospitalizations, and healthcare costs. The project pilots conducted in eight countries - Cyprus, Germany, Greece, Italy, Malta, Poland, Romania, and Spain - demonstrate that culturally adapted interventions and increased health literacy significantly improve vaccine literacy and uptake. Training healthcare professionals in cultural competence, creating multilingual educational materials, and involving community leaders in outreach efforts have been crucial in achieving these outcomes. However, actual vaccination uptake varied by country, revealing ongoing challenges such as mistrust in healthcare systems, limited resources, and logistical barriers.

The thesis concludes that while current policies aim to support equitable healthcare access, they fall short in meeting the unique needs of NAMs, particularly those without documentation. A cross-sectoral and participatory approach to public health is essential for addressing the structural and systemic barriers impacting vaccination effectiveness. The thesis underscores the importance of inclusive policies, cross-border collaboration, and continuous training for healthcare providers to build resilience within healthcare systems. These policies and practices can not only mitigate public health risks associated with low vaccination coverage but also foster social integration and trust in healthcare institutions. Ultimately, ensuring comprehensive vaccination access for NAMs serves as a model for broader health equity, reinforcing Europe’s commitment to inclusive and effective healthcare for all.

Chapter 1

General introduction

1.1 PEOPLE LIVING IN THE EUROPEAN UNION

Migration remains a defining feature of the European Union (EU) shaping its societies and challenging its institutions. The EU has long been a destination for diverse migration flows, including refugees, asylum seekers, labor migrants, and individuals seeking better opportunities or fleeing conflict and economic instability. These migration dynamics have profoundly influenced the EU's social, economic, and cultural. Before exploring vaccination access for migrants, it's essential to understand the demographic context of the EU. The research presented in this chapter has been adapted and expanded from the European Commission's *Statistics on Migration to Europe* report [1].

As of 2023, the EU is home to **448.8 million people** across its 27 Member States. Among this population**, 27.3 million are non-EU nationals**, accounting for approximately **6% of the total population**. Additionally, around **42.4 million people, or 8,5% of EU residents, were born outside the EU**.

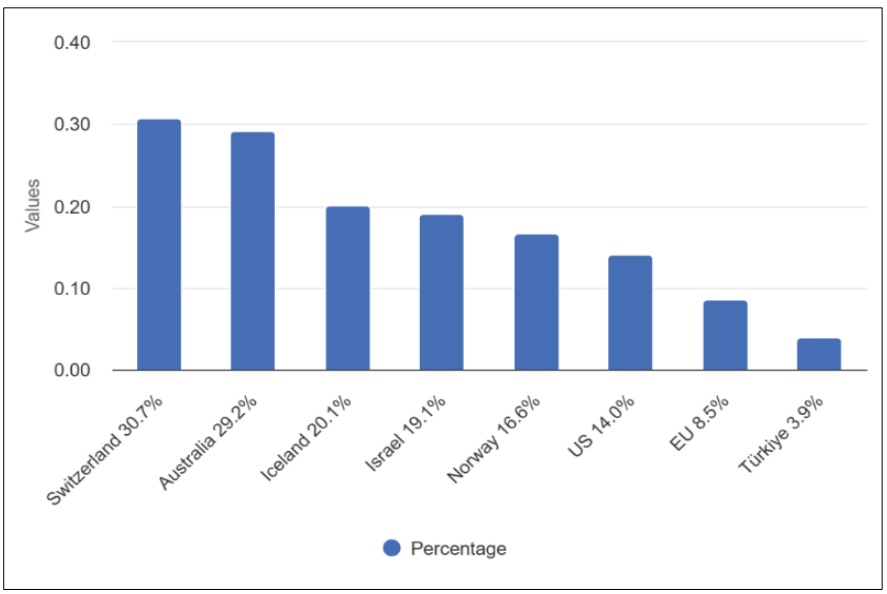

Figure 1. Foreign-Born Population by Country in EU. *Source: Eurostat (2022), OECD (2021). Note: non-EU born in case of the EU (i.e. those born in another Member State are not included); if intra-EU mobile persons were included, the share would be 12.4%.*

In 2022, residence permits issued to non-EU nationals highlighted the diverse motivations that drive migration within the European Union. These permits reflected a range of purposes, including employment, education, family reunification, and international protection.

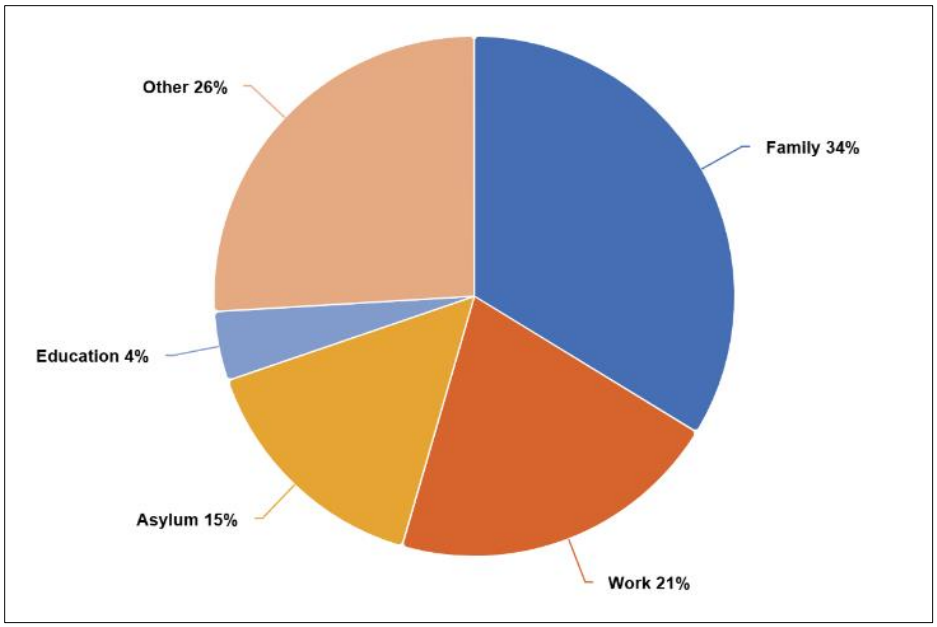

Figure 2. Residence Permits by Reason for Non-EU Nationals, 2022. Source: Eurostat; “other” includes permits issued for the reason of residence only, permits issued to victims of trafficking of human beings and unaccompanied minors, as well as permits issued for all other reasons for which residence permits may be issued and which are not covered by the other categories.

1.1.1 Employment of non-EU citizens

In 2022, 9.93 million non-EU citizens held jobs in the EU, equating to 5.1% of the working-age population (20–64 years). Employment rates were 77.1% for EU citizens, compared to 61.9% for non-EU citizens, many of whom are essential workers.

Certain **sectors and occupations have high non-EU citizen representation**, including:

Sector	Employment of non-EU citizens	Employment of EU citizens
Accommodation and food service activities	11.3%	4.2%
Administrative and support service activities	7.6%	3.9%
Domestic work	5.9%	0.7%
Construction	9.1%	6.6%

Table 1. Over-represented sectors. Source: Eurostat

In terms of occupations, **non-EU citizens were over-represented** among:

Occupational group	Employment of non-EU citizens	Employment of EU citizens
Cleaners and helpers	11.4%	2.9%
Personal services workers	7.3%	4.1%
Personal care workers	5.5%	3.0%
Construction workers, excluding electricians	6.1%	3.7%
Workers in mining, construction, manufacturing and transport	6.0%	2.5%
Food preparation assistants	2.6%	0.6%
Agricultural, forestry and fishery workers	2.4%	0.7%

Table 2. Over-representation by occupation. Source: Eurostat

Non-EU citizens were under-represented in other economic sectors, including:

Sector	Employment of non-EU citizens	Employment of EU citizens
Public administration and defence, compulsory social security	1.1%	7.4%
Education	3.9%	7.6%
Human health and social work activities	8.5%	11.2%
Professional, scientific and technical activities	3.8%	6.0%

Table 3. Under-represented sectors. Source: Eurostat

On the other hand, **non-EU citizens were under-represented** among:

Occupational group	Employment of non-EU citizens	Employment of EU citizens
Teaching professionals	2.4%	5.5%
Business and administration associate professionals	2.6%	6.8%
Clerical and administrative workers	1.5%	4.4%
Science and engineering associate professionals	1.7%	3.5%
Business and administration professionals	2.3%	4.5%
Health professionals	1.5%	3.1%

Table 4. Under-representation by occupation. Source: Eurostat

1.1.2 Refugees in Europe

Since Russia's military aggression against Ukraine in February 2022, Europe has received the largest number of people fleeing war since World War II. Based on data from UNHCR, all around the world there were 37.9 million refugees at mid-2024 and 68.3 million internally displaced persons (due to conflict and violence) at the end of 2023.

At the end of 2021, less than 10% of all the world's refugees and only a fraction of internally displaced persons was living in the EU. By the end of 2022, as a result of the war in Ukraine, the share of refugees living in the EU increased to more than 20%. **The share of refugees in the EU was 1.5% compared to its total population**. Several countries around the world host a large refugee population. **Most refugees from Africa and Asia do not come to Europe, but rather move to neighbouring countries.**

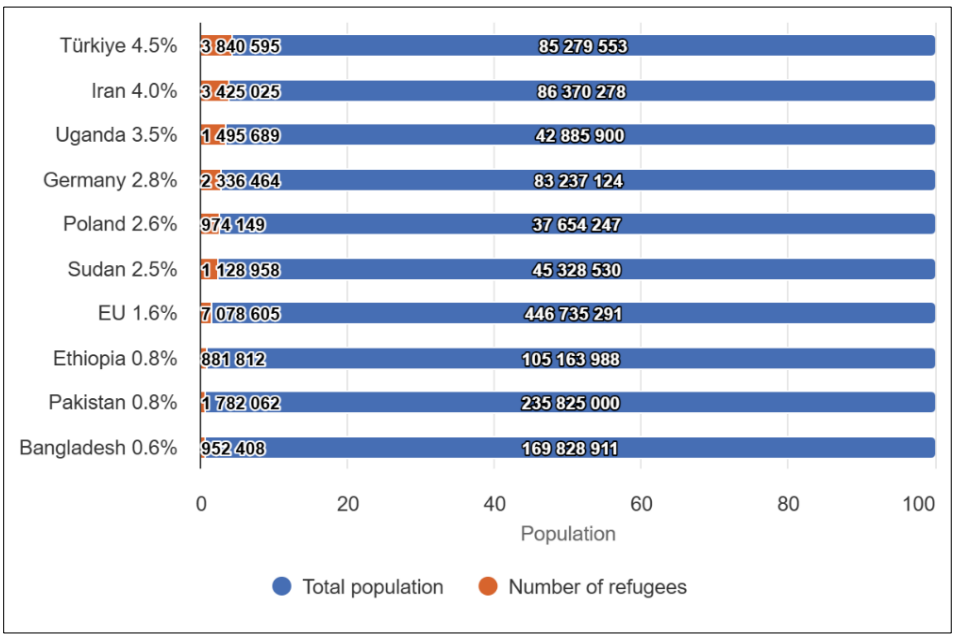

Figure 3. The graph shows the ten countries hosting the most refugees and the EU. Source: UNHCR

1.1.3 Migration to and from the EU

In 2022, the EU recorded **6.98 million immigrants** and **2.73 million emigrants**, resulting in a net migration of **4.25 million**. While irregular migration is a small fraction, **irregular border crossings increased to 385,445 in 2023**, with rising fatalities in Mediterranean routes.

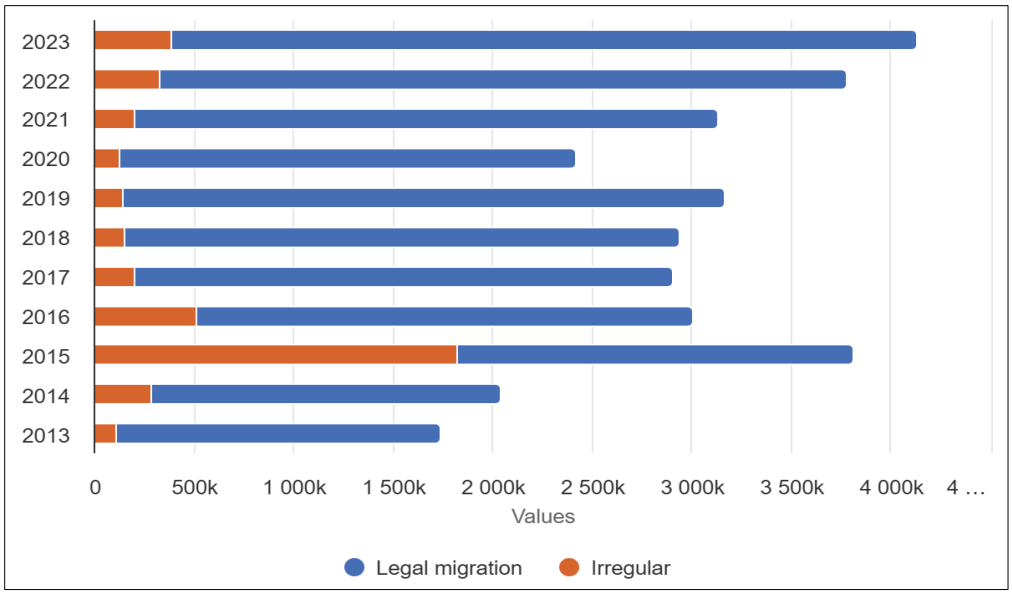

Figure 4. Trends in legal and irregular migration to the EU from 2013 to 2023. Source: EUROSTAT

In 2022, over 3.4 million first residence permits were issued in the EU, compared to 2.9 million in 2021, exceeding numbers seen before the start of the COVID-19 pandemic (3.0 million in 2019). The number of first permits issued by Germany (+190%) and Ireland (+146%) more than doubled when compared to 2021. In 2022, there was a particularly large increase of asylum-related (+60%) permits but the number of permits issued for education (+29%), family (+29%) and other reasons (+47%) also increased year-on-year. On the other hand, the number of permits issued for work-related reasons decreased compared to 2021 (-6%). In 2022, first permits were issued for the reasons shown figure 5 (A).

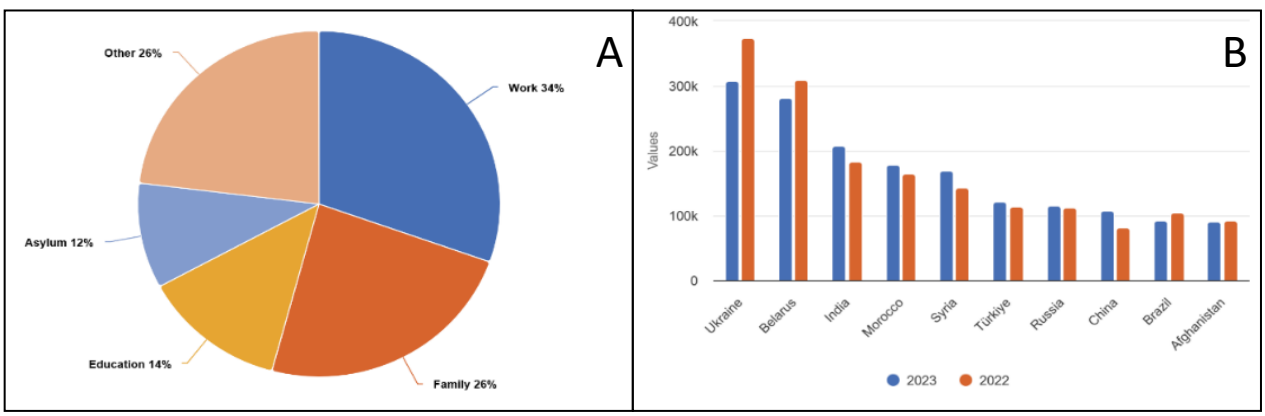

Figure 5. A) First permits issued by reasons; B) Top 10 nationalities of first residence permits issued in EU Member States in 2022. Source: Eurostat; “other” includes permits issued for the reason of residence only, permits issued to victims of trafficking of human beings and unaccompanied minors, as well as permits issued for all other reasons for which residence permits may be issued and which are not covered by the other categories.

