



Original article

AdMiRE study: Development and validation of a WHO-aligned tool to assess healthcare access and antibiotic use among migrant populations in Europe—a multicountry Delphi and psychometric study on behalf of ESGITM group



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ABSTRACT

Objectives: Migrants and refugees face a high burden of infections caused by multidrug-resistant bacteria but frequently encounter structural barriers to healthcare and appropriate antibiotic treatment. This multicountry study applied a structured Delphi process to develop a standardized survey that systematically assesses healthcare access and barriers to appropriate antibiotic use among migrant and refugee populations in Europe.

Methods: A multicountry Delphi consensus study was conducted with two different panels of experts including 64 experts from 12 European countries, from academia, clinical practice, nongovernmental organization, and migrant communities, to design and validate a survey on healthcare access and antibiotic use. Content validity was assessed using Item- and Scale-level Content Validity Indices (I-CVI and S-CVI/Ave) and the interquartile range. The finalized questionnaire was pilot-tested among 183 migrants, evaluating internal consistency (Cronbach's α ; KR-20), temporal stability (intraclass correlation coefficient), inter-rater reliability (κ), and construct validity via exploratory factor analysis.

Results: Fifteen of 16 experts (94%) completed both Delphi rounds. The S-CVI/Ave improved from 0.94 to 0.95, and the mean interquartile range decreased from 0.38 to 0.02, indicating strengthened content validity and consensus. External validation confirmed excellent agreement (S-CVI/Ave = 0.96). Psychometric testing demonstrated good reliability (Cronbach's α = 0.82–0.91; KR-20 = 0.79), substantial inter-rater agreement (κ = 0.72), and robust construct validity (KMO = 0.84; Bartlett's test p < 0.001).

Conclusions: The AdMiRE questionnaire is a reliable and methodologically robust tool for assessing healthcare access and antibiotic use among migrants and refugees in Europe. This validated instrument provides a standardized framework for generating comparable data to inform policies, strengthen antimicrobial stewardship, and promote equitable access to care across migrants.

Introduction

Antimicrobial resistance (AMR) is a growing global health crisis, threatening medical progress and driving increases in morbidity, mortality, and healthcare costs worldwide [1]. The overuse and misuse of antibiotics in humans, animals, and agriculture remain key drivers of this phenomenon, accelerating the spread of resistant pathogens [1]. Recent projections estimate that more than 39 million deaths could be attributed to antibiotic-resistant infections by 2050, underscoring the urgency of effective interventions [2].

Although AMR affects all regions, its burden is disproportionately heavier in low- and middle-income countries, where limited healthcare resources and widespread antibiotic misuse contribute to higher mortality rates [3]. The economic and societal impact of AMR is also more severe in low- and middle-income countries than in high-income countries, further deepening global health inequalities [4]. However, AMR is not confined to resource-limited settings—it also represents a pressing challenge in high-income regions, where different population groups experience unequal exposure and vulnerability [5,6].

A recent meta-analysis by Hermsen *et al.* highlighted the disproportionate burden of AMR carriage and infection among refugees and asylum seekers worldwide [7]. Refugees and migrants were found to have a significantly higher likelihood of carrying or being infected with multidrug-resistant Gram-negative and Gram-positive organisms compared with host populations. These findings underscore how structural barriers—administrative restrictions, financial constraints, language difficulties, and fear of deportation—limit healthcare access and contribute to delayed medical care, self-medication, and inappropriate antibiotic use, amplifying the risk of poor outcomes and transmission of resistant pathogens [7–9].

In parallel, the 2022 WHO Global Evidence Review on Health and Migration—Capturing the Evidence on Access to Essential Antibiotics in Refugee and Migrant Populations—documented marked variability in antibiotic access and healthcare availability across European countries [10]. Understanding the factors driving these disparities is essential to design interventions that balance antimicrobial stewardship with equitable healthcare access.

Europe hosts a substantial share of the world's migrant populations, many originating from regions with high AMR prevalence. At the end of 2021, Europe sheltered less than 10% of the global refugee population; however, after Russia's invasion of Ukraine in 2022, this rose to 20% [11]. In terms of non-EU citizens in the EU, in 2024, they make up 6.4% of the total population accounting for 28.9 million of the 449.3 million

inhabitants [11]. The increasing prevalence of AMR among migrants in Europe has been further documented by Chukwudile *et al.* [12], whose updated systematic review (2017–2023) reported a pooled prevalence of 28.0% for any detected AMR, compared with 25.4% in the previous review up to 2016.

