



Tuberculosis screening in the European migrant population: a scoping review of current practices

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Several important barriers hinder the effective TB screening of migrants. Additional research is needed to comprehend the patterns through which regular migrants adhere to existing TB screening strategies in European countries. <https://bit.ly/3Pi6A4l>

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Abstract

Responding to a surge in new tuberculosis (TB) cases among migrants from high-incidence countries, low-incidence European nations have heeded World Health Organization recommendations by implementing TB screening in this population. This review aims to synthesise evidence on current screening strategies for active TB and latent tuberculosis infection (LTBI) in European high-income countries, and their main barriers and interventions. PubMed, Web of Science and Scopus were searched from March to April 2023, including articles in English, published in the last decade, pertaining to screening strategies for active TB or LTBI in Europe focused on migrants, excluding those exclusively composed of refugees, asylum seekers or other migrant populations. 32 studies fit the criteria. Screening in migrants varies between countries regarding timing, population, screening location and diagnosis. Furthermore, some barriers prevent migrants from benefiting from screening, namely physical, cultural and professional barriers. Additional research is needed to determine the patterns through which regular migrants adhere to current screening strategies in European countries.

Educational aims

- To describe the main characteristics of screening (timing, target population, location and screening methods) employed in European countries for screening both active TB and LTBI among migrant populations.
- To identify the main barriers that prevent migrants from correctly benefiting from TB and LTBI screening.
- To explore the strategies implemented by European countries to overcome the identified barriers.

Introduction

The World Health Organization (WHO) developed the End TB Strategy with the aim of eliminating tuberculosis (TB), reducing the global incidence of TB to one TB case per 1 000 000 in low-incidence countries [1–3]. Many countries in Europe have achieved a low incidence of TB, with most new TB diagnoses occurring in migrants from high-incidence countries. In most cases, these migrants are exposed to conditions that facilitate infection and/or disease reactivation, concomitantly to their already high vulnerability to TB infection [4]. Several European high-income countries have implemented TB screening programmes according to different sets of guidelines to counteract the disease's spread and prevent an increase in the number of new cases. The WHO recommends systematic screening of immigrants for active disease with chest radiography (CXR), and screening of immigrants from high TB burden countries for latent tuberculosis infection (LTBI) with a tuberculin skin test (TST) or interferon- γ release assay (IGRA) [5–7].



The European Centre for Disease Prevention and Control (ECDC) recommends offering screening for active disease with CXR and for LTBI with TST or IGRA soon after arrival for all migrant populations from high TB incidence countries (>120 cases per 100 000) [6–9].

The implementation of screening programmes presents several challenges, including a lack of evidence regarding timing, target population and cost-effectiveness of the various methods [9], and obstacles such as lack of training for health professionals and cultural differences [10–13].

This scoping review examines existing evidence on screening strategies for active TB and LTBI in European high-income countries, and the identified barriers and interventions to respond to or mitigate their effect on the migrant population.

Methods

This review followed the methodological framework proposed by ARKSEY and O'MALLEY [14], which suggests five stages for developing a transparent and reliable review. The research questions were:

- 1) What strategies are implemented for active TB and LTBI screening in migrant populations?
- 2) What are the different modalities used in TB screening?
- 3) What are the different target populations chosen for screening?
- 4) What are the difficulties/solutions and recommendations associated with the implemented strategies?

Identifying relevant studies

A preliminary search was conducted in PubMed to assess the terminology and keywords most commonly used. From March 2023 to April 2023, a thorough search of PubMed, Web of Science and Scopus was conducted. The search query included keywords related to “tuberculosis”, “screening” and “migrants”. Only articles published in English during the last decade were eligible for inclusion.

Study selection

The screening process followed the PRISMA-S (Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for scoping reviews) and was carried out in three stages [15]. Records were imported into a reference management software for further organisation. After duplicate removal, text and abstracts were independently screened by two researchers, followed by a full-text review with the same structure. A third reviewer solved disagreements. Backward and forward citation searching was conducted to identify relevant references (figure 1).

For this scoping review, migrants should be understood as people who freely choose to move across an international border to establish a new residency [16]. Therefore, studies solely focused on refugees, asylum seekers or any other migrant forced to vacate their home country because of a threat to their lives or freedom were not eligible for inclusion. The country of arrival ought to be a European country, for which records that did not focus on screening strategies or were outside Europe were excluded.