1.1.4 Seeking asylum in Europe

In 2023, asylum seekers came from close to 150 extra-EU27 countries. 1,129,800 applications, including 1,049,000 first time applications, were lodged in the EU in 2023, an increase of 18% in comparison to 2022, and of 62% compared to 2019, before COVID-19. A significant share of applicants come from visa-free countries (21% of asylum applicants in 2022, down from 22% in 2021, with a high number of applicants from Latin America) who enter the EU legally, mostly from Venezuela (6.0%), Colombia (5.6%) and Peru (2.1%) followed by Georgia (2.2%) and Ukraine (1.2%). Key destinations include Germany, Spain, France, Greece, Austria, and Cyprus saw the highest rates of first-time asylum applications relative to their populations, reaching up to 1,300 applications per 100,000 inhabitants. In 2022, 271,500 people seeking asylum were under 18 years old – at least around one out of ten (31,000[1]) were **unaccompanied minors**. Most unaccompanied minors came from Afghanistan, Syria and Somalia.

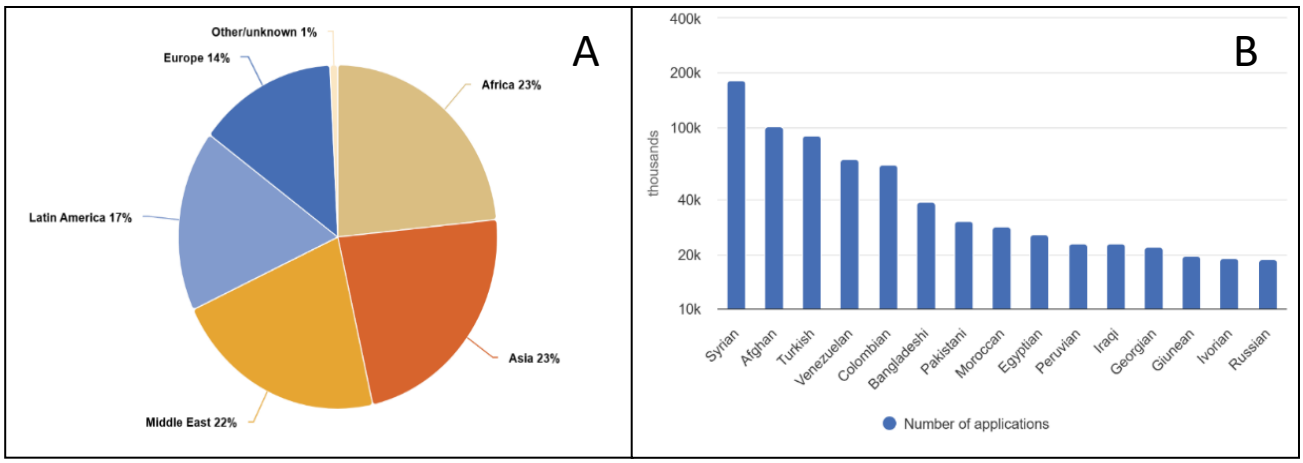

Figure 6. A) First time asylum applicants by continent of origin (2023); B) Top 10 nationalities of first residence permits issued in EU Member States in 2022. Source: Eurostat; “other” includes permits issued for the reason of residence only, permits issued to victims of trafficking of human beings and unaccompanied minors, as well as permits issued for all other reasons for which residence permits may be issued and which are not covered by the other categories.

In 2023, EU countries issued 673.000 first instance asylum decisions. 53% of these decisions were positive: 152.000 persons received refugee status, 129.700 were granted subsidiary protection status and 75.400 received humanitarian status. In 2023, at least a further 43.700 final decisions[2] were issued following an appeal, including: 5.800 decisions granting refugee status, 1.700

[1] Missing data for CZ, EL, ES, HR, CY, LT, NL

[2] Missing data for CZ, DE, EL, ES, FR, HR, CY, LT, NL

granting subsidiary protection status, 10.400 granting humanitarian status. Overall, EU countries granted **protection to at least 375.100 people** in 2023 (data from UNHCR).

At the end of 2023, 883.000 asylum applications were pending - 39% more than the previous year, and double that of the period between 2017-2021. The ratio of pending cases and applications varies widely across Member States, reflecting the differences in processing time. According to the EU Agency for Asylum (EUAA) data, at the end of 2023, 49% of the cases pending at first instance had been pending for more than six months.

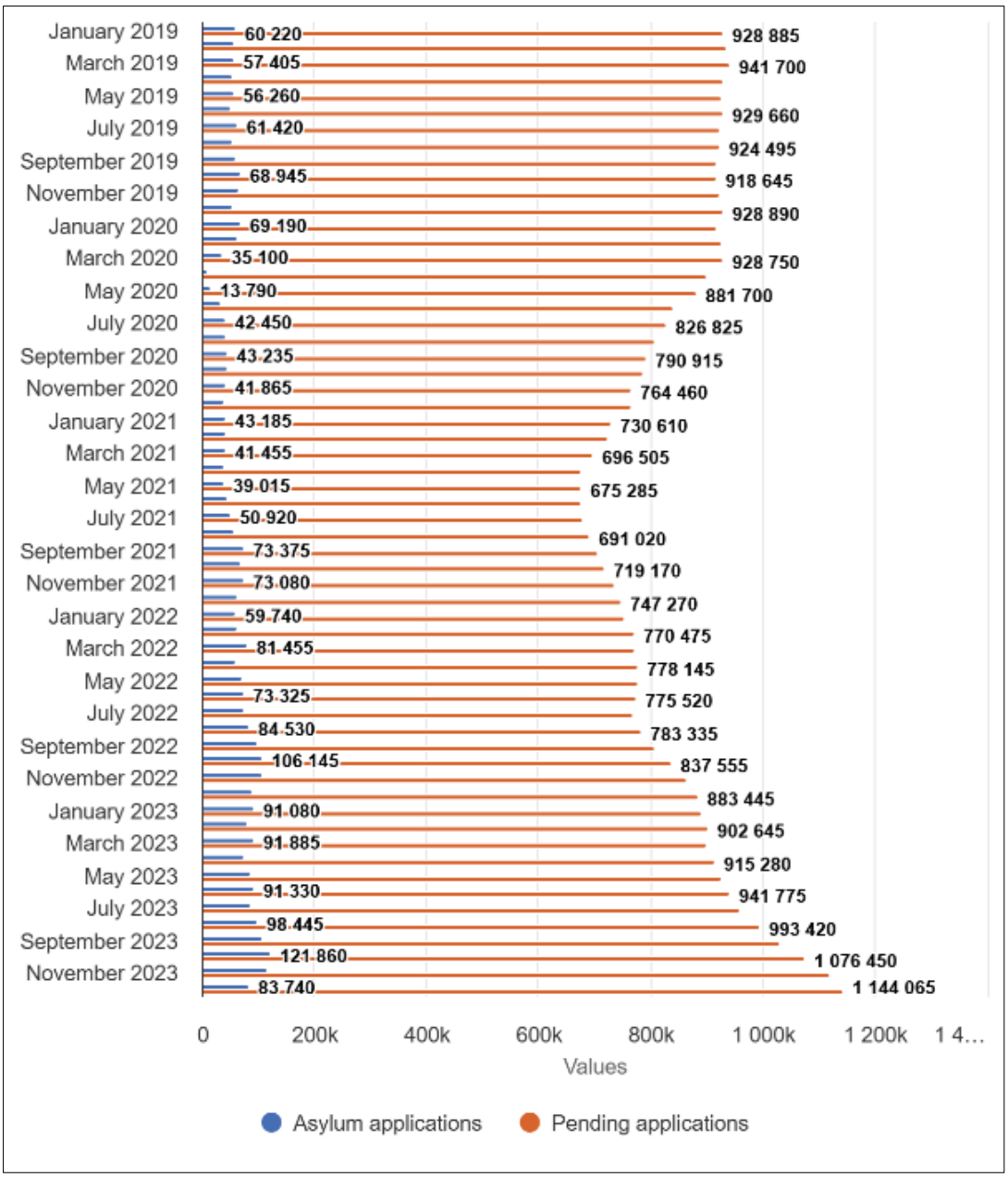

Figure 7. Number of pending applications compared to total number of applications in a given month. Source: EUROSTAT

The EU's asylum system is undermined due to significant differences in recognition rates across EU countries. For example, in 2023 the recognition rate of Afghan citizens at first instance (not including humanitarian status) ranged from 13% in Bulgaria to 99% in Ireland (from those Member States that issued at least 100 first instance decisions to Afghan citizens).

In 2022, Member States reported 174.500 outgoing requests under the Dublin rules sent to other Member States and other countries participating in the Dublin system to take responsibility for examining an application for international protection. Out of 158.200 decisions on such requests, 97.700 (62%) were accepted and 13.300 outgoing transfers were executed, corresponding to 14% of accepted requests.

In 2022, around **17.300 people in need of international protection were resettled** from non-EU countries to EU Member States, 6% less than in 2021 but 97% more than in 2020. Syrian nationals accounted for 63% of the people resettled. Under joint EU resettlement schemes, more than 117.000 persons found protection in the EU since 2015. In addition, since 2021, more than 46.000 persons, mostly Afghans at risk, arrived in the EU via humanitarian admission. Member States receive support from the EU budget for resettlement and humanitarian admission.

1.1.5 Irregular border crossings

In 2023, **385,445 irregular border crossings were registered**, representing a 18% increase compared to 2022. This figure includes: **270,366 sea crossings**, an increase of 64%, and **115,079 land border crossings**, a decrease of 29% compared to 2022.

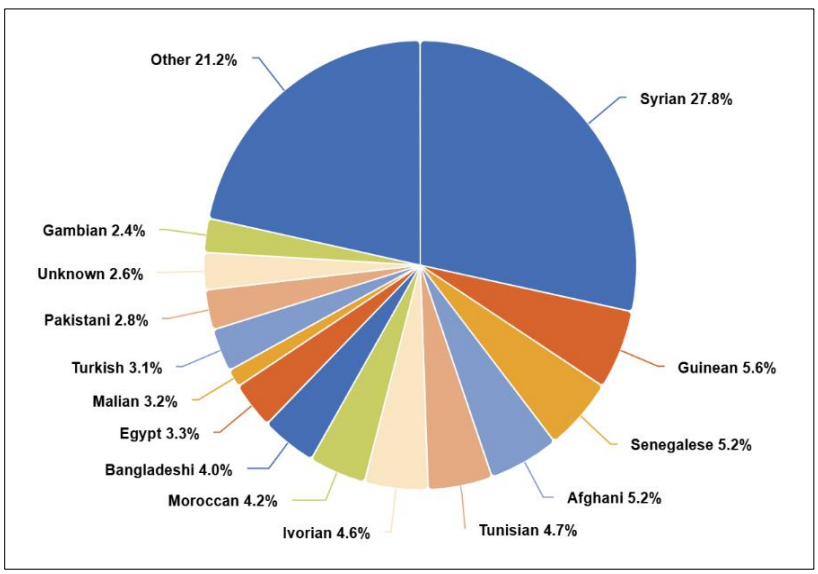

Figure 8. Irregular EU border crossings by nationality in 2023. Source: Frontex.

In 2022 an increase in crossings on the **Central Mediterranean** (+56%, 105,600), the **Eastern Mediterranean** (+113%, 43,900) and the **Western Balkan routes** (+134%, 144,100) compared to 2021. Decrease in crossings on the **Western Mediterranean** (including the Atlantic route from Western Africa to the Canary Islands) (-25%, 30,600) and the Eastern borders routes (-22%, 6,300) compared to 2021. 18% increase of deaths at sea: 2,411 persons were reported dead or missing in 2022 on the three Mediterranean routes, compared to 2,047 in 2021. In 2023 there was an increase in crossings on the Central Mediterranean route (+54%, 162,700), the Atlantic and Western Mediterranean routes (+157%, 39,700 and +12%, 16,900, respectively) and the Eastern Mediterranean route (+57%, 60,800) compared to 2022. At the same time, there was a decrease in crossings on the Western Balkan route (-31%, 99,000) and the Eastern borders route (-10%, 5,700) compared to 2022. 29% increase of deaths at sea: 3,105 persons were reported dead or missing in 2023 on the three Mediterranean routes, compared to 2,411 in 2022 (EUROSTAT).

1.1.6 Returns

In 2023, 430,600 non-EU citizens were ordered to leave the EU, a slight decrease of 0.1% from 2022, which had seen a 27% increase from 2021's figure of 340,500. The primary nationalities ordered to leave in 2023 included citizens from Morocco (8.1%), Algeria (7.5%), Afghanistan (5.5%), Syria (5.0%) and Türkiye (4.8%). Of those ordered to leave, 83,400 individuals were successfully returned to non-EU countries, representing 19% of all return orders, up from 17% in 2022. The largest groups returned were from Georgia (12.0%), Albania (9.3%), Türkiye (6.6%), Moldova (4.3%) and Serbia (3.9%). Among the nationalities with at least 5,000 return orders, the **return rate was particularly low** for those coming from Syria (3%), Democratic Republic of the Congo (3%), Afghanistan (4%), Guinea (5%) and Morocco (8%). In 2023, the share of voluntary and forced returns was 46-54%. 75% of the returns were assisted returns - the persons returned received logistical, financial and/ or other material assistance (EUROSTAT).

1.1.7 Short stay Visas

In 2022, nearly 1,700 Member States' consulates received 7.6 million short stay visa applications lodged by non-EU citizens, up from 2.9 million in 2021 but 55% less than in 2019. In total, 5.9 million short stay visas were issued and 1.3 million were refused, amounting to an EU-wide refusal rate of 17.9% (up from 13.4% in 2021). Most applications were lodged in Türkiye (778,400), Russia (687,200), India (671,900), Morocco (423,200), Algeria (392,100). Most visa applications were processed by France (1,918,500), Spain (1,197,500), Germany (1,043,300), Italy (727,500),

Greece (459,100). 58% of all visas were issued for multiple entries. Short stay visas cover travel throughout the 26 Schengen countries for up to 90 days in any 180-day period (EUROSTAT).

1.2 MIGRANTS' ACCESS TO VACCINATIONS

Among these groups, **irregular migrants, asylum seekers with pending applications, refugees from non-European conflicts, unaccompanied minors, and those with uncertain legal status emerge as the most vulnerable**. These categories face significant barriers in accessing essential services, including healthcare and vaccination programs. **In particular, the data highlights those irregular migrants, amounting to approximately 385,000 people in 2023, are not adequately included in support systems due to their undocumented status**. Asylum seekers with pending applications, with over **883,000 cases still being processed**, live in a situation of great uncertainty that limits their access to essential services. **Refugees from crises other than Ukraine, particularly those from Africa and Asia,** may not receive the same level of attention and support, leaving significant gaps in coverage**. Unaccompanied minors**, over 31,000 in 2022, represent a particularly vulnerable group at risk of being left without adequate protection. Finally, individuals with **uncertain legal status,** such as those who have been ordered to leave but have not yet been repatriated, often lack access to fundamental support services, remaining **in a state of social exclusion**. It is evident that current policies fail to ensure equitable and inclusive coverage for all migrant groups. Greater effort is needed to identify and support vulnerable groups, ensuring that legal and administrative barriers do not hinder access to essential services. Only through more inclusive policies and better management of diverse legal statuses will it be possible to guarantee true equity in access to services for all migrants present in the EU.

Although migrants are not inherently less healthy than the host population, their health outcomes are strongly influenced by social determinants like education, income, housing quality, and access to services. Language, cultural differences, and legal barriers compound these challenges, creating disparities in healthcare access. Additionally, the health impacts of forced displacement, overcrowded living environments, and limited nutrition further contribute to their vulnerability, especially in the context of communicable diseases. These disparities are particularly evident in vaccination coverage, as many migrants come from countries where national healthcare services, including immunization programs, have been disrupted, often resulting in immunity gaps. Vaccine hesitancy, exacerbated by socio-political issues in Europe, poses a public health challenge, with geographical clusters of unvaccinated individuals contributing to outbreaks of vaccine-

preventable diseases (VPDs). For host countries, the rapid arrival of potentially unvaccinated populations heightens the risk of disease transmission, as has been observed in recent outbreaks linked to interactions between migrant and host communities. Addressing these immunity gaps early with catch-up vaccinations could be a more cost-effective strategy than outbreak response measures. Efforts to improve vaccination access for migrants are supported by various initiatives from international organizations and EU bodies. In 2015, WHO, UNHCR, and UNICEF advocated for the inclusion of vaccines in health services targeting refugees, asylum seekers, and migrants [2]. Subsequently, technical guidance from the European Centre for Disease Prevention and Control (ECDC) provided EU/EEA countries with scientific advice on migrant immunization policies [3, 4]. Projects like the EU-funded "CARE" project and the "VENICE" project have identified significant disparities among EU countries regarding migrant vaccination strategies, particularly for adult migrants, who are often excluded from vaccination efforts focused on children. [5-6].