Despite this growing body of evidence, there remains a lack of standardized instruments to systematically assess healthcare access and antibiotic use among migrant and refugee populations in Europe. To address this gap, we conducted a multicountry Delphi-based consensus study focused on antibiotic access and use in these groups. Through a structured, iterative Delphi process, our study aimed to achieve expert consensus on the development of a European survey for healthcare professionals to evaluate healthcare accessibility, barriers to appropriate antibiotic use, and factors contributing to misuse—including self-medication, lack of prescription control, and systemic inequalities—from both patient and health system perspectives.

Methods

Project aim and consensus method

The primary objective of this study was to achieve expert consensus on access to healthcare services and use of antibiotics among migrants in Europe, identifying barriers from the patient's perspective and assessing the appropriate use of antibiotics. This was done in alignment with the critical issues outlined in the 2022 WHO Global Evidence Review 'Capturing the Evidence on Access to Essential Antibiotics in Refugee and Migrant Populations' [12]. The target population of the study consists of migrants and refugees. In the absence of a universally accepted definition of 'migrant', and taking into account prevailing conceptual models, the following definition was adopted as part of the Delphi process: "A migrant is a person who has moved from their usual place of residence to another location, across national borders, regardless of his/her legal status, reasons for movement, or whether the migration was voluntary or involuntary. Short-term travel for purposes such as recreation, education, business, or religious pilgrimage is excluded". To accomplish this, we employed the Delphi method, a well-established, iterative, and systematic approach for reaching expert consensus, followed by psychometric evaluation on a sample population (Fig. 1). This method is particularly valuable in fields where existing knowledge is limited or uncertain. It involves multiple rounds of structured surveys completed by a panel of experts, with controlled feedback and analysis after each round to refine responses [13].

Roadmap of the conceptualization and validation of the AdMiRe questionnaire

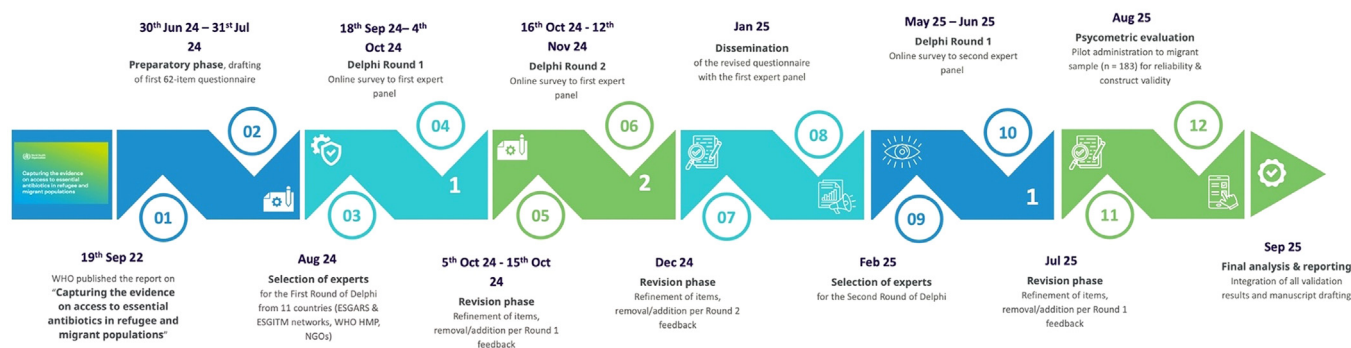


Fig. 1. Roadmap of the conceptualization and validation of the AdMiRe questionnaire

Detailed selection criteria, content validity computation, and item-level results across Delphi rounds are available in the supplementary materials (Methods S1, Tables S1–S4, Results S1).