Charting the data

To facilitate the comparison of data from the included records, the authors developed an extraction table with the following categories: author(s) and publication year, country of arrival, study design, period of study, population, sample size, and TB type.

Collating, summarising and reporting the results

Data from each included record was collated and summarised in table 1. A narrative synthesis was conducted on the included studies and the main findings are reported in the following section of the review under the following categories: active TB, LTBI, barriers, interventions and screening applications.

Results

Active TB

Timing and population

Several European countries carry out screening for active TB in the migrant population. However, this timing varies between countries and can be performed pre-entry, on arrival or shortly after arrival (table 2). The UK began screening migrants for active TB in 1965, on arrival to the country. However, due to the ineffectiveness of this method demonstrated in studies [31], a pre-entry screening method was implemented

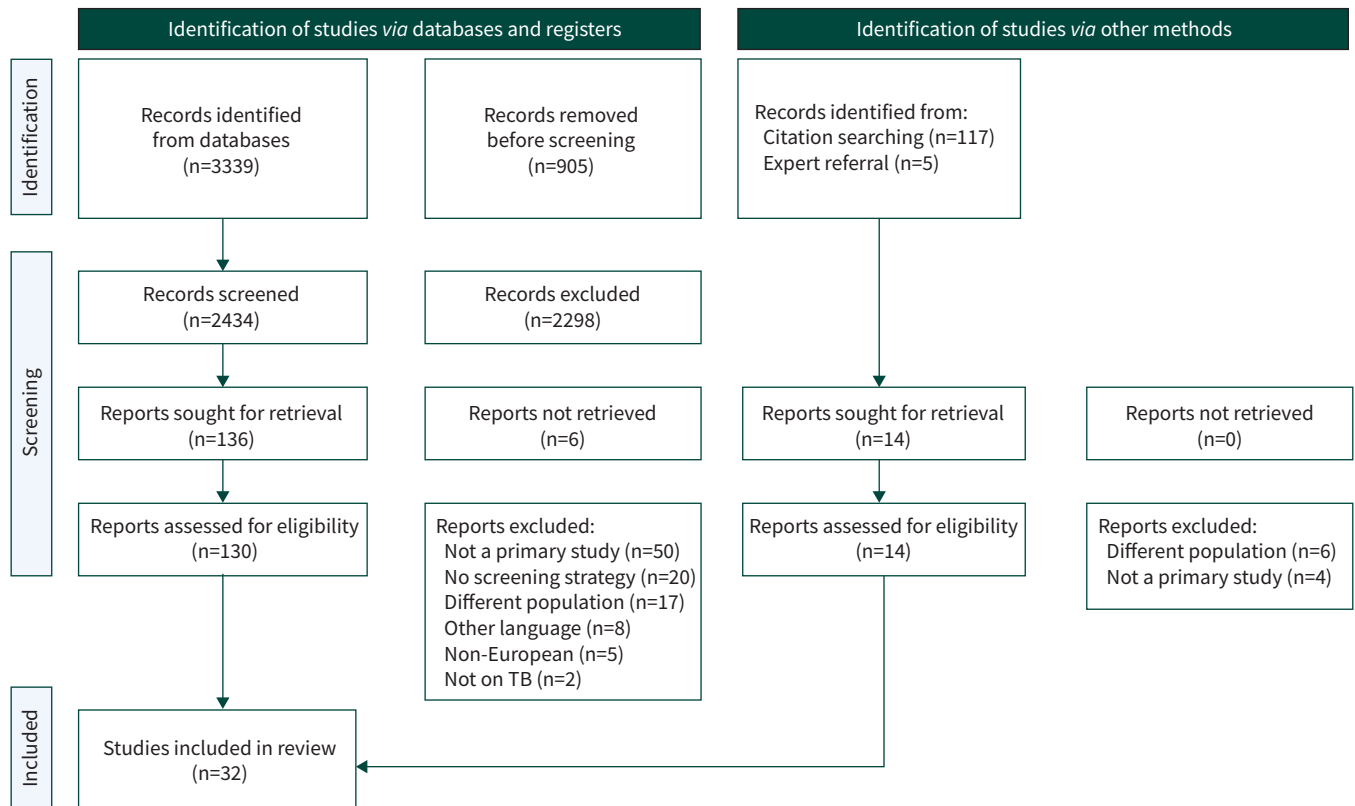


FIGURE 1 2020 Preferred Reporting Items for Systematic reviews and Meta-Analyses flow diagram. TB: tuberculosis.