1.2.1 Addressing barriers to access and improving health equity

Migrants, refugees, and asylum seekers should have non-discriminatory and equitable access to healthcare services, including vaccines, regardless of their legal status. Particular attention should be given to undocumented migrants, who may be excluded from catch-up vaccination due to barriers in accessing healthcare and limited or no entitlement to free health services. Administering the full vaccination schedule, which may require multiple appointments spaced out over several months, poses additional challenges. Cooperation between health authorities in arrival, transit, and destination countries is needed to manage the immunization of migrants who move across Europe. A life-course approach is required for migrants, just as it is for the host populations. Currently, adolescent and adult migrants are often excluded from appropriate catch-up vaccination upon arrival, as national policies largely focus on children under the age of five.

While most EU/EEA countries have some form of immunization policy for migrants, the implementation varies, especially regarding adult vaccinations and the integration of migrant health data. Factors such as staffing shortages, insufficient training on migrant health needs, and inadequate data collection systems contribute to inconsistent application of these policies at the local level. The heterogeneity in data collection also hinders cross-border information sharing, making it difficult to monitor migrant vaccination uptake and evaluate the effectiveness of interventions [7].

Furthermore, migrants often face additional social determinants of health, including poor living conditions, low socioeconomic status, and barriers to accessing health services upon arrival, such as language difficulties, inability to pay, cultural beliefs, and fear of discrimination. Various factors influence migrants' utilization of immunization services, including limited or no entitlement to

health services and socio-cultural, educational, and socioeconomic barriers [7-9]. There are also differences among migrant groups; for example, refugees tend to have a lower uptake of services compared to asylum seekers, and undocumented migrants are often excluded from national healthcare services [10]. To achieve equitable access to vaccinations, the European Vaccine Action Plan (2015–2020) emphasizes the need for culturally competent healthcare services for migrants [11]. Tailored solutions must address the diverse needs of migrant populations, with input from community members to ensure that policies are both effective and inclusive. Migrants' access to immunization is often restricted by socio-cultural and socioeconomic barriers, including limited entitlement to healthcare, language obstacles, financial constraints, and fear of discrimination. Although practical experiences related to migrants' access to vaccination have been collected, the effectiveness of these practices has not been fully evaluated, and it remains unclear to what extent they are context-dependent or replicable. Identifying appropriate local and national solutions to overcome barriers is likely the only way to ensure migrants' uptake of vaccinations [5-13]. Recognizing these challenges, the UCL-Lancet Commission on Migration and Health suggests involving migrants in the decision-making process to create more inclusive healthcare policies [12]. As the Sustainable Development Goal (SDG) 3.8 targets universal access to essential medicines and vaccines, the EU faces the responsibility to adapt health systems to meet the needs of a mobile population. Policymakers, researchers, and healthcare professionals have a responsibility to ensure that health systems adapt to an increasingly mobile world and promote equitable access to vaccines for all [14].

1.2.2 Promoting Cultural Sensitivity and Health Literacy for Equitable Vaccination Access in Migrant Populations

Based on ECDC recommendations which underline the critical importance of a widespread cultural sensitivity and a community-based approach in the system of services [4]. On several occasions WHO suggested that Member States improve and strengthen the quality of professional training, while DG SANTE provided financial support for training of healthcare and other workforce working with migrants (e.g., MIG-H and TRAIN4M&H) [15]. Moreover, the importance of intercultural competence and cultural sensitivity in health care systems is being increasingly recognized as integral to the provision of equitable and adequate health care [16, 17]. Across the WHO European Region, Member States are adopting more culturally sensitive health care systems to avoid discriminating against those whose needs differ from the majority, such as NAM [18]. The approach adopted in this thesis is linked to the studies on public health literacy, which shift the focus from the ways treatment is provided to the ways in which a health system organizes and allows a real enjoyment of the right to health for every person [19, 20]. The development of a critical extension of

health literacy (HL) concerns both professionals and the system to which they belong, through the four dimensions of HL: access - understand – appraise - apply [21]. In this framework, the objective will be to support above all Vaccination Literacy (VL). VL is not simply knowledge about vaccines but is also about developing a system with decreased complexity to communicate and offer vaccines as sine qua non of a functioning health system. Developing specific VL strategies for migrants means that specific migrant-friendly strategies can make systems more responsive to migrant needs [22].

1.3 SCOPE AND OUTLINE OF THIS THESIS

The purpose of this thesis is to provide a comprehensive reflection on enhancing access to vaccination for Newly Arrived Migrants (NAM) in Europe, with a particular focus on analyzing evidence, reviewing activities, and presenting initiatives related to this issue. The EU co-funded project "Access To Vaccination For Newly Arrived Migrants" (AcToVax4NAM) serves as a case study, offering practical insights and recommendations derived from its activities. This project aims to address barriers to vaccination for NAM by promoting equitable and guaranteed access to vaccines, with a specific emphasis on Vaccine Preventable Diseases (VPDs) covered by National Immunization Plans. A life course approach guides the project's initiatives to ensure that NAM have continuous immunization support, and special consideration is given to COVID-19 vaccination to facilitate equal access to vaccination services.

This thesis begins with an introduction to the research context, highlighting the significance of equitable vaccination access as a public health priority. A systematic review in **chapter 2** examines barriers and opportunities in providing COVID-19 vaccination for migrants and ethnic minorities across the WHO European region, focusing on access, challenges, and willingness among resident and non-resident foreigners, as well as the specific case of Ukrainian refugees. **Chapter 3** introduces the AcToVax4NAM project, detailing its objectives and contributions to addressing vaccination challenges for NAM. **Chapter 4** develops a General Conceptual Framework to systematically identify and address barriers, forming the basis for structured interventions. In **chapter 5**, the focus shifts to adapting practical solutions and linking tools to real-life challenges, while **chapter 6** highlights country-specific interventions piloted through the AcToVax4NAM project, demonstrating their effectiveness in improving vaccination access. **Chapter 7** concludes with a blueprint for action, offering actionable recommendations for stakeholders to dismantle systemic barriers and ensure equitable vaccination coverage. The thesis concludes by summarizing the main findings, reflecting on their implications for policy and practice, and outlining future directions to advance migrant health and public health equity.

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Chapter 2

Access to vaccination for migrants: a persistent and important issue in Europe

2.1 ACCESS TO COVID-19 INFORMATION, DIAGNOSIS, AND VACCINATION FOR MIGRANTS AND ETHNIC MINORITIES IN THE WHO EUROPEAN REGION: A SISTEMATIC REVIEW

The systematic review investigates disparities in access to COVID-19 healthcare services among migrants and ethnic minorities (MEMs) in the WHO European region [1]. The COVID-19 pandemic has affected over 760 million people worldwide, resulting in more than 6.9 million deaths [2]. However, its impact has been particularly severe on the most disadvantaged socioeconomic groups and minorities, including migrants and ethnic minorities (MEM). For these communities, COVID-19 has been experienced as a "syndemic," a pandemic that interacts with and worsens pre-existing social vulnerabilities [3]. MEM populations, often living in poor housing conditions with limited access to healthcare protections and social support, have faced higher risks of infection and worse health outcomes [4,5]. Before the pandemic, inequalities in healthcare access were already documented in European countries, with significant barriers linked to residence status, ethnicity, and migratory background [6,7].

The vaccination campaign was crucial in controlling the spread of the virus and reducing hospitalizations and deaths, but its success was hindered by structural barriers (systemic issues affecting access) and attitudinal barriers (beliefs and perceptions reducing vaccine uptake willingness) [8]. This systematic review, part of a broader project, examines disparities in access to COVID-19 prevention, diagnosis, and treatment among MEM populations in the WHO European region, which hosts around 90 million international migrants (almost 10% of the total population). Previous studies have documented a higher risk of infection, severe illness, and mortality among MEM populations compared to the general population [9, 10]. This analysis aims to address the lack of systematic evidence regarding disparities in access to healthcare services for these vulnerable populations.

2.1.1 Vaccine hesitancy among migrant and ethnic minority populations in WHO EU region

Research on vaccine hesitancy during the COVID-19 pandemic highlights significant disparities among different population groups, particularly migrants and ethnic minorities (MEM). Out of the studies analyzed, eight were conducted in the UK, while one each was carried out in France, Germany, and Israel. These studies focused on both general populations and specific subgroups, such as healthcare workers, parents of young children, and adults with disabilities. Across all studies, MEM populations consistently exhibited greater vaccine hesitancy compared to the general population. In the UK, two studies using longitudinal data from the Understanding

Society survey revealed that certain ethnic groups, particularly Black and South Asian communities, were significantly more hesitant about COVID-19 vaccination than White British/Irish participants [11, 12]. For example, Black or Black British individuals had an odds ratio (OR) of 13.53 for vaccine hesitancy, and South Asian groups had an OR of 3.96, even after adjusting for demographic and socio-economic variables. Similarly, in Scotland, a cross-sectional study found that individuals from Black, Asian, and Minority Ethnic (BAME) groups were almost three times less likely to accept a vaccine than those of White ethnicity (adjusted coefficient 2.91) [13]. Further evidence from France showed higher reluctance among migrants compared to native-born individuals, with the highest levels of hesitancy observed among descendants of those from French Overseas Departments and African/Asian countries [14]. In Israel, a national study found Arab participants to be significantly more likely to refuse vaccination than their Jewish counterparts (OR 4.79 for men and OR 3.42 for women). Other findings linked vaccine hesitancy to broader sociocultural and informational factors [15]. For instance, a UK study observed correlations between hesitancy and conspiracy beliefs, as well as reliance on social media platforms like YouTube and WhatsApp for COVID-19 information [16]. Additionally, trust in scientists and healthcare professionals appeared lower among non-White ethnic groups, contributing to hesitancy. In Germany, research involving Turkish-speaking patients found that a migratory background was a significant predictor of reluctance to vaccinate, with ORs of 4.43 and 3.08 in univariate and multivariate analyses, respectively [17]. A multimethod UK study involving parents of young children highlighted that Black, Asian, Chinese, Mixed, or Other ethnic groups were over twice as likely as White participants to reject vaccination for themselves (OR 2.73) and their children (OR 2.55) [18]. Finally, vaccine hesitancy was also found to intersect with other vulnerabilities. Among UK healthcare workers, Black Caribbean, Black African, Asian Chinese, and White Other groups were more likely to be hesitant, even after adjusting for job roles, trust levels, and perceived risks [19]. A separate study extended this association to people with disabilities, showing that minority ethnic individuals with disabilities were at an even greater risk of hesitancy compared to White British individuals without disabilities [20]. These findings underscore the complex interplay of structural, cultural, and social factors in vaccine hesitancy among MEM populations. Addressing these disparities requires tailored communication strategies, increased accessibility, and targeted interventions to build trust and promote equitable vaccine uptake.

2.1.2 Structural barriers to vaccine access in WHO EU region

Five studies investigated vaccine uptake among MEM populations, consistently showing lower vaccination rates compared to the general population. These disparities were particularly pronounced among Black ethnic groups and migrants, highlighting significant inequities in access

and coverage. In the UK, a study conducted in Wales in April 2021 focused on individuals aged 50 and over, revealing significantly lower odds of vaccination for Black (AOR 0.22), Asian (AOR 0.41), mixed ethnic (AOR 0.36), and other ethnic groups (AOR 0.24) compared to the aggregated White population, even after adjusting for variables such as age, healthcare worker status, and care home residency [21]. Another study involving over 6.6 million adults aged 70 and older reported the lowest vaccination rates among Black African and Black Caribbean groups, with adjusted odds ratios of 5.01 and 7.62, respectively, for not being vaccinated compared to White British individuals [22]. Similarly, healthcare workers from ethnic minority backgrounds in the UK were significantly less likely to be vaccinated than their White colleagues, with Black healthcare workers showing the lowest likelihood (OR 0.30), followed by South Asian workers (OR 0.67), even after controlling for socio-demographic and occupational factors. In Israel, disparities in vaccination rates were evident between Jewish and Arab populations [23]. Arab communities showed consistently lower uptake across all age groups and doses compared to Jewish populations, with disparities being more pronounced among younger individuals. For those under 60, the difference in vaccination rates reached 33% for the first dose and 37% for the second dose, while older individuals showed smaller but still significant gaps. In Italy, research conducted in three informal settlements in Rome—Tiburtina, Termini, and Collatina—highlighted stark contrasts in vaccination coverage. While the national average vaccination rate was 79.06% as of September 2021, the rates in these settlements were significantly lower, ranging from 13.3% to 35.9%. Irregular migrants had the lowest vaccination coverage within these communities, with rates as low as 11.1% in Tiburtina [24]. These findings emphasize that structural barriers, socio-economic challenges, and legal status play a crucial role in limiting vaccine uptake among MEM populations. Addressing these disparities requires targeted strategies that focus on improving accessibility, overcoming hesitancy, and promoting equitable vaccination campaigns tailored to the specific needs of these communities.

2.1.3 Limited access to COVID-19 testing and information in WHO EU region

Only three of the nineteen studies focused on aspects other than vaccination, specifically addressing access to COVID-19 information and testing. These studies revealed significant disparities in the availability and timeliness of these services for migrants and vulnerable populations. One study [25] assessed the readability and accessibility of online COVID-19 information for non-native English speakers. It found that over half of the websites analyzed were difficult to read, with only 3.4% providing information in multiple languages and 6.8% offering graphical aids to support comprehension. This lack of accessible and culturally appropriate communication underscores a critical barrier for non-native speakers seeking reliable health

information during the pandemic. The other two studies examined access to COVID-19 testing in Italy and Switzerland. In Italy, a study compared the median dates of positive test diagnoses between Italian nationals and non-Italians [26]. Non-Italian nationals were diagnosed later than their Italian counterparts, with a median date of April 14 (IQR March 28–May 8) compared to April 1 (IQR March 20–April 18) for Italians. The delay was even more pronounced among non-Italians from countries with low Human Development Index (HDI), whose median diagnosis date was April 29 (IQR April 6–June 22). This finding suggests delays in accessing testing services for migrants, particularly those from low-resource settings. In Switzerland, another study compared undocumented migrants and homeless individuals with the general population accessing COVID-19 testing services at Geneva University Hospitals [27]. The main outcome measured was the interval between symptom onset and testing. While there was no significant difference in the proportion of visits occurring within the first three days of symptom onset ($p=0.149$), nor in the average number of symptoms reported ($p=0.408$), this parity does not negate the potential barriers these underserved populations face in accessing testing services.

2.1.4 Conclusion

This systematic review highlights significant disparities in healthcare access for migrants and ethnic minorities (MEM) in the WHO European region during the COVID-19 pandemic. Despite investigating access to prevention, diagnosis, and care, the review found no studies addressing inequalities in treatment access for MEM populations. Most research focused on vaccination, with 16 out of 19 studies addressing vaccine hesitancy—a major barrier to vaccine coverage identified by WHO as a global health threat in 2019. Vaccine hesitancy among MEM populations was consistently higher than in the general population, often influenced by distrust in government and institutions, as well as historical experiences of structural racism. While socio-economic factors such as income and education levels were associated with vaccine hesitancy, they did not fully explain the disparities, particularly among Black populations, which consistently showed the highest levels of hesitancy. This suggests additional factors, such as systemic discrimination and cultural barriers, play a critical role. The review also underscores the limitations of generalized health interventions, advocating for tailored, multilingual, and community-based approaches to improve vaccine acceptance and healthcare access. The review aligns with previous findings that MEM populations face numerous barriers to vaccination, including legal, administrative, and logistical obstacles. Issues such as fear of detection among undocumented migrants, lack of accessible services, and language barriers further hinder equitable healthcare access. Additionally, delays in COVID-19 testing and diagnosis for MEM groups, as observed in Italy and Switzerland, highlight the systemic

challenges in ensuring timely health services for these populations. While this work strengthens the evidence of healthcare inequities for MEM populations, it also points to gaps in research, particularly regarding access to COVID-19 treatment. Future studies should explore these disparities to guide the development of inclusive policies and health promotion programs that prioritize trust-building and address socio-economic and structural barriers. These efforts are essential to achieving equitable and effective healthcare delivery for all. Supplementary material is available at https://doi.org/10.1007/s10389-024-02325-9.