Preparatory phase: literature review and expert panel selection

The Antibiotic Access and Use in Migrant and Refugee Populations in Europe (AdMiRE) study was developed in collaboration with experts from 12 European countries (Belgium, Denmark, England, Finland, France, Germany, Hungary, Italy, Norway, Portugal, the Republic of Moldova, and Spain), who were identified through the ESCMID Study Group for Infections in Travellers and Migrants (ESGITM), the WHO Health and Migration Programme, and partner humanitarian organizations, such as Doctors with Africa CUAMM and Médecins Sans Frontières.

A total of 40 experts participated across the two Delphi panels, ensuring broad representation by geographical region (Northern, Southern, Eastern, and Western Europe), professional background, and gender balance (22 women and 18 men).

Expert selection was based on predefined eligibility criteria, including: (i) recognized expertise in AMR, migrant or refugee health, or community-based health systems; (ii) active engagement in research, clinical care, or policy; and (iii) voluntary participation in the Delphi process.

This multidisciplinary, geographically diverse, and gender-balanced composition ensured that the development of the AdMiRE survey captured a wide range of perspectives—bridging academic, clinical, humanitarian, and community-based expertise—and strengthened both the external validity and social relevance of the tool.

In addition, to supplement the Delphi process, a targeted literature review was conducted up to 30 June 2024, synthesizing evidence on migrants' access to healthcare, antibiotic availability, and patterns of inappropriate antibiotic use across Europe. The final search was conducted across multiple databases, including PubMed, Embase, Scopus, Web of Science, CINAHL, and Global Health (Table S1).

Survey development

The survey development phase took place from 1 July 2024. The Delphi survey was first developed by two senior infectious disease experts (A.S. and F.D.G.). The survey was structured based on the 2022 WHO Global Evidence Review [12], which systematically analysed the availability and use of essential antibiotics among migrants and refugees. The literature review findings were also incorporated to refine the scope of the questions.

Delphi survey

The Delphi method is designed to ensure the independent and unbiased expression of expert opinions while utilizing collective insights

to achieve consensus. This was facilitated through an online survey questionnaire, allowing for an iterative process of feedback and refinement. To maintain objectivity and prevent bias, expert responses were anonymized, ensuring that only the study coordinators had access to individual responses. Anonymity was maintained throughout all survey rounds to mitigate the risk of dominance bias or influence by prominent experts. In addition, the moderator, responsible for analysing both qualitative and quantitative feedback, received only an anonymized dataset containing participants' comments, ensuring a double-blind process and preventing any potential bias in the interpretation of responses. The Delphi process consists of multiple iterative rounds, during which the responses from all participants are aggregated, analysed, and summarized. This controlled feedback mechanism allows participants to reconsider their initial responses in light of the collective input from the panel, promoting a convergence of opinions while preserving individual expert autonomy.

Survey structure and evaluation criteria

The first-round Delphi survey consisted of 62 questions divided into three main sections:

1. Introductory Section: focused on the definition of 'migrant', ensuring a shared conceptual framework among panellists (Box 1) [14,15].
2. Section 1: Demographic Data and General Information: collected background details on participants and their professional expertise.
3. Section 2: Access to Health Services and Antibiotics: further subdivided into five key dimensions of healthcare access based on the WHO framework:
 - Approachability (awareness and information availability)
 - Acceptability (cultural, social, and linguistic factors)
 - Availability (geographical and logistical accessibility of services)
 - Affordability (financial and administrative barriers)
 - Appropriateness (quality and suitability of healthcare interventions)

Each question was evaluated using a 5-point Likert scale, with different assessment criteria based on question type:

- Questions from the introductory section and Section 1 were assessed for clarity, relevance, and appropriateness for the study objectives.
- Questions from Section 2 were evaluated for clarity, relevance, appropriateness, and ability to capture the internal dimensions of the study (capturability).

Participants were encouraged to provide qualitative feedback, including suggestions for additional indicators, refinements to survey items, and general comments to enhance the survey's robustness.

Box 1
Definition of the target population eligible for the AdMiRE study.

Asylum seeker: an individual who is seeking international protection. In countries with individualized procedures, an asylum seeker is someone whose claim has not yet been finally decided by the country in which he or she has submitted it. Not every asylum seeker will ultimately be recognized as a refugee, but every recognized refugee is initially an asylum seeker [14].

Migrant: a migrant is a person who has moved from their usual place of residence to another location, across national borders, regardless of his/her legal status, reasons for movement, or whether the migration was voluntary or involuntary. Short-term travel for purposes such as recreation, education, business, or religious pilgrimage is excluded.