in 2011 [36]. In this type of screening, migrants have to acquire a “medical clearance certificate” proving they do not have active TB to enter the UK [36]. Pre-entry screening has proven to be an important and effective measure in reducing active TB cases in this country [4, 18]. In the rest of Europe’s high-income countries, screening is performed on arrival or shortly after arrival [6, 12, 24, 26, 29, 33].

To select the population to be screened, studies were conducted on migrant populations to gauge their contribution to increased TB incidence. Most countries screen migrants from high-incidence countries, with this definition differing from country to country, ranging from >40 per 100 000 population to >200 cases per 100 000 population [6, 12, 29, 32, 33, 36]. Another criterion used is selection based on a specific list of countries or regions to screen [12, 33].

Screening in different countries can be voluntary [6, 26, 29, 32] or mandatory [12, 26, 33, 36]. Despite including other migrant populations, some countries have their screening programmes more targeted at specific migrant groups, such as asylum seekers [11, 26]. The population screened also leads to variation in the place of screening, with this specific population often being screened in reception/relocation centres [12, 26], while regular migrants are usually screened at the level of primary care, dedicated outpatient clinics or municipalities [12, 24, 26].

Diagnostic techniques

Active TB is usually screened through two main methods: symptom questionnaire and CXR. The ECDC recommends screening for active TB using CXR soon after arrival for migrants from high TB incidence countries [8, 9]. An international questionnaire (or interview strategy) for healthcare professionals with participants from 80 countries showed that CXR is widely used to screen for active TB in migrants [7]. CXR is a widely available, low-cost, low-radiation examination and can present TB typical lesions with an estimated sensitivity of 59–82% and a specificity of 52–63% for detecting active TB. However, it can only detect pulmonary TB [31].

In countries such as Sweden, Italy and Switzerland, CXR is performed in the presence of symptoms [26, 27, 32]. A study comparing the interview strategy with CXR screening proved the former to be equally as

TABLE 1 Summary of included studies

First author [ref.]	Year	Country of arrival	Study design	Period of study, months	Population	Sample size	TB type
ABUBAKAR [17]	2018	UK	Prospective cohort	61	Migrants General population at high risk for LTBI (contacts) [#]	9610 4749 migrants 4861 contacts	LTBI
ALDRIDGE [18]	2016	UK	Retrospective cohort	84	Migrants	519 955	Active TB
BARCELLINI [19]	2018	Italy	Retrospective observational	78	Foreign-born, registered at accommodation centres	2666	LTBI
BERROCAL-ALMANZA [4]	2019	UK	Retrospective cohort	48	Migrants	343 062 224 234 screened for active TB 118 738 not screened for active TB	LTBI
BERROCAL-ALMANZA [20]	2019	UK	Qualitative	6	Relevant stakeholders	33	LTBI
BERROCAL-ALMANZA [21]	2022	UK	Retrospective cohort	96	Migrants	368 097 330 829 not tested for LTBI 37 268 tested for LTBI	LTBI
D'AMBROSIO [7]	2021	Worldwide	Cross-sectional	6	Healthcare professionals	1055	Active TB LTBI
GONÇALVES [13]	2022	Spain	Qualitative	Not defined	General practitioners	29	Not defined
HERRADOR [22]	2015	Norway	Descriptive observational	180	Immigrants Asylum seekers	44	Active TB LTBI
HARGREAVES [23]	2014	UK	Cross-sectional	6	Migrants	36	LTBI
HARSTAD [24]	2014	Norway	Prospective cohort	7–12	Migrants	362 180 control 182 intervention	Active TB LTBI
KALENGAYI [11]	2016	Sweden	Qualitative	3	Migrants	26	Active TB
LOUTET [3]	2018	UK	Retrospective cohort	13	Migrants	5591 2269 IGRA test done 3322 IGRA test not done (declined or no results)	LTBI
LUAN [6]	2021	France	Cross-sectional	14	Primary care physicians TB specialists in secondary care Other physicians	367	Active TB LTBI
MARGINEANU [25]	2022	EU/EEA Switzerland	Cross-sectional	6	TB experts	30	LTBI
MENEZES [26]	2022	Italy Netherlands Sweden UK	Cross-sectional	48	Migrants	2 107 016	Active TB
MOR [27]	2013	Switzerland Israel	Not specified	Not specified	Migrants	Not specified	Active TB LTBI
NOORI [9]	2021	EU/EEA	Not specified	Not specified	Migrants	Not specified	Active TB