2.2 THE OPPORTUNITY PROVIDED BY VACCINATION OFFER TO REFUGEES FROM UKRAINE IN EUROPEAN COUNTRIES

In order to support Ukrainian refugees in response to the 2022 Russian invasion of Ukraine, eight European Countries, part of the AcToVax4NAM Consortium, provided a comprehensive look at how their health policies have endeavored to prevent outbreaks of Vaccine-Preventable Diseases (VPDs) among Ukrainian refugees [28].

Following the Russian invasion of Ukraine, over 6.4 million refugees were recorded globally between February 2022 and March 2024, with approximately 6 million arriving in Europe [29]. In response, the European Council issued a directive granting Temporary Protection (TP) to those fleeing the conflict, offering a framework to manage the mass arrival of refugees and ensure their access to essential services [30]. Refugees face heightened health risks due to the physical and psychological toll of displacement, with mass movements increasing the likelihood of Vaccine-Preventable Disease (VPD) outbreaks, particularly among children [31]. This is compounded by Ukraine's historically low vaccination rates, largely driven by vaccine skepticism [32]. To address these risks, European and international agencies, including the WHO, ECDC, and UNHCR, issued guidelines to help host countries manage vaccination efforts for Ukrainian refugees. These guidelines emphasized ensuring that refugees receive age-appropriate vaccines for Poliomyelitis, Measles, Rubella, and COVID-19, with additional vaccines administered as part of the host country's National Immunization Program (NIP) [33, 34]. For individuals lacking official vaccination records, a full age-appropriate vaccination series was recommended. Efforts by the WHO, in collaboration with the Ukrainian Ministry of Health, enabled remote verification of vaccination records and provided translated documentation to support healthcare providers in host countries [33, 35]. The WHO stressed the importance of inclusive immunization policies, highlighting the need to address linguistic, cultural, and logistical barriers that may hinder refugees' access to vaccination services. Host countries were encouraged to plan resources and services accordingly to ensure equitable access. Similarly, the ECDC prioritized COVID-19 vaccination in Temporary Reception Centers,

recommending primary vaccination courses and booster doses for eligible individuals, with particular focus on high-risk groups such as the elderly, pregnant women, immunocompromised individuals, and those with underlying conditions [36]. Both the WHO and ECDC advised issuing physical or digital proof of vaccination to refugees, facilitating their transit and access to health services within or across host countries [35, 36]. Key international organizations collaborated to produce resources such as the Information to Guide Individual Health Assessment of Refugees fleeing the war in Ukraine, which offers guidance for healthcare providers on health assessments and vaccination protocols [37]. These collective efforts aim to mitigate immunization gaps and enhance health security amid crises.

2.2.1 Health and vaccination measures for Ukrainian refugees in the AcToVax4NAM consortium countries

By the end of March 2023, over 2.5 million Ukrainian refugees with Temporary Protection (TP) status were recorded across the AcToVax4NAM Consortium countries [38]. All eight countries, (Cyprus, Germany, Greece, Italy, Malta, Poland, Romania, and Spain) implemented health measures to address the immunization needs of displaced persons, with some differences in the availability of information in Ukrainian and the approach to vaccination policies. In Cyprus, refugees granted TP status are entitled to free healthcare, including COVID-19 and other necessary vaccinations. Certificates of vaccination or recovery from COVID-19 are issued to individuals vaccinated in Ukraine, with information on TP rights and health services available in Ukrainian on the Ministry of Interior's website [39, 40]. In Germany, refugees from Ukraine have access to vaccinations recommended by the Standing Committee on Vaccination (STIKO) and are entitled to COVID-19 vaccination under the Coronavirus Vaccination Ordinance [41]. The Robert Koch Institute (RKI) provides vaccination information leaflets in Ukrainian and offers guidelines to public health services for vaccinating refugees [42, 43, 44, 45]. In Greece, Ukrainian refugees can access free public healthcare, including COVID-19 vaccinations, through a temporary social security number (AMKA). Children are vaccinated according to standardized protocols, and the Ministry of Migration and Asylum provides multilingual instructions on accessing health services [45, 46]. In Italy, Ukrainian refugees receive a Temporary Present Foreigner (STP) health code, granting access to health services, including routine and COVID-19 vaccinations. Italian guidelines prioritize vaccinations against COVID-19, Diphtheria, Tetanus, Pertussis, Poliomyelitis, and Measles. Information on health services is available in Ukrainian, English, and Russian [47, 48, 49, 50]. In Malta, Ukrainian refugees are offered vaccinations against COVID-19 and other diseases upon arrival, with free immunizations aligned with the National Immunization Schedule. Information leaflets in Ukrainian, Russian, and English guide refugees in accessing TP and health services [51, 52]. In

Poland, refugees are granted equal access to health services and vaccinations included in the National Immunization Program (NIP). Priority vaccines include those for MMR, Diphtheria, Poliomyelitis, Hepatitis B, and COVID-19, and vaccination policies are available in Ukrainian on government websites [53, 54, 55]. In Romania, Ukrainian refugees are integrated into the National Health Programs aimed at preventing and monitoring communicable diseases. Vaccinations under the NIP are offered free of charge, with COVID-19 vaccination also available at no cost. Information on immunization services is accessible in Ukrainian [56, 57]. In Spain, Ukrainian refugees receive individualized assessments of vaccination status. Vaccines are provided according to Spanish guidelines, prioritizing COVID-19, Measles, and Poliomyelitis due to Ukraine's low coverage rates. If documentation is unavailable, individuals are vaccinated according to the Spanish Vaccination Calendar. Spanish authorities provide the Ukrainian National Vaccination Calendar to assist healthcare providers [58, 59].

These comprehensive measures demonstrate the commitment of AcToVax4NAM countries to addressing the immunization needs of Ukrainian refugees, emphasizing the importance of equitable access, tailored health strategies, and multilingual resources to overcome logistical and cultural barriers.

2.3 EXPLORING COVID-19 VACCINATION WILLINGNESS IN ITALY: A FOCUS ON RESIDENT FOREIGNERS AND ITALIANS USING DATA FROM PASSI AND PASSI D'ARGENTO SURVEILLANCE SYSTEM

A study conducted in Italy highlights key determinants of vaccine hesitancy, including sociodemographic factors, economic difficulties, and levels of trust in local health authorities through the Italian surveillance systems PASSI and PASSI d'Argento [60].

The COVID-19 pandemic magnified health disparities between migrants and indigenous populations, with migrants experiencing worse outcomes in many cases [61-66]. Conditions of social vulnerability, limited access to healthcare services, and a higher risk of communicable diseases place migrant populations at greater health risks [67]. In Italy, one of the European countries hardest hit by the pandemic, studies documented a higher risk of adverse outcomes among migrants, although in some cases, delayed diagnoses resulted in lower observed risk [68-71]. Contributing factors included overcrowded living conditions, lower socio-economic status, and language barriers, which diminished the effectiveness of preventive measures [65]. Similar challenges were observed in vaccination uptake, with language barriers, physical access issues, and mistrust in government systems identified as key factors limiting vaccine coverage [72]. Local studies in Italy confirmed

lower COVID-19 vaccination rates and delayed access among migrants compared to Italian citizens, but comprehensive evidence on the determinants of vaccine acceptance in this population remains scarce. Vaccine hesitancy, characterized by delays or refusals to accept vaccines despite availability, varies widely across time, location, vaccine types, and population subgroups. Understanding these dynamics, particularly among foreign residents, is essential for designing effective, targeted interventions to improve vaccine uptake. This study leverages data from Italian surveillance systems, PASSI and PASSI d'Argento, collected between August 2020 and December 2021, to analyze vaccine hesitancy and uptake among both foreign and native populations in Italy. By focusing on the foreign community, this research aims to provide actionable insights into the factors influencing vaccination behaviors, supporting the development of tailored public health strategies to address disparities and improve equitable access to healthcare.

2.3.1 COVID-19 vaccine hesitancy in Italy

During the study period, 19,681 eligible participants were interviewed through the PASSI and PASSI d'Argento surveillance systems, of whom 18,741 were Italian citizens (95.2%) and 940 were foreign-born residents (4.8%). The demographic, health-related, and COVID-19 attitudes and experiences of the study population revealed notable differences between Italian and foreign residents. On average, foreign residents were younger (43 years old) compared to Italians (49 years old) and had lower educational attainment, with only 58.1% holding a high educational level versus 71.6% of Italians. Additionally, the majority of Italians (50.6%) resided in southern Italy, while only 12.1% of foreign residents lived in this region. Seasonal flu vaccine uptake was low across both groups but significantly lower among foreigners (90.0% unvaccinated) compared to Italians (75.8% unvaccinated). Similarly, chronic disease prevalence was lower among foreign residents (17.1%) compared to Italians (24%). Foreign residents also reported a lower perceived risk of contracting COVID-19 (37.6% vs. 47.2% for Italians) and were less likely to experience intrusive thoughts about the pandemic (27.0% vs. 30% for Italians). However, trust in Local Health Units (LHUs) to manage the COVID-19 situation was slightly higher among foreigners (77.6%) than Italians (75.4%). In terms of COVID-19 vaccination willingness, foreign residents were significantly more hesitant. Among foreign participants, 49.4% were certain they would get vaccinated compared to 60.7% of Italians. Foreigners were more likely to respond "definitely no" (12.0% vs. 6.9%) or "probably no" (15.1% vs. 9.1%) compared to Italians. The regression analysis examined the relationship between citizenship and vaccine hesitancy, adjusting for sociodemographic, health, and COVID-19-related variables. Foreign residents were more likely to belong to the vaccine refusal group compared to Italians (Relative Risk Ratio, RRR = 1.34; 95% CI 1.07–1.68). Among Italians, vaccine hesitancy was strongly associated with economic difficulties (RRR = 1.57 for inclination, RRR = 1.64 for refusal)

and distrust in LHUs' COVID-19 management (RRR = 2.15 for refusal). Higher educational levels were protective against hesitancy (RRR = 0.76 for inclination, RRR = 0.52 for refusal), while knowing someone affected by COVID-19 reduced the likelihood of refusal (RRR = 0.69). Seasonal flu vaccine recipients were less hesitant (RRR = 0.44 for inclination, RRR = 0.13 for refusal). For foreign residents, vaccine hesitancy was linked to concerns about the COVID-19 situation (RRR = 1.87 for inclination). Female participants were more likely to refuse vaccination (RRR = 1.68), while factors such as education level, economic difficulties, and trust in LHUs showed elevated but non-significant RRR values due to the smaller sample size. Seasonal flu vaccination significantly reduced hesitancy among foreigners as well (RRR = 0.44 for inclination, RRR = 0.10 for refusal). Hesitancy decreased over time across all groups, with lower rates in 2021 compared to 2020. Among Italians, the RRR for inclination decreased to 0.24 (95% CI 0.21–0.28), and for refusal to 0.33 (95% CI 0.29–0.39). Among foreigners, the RRR decreased to 0.42 (95% CI 0.25–0.70) for inclination and 0.29 (95% CI 0.18–0.48) for refusal. This study's strengths include a large, representative sample of the adult population in Italy and consistent methodology between the PASSI and PASSI d'Argento systems. Additionally, the use of socio-demographic and health-related characteristics as confounders enhanced the analysis of vaccine hesitancy determinants. However, limitations include the absence of data on foreign residents' countries of origin, despite its potential relevance to vaccine attitudes [60].

2.3.2 Conclusions and Public Health implications

The study identified significant differences in vaccine willingness between Italians and foreign residents, even among a population likely integrated into the Italian healthcare system. These disparities are expected to be more pronounced among newly arrived or non-Italian-speaking migrants. Socio-economic factors played a prominent role in vaccine hesitancy among Italians and, to a lesser extent, foreigners. The findings emphasize the need for tailored interventions to improve vaccine literacy, counter misinformation, and build vaccine confidence among migrants. Public health efforts should focus on making vaccination services more inclusive and accessible, particularly for disadvantaged populations. Addressing these disparities is critical for fostering trust in health institutions and ensuring equitable healthcare access. The insights provided by this study can guide policymakers in designing effective immunization strategies and promoting public health equity.

2.4 ACCESS TO COVID-19 VACCINATION IN ITALY IN THE PERIOD 2020-2023 FOR NON-RESIDENT FOREIGNERS: OPPORTUNITIES, CHALLENGES AND CRITICAL ISSUES

Another important study conducted in Italy evaluates national data collection for non-resident foreigners, highlighting opportunities, challenges and critical issues to access to COVID-19 vaccination in the period 2020-2023 [74].

In Italy, people living in socially and medically marginalized conditions often face significant barriers to accessing basic healthcare services due to organizational, socioeconomic, and cultural factors [75-78]. The launch of the COVID-19 vaccination campaign in December 2020 further highlighted systemic challenges in ensuring vaccination access for non-resident foreigners. The campaign's initial planning excluded individuals housed in collective reception centers unless they qualified for medical reasons, such as age or chronic illness [79]. Additionally, foreigners without valid or active healthcare cards faced difficulties booking vaccinations through regional portals, even when eligible based on age [79]. Civil society organizations stepped in to assess the capacity of reception centers to manage COVID-19 cases and gauge residents' willingness to be vaccinated [80, 81]. However, access for individuals without healthcare cards, tax codes (CF), or formal residences, such as the homeless, was not officially ensured until August 24, 2021, when a directive from the Extraordinary Commissioner for the COVID-19 emergency clarified their inclusion [79]. The inclusion of non-resident foreigners in the vaccination campaign also highlighted issues related to the quality of healthcare data collection systems. Accurate and complete data on foreign individuals were essential for ensuring effective vaccination efforts [82]. This challenge was particularly critical for non-EU foreigners using Temporarily Present Foreigners codes (STP), EU foreigners without healthcare cards (ENI), and those in the process of regularization with provisional tax codes. This article describes the vaccination efforts aimed at combating COVID-19 among the foreign population in Italy, focusing on non-resident individuals. The analysis addresses key groups, including non-EU foreigners using STP, ENI and provisional CF codes. It also evaluates the completeness of variables such as citizenship and country of residence in vaccination data to assess whether reliable information on vaccination coverage for this population can be obtained. These insights are critical for improving access to healthcare and addressing disparities for foreign populations in Italy.

2.4.1 Vaccination coverage and characteristics of residents and non-residents in Italy during the COVID-19 campaign

From December 27, 2020, to June 14, 2023, 51,112,236 distinct tax codes (CFs) were

registered in the National Vaccine Registry (*Anagrafe Nazionale Vaccini* system). After excluding invalid or non-compliant codes, 51,019,671 records (99.82% of the total) were analyzed, representing 144,962,099 vaccine doses administered. Among these, 89.03% of vaccinated individuals were residents born in Italy, while 10.59% were foreign residents born abroad, including Italian nationals born abroad. Non-resident foreigners accounted for 0.38% (194,323 individuals) of the total vaccinated population. This group includes those identified through provisional CFs, STP codes, or ENI codes, comprising 3.47% of the vaccinated foreign population. The study identified two distinct peaks in vaccination administration: mid-2021 during the primary vaccination campaign and early 2022 during the booster campaign. These trends were consistent across residents and non-residents, except for ENI-coded individuals, whose vaccinations peaked only during early 2022. The majority of foreign residents born abroad were vaccinated in Lombardy (22.06%), followed by Lazio and Campania. Non-resident foreigners with provisional CFs, STP codes, or ENI codes were vaccinated primarily in Lombardy, Lazio, and a few other regions, with approximately half of vaccinations occurring in unidentified regions for STP and ENI-coded individuals [74].

2.4.2 Vaccine types and administration patterns

mRNA vaccines were the most commonly administered for all groups: 95.16% of vaccinations for individuals with provisional CFs; 94.25% for STP-coded individuals; 89.48% for ENI-coded individuals. The single-dose viral vector vaccine (Ad26.COV2.S) was more frequently used among non-residents, representing 3.99% of vaccinations for those with provisional CFs, 5.24% for STP codes, and 9.95% for ENI codes, compared to 1.20% for residents born in Italy and 1.99% for those born abroad. Among residents born in Italy and abroad, more than 66% received at least three doses, while non-residents more frequently received only the primary cycle (57.77% for provisional CFs, 65.04% for STP codes, and 64.37% for ENI codes). Approximately 80% of all groups completed the primary cycle with two mRNA doses, but a higher percentage of non-residents received the single-dose viral vector vaccine (7.31% for provisional CFs, 8.84% for STP codes, and 17.83% for ENI codes) [74].