Refugee: according to the United Nations Convention relating to the Status of Refugees, a refugee is: a person who, owing to a well-founded fear of persecution for reasons of race, religion, nationality, membership of a particular social group or political opinions, is outside the country of his nationality and is unable or, owing to such fear, is unwilling to avail himself of the protection of that country [15].

Delphi process and rounds

The Delphi process involved a total of 40 experts from 12 European countries, divided into a primary consensus panel ($n = 16$) and an independent validation panel ($n = 24$). The process consisted of two iterative Delphi rounds conducted via an online platform to facilitate participation across multiple countries and professional backgrounds.

The first Delphi phase was carried out between September and November 2024, followed by an internal revision and dissemination phase from December 2024 to January 2025. The second Delphi phase, conducted by an independent validation panel, began after a new expert selection process in February 2025, with the survey distributed between May and June 2025. This was followed by a final revision phase in July 2025, a psychometric evaluation in August 2025 on a pilot sample of 183 migrants, and final data analysis and reporting in September 2025 (Fig. 1).

After each Delphi round, responses were quantitatively analysed and qualitatively reviewed. Summary statistics and feedback synthesis were used to identify items requiring modification. Revised versions of the questionnaire were recirculated for re-evaluation, enabling experts to reconsider their responses in light of the group’s collective feedback—fostering a progressive convergence towards consensus.

To minimize potential bias and ensure the robustness of the findings, the second Delphi round involved a new, independent panel of experts who had not participated in the first phase. This validation aimed to confirm the stability, reproducibility, and generalizability of the content validity indices. The external panel assessed the revised survey using the same evaluation metrics—Item- and Scale-level Content Validity Indices (I-CVI, S-CVI/Ave) and interquartile range (IQR)—providing an additional layer of methodological rigour and strengthening the external validity of the instrument [16].

Content validity assessment

All statistical analyses were performed by a single researcher to ensure methodological consistency. Content validity was evaluated through I-CVI and S-CVI/Ave, complemented by the IQR to quantify expert agreement [17]. Thresholds for item retention, revision, or exclusion were applied according to established criteria, with $IQR \leq 1$ indicating consensus. Quantitative results were integrated with qualitative feedback to guide item refinement. Detailed computational methods and decision criteria are available in the supplementary methods (File S1).

Psychometric evaluation

Beyond the content validity indices, the finalized questionnaire underwent a psychometric validation on a sample of 183 migrants to assess reliability and construct validity. Analyses included internal consistency (Cronbach’s α and KR-20), temporal stability and inter-rater reliability (intraclass correlation coefficient and κ coefficients), and exploratory factor analysis with item-level discrimination indices. The pilot testing was conducted using trained researchers. When literacy limitations were identified, the questionnaire was administered in an interviewer-assisted format. Professional interpreters or intercultural mediators were involved when necessary. To minimize variability

Table 1
Characteristics of the experts of the first panel.

	<i>n</i> = 16 (%)
Sex	
Female	9 (56)
Male	7 (44)
Institution	
Academics	6 (38)
Clinicians	5 (31)
NGOs	2 (12)
Migrants/refugees	2 (12)
WHO	1 (6)
Years of expertise	
>10 y	14 (88)
2–5 y	2 (12)
<2 y	0
ESCMID SG members	
Yes	12 (75)
No	4 (25)
Geographic distribution ^a	
Northern Europe	5 (31)
Western Europe	3 (19)
Eastern Europe	2 (12)
Southern Europe	6 (38)

NGO, nongovernmental organization; SG, study group.
^aDistribution according to UN geoscheme.

in wording and interpretation, *ad hoc* translation by clinicians or study staff was not permitted. Full methodological details, including analytical procedures and interpretation thresholds, are provided in the supplementary methods (File S1).

Results

Content validity evaluation – first panel of experts

Of the 16 invited experts, 15 (94%) completed the 62-item survey in Round 1. All inclusion criteria were met, with 88% of participants having over 10 years of experience (Table 1). The overall S-CVI/Ave was 0.94, demonstrating strong scale validity: 31 items showed excellent validity (S-CVI/Ave ≥ 0.90), 24 required minor revisions, and 7 were substantially revised or removed (S-CVI/Ave < 0.80).