Continued

TABLE 1 Continued

First author [ref.]	Year	Country of arrival	Study design	Period of study, months	Population	Sample size	TB type
NORDSTOGA [12]	2019	Multicountry [¶]	Qualitative	Not defined	Migrants	34	Active TB LTBI
PANCHAL [28]	2014	UK	Retrospective cohort	132	Foreign-born TB notifications Flag-4 immigrant registrations ⁺	59 007 30 569 from countries with a reported WHO TB incidence <150 per 100 000 25 800 from countries with a reported WHO TB incidence 150–499 per 100 000 2638 from countries with a reported WHO TB incidence >500 per 100 000	LTBI
RÄISÄNEN [29]	2018	Finland	Cross-sectional	36	Migrants	203	Active TB
SEEDAT [10]	2014	England (UK)	Qualitative	Not specified	Community health leads	20	Active TB
SEQUEIRA-AYMAR [30]	2022	Spain	RCT	9	Migrants	15 780	Active TB
SEVERI [31]	2016	UK	Retrospective cohort	18	New entrants	200 199	Active TB
SHEDRAWY [32]	2021	Sweden	Cost-effectiveness analysis	48	Migrants	5470	LTBI
SPRUIJT [33]	2019	Netherlands	Mixed methods	7	Non-EU Migrants	566	Active TB LTBI
SPRUIJT [34]	2020	Netherlands	Mixed methods	Not specified	Migrants Asylum seekers	401	LTBI
SPRUIJT [35]	2022	Netherlands	Retrospective cohort	48	Immigrants Migrants Asylum seekers	1541	Active TB
THOMAS [36]	2018	UK	Descriptive observational	60	Migrants UK-born population	8409	Active TB
VASILIU [37]	2023	EU Iceland Norway Switzerland UK	Cross-sectional	12	Migrants	9116	Active TB
WALKER [38]	2018	UK	Mixed methods	Not specified	Migrants	2040	LTBI
ZENNER [2]	2017	UK	Retrospective cohort	264/264	Migrants	1820	LTBI

EU: European Union; EEA: European Economic Area; RCT: randomised controlled trial; LBTI: latent tuberculosis infection; TB: tuberculosis; IGRA: interferon- γ release assay; WHO: World Health Organization. [¶]: defined by recent contact with someone with active TB; [¶]: Africa (Congo, Eritrea, Ethiopia, Ghana, Nigeria, Senegal, Somalia, Tunisia and Uganda), Asia (Burma, India, Iraq, Pakistan and Philippines) and Europe (Ukraine and Turkey); ⁺: first registration episode with primary care for individuals having either a previous address outside the UK or residence abroad >3 months.

TABLE 2 Overview of key dimensions of active tuberculosis (TB) screening in European countries

Country	Population	Timing	Participation	Setting	Method
Finland	From countries with a TB incidence ≥ 150 per 100 000 who plan to stay in the country for a period >3 months	On arrival or shortly after arrival	Voluntary	Not specified	CXR+questionnaire
France	From countries with a TB incidence >40 per 100 000	On arrival or shortly after arrival	Voluntary	TB control centres Healthcare access centres Nongovernmental organisations General practitioners	Not specified
Italy	Mainly asylum seekers	On arrival or shortly after arrival	Voluntary	Reception centres Outpatient clinics	CXR performed in presence of symptoms
Netherlands	From non-EU countries with TB incidence >50 per 100 000	On arrival or shortly after arrival	Mandatory	Reception centres Outpatient clinics	CXR+questionnaire
Norway	From countries with TB incidence >200 per 100 000, Afghanistan and Eritrea, everyone above the age of 15 years	On arrival or shortly after arrival	Mandatory	Municipalities	CXR+questionnaire
Sweden	Mainly asylum seekers	On arrival or shortly after arrival	Voluntary	Primary care	CXR performed in presence of symptoms
UK	From countries with TB incidence ≥ 40 per 100 000 who intend to remain in the UK for a period >6 months	Pre-entry	Mandatory	Country of origin	CXR+questionnaire