2.4.3 Demographics and data completeness

No significant gender differences were observed among residents born in Italy or abroad, with females comprising slightly more than half of the vaccinated population. However, among non-residents with provisional CFs, STP, or ENI codes, females represented less than 50% of those vaccinated. Vaccination was concentrated in the 20–59 age group for all categories, particularly among non-residents, where over 75% of vaccinations occurred within this age range.

Completeness of citizenship data was low for non-resident foreigners: 44.23% for provisional CFs. 40.46% for ENI codes; 44.66% for STP codes. For foreign residents, citizenship data was available in 54.19% of cases, comparable to residents born in Italy (54.50%). Data on foreign countries of residence was nearly complete across all groups. Challenges in data completeness emerged due to insufficient information on citizenship, which limited the possibility of accurately estimating vaccination coverage among non-resident foreigners. This lack of reliable data highlights the difficulties in capturing the actual reach and effectiveness of Italy's vaccination efforts for non-residents [74].

2.4.4 Conclusion

This investigation represents the first national description of non-resident access to COVID-19 vaccination, based on data collected in the ANV System. It is important to note, however, that the small number of provisional CFs, STP codes, and ENI codes in the ANV System does not reflect the total estimated number of non-resident foreigners present in Italy during the study period. The data analyzed indicate that a significant percentage of non-resident foreigners received at least one dose of the COVID-19 vaccine, with most having completed only the primary vaccination cycle with two doses. Only a minority received a third dose or completed the cycle with the single-dose viral vector vaccine (Ad26.COV2.S). The delay in vaccinations, highlighted by the analysis of the time trend by code type for non-residents, could be attributed not only to logistical, linguistic, and cultural barriers but also to the initial lack of clear guidelines regarding this population. The trend for non-residents with provisional CF and STP codes started to increase from the 27th week of 2021 (early July), peaking in late August and throughout September. This peak may demonstrate that once a major barrier, explicit recognition of the right to vaccination, was removed through the Extraordinary Commissioner's note on August 24, 2021 [79], a large portion of the non-resident population was able to access vaccination. Nevertheless, the total number of non-resident foreigners vaccinated remains relatively low compared to population estimates, likely influenced by difficulties in accessing vaccinations and, more generally, the National Health Service (SSN). The study also highlighted the impossibility of calculating vaccination coverage for non-resident foreigners. While some useful variables, such as citizenship, are present in the ANV System, they are not always filled in, and population data collected by ISTAT does not cover non-resident foreigners. Therefore, it is crucial to improve the completeness of the citizenship variable both in the ANV System and in population data collection, in line with the WHO's recommendations, which call for the inclusion of citizenship, country of birth, years since arrival in the host country, and parents' country of birth in all routine information systems (8). In conclusion, the challenges faced by non-resident foreigners in accessing COVID-19

vaccinations highlight the importance of developing new strategies to address the issues related to SSN accessibility for this population. Overcoming organizational, administrative, and data collection challenges is necessary to ensure equitable and universal access to vaccinations for all individuals present in the country, regardless of their legal status or country of origin, in order to effectively prevent the spread of infectious diseases and protect public health. Finally, improving the collection and recording of existing variables and adding the necessary ones to information systems will enable an accurate assessment of vaccination coverage and better planning and monitoring of public health interventions targeting the foreign population, regardless of their position within the SSN.

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Chapter 3

Unveiling AcToVax4NAM

Co-funded by the European Union's
Health Programme (2014-2020)

Access to Vaccination
for Newly Arrived Migrants

3.1 PROJECT OVERVIEW

Access to Vaccination for Newly Arrived Migrants (AcToVax4NAM) is a three-year project (starting date: 01/05/21 – end date: 30/11/24) co-funded by the European Commission (EC), within the framework of the Third Health Programme, which aims to improve access to vaccinations for Newly Arrived Migrants (NAM) by tackling barriers and making care more equitable in EU/EEA countries. The project considers vaccinations that form part of National Immunization Plans for Vaccine-Preventable Diseases (VPDs), including COVID-19, through a life-course approach (children and adolescents, adults, and the elderly). The AcToVax4NAM project is coordinated by the Prolepsis Institute (Greece) within a consortium of a total of 10 organizations involving 8 European countries.

n°	Organisation Name	Country
1	Prolepsis Institute of Preventive Medicine, Environmental and Occupational Health - WP1 e WP7	Greece
2	Center for Social Innovation - WP2 (CSI)	Cyprus
3	Fundaţia Romtens - WP3 (ROMTENS)	Romania
4	Centro Nazionale per la Salute Globale, Istituto Superiore di Sanità - WP4 (ISS)	Italy
5	Department of Public Health and Infectious Diseases, Sapienza University of Rome - WP5 (SAP)	Italy
6	Fundació Hospital Universitari Vall d'hebron, Institut de Recerca - WP6 (VHIR)	Spain
7	Ministry of Health (MoHGR)	Greece
8	Ethno-Medizinisches Zentrum e.V. (EMZ)	Germany
9	Ministry for Health – Government of Malta (IDCU)	Malta
10	National Institute of Public Health NIH, National Research Institute (NIZP-PZH)	Poland

Table 5. Partners of the AcToVax4NAM consortium and Work Package (WP) leaders

3.1.1 General objectives

General objectives of the Project AcToVax4NAM aimed to improve vaccination literacy and access and thereby vaccination uptake for Newly Arrived Migrants (NAM), making access conditions more equitable and guaranteed. The project targeted Vaccine Preventable Diseases (VPDs) that were part of the National Immunization Plans and adopted a life course approach. COVID-19 vaccination was considered in all the project's activities, within the logic of promoting equal access to relevant vaccination services for NAM.

AcToVax4NAM identified solutions for overcoming system barriers while also addressing the impact of political and cultural environments in each of the consortium countries. It addressed institutional or system-based VL for health and social care professionals who worked with NAM, including non-medical personnel such as health mediators AcToVax4NAM adopted a participatory

approach by involving the target groups in the project to achieve widespread acceptance of the proposed solutions.

3.1.2 Pertinence of geographic coverage

The AcToVax4NAM consortium included first-line, transit, and destination countries. More specifically:

- Southern European countries of first arrival located at the Mediterranean border (**Cyprus, Greece, Italy, Malta, Spain**), which could also be considered destination countries when NAM decided to settle there. Spain was also considered a relocation country by IOM (32).
- **Germany** was the most important destination and relocation country as was evident from the number of refugees and asylum seekers received in mid-2019 (see Table below).
- **Poland** and **Romania** were located at the Eastern EU borders and were therefore at the same time first arrival and transit countries. Poland was also considered a relocation country by IOM (31). However, they were recently becoming also destination countries, as could be seen by the percentage of migrants out of the total population (see Table below).

3.1.3 Recipients of the AcToVax4NAM Project

The **final beneficiaries** are NAM in first-line, transit, and destination EU/EEA countries, regardless of their legal status. Given that there is no widely established definition of NAM, the AcToVax4NAM Project has developed an operational definition based on Public Health considerations, regardless of legal status or country of origin. NAM is defined as: "*a person (with a different citizenship from the hosting country, with either EU/EEA or third country citizenship), who entered the country in the last 12 months EITHER within the procedures prescribed by the governmental migration policies, excluding tourists and short visa/permit < 3 months, OR outside the procedures recognized by the legislation (or overstay after visa expired)".*

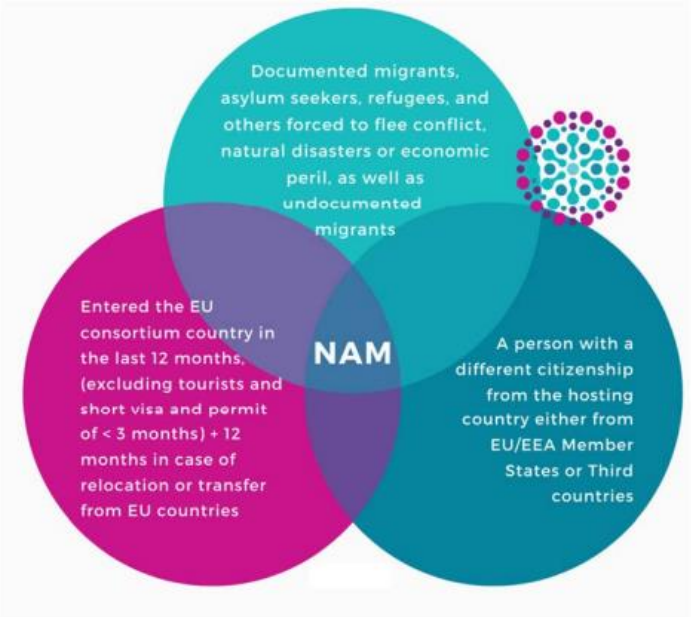

Figure 9. The operational definition is based on Public Health considerations, regardless of legal status or country of origin. NAM is defined as: “a person (with a different citizenship from the hosting country, with either EU/EEA or third country citizenship), who entered the country in the last 12 months EITHER within the procedures prescribed by the governmental migration policies, excluding tourists and short visa/permit < 3 months, OR outside the procedures recognized by the legislation (or overstay after visa expired)”.

3.1.4 Target groups

The target groups of the project are “all professionals FOR health”, a denomination also given in the framework of the project, which refers to ALL personnel involved in the vaccination of NAM from public and private institutions at the local, regional, and national levels, summarized below:

- Health and social care professionals who work in the field of delivery of immunizations with special attention to migrants; including physicians, nurses, social workers, psychologists, cultural mediators, migrant community representatives, etc.
- Professionals, who work in managing/organizing immunization services with special attention to migrants; including managers, administrative staff, physicians, nurses, social workers, etc.
- Experts related to immunization planning with special attention to migrants; including policymakers, public health professionals, scientific organizations and universities professionals, etc.

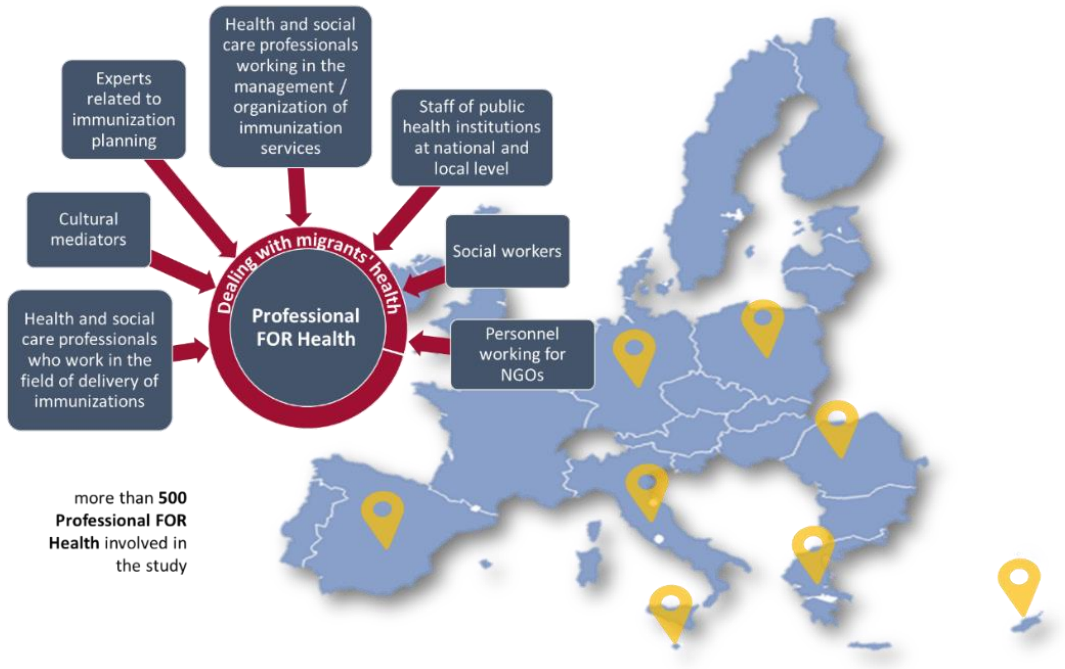

Figure 10. AcToVax4NAM Consortium Countries. Germany, Poland, Spain, Italy, Greece, Malta, Cyprus and Romania. Professional FOR Health - All professionals who must / can deal with the health of migrants. In this group, it can therefore include all health and social care professionals who work with NAM

The target groups were involved in the identification of country-specific system barriers and solutions, VL and CB training sessions, the elaboration of country-specific action-oriented flow charts, and in the implementation of the pilot itself for the vaccination uptake among NAM. An overall number of 500 “professional FOR health” were targeted by the project.

Stakeholders included:

- Actors from the target groups, in terms of professional associations involved, regional, and national public health institutions, and NGO representatives,
- Managers and service providers at different levels of the national migrant reception and vaccination system,
- Policy makers at regional, national, and European levels, and
- Scientific organizations and universities.
- Migrant communities’ representatives and their leaders.

3.1.5 Work Packages

To achieve the project's objective, the work plan has been divided into seven interlinked Work Packages (WPs):

- **WP1**: "**Management**". The WP includes actions undertaken to manage the project and to ensure that it is being implemented as planned.
- **WP2**: "**Dissemination, Communication, and Sustainability**". The WP covers actions undertaken to ensure that project results and deliverables are being made available to the stakeholders.
- **WP3**: "**Evaluation**". The WP comprises the actions undertaken to verify whether the project is being implemented as planned and reaching its objectives.
- **WP4**: "**Immunization guidance, reception, & vaccine offer systems for NAM and related barriers: a conceptual framework**". The WP describes a compilation of the main recommendations on immunization procedures for NAM and the policies implemented in consortium countries on vaccination provision for NAM, and a General Conceptual Framework (GCF) to characterize and analyse barriers and possible solutions to NAM immunization procedures in a pathway consisting of logical steps.
- **WP5**: "**Health care systems' vaccination literacy and migrant sensitivity to promote the active immunization of NAM**". The WP includes activities aimed at reinforcing the networking capacity among institutional and non-institutional organizations and actors, at strengthening healthcare system Vaccination Literacy (VL) and responsiveness among health and social professionals, to increase the building skills and cultural sensitivity of the health system.
- **WP6**: "**Country-specific, action-oriented flowcharts and repository of tools to improve access to vaccination of NAM**". The WP seeks to develop a country- specific action-oriented flowchart in each consortium country and a toolbox which collects an extensive variety of tools to create material resources to improve access to immunization for NAM.
- **WP7**: "**Piloted solutions to overcome system barriers and final recommendations to increase vaccination uptake**". The WP includes the piloting and evaluation of country-specific solutions to overcome system barriers and increase vaccination uptake. It also involves the formulation of final recommendations to inform relevant local, national, and EU policies.

The process and the interrelation of the seven work packages of this project are detailed below and summarized in figure 11:

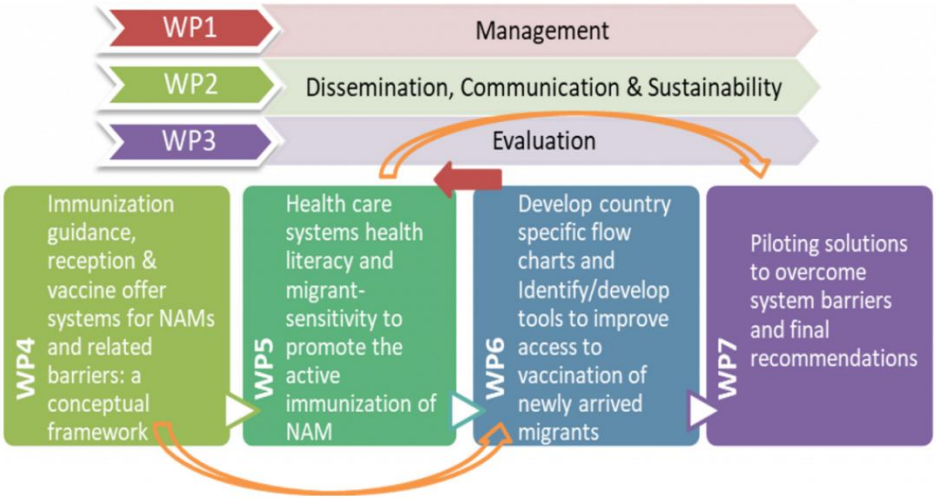

Figure 11. Work Package Logic of the AcToVax4NAM project.