Expert feedback led to refinement of the definition of ‘migrant’, the addition of a definition for migrant legal status, and the inclusion of eight new items addressing perceived discrimination in healthcare, adapted from the Discrimination in Medical Settings Scale.

In Round 2, conducted from 16 October to 12 November 2024, the revised 69-item questionnaire maintained a 94% response rate, with marked improvement in content validity (S-CVI/Ave = 0.95). Fifty-nine items achieved S-CVI/Ave ≥ 0.90 , and only three were excluded due to persistently low scores. The mean IQR decreased from 0.38 to 0.02, and the proportion of items with IQR = 0 increased by 31%, indicating near-unanimous consensus. Given the stability of responses and the high level of agreement, the consensus process was concluded after the second round. Detailed item-level results are reported in the supplementary results (File S2).

Table 2
Characteristics of the experts of the second panel.

	N = 24 (%)
Sex	
Female	13 (54)
Male	11 (46)
Institution	
Academicians	10 (42)
Clinicians	9 (36)
NGOs	2 (8)
Migrants/refugees	2 (8)
IOM	1 (4)
Years of expertise	
>10 y	19 (79)
2–5 y	5 (21)
<2 y	0
Geographic distribution ^a	
Northern Europe	9 (37)
Western Europe	4 (17)
Eastern Europe	3 (13)
Southern Europe	8 (33)

IOM, International Organization for Migration; NGO, nongovernmental organization.

^a Distribution according to UN geoscheme.

Table 3
IQR comparison during the three rounds.

	Panel 1		Panel 2
	Round 1	Round 2	Round 1
Mean IQR	0, 38	0, 02	0, 01
Median IQR	0, 00	0, 00	0, 00
Min IQR	0, 00	0, 00	0, 00
Max IQR	2, 00	1, 00	0, 50
Standard deviation	0, 60	0, 15	0, 09
Proportion IQR = 0	0, 66	0, 97	0, 99
Proportion IQR = 1	0, 24	0, 01	0, 01
Proportion IQR > 1	0, 06	0, 00	0, 00

IQR, interquartile range.

Content validity evaluation – second panel of experts

The independent validation panel comprised 24 experts, including 10 academics, 9 clinicians, 2 nongovernmental organization (NGO) representatives, 2 community leaders with migrant backgrounds, and 1 International Organization for Migration representative (Table 2). Women represented 54% of the panel, and 79% of participants had more than 10 years of experience. Geographical representation was balanced across Europe, with slightly higher participation from Southern and Northern regions.

Of the 24 experts invited, 21 (88%) completed the survey. Among 67 items evaluated, 61 achieved S-CVI/Ave ≥ 0.90 , confirming strong content validity; five items required minor revisions, and one item ('What are antibiotics used for?') underwent substantial modification because of low agreement. The overall S-CVI/Ave = 0.96, confirming excellent scale validity. Given the high degree of consensus and stability of responses, a second round was deemed unnecessary (Table 3).

Psychometric evaluations

The finalized questionnaire was administered to 183 migrants (63% men; mean time in Europe 6.2 years). Participants originated primarily from Africa (33%), the Americas (20%), South-East Asia (20%), and the Eastern Mediterranean (20%), with diverse legal and housing statuses (Table 4).

Internal consistency was strong: Cronbach's α ranged from 0.82 to 0.91 for Likert-type items, and KR-20 was 0.79 for dichotomous items. Test–retest reliability in a subset of 67 respondents yielded intraclass

Table 4
Characteristics of the migrant sample included in the psychometric evaluation (n = 183).