EU: European Union; CXR: chest radiography.

effective as and more cost-effective than CXR, with the disadvantage of delaying diagnosis and treatment by a few weeks [27]. Screening based solely on a symptom questionnaire has the disadvantage of missing asymptomatic cases, and there are also cultural and linguistic differences that can compromise communication [11, 13, 27]. There are countries, such as Norway, the UK, Finland and the Netherlands, where screening includes both methods [12, 26, 29], though the choice of methodology and its cost-effectiveness will depend on the population and screening timing in each country [27].

Latent tuberculosis infection

Argument, timing and population

Most cases of active TB among migrants are due to reactivation of LTBI [2, 3, 18, 20–23, 32, 38]. In addition to having greater contact with TB in their country of origin (due to high incidence rates), migrants are subject to stressful circumstances associated with the change of country, the adaptation process, and financial and social difficulties [37], all of which can promote this reactivation [4]. LTBI screening and treatment are associated with a lower incidence of TB and earlier detection of TB cases reducing possible transmissibility [2, 4, 21].

The TB screening criteria differ from the LTBI criteria (table 3). In some high-income countries, the TB incidence threshold in the country of origin from which to screen for LTBI differs from that used for active TB [3, 4, 20, 28], and in other countries, the threshold used for both screenings is the same [6, 12, 32, 33]. There are high-income countries that also target screening at populations coming from specific countries [12], since these, regardless of the incidence in the country of origin, have a higher risk of developing LTBI in the recipient country [19, 37].

In LTBI screening, in addition to selecting migrants based on their TB incidence threshold in the country of origin, they are also selected according to their age [2, 4, 6, 12, 20, 21, 28, 33]. Older patients are associated with less completion of the cascade of care due to adverse effects, reducing the programme's cost-effectiveness [32]. LTBI screening can also be voluntary [4, 20, 26, 32] or mandatory [12]. In a questionnaire to experts from the European Union (EU) and Switzerland, in which responses were obtained from ~30 countries, half of the countries had an LTBI screening programme, while five countries planned to implement it [25]. As for the population chosen for screening, of the countries with an LTBI programme, 12 screened asylum seekers, eight screened student migrants and only seven screened labourers [25]. Regarding the place where the screening took place, in eight countries, it was performed at

TABLE 3 Overview of key dimensions of latent tuberculosis (TB) infection screening in European countries

Country	Population	Timing	Participation	Setting	Method
France	Children from countries with TB incidence >40 per 100 000 up to the age of 18 years Adults aged 18–40 years who live with children and come from countries with an incidence >100 per 100 000	On arrival or shortly after arrival	Voluntary	TB control centres Healthcare access centres Nongovernmental organisation General practitioners	IGRA/TST
Italy	From countries with TB incidence >100 per 100 000	On arrival or shortly after arrival	Voluntary	Reception centres Outpatient clinics	IGRA/TST
Netherlands	Not specified	Not specified	Not specified	Not specified	IGRA/TST
Norway	From countries with TB incidence >200 per 100 000, Afghanistan and Eritrea, under the age of 35 years	On arrival or shortly after arrival	Mandatory	Municipalities	IGRA
Sweden	From countries with TB incidence >100 per 100 000 or with an exposure risk factor	On arrival or shortly after arrival	Voluntary	Primary care	IGRA/TST
UK	Migrants aged 16–35 years who have been in the UK for up to 5 years and have lived for >6 months in high-incidence countries (≥ 150 per 100 000) or sub-Saharan Africa	Pre-entry	Voluntary	Primary care	IGRA

IGRA: interferon- γ release assay; TST: tuberculin skin test.

the level of primary health care or tertiary facilities, six reported it taking place in refugee camps and five reported it taking place in specialist migrant centres or HIV centres [25]. Nine experts reported screening migrants based on age (six in migrants aged <18 years, one in migrants aged between 19 and 35 years, and two in those aged <36 years) and 12 screened based on the country of origin, which 10 mentioned being based on the incidence of TB in the country of origin and two mentioned being based on regions [25]. The high-incidence threshold varied between countries [25].