The WP4 guided the implementation of subsequent WPs, after having reviewed the national reception system/pathways of NAM and vaccination policies within the consortium countries and developed the GCF on which each country based their country-specific action-oriented flowcharts, thus establishing country-specific prescribed methods for the vaccination of NAM (WP6). Based on the analysis performed in WP4, WP5 maps stakeholders and strengthens the networking capacity among stakeholders through the development of a vaccination literacy tool: a glossary of essential definitions related to vaccination. Moreover, WP5 training activities were developed in order to strengthen VL and responsiveness among “professionals FOR health”.

Some tools developed in WP6 (flowchart & repository/database of tools), were presented during the training activities within the framework of WP5. Following these materials, as well as the indicators provided in WP5 on the knowledge and VL of professionals, and in collaboration with the stakeholders involved, the final WP7 focuses on the implementation and evaluation of specific solutions and the development of final country- specific recommendations to promote and increase the uptake of vaccination among NAM. AcToVax4NAM adopted a participatory approach by involving the target groups (“professionals FOR health”) to achieve widespread acceptance of the proposed solutions.

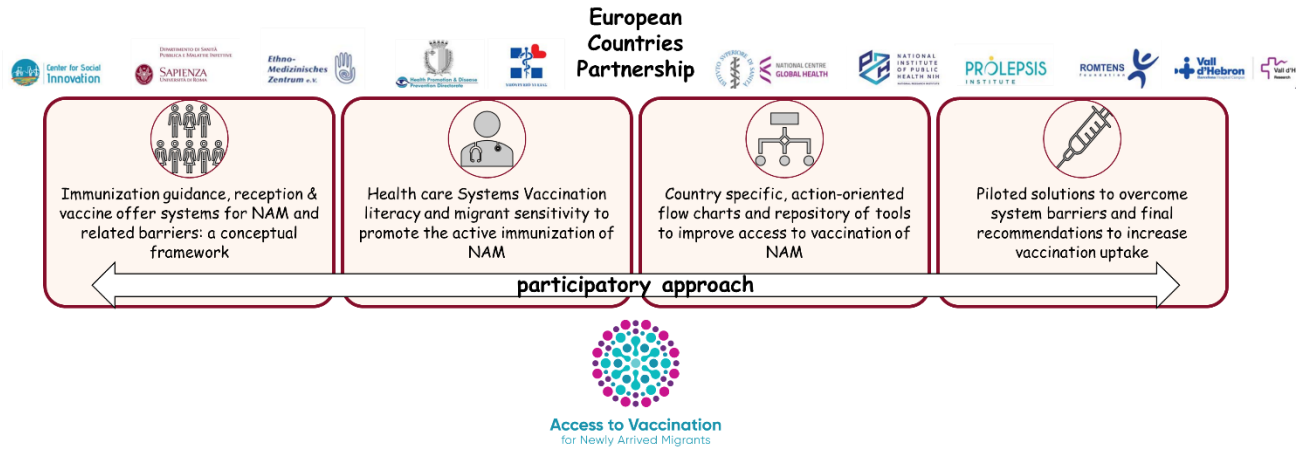

Figure 12. Diagram of the AcToVax4NAM project's participatory approach, highlighting key areas: conceptual framework, healthcare system literacy and migrant sensitivity, country-specific tools, and piloted solutions to enhance vaccination access for NAM.

In addition, partners in each country promoted the ability to create cooperative networks among organizations and institutions stakeholders working with NAM to foster immunizations across the life course. The aim was to utilize the network of stakeholders, especially those who were linked to national services, in order to inform related national policy.

Finally, the AcToVax4NAM took into consideration that new vaccines against COVID-19 would be available in 2021. The vaccine for the new coronavirus needed to be widely accessible and available for all population groups, especially the most vulnerable. The distribution of the COVID-19 vaccine was not influenced by socio-economic disparities or legal profiles, and inequality in accessing the vaccine was not created. Although national strategies of prioritization in relation to the availability of the COVID-19 vaccines were diversified, the project considered the vaccine in all its planned activities (all related WPs); efforts were made to pilot actions to increase access to the vaccine and acceptability/understanding of the benefit of vaccination for COVID-19 by NAM.

Chapter 4

Developing a General Conceptual Framework for understanding how to improve vaccination coverage in European Countries

4.1 DEVELOPING A GENERAL CONCEPTUAL FRAMEWORK

This chapter describes the development of a General Conceptual Framework (GCF) to improve vaccination coverage for Newly Arrived Migrants (NAM) in EU/EEA countries, addressing barriers and proposing systemic solutions [1].

The vaccination coverage of refugees and migrants within the European Union and European Economic Area (EU/EEA) is often poor and it is therefore a priority of the European Union to ensure high levels of immunisation for these populations. Within the framework of the AcToVax4NAM Work Package 4 (Immunization guidance, reception & vaccine offer systems for NAM e related barriers: a conceptual framework), a GCF has been developed to characterize and critically analyse the system barriers that hinder the immunization of NAMs and identify possible solutions, considering the logic steps required for NAMs immunisation in order to understand how to overcome barriers for delivering an inclusive immunisation program for NAMs and improving their immunisation coverage. The GCF considers all steps taken in the health care pathway from the vaccination entitlement to completion of needed vaccination, addressing also dropout, and adopting a life-course approach to immunization for children, adolescents, adults and elderly. The framework is intended for managers and service providers at different level of the national migrant reception and vaccination system, professional associations involved in NAMs vaccination, regional and national public health institutions and NGO representatives and, ultimately, for policy makers at regional and national level both in the consortium countries and in other ones, as well as those at European level. In particular, it is considered highly valuable for increasing awareness of European and national institutional and scientific stakeholders about barriers and solutions for vaccination of NAMs. The final beneficiaries are NAMs based on the definition developed by the AcToVax4NAM project.

4.1.1 Designing the General Conceptual Framework: a mixed-methods approach

The development of the GCF unfolded in three main stages using a mixed-methods approach that integrated theoretical conceptualization, literature review, and qualitative research. In the first stage, a Preliminary Conceptual Framework (PCF) was developed, drawing on the expertise of the National Center for Global Health (ISS) and the Department of Public Health and Infectious Diseases at Sapienza University of Rome. Through a hybrid workshop, a "hub-and-spoke" model was designed (Figure 13), identifying five key nodes in the vaccination process for newly arrived migrants (entitlement, reachability, adherence, achievement, and evaluation), supported by specific Question Groups (QGs) to guide data collection and analysis (Supplementary material).

Figure 13. Theoretical conceptualization of a preliminary conceptual framework (A, B), EU/EEA, 2022.

The second stage involved a non-systematic literature review, which included scientific and institutional materials to identify legal, economic, organizational, psychosocial, and cultural/linguistic barriers and corresponding solutions. Concurrently, focus groups (FGs) and personal interviews (PIs) were conducted in seven European partner countries of the consortium to explore the experiences of health and social professionals involved in vaccination programs for migrants. Transcripts were thematically analyzed, providing further insights into challenges and operational strategies. One-hundred and fifty-one documents were collected from the review, 85 documents (out of which 38 scientific articles, 16 reports, 5 guidelines, 4 policy documents, 5 technical documents, and 17 other document types), containing at least one barrier and/or solution, were selected and analyzed. After the exclusion of 7 documents (not pertinent to immunization), 78 documents were included [2–76]. From them, 403 records were extracted, containing **barriers (210 records)** and

possible **solutions (193 records)** across various domains such as legal, economic, organizational, psychosocial, and cultural/linguistic factors.

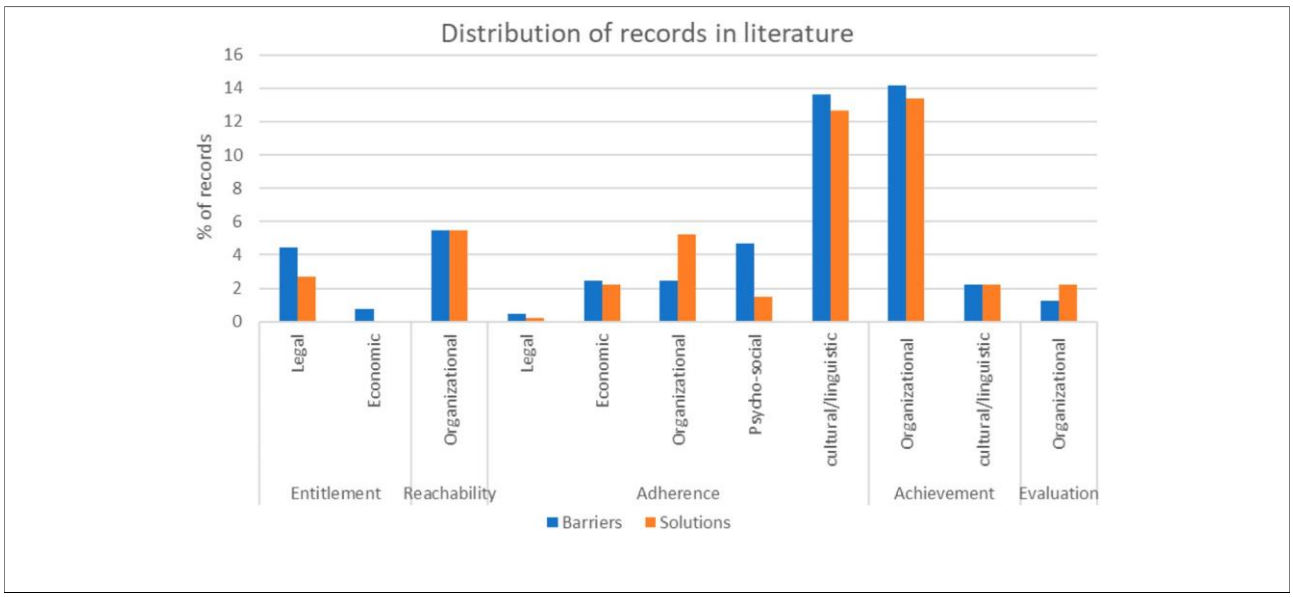

Figure 14. Distribution of barriers and solutions subcategory in literature, EU/EEA, 2022.

Additionally, the qualitative research phase involved **117 participants**, comprising health and social care professionals, who were engaged through **13 focus groups (FGs)** and **53 personal interviews (PIs)** conducted in **seven European partner countries**: Germany, Poland, Spain, Italy, Greece, Malta, and Cyprus. These participants provided valuable insights into the practical challenges and strategies for improving vaccination access for newly arrived migrants. Key findings from Desktop Literature Review and Qualitative research (FGs discussions and Pis) are summarized in the published version of the article [1].

In the final stage, the findings from the earlier phases were integrated into the PCF, expanding the dynamics between the identified nodes and transforming the framework into a practical tool. This iterative process, guided by input from the project steering committee, concluded with the presentation of a consolidated framework that not only highlights critical issues but also offers practical solutions to improve migrants' access to vaccination while accommodating diverse national contexts.

4.1.2 The five hubs of the vaccination process for Newly Arrived Migrants

The logical conceptualization considered the main steps involved in the vaccination of NAMs. These steps become the five hubs of the Preliminary Conceptual Framework: 1) *Entitlement* to vaccination, 2) *Reachability* of people to be vaccinated, 3) *Adherence* (vs. Hesitancy) to vaccination, 4) *Achievement* of vaccination (execution and completion), 5) *Evaluation* of vaccination intervention

(Figures 13A, 13B). As can be seen, there is a connection between each hub. The interrupted arrow starting from the *Entitlement* hub underlines that without the legal right to immunisation the entire process cannot start. The continuous arrows show the sequential continuity of the process.

Entitlement intended to encapsulate “what for whom” and concerns the regulatory planning of the vaccination offer; *Reachability* is related to “how to whom” and regards all strategies, including the “proximity approach,” and abilities of the health service to get in contact with NAMs; *Adherence* that framed “how for what” includes the strategies to ensure that NAMs respond positively to the vaccination offer and to devise abilities in the “professional FOR health” to counteract vaccination hesitancy and fear among NAMs; *Achievement* concerns the execution and completion of vaccination, that is “what (vaccines) and when for whom and how for what” and should depends on organization and flexibility of health services; *Evaluation*, which should report “how many (vaccinated) among all migrants,” regards the necessity of data collection and information flow about NAMs vaccination to be used for the evaluation of activities (Figure 13A).

The dashed arrows in Figure 13B underline that the *Achievement* and *Evaluation* are linked with the other hubs. In particular, the dashed arrows starting from the *Achievement* hub indicate that if the execution and completion of vaccination do not happen it is important to go back to the previous hubs (*Reachability* and *Adherence*) to understand the reasons. The dashed arrows from the Evaluation hub indicate that the evaluation process must be cross-cutting at all hubs and has to take into account their strategies and actions. Despite the heterogeneity and breadth of the results of the analytical work, an attempt has been made in Figure 15 to graphically summarize the overall picture obtained, integrating some elements with respect to the starting outline.

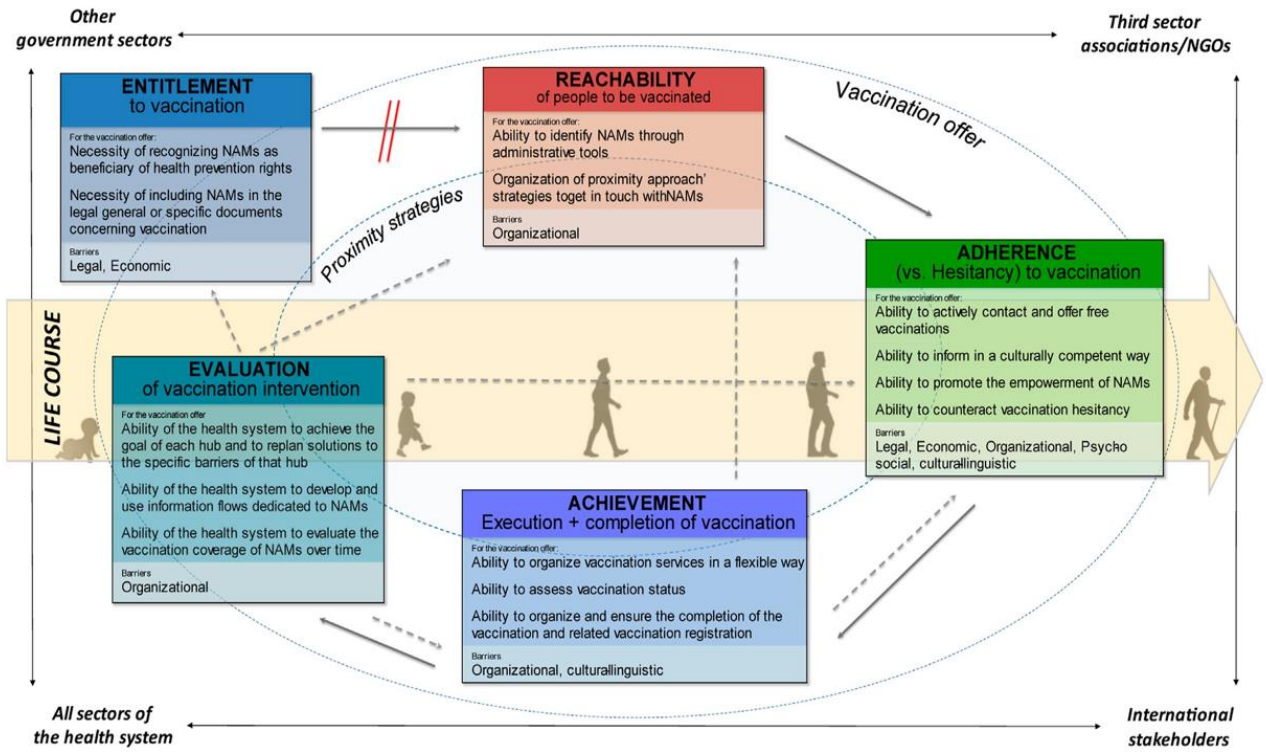

Figure 15. Schematization of the GCF with the specific abilities and barriers of each hub, EU/EEA, 2022.