Characteristic	N (%) OR MEAN $\pm$ SD
Sex	
Male	115 (62.8%)
Female	68 (37.2%)
Region of origin (WHO regions)	
Africa	61 (33.3%)
Americas	37 (20.2%)
South-East Asia	36 (19.7%)
Eastern Mediterranean	36 (19.7%)
Western Pacific	13 (7.1%)
Migration status	
Documented migrant	92 (50.3%)
Undocumented migrant	55 (30.1%)
Refugee	18 (9.8%)
Asylum seeker	9 (4.9%)
Prefer not to answer	9 (4.9%)
Length of stay in Europe (y)	6.2 $\pm$ 3.1 (range 1–14)
Housing situation	
Private accommodation (alone/family)	46 (25.1%)
Shared private accommodation	64 (35.0%)
Resettlement camp	27 (14.8%)
Homeless	15 (8.2%)
Transit centre	9 (4.9%)
Reception centre	4 (2.2%)
Temporary shelter	18 (9.8%)
Health coverage	
Yes	112 (61.2%)
No	71 (38.8%)
Education level	
No formal education	27 (14.8%)
Primary education	73 (39.9%)
Secondary education	37 (20.2%)
Technical training	15 (8.2%)
Bachelor's degree	9 (4.9%)
Other qualifications	22 (12.0%)

correlation coefficient values of 0.76–0.88, whereas inter-rater reliability showed substantial agreement (Fleiss' κ = 0.72). Exploratory factor analysis supported construct validity (KMO = 0.84; Bartlett's test p < 0.001). Item–total correlations ranged from 0.32 to 0.68, with no ceiling or floor effects observed.

These findings confirm the instrument's strong reliability and validity, supporting its use for assessing healthcare access and antibiotic use among migrant populations in Europe.

Discussion

Although numerous frameworks exist to monitor AMR, none has captured the lived barriers to antibiotic access among migrants—a critical equity dimension in Europe's AMR response. The AdMiRE study represents the first multicountry Delphi-based consensus initiative aimed at systematically assessing antibiotic access and use among migrant and refugee populations in Europe. The development of this survey marks an essential first step towards its implementation across European countries, providing a standardized tool for data collection and policy guidance regarding healthcare utilization and access, antibiotic use, and resistance among migrants and refugees. Despite the specific healthcare needs and numerous barriers that refugees and migrants face in accessing healthcare and appropriately using antibiotics, systematic and comprehensive data remain scarce across Europe.

Addressing these knowledge gaps is fundamental for developing evidence-based, targeted, and effective healthcare policies at the European, national, and local levels, as recommended by the Global Evidence Review on Health and Migration series [18]. Such efforts are crucial to guarantee equitable access to healthcare for vulnerable populations while upholding principles of individual and community health protection.

Migration in Europe is a complex and heterogeneous phenomenon, reflecting global mobility and the diversity of national contexts. Multiple factors contribute to limited healthcare access and the misuse of antibiotics among migrants and refugees, including cultural, social, economic, linguistic, gender, and medical-scientific aspects, as well as differences in legislation and health system structures across European countries [19,20]. Developing a robust and adaptable tool to capture these dimensions required a careful and strategic selection of expert panel members to ensure the survey's applicability across Europe.

Our expert panels from 12 European countries included professionals from the WHO Health and Migration Programme, experts from 12 European countries, infectious disease specialists, academics, representatives of NGOs, and members of migrant and refugee communities. This multidisciplinary composition provided a comprehensive perspective on healthcare accessibility and antibiotic use among migrant populations. Infectious disease specialists contributed technical expertise on antibiotic treatment and AMR risk factors, whereas cultural mediators ensured linguistic adequacy and cultural sensitivity. NGO representatives brought insights grounded in real-world experiences of migrants—such as discrimination, language barriers, and logistical obstacles—whereas academics ensured methodological rigour and adherence to ethical standards.

The involvement of the ESGITM further strengthened the project. As part of the European Society of Clinical Microbiology and Infectious Diseases (ESCMID), ESGITM brings together experts focused on the epidemiology, prevention, and management of infections in migrants and travellers. This collaboration ensured that the panel included professionals with recognized expertise in migration-related infectious diseases, enhancing both scientific and practical relevance [21]. Both Delphi rounds achieved exceptionally high response rates, ensuring consistent engagement and representation throughout the process [22].

Delphi studies, although widely used in healthcare research, often lack standardized reporting and established quality criteria, leading to methodological variability [23]. In our study, this limitation was addressed through deliberate methodological choices designed to minimize bias and strengthen validity. The combination of quantitative (Likert-based scoring) and qualitative (open-ended feedback) approaches allowed both measurable progress in consensus and nuanced exploration of key issues. The double-blind process ensured independence between expert evaluation and moderator synthesis, reducing the influence of dominant opinions. Concurrent analysis of IQR values and content validity indices (I-CVI and S-CVI/Ave) provided a quantitative foundation for evaluating progress between rounds and confirming the tool's robustness, following established benchmarks from previous validation studies [24,25].