Diagnostic techniques

For LTBI screening, either the TST and/or IGRA are used. ECDC recommends offering screening using one of the tests for migrants from countries with a high incidence of TB [8, 9]. In a questionnaire to experts from the EU and Switzerland, with responses from 30 countries, 15 had an LTBI programme and 13 confirmed the use of one of the two tests or both [25]. Some countries only used an IGRA, such as the UK [2, 3, 20, 21] and Norway [12]. Other countries use both tests, such as the Netherlands [33, 35], Sweden [26, 32], Italy [19, 26] and France [6].

In addition to the TST requiring more than one visit to the health services, it is based on a subjective reading of the result, depending on the professional and their experience [7]. It also shows cross-reactivity with the bacille Calmette–Guérin vaccination and exposure to nontuberculous mycobacteria [7]. The IGRA has greater sensitivity and specificity, and requires only one visit to the health services, but is more expensive, requiring special laboratory infrastructure and supplies [7, 33].

In addition to being a diagnostic test, the TST and IGRA can also be used as prognostic markers for TB disease progression [17]. Analysing the performance of these tests is important when choosing the method to adopt for screening LTBI [2]. In an observational study in the UK, IGRA was shown to be superior in predicting TB cases [2]. However, a UK Prognostic Evaluation of Diagnostic IGRAs Consortium TB study showed that when stratifying TST by vaccination status, it has an incidence rate ratio equivalent to the IGRA [17].

Barriers

According to the ECDC [8], and having been demonstrated in several studies, there are important barriers that prevent migrants from correctly benefiting from TB and LTBI screening [3, 6, 7, 9–13, 20, 24, 33].

Physical barriers

In some countries, such as Sweden and Norway, people are invited by letter to undergo screening [11, 12]. In studies in both countries, people report difficulty finding the screening location and means of travel [11, 12].

Many of them have to ask other people for help, causing them a feeling of lack of autonomy, leading to a lack of trust in the system [12].

Professional barriers

Although most migrants have a favourable opinion of screening, other frequently reported barriers are the lack of explanation of the screening process by healthcare professionals and the lack of communication of negative results [11, 12]. Some obstacles are also linked to the lack of training of professionals and staff in migrant health, leading them to have negative attitudes towards these people [10, 11], and the lack of guidelines on which they can base their activity or the use of different guidelines between countries and healthcare professionals [6, 7, 13, 25]. In a survey of doctors involved in migrant health in France, the majority felt that screening was not their responsibility [6]. Some general practitioners (GPs) did not know who to screen and one in two professionals screened migrants regardless of the incidence of TB in the country they came from [6]. The attitude of physicians and other staff greatly influences adherence to screening and treatment, and there are studies in which it varies between centres depending on the health professional [3, 33].

One of the difficulties also reported is the lack of connection between municipal and specialist public healthcare [24]. Often, municipal healthcare does not register or refer patients, and many patients do not present themselves at the hospital for further study [24].

Cultural barriers

Language is also referred to as an obstacle in communicating with staff and occasionally, there is a poor choice of interpreters, both in terms of language and professionalism [11]. In countries like Sweden and Norway, where people are invited by letter to undergo screening, they report not understanding the information contained in the letter [11, 12].

Some cultural beliefs and values hinder the ability to establish a trusting relationship between the person and the care provider [13]. This is particularly true in cultures where, for instance, women are obliged to be accompanied by a man responsible for communicating with healthcare professionals [13].

However, one of the biggest problems for migrants in their communities is stigma, which appears to be influenced by a lack of understanding regarding screening [9, 10, 12, 20]. Lack of health literacy is another common problem presented by migrants [11, 12, 20, 33]. Several migrants mention fearing that screening is something linked to the government and that there will be legal consequences if they are diagnosed with TB [9–11, 20]. All of these barriers contribute to a decrease in the registration of migrants in primary healthcare, and this problem has been reported in several studies [3, 20, 22, 23, 38].