4.1.3 Health System's strategies to address vaccination barriers for NAMs by hub

Based on literature review and experiences of health professionals, addressing vaccination barriers for migrants requires a comprehensive and multi-faceted approach. This approach should consider various factors and challenges. The following strategies are essential for overcoming system barriers and promoting successful vaccination interventions for migrants.

Entitlement to vaccination – this hub focuses on the rights of NAMs to receive vaccinations and the barriers that may arise in relation to their entitlement. Healthcare professionals must be well-informed about migrants' rights and entitlements to healthcare services. This includes providing continuous training for healthcare personnel and practitioners on the entitlement to health and vaccinations for different profiles of migrants. Furthermore, national, regional, and local authorities should revise their immunisation policies and documents to explicitly mention migrants and NAMs as beneficiaries. This can be done by updating existing documents or creating new ones that clearly state the rights and access to immunisation services for all individuals residing within the country, regardless of their legal status or country of origin.

Reachability of people to be vaccinated – this hub addresses the challenges associated with reaching NAMs and ensuring that they have access to vaccination services. It involves proximity strategies to overcome geographical, logistical, and communication barriers. Reachability should be

improved through updated data sources and multi-sector collaboration: accurate and up-to-date information about migrant populations is essential for effective outreach. This includes improving data sources by aligning with municipal registers and establishing links between different government departments and the National Health System (NHS). Strengthen cooperation between different levels and sectors, including general practitioners, family paediatricians, clinics for temporarily or undocumented foreigners, family planning units, hospitals, municipalities, non-governmental organizations (NGOs), and other entities that interact with migrants. Involve foreign communities in reaching out to migrants not listed for vaccination.

Adherence to vaccination – this hub deals with factors that influence the adherence of NAMs to the recommended vaccination schedule. It includes considerations like cultural beliefs, language barriers, vaccine acceptance as well as organizational vaccination literacy. To promote adherence, several strategies can be implemented. These include planning health promotion campaigns specifically targeting migrant populations; providing training to healthcare professionals, including language mediators, on migrant health needs, cultural awareness, vaccination hesitancy, risk communication, and community engagement; involving migrant communities in promoting vaccination; strengthening links with general practitioners and family paediatricians to promote vaccinations for the entire household; ensuring all services that interact with migrants can provide accurate information on vaccination pathways.

Achievement of vaccination – this hub encompasses the actions needed to successfully administer vaccinations to NAMs, including effective delivery, monitoring, and follow-up. It involves strategies to ensure that the vaccination process is completed for each individual. Achieving vaccination coverage requires the implementation of flexible services and improved documentation processes. To ensure this, it is essential to develop detailed procedures that cover the entire vaccination cycle and provide these guidelines to vaccination service operators. Access to vaccinations can be significantly improved by extending operating hours and days, streamlining reservation systems, and establishing multidisciplinary teams within vaccination centers. Additionally, creating local clinics and temporary hubs and organizing vaccination initiatives with the active support of migrant communities and third-sector organizations can greatly enhance outreach efforts. To support migrants effectively during the vaccination process, services should include the presence of linguistic and cultural mediators, as well as the distribution of informational materials in multiple languages. Strengthening the communication and relational skills of healthcare professionals working in the vaccination field is also critical to fostering trust and understanding. Finally, facilitating the exchange of vaccination information and certificates between countries is

essential, including ensuring that certificates are readily available in multiple languages to accommodate diverse populations.

Evaluation of the intervention – this is a cross-cutting hub which focuses on assessing the effectiveness of vaccination interventions for NAMs. It involves monitoring and evaluation activities to measure the impact of the implemented strategies and identify areas for improvement. To effectively evaluate interventions targeting vaccination among migrant populations, it is essential to adopt a comprehensive approach grounded in research and continuous monitoring. Surveys and focus groups can be conducted to explore the underlying reasons why certain groups fail to benefit from vaccination efforts. Additionally, the system's capacity to reach migrants should be assessed, with a focus on identifying and addressing obstacles and determinants that hinder access. A critical aspect of this process involves studying vaccine hesitancy and refusal among migrants to better understand the barriers they face and the factors influencing their decisions. Furthermore, analyzing vaccination coverage within migrant communities is vital, and efforts should be made to strengthen collaboration with local registries and government agencies to enhance the quality and accuracy of data. It is important to develop methods for recording additional or booster doses for migrants who are not enrolled in the National Health System (NHS), ensuring that they receive equitable access to all necessary immunizations. This holistic approach will enable the design of more effective interventions and policies tailored to the specific needs of migrant populations.

4.1.4 Strategies Common to More Than One Hub

Certain strategies can simultaneously address the purposes of different hubs and fulfill unique purposes concurrently. The following strategic lines encompass multiple hubs:

a) *Proximity strategies*: public health strategies focus on fostering relationships between public institutions, private social organizations and communities with the goal of promoting access to services. Key features include networking, a multidisciplinary approach, the use of mobile teams, cultural mediators, and raising provider awareness through the active offer of health services, the orientation to services, the creation of pathways for taking in charge and the involvement of the population in empowerment processes. These strategies help to overcome geographical barriers and encourage better access to healthcare for migrants. Proximity strategies inform the vaccination process and are tailored to each hub, characterizing specific actions related to reachability, adherence and achievement.

b) *Training courses for providers*: the skills and competencies of providers involved in the vaccination process are crucial. Continuous training and updating are essential for strengthening the health system and other sectors involved in vaccination. In Germany, the

Robert Koch Institute (RKI) offers a range of training courses and resources for healthcare providers involved in vaccination services. These courses include topics such as vaccination schedules, vaccine storage and handling, and communication skills to effectively engage with diverse populations, including migrants. Training improves the system's ability to reach NAMs, especially those in the hard-to-reach groups (reachability), offer and promote vaccinations, particularly also in countering vaccination hesitancy (adherence), and carry out vaccinations (achievement). Training is also a key element in developing proximity strategies should involve all stakeholders involved in the vaccination process.

c) *Migrant sensitive approach*: effective vaccination promotion, organization, and delivery require sensitivity to the unique differences of migrants, including age, gender, legal status, economic status, and more. Investing in multidisciplinary and multi-sectoral training and retraining helps strengthen the migrant-sensitive approach. In the United Kingdom, the NHS has initiated several programs to improve vaccination rates among migrants, such as offering translated materials in various languages, providing cultural competency training for healthcare providers, and using community leaders to promote vaccine uptake.

d) *Data source*: improving vaccination data collection among migrant populations is critical for developing appropriate health policies and services. Hub-specific Standardized Operating Procedures (SOPs) can enhance the quality of the vaccination process by facilitating information sharing within systems at various level. Access to disaggregated data enables better estimation of vaccination coverage, strengthens evaluation for each identified hub and improve the vaccination process in that hub. Particularly important is the registration of vaccinations and linking national and supranational databases to address the mobility of migrant populations. In the European Union, the ECDC has developed a project called "Vaccine Schedule" that gathers information on vaccination schedules and policies across EU/EEA countries. This project aims to improve data collection and sharing between countries to better understand vaccination coverage and gaps in migrant populations.

4.1.5 Conclusion

This study aimed to develop a General Conceptual Framework (GCF) to improve vaccination coverage for newly arrived migrants (NAMs) in EU/EEA countries by systematically identifying and addressing barriers across the vaccination process. Combining literature review and qualitative research, the study analyzed barriers and solutions related to entitlement, reachability, adherence, achievement, and evaluation. Qualitative insights from health and social care professionals in seven countries provided practical perspectives on implementation challenges and strategies. The GCF

outlines stages of the vaccination process and proposes targeted strategies, such as addressing entitlement barriers through improved knowledge of health rights, enhancing reachability via outreach efforts, and promoting adherence through culturally sensitive campaigns. It also emphasizes proximity interventions and flexible organizational practices to support vaccination achievement and the importance of evaluation for continuous improvement.

While the lack of a standardized international definition for NAMs limits data collection and tailored approaches, the AcToVax4NAM project developed an operational definition to encompass a broad range of migrant profiles, irrespective of legal status or origin. The study highlights the GCF's adaptability across contexts and calls for its integration with other European initiatives to build a shared network and improve vaccination equity. Recommendations include creating Standard Operating Procedures (SOPs) and action-oriented flow charts customized for national health systems and local needs, ensuring collaboration among stakeholders.

Ultimately, the GCF provides a practical tool to improve vaccination access and coverage for NAMs while safeguarding public health. It advocates for policies that uphold migrants' health rights, fostering their integration and wellbeing while protecting host communities. The study concludes that by addressing unique needs and barriers, vaccinations can significantly enhance NAMs' health outcomes and the inclusivity of healthcare systems across Europe.

4.1.6 Supplementary material

Supplementary material is available at
https://www.ssph-journal.org/articles/10.3389/ijph.2023.1605580/full#supplementary-material.

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Chapter 5

Adapting practical solutions and linking tools to address real-life challenges

5.1 INTRODUCTION

Vaccination coverage among NAMs has become an increasingly critical issue in Europe, where traditional healthcare systems often face challenges in providing equitable services to this vulnerable population. Migrants, due to their mobility, legal status, language barriers, and varying levels of health literacy, encounter unique obstacles in accessing healthcare services, including vaccination. The AcToVax4NAM project was designed to address these barriers through a collaborative, multi-country approach that emphasizes participation from a wide range of stakeholders, including healthcare professionals, cultural mediators, and migrant communities.

The objectives of this study are i) to reinforce networking and collaboration among healthcare providers and non-institutional organizations, thereby improving vaccination literacy and promoting cultural sensitivity in the healthcare system; ii) to strengthen the healthcare system's ability to respond effectively to the needs of NAMs by training healthcare professionals and other relevant personnel, such as cultural mediators and iii) to develop country-specific, action-oriented flowcharts designed to improve vaccination coverage among NAMs by addressing systemic barriers and providing practical solutions for overcoming these challenges.

The research presented in this chapter summarizes the activities and outcomes of Work Packages 5 and 6. It draws on Deliverable 5.1, which developed a migrant-centered and migrant-sensitive glossary of vaccination essential definitions; Deliverable 5.2, which provided training materials and tools; Deliverable 6.1, which created a repository/database of tools to overcome system barriers with relevant search filters; and Deliverable 6.2, which produced a flowchart for each consortium country.

5.2 MATERIAL AND METHODS

5.2.1 Participatory research approach

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5.2.2 Participant recruitment

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Inclusion criteria: [redacted]

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Exclusion criteria: [redacted]

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5.2.3 Development of the glossary of essential vaccination terms

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5.2.4 Development and validation of training materials

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5.2.5 Development of country-specific flowcharts

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5.2.6 Organisation of focus group discussions, workshops and training sessions

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5.2.7 Validation process and iterative refinement

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5.3 RESULTS

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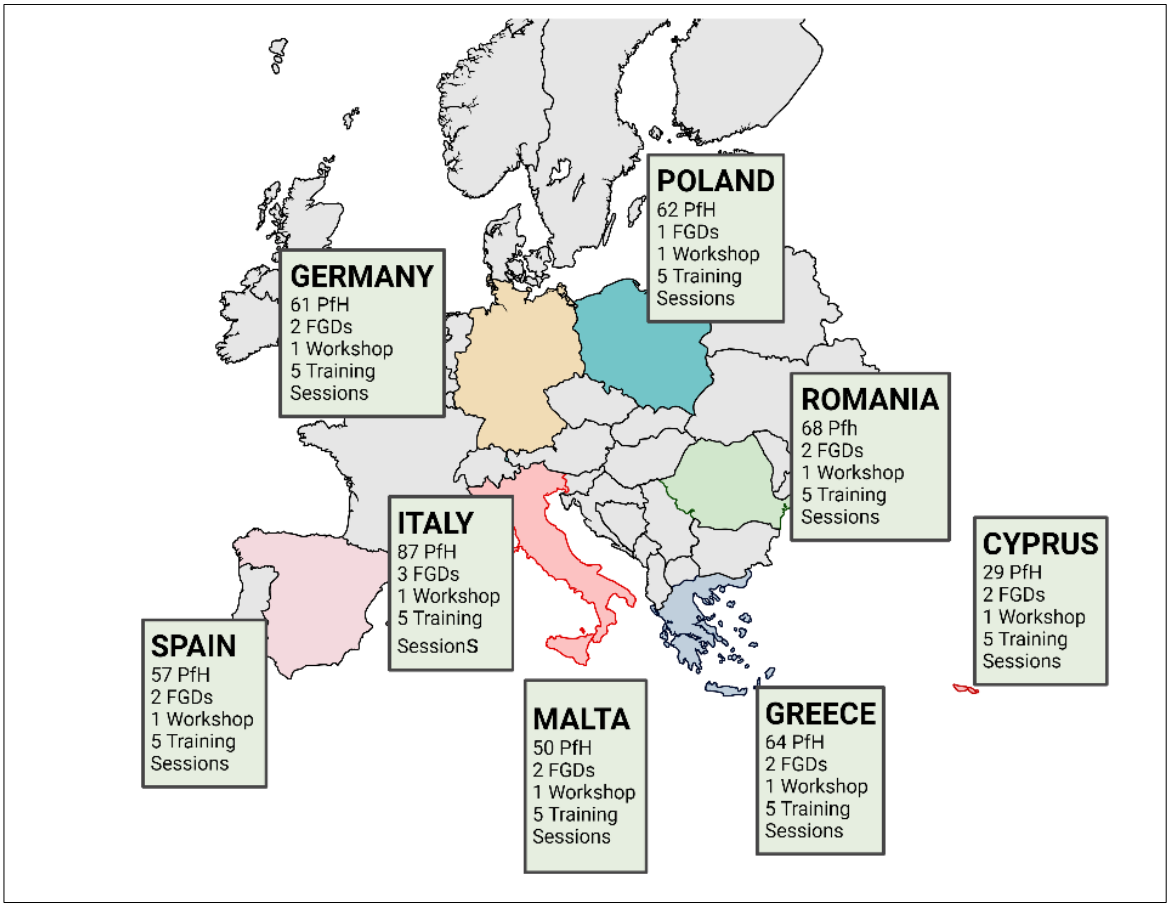

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Germi

Sono dei microrganismi piccolissimi che possono essere visti soltanto con il microscopio. Esistono vari microrganismi come batteri, virus, funghi e alghe. Non tutti i microrganismi sono causa di malattie, ma alcuni possono determinare l'insorgenza di malattie nell'uomo.

Germs

They are tiny microorganisms that can only be seen with a microscope. There are many different types of microorganisms such as bacteria, viruses, fungi and algae. Not all microorganisms cause diseases in humans, but some can.

Infezione

È una condizione che si verifica quando un microrganismo (virus, batterio, fungo, etc.), che può essere pericoloso, riesce a penetrare nel nostro corpo e a replicarsi, combattendo con il nostro sistema immunitario. Le infezioni avvengono di continuo, però spesso non ce ne accorgiamo. Infatti, quando il nostro organismo funziona bene, nella maggior parte dei casi le infezioni non provocano sintomi. Una persona con un'infezione non sempre trasmette l'infezione ad altre persone.

Infection

It is a condition that occurs when a potentially dangerous microorganism (virus, bacteria, fungi, etc.) manages to enter our body and replicate itself, fighting with our immune system. Infections happen all the time, however, in several cases we don't even notice. In fact, when our body works properly, infections may not cause symptoms. A person with an infection does not always pass the infection on to other people.

Malattia Infettiva

È una malattia che può nascere da un'infezione facendo comparire dei sintomi. Questo succede perché, a causa di diversi fattori, il nostro corpo non riesce a sconfiggere il microrganismo che ha causato l'infezione. Oltre alla visita dal medico, ci sono diversi esami diagnostici che si possono fare per sapere se si ha una malattia infettiva (tamponi, esami colturali, esami strumentali ecc.), la scelta di quale fare dipende dal tipo di malattia. Per qualsiasi dubbio o domanda sugli accertamenti diagnostici per le malattie infettive ci si può rivolgere al personale medico.

Infectious Disease

It is a disease that could develop from an infection resulting in the appearance of symptoms. This happens because, due to various reasons, our body is unable to fight the microorganism that caused the infection. Other than the visit with a physician, various diagnostic tests can be done to find out whether you have an infectious disease or not. The choice of which test to conduct (swabs, culture tests, blood tests, instrumental examinations, etc.) depends on the type of disease. If you have any doubts or questions about diagnostic tests for infectious diseases, you can ask the healthcare staff.