An additional strength was the reproducibility of findings across panels: the second Delphi panel largely confirmed the results of the first, requiring only minor refinements. This consistency reinforced the credibility of the tool and demonstrated the consolidation of consensus. Furthermore, psychometric evaluation conducted on a diverse sample of migrants confirmed that the questionnaire is not only theoretically sound but also empirically reliable and culturally sensitive. Together, these two complementary steps—expert consensus through Delphi panels and psychometric validation—illustrate a dual validation pathway that enhances methodological rigour. The Delphi ensured conceptual validity and inclusiveness, whereas psychometric testing established internal consistency, temporal stability, and structural validity. Such an approach is particularly relevant in migrant health research, where the constructs being measured are complex and context-dependent.

This rigorous and systematic framework mitigated potential sources of bias from both facilitators and participants, strengthening the reliability of the process and outcomes. Nonetheless, certain limitations must be acknowledged. Not all European countries were represented in the panel; however, the broad geographical distribution of members—from Southern, Northern, Central, and Eastern Europe—helped capture diverse migration patterns, national health systems, and sociopolitical

contexts [26]. This diversity allowed for the development of a tool capable of reflecting regional variations while remaining applicable across Europe.

Another limitation lies in the inherent flexibility of the Delphi methodology, which lacks strict standardization in healthcare research. Nonetheless, the balanced selection of panel members, the integration of qualitative and quantitative feedback, the double-blind design, and the systematic computation of validity metrics all contributed to minimizing bias and ensuring methodological rigour. Although the number of experts may appear modest, it falls within the validated range for Delphi studies, and the diversity and depth of expertise across participants compensate for this limitation. The AdMiRE study involved experts from 12 European countries, the WHO Health and Migration Programme, NGOs active in migrant health, and representatives of migrant and refugee communities. Specifically, the study included members from ESGITM as well as humanitarian organizations such as Doctors with Africa CUAMM and Médecins Sans Frontières, fostering a rich and policy-relevant dialogue. Although not all professionals involved in migrant health management (e.g. general practitioners) were represented, experts were selected to ensure consistency and comparability across European healthcare systems. Administration across heterogeneous linguistic and literacy contexts represents an important consideration. Although interviewer-assisted administration with intercultural mediators was used when needed, this approach may introduce interpreter-related variability and potential interviewer bias. Standardized administration protocols and culturally adapted translations will therefore be important for future multicountry implementation. In addition, the questionnaire may be administered using flexible formats (digital or paper-based), depending on the local context and available resources. These aspects will be important to ensure feasibility and comparability when the tool is applied across different healthcare systems and migrant populations. The pilot phase also presents limitations related to participant recruitment. As participants were mainly reached through healthcare or community-related settings, some degree of selection bias cannot be excluded, and harder-to-reach groups such as undocumented migrants or recently arrived asylum seekers may be underrepresented. Future implementations should consider targeted outreach strategies to improve representativeness.

The AdMiRE survey provides a standardized instrument to assess the five key dimensions of healthcare access—approachability, acceptability, availability, affordability, and appropriateness of antibiotic use. The next phase of the AdMiRE initiative will focus on deploying the survey across Europe to generate comparative data on healthcare accessibility and antibiotic use disparities. Integrating AdMiRE into broader surveillance frameworks, including WHO and European Centre for Disease Prevention and Control (ECDC) initiatives, could provide systematic insights into AMR-related inequalities among migrants. This would facilitate cross-country comparisons, evidence-based policy recommendations, structured health assessments for newly arrived populations [27], and targeted interventions to strengthen antimicrobial stewardship and equitable healthcare access.

Ensuring equitable access to healthcare for all is not only a public health necessity but also a fundamental human right. No one should be left behind in the fight for the right to health.

Declaration of AI and AI-assisted technologies in the writing process

The authors declare that no artificial intelligence (AI) or AI-assisted technologies were used in the preparation of this manuscript.

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Declaration of competing interest

The authors declare that they have no conflicts of interest.

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Supplementary materials

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