Malattia Prevenibile con Vaccino

È una malattia che può essere prevenuta (cioè evitata) con la vaccinazione. Diverse malattie infettive (ad esempio la poliomielite, il tetano, il morbillo, il COVID-19) possono essere evitate, o i loro sintomi ridotti, facendo una vaccinazione specifica. Purtroppo non per tutte le malattie infettive è disponibile un vaccino.

Vaccine - Preventable Disease

It is a disease that can be prevented through vaccination. Several infectious diseases (e.g. polio, tetanus, measles, COVID-19), can be avoided or their symptoms reduced, thanks to vaccination. Unfortunately, there is no vaccine for some infectious diseases.

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Chapter 6

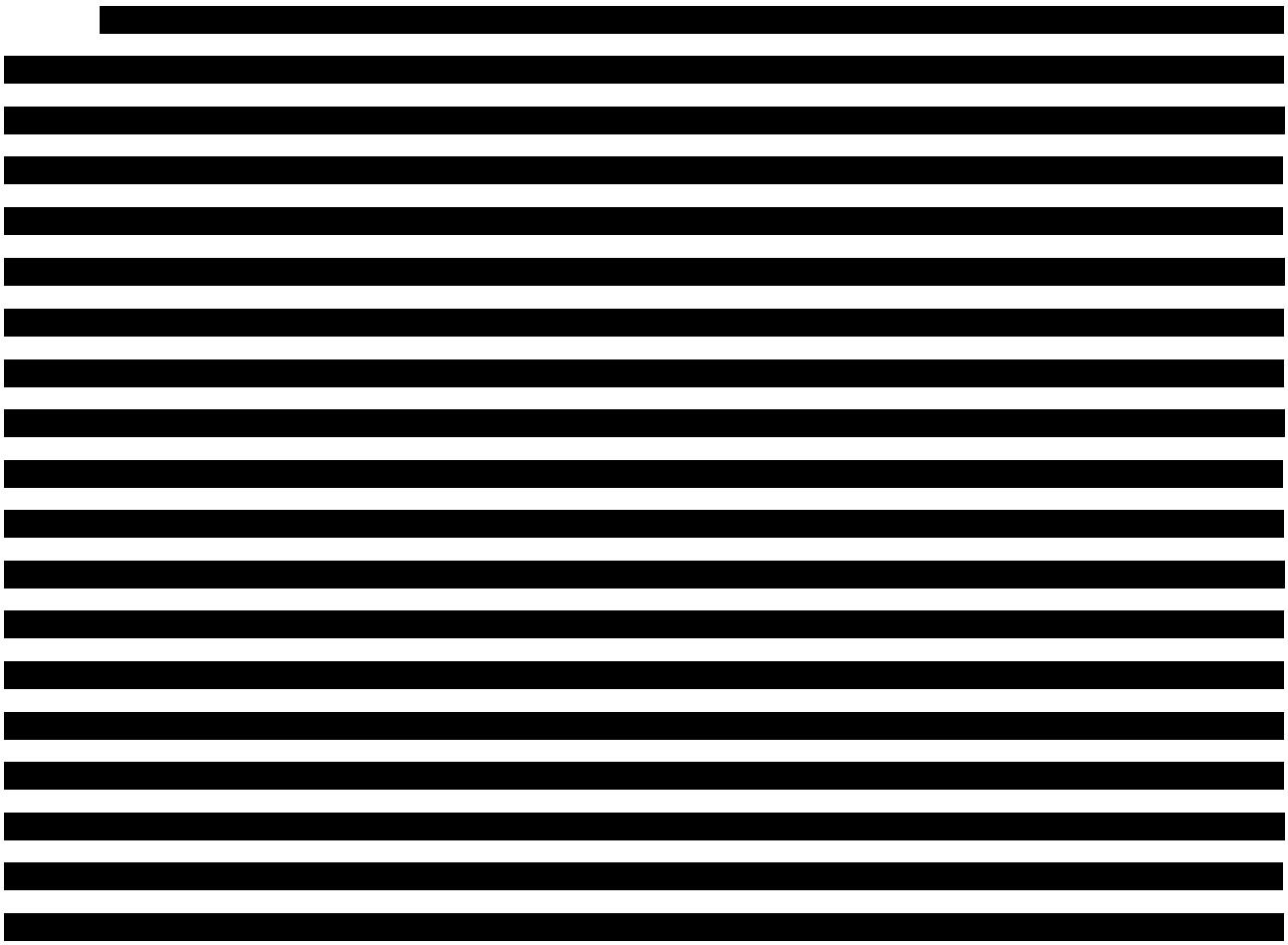
Advancing real-life interventions: Improving vaccination access for NAM in Europe through AcToVax4NAM project country pilots

6.1 Introduction

Migration has become a central issue in Europe, where a diverse influx of migrants and refugees has created challenges for public health systems. Among these challenges, ensuring equitable access to vaccinations for Newly Arrived Migrants (NAM) is paramount to maintaining public health security. Vaccinations are one of the most effective public health measures available, as they prevent the spread of infectious diseases, yet NAM populations often face a range of barriers that impede their access to immunization services. Given the vital role of vaccinations in controlling preventable diseases such as measles, diphtheria, and, more recently, COVID-19, addressing these barriers is both a humanitarian and public health imperative.

The research presented in this chapter is based on the activities conducted as part of Work Package 7 (WP7) and is summarized from two key deliverables: Deliverable 7.1, which includes the country pilot reports, and Deliverable 7.2, which provides the overall report and recommendations.

6.2 Study design



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6.2.1 Piloted solutions to overcome system barriers on vaccinations

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6.3 Results

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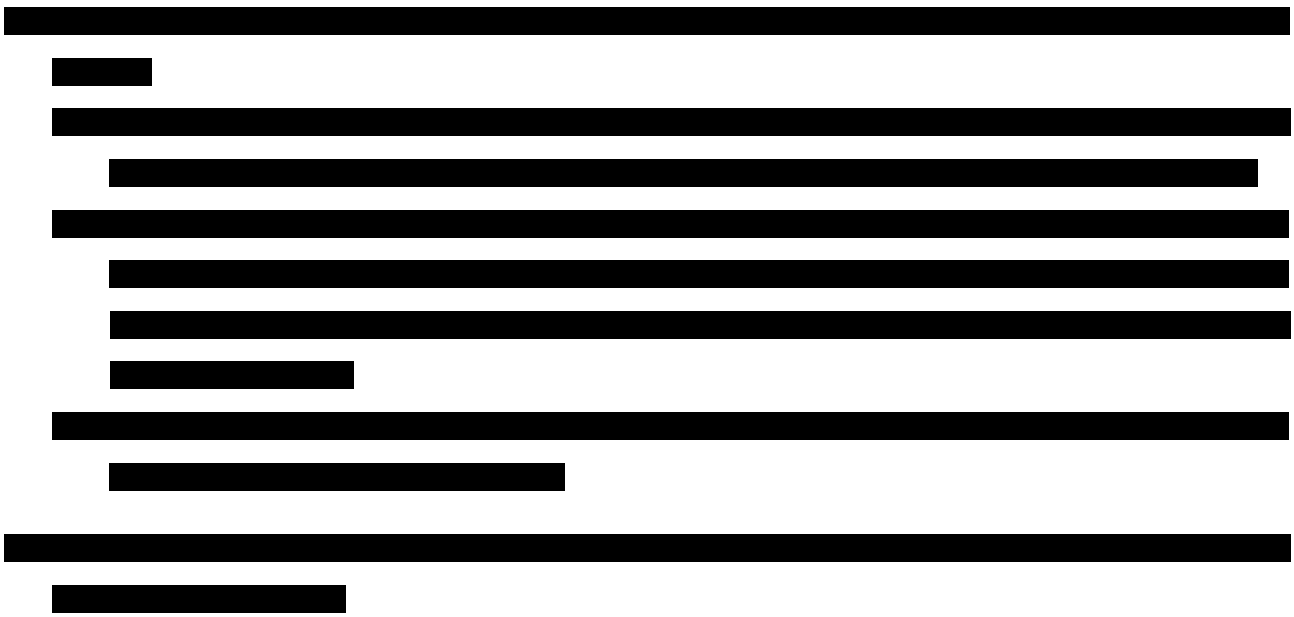
Chapter 7

Blueprint for action: presentation of recommendations to empower change and improve access to vaccination for NAM

The recommendations outlined below are the elaboration and synthesis of key insights and proposals shared during the AcToVax4NAM project, specifically those presented at the AcToVax4NAM EU Conference: “Building Bridges to Better Health: The Impact of AcToVax4NAM in Promoting Vaccination Equity for Newly Arrived Migrants” held on October 18, 2024, at the Stelios Foundation Conference Hall in Athens, Greece. The approach prioritizes the establishment of vaccine-literate organizations and systems, which emphasize the healthcare system’s responsibility to reach and engage vulnerable populations. This perspective shifts the focus from solely individual responsibility for vaccination to a broader systemic commitment, where health services actively work to ensure inclusive and accessible vaccination pathways. These recommendations are framed around the General Conceptual Framework developed within the project, covering key stages of the vaccination process: Entitlement, Reachability, Adherence, Achievement, and Evaluation. They advocate for an intersectoral, collaborative approach, recognizing that effective vaccination for NAM involves multiple stakeholders including healthcare providers, policymakers, training institutions, and community organizations. The goal is to create a cohesive environment that supports NAM through coordinated efforts across health, social, and administrative sectors. By implementing these recommendations, stakeholders can take actionable steps to increase vaccination uptake, address systemic barriers, and build equitable, inclusive healthcare systems that benefit both migrant populations and the broader public health landscape.



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CONCLUSIONS

Summary of the main findings

Summary of the main findings

The thesis project has provided a nuanced, context-sensitive approach to addressing vaccination barriers among Newly Arrived Migrants (NAMs) across eight European countries, offering valuable insights into public health practices and global health efforts. The AcToVax4NAM project's multi-country pilot initiatives demonstrated that culturally adapted interventions, bottom-up engagement with local stakeholders, and targeted training for Professionals For Health (PFH) are essential components for enhancing vaccination literacy and uptake within vulnerable migrant populations. These findings hold broader implications for public health systems and global health frameworks aiming to achieve equitable healthcare access for all.

Key findings and implications for public health and global health.

The thesis highlighted that increasing vaccination literacy among PFH is crucial in building responsive and inclusive health systems. Countries such as Italy and Germany reported substantial improvements in the knowledge, confidence, and cultural competence of healthcare providers in engaging with NAM populations. This capacity-building approach underscores the importance of embedding training in cultural sensitivity, migrant health needs, and health literacy within public health systems. By ensuring that healthcare providers are well-equipped to communicate effectively with diverse populations, health systems can mitigate vaccine hesitancy, foster trust, and reduce inequities in vaccine access. In a global health context, this approach aligns with the principles of health equity, which advocate for an inclusive healthcare environment that respects and responds to cultural differences.

The AcToVax4NAM project emphasized the necessity of using multilingual and culturally tailored resources—such as communication cards, visual aids, and educational materials to overcome language and literacy barriers. In Cyprus, these resources contributed to significant improvements in HPV vaccination rates among NAMs, while in Germany and other countries, they enhanced overall vaccine knowledge. This approach reflects the importance of tailored health communication strategies in global health, where linguistic diversity and cultural sensitivity are pivotal to reaching underserved populations. Such interventions align with Sustainable Development Goal 3 (Good Health and Well-Being) by addressing disparities in healthcare access and outcomes. Ensuring that public health information is accessible to all linguistic and cultural groups fosters inclusivity and helps create health-literate societies, a cornerstone of sustainable health systems worldwide.

While improvements in vaccine literacy and intention to vaccinate were observed across pilot countries, translating these achievements into actual vaccination uptake proved challenging. Factors such as logistical barriers, high turnover among NAM populations, and limited follow-up infrastructure affected sustained vaccination rates, especially in Malta, Poland, and Romania. These challenges reflect systemic gaps within health systems, where bureaucratic and logistical obstacles often impede timely and equitable healthcare delivery. To address these barriers, health systems must adopt a **bottom-up approach** that involves direct input from local communities, migrant leaders, and front-line healthcare providers in the design and implementation of health interventions. This approach empowers communities, builds trust, and ensures that health services are aligned with the needs of end-users. Moreover, the implementation of flexible, responsive public health policies that accommodate the realities faced by migrant populations is crucial for the sustainability and effectiveness of global health initiatives.

The project's conceptual framework focusing on Entitlement, Reachability, Adherence, Achievement, and Evaluation—offers a valuable, replicable model for tackling systemic vaccination barriers. This structured approach ensures that NAM populations are granted the legal right to access vaccines (Entitlement), are physically reachable (Reachability), are supported in adhering to vaccination schedules (Adherence), complete vaccination courses (Achievement), and are evaluated through robust data collection and feedback loops (Evaluation). In a global health context, this framework can be adapted to various settings, particularly in low- and middle-income countries where health inequities persist. By emphasizing these stages, the framework provides a blueprint for building resilient healthcare systems capable of adapting to emerging health challenges and reaching marginalized groups. This aligns with global health goals of achieving **Universal Health Coverage (UHC)** and ensuring no one is left behind.

Recommendations for future public health initiatives and global health efforts

The success of the AcToVax4NAM pilots was largely due to collaboration among healthcare providers, community organizations, policymakers, and migrant representatives. To replicate these outcomes on a larger scale, future public health initiatives should foster partnerships across sectors. Engaging local communities in a bottom-up manner ensures that interventions are grounded in the lived experiences of migrant populations, leading to more effective, sustainable, and contextually relevant solutions. Such collaborations support **global health** efforts and align with the WHO's Health in All Policies (HiAP) framework, advocating for multisectoral approaches to health that consider social determinants and create enabling environments for health equity.

Leveraging digital technology and innovative resources like Spain's "VacGame" application is essential for engaging NAM and addressing their unique health literacy needs. Digital tools can provide interactive, accessible platforms for health education, reinforcing vaccination messages and making information readily available. Given the increasing mobility of populations and the rise of digital health, such tools are crucial for building **digital health literacy** among migrants. Additionally, digital interventions can bridge the gap between healthcare providers and hard-to-reach communities, contributing to a more connected and responsive global health system.

Cultural competency training should be institutionalized within healthcare systems to ensure that all staff members—from front-line providers to administrative personnel—are equipped to meet the needs of diverse populations. In the context of global health, cultural competency training builds the foundation for **people-centered care**, which respects individual and cultural differences, thus enhancing the effectiveness of health interventions. By making cultural competence a core component of public health training programs, health systems can foster an inclusive environment that promotes equity and addresses the social and cultural determinants of health.

Many NAM face bureaucratic hurdles that impede access to vaccinations and other essential services. Streamlining processes, simplifying paperwork, and providing clear, actionable information can significantly improve service accessibility. This aligns with the global health agenda of removing barriers to **Universal Health Coverage (UHC)** and ensuring equitable access to essential health services. Future initiatives should focus on reducing administrative burdens for both migrants and healthcare providers to facilitate smooth and timely healthcare delivery.

Robust monitoring and evaluation frameworks are essential to assess intervention impact, refine strategies, and ensure adaptability to changing needs. By establishing feedback loops and regularly evaluating program outcomes, health systems can better respond to gaps in service provision and maintain alignment with migrant health needs. This is particularly relevant in the global health landscape, where migration patterns and health challenges are constantly evolving. Regular data collection, analysis, and feedback processes support **evidence-based policy-making** and allow for dynamic adjustments in health interventions.

The PhD thesis underscores that equitable healthcare for migrants, particularly in vaccination access, is achievable through tailored, culturally sensitive interventions, stakeholder collaboration, and a commitment to health equity. While the AcToVax4NAM pilots revealed areas of success in improving vaccine literacy and intention, they also highlighted persistent systemic barriers that hinder full immunization uptake among NAM. These insights emphasize the need for resilient health

systems that integrate bottom-up approaches, leverage digital tools, and uphold cultural competence to meet the needs of diverse populations.

In a global health context, the AcToVax4NAM framework offers a valuable model for countries facing similar challenges with migrant and refugee populations. By addressing systemic barriers through sustainable, inclusive approaches, health systems across Europe and beyond can advance towards the goals of Universal Health Coverage and health equity. Future efforts should build on the lessons learned from this project, prioritizing adaptability, community engagement, and the integration of technology to create more accessible, responsive, and equitable healthcare systems worldwide. This commitment to inclusivity and health equity is not only a public health priority but a global ethical responsibility in the pursuit of well-being for all.

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