Interventions

To overcome these barriers, countries have developed several strategies. These include call letters that are more understandable with a better explanation regarding the screening location [12], rethinking the screening location [34, 38], trying to bring screening to communities [10, 34, 38], and involvement of cultural mediators and community organisations bridging the gap between the patient and health services [7, 9, 10, 13, 20, 23, 33, 34]. Some community places can be used for education and screening, such as churches, sports clubs, group housing and schools [20, 38, 34]. Regarding strategies used for education, a study in the Netherlands showed that delivering information face-to-face is more effective than letters and posters [34]. Workshops with quizzes, videos and audio can be used in colleges for health education and improve registration with GPs, as shown within English for Speakers of Other Languages classes [38].

In countries where TB screening is only possible after enrolment in primary healthcare, the support of community mediators becomes crucial for migrants to seek this care, and the existence of guidelines and training of health professionals in migrant health is also essential so that they feel prepared to face these situations [13]. In addition to training doctors and nurses, it is important to train all staff who meet migrants for greater cultural and linguistic sensitivity [3, 9, 10, 12, 13, 25].

In a study in Norway, after screening at the municipal healthcare level, many patients did not attend the hospital for further study, and some interventions were implemented to improve the link between the two healthcare facilities [24]. Thus, in addition to making appointments by letter, patients were contacted by telephone, and if the patient was absent, the appointment was rescheduled. Reducing the waiting list length also contributed to increased adherence, as people still remembered why they had been referred [24].

Screening applications

To facilitate screening in the migrant population, several countries have tried to develop tools to help perform TB and LTBI screening. The ISMiHealth tool is a clinical decision-support system integrated with patient information and guides GPs by advising on screening recommendations for migrants for various diseases prevalent in these groups. In two studies carried out in Catalonia, Spain, training health professionals before using this application increased their knowledge of the most prevalent imported diseases [13, 30]. The professionals reported that without the app, they would not have screened most patients [13]. With this app, the proportion of screening increased for all diseases, and the overall diagnosis rate also increased [30]. The fact that it is a multidisease application reduces costs to the health system [13, 30]. The Flag 4 code is a computer code that indicates people who register with primary care and have lived outside the UK for >3 months [4, 28], helping the GP remember the need to screen the migrant population [28].

Discussion

In this article, we synthesise the existing evidence on TB screening strategies implemented by several European high-income countries, and the main associated barriers and interventions. In Europe, the most screened groups of migrants are asylum seekers and refugees, though some countries apply screening programmes to other groups such as students, labour migrants and family reunions [25]. However, screening these groups is equally crucial for TB treatment and prevention [9], for which reason, this review focuses on regular migrants, excluding asylum seekers and refugee migrant groups across European countries.

Though screening is recommended in Finland for all migrant groups, it is routinely performed on asylum seekers and refugees but not with equal frequency on other groups. Screening is voluntary, with CXR and a symptom questionnaire [29]. In a study by RÄISÄNEN *et al.* [29], 80% of the foreign-born TB cases were not refugee or asylum seekers migrants, proving that screening should also be targeted at other groups of migrants.

In Sweden and Norway, screening for TB and LTBI is performed with a call-by letter [11, 12, 22]. In Sweden, this is voluntary, aimed mainly at asylum seekers and irregular migrants (with each locality being free to offer screening to other groups), performing CXR in the presence of symptoms or a positive IGRA/TST [11, 26, 32]. In Norway, screening is mandatory, targeting any migrant from high-incidence countries (>200 per 100 000), Afghanistan and Eritrea [12]. This is performed with CXR, symptom screening and IGRA for migrants <35 years of age [12]. However, in Italy, TB screening is voluntary and carried out on arrival or shortly after arrival, mainly for refugees and asylum seekers, using CXR if there are symptoms or IGRA/TST positivity [26].

In the Netherlands, active TB screening is mandatory, carried out upon arrival or shortly after entry with a symptom questionnaire and CXR, for migrants from non-EU countries with a TB incidence >50 per 100 000 [26, 33]. Furthermore, for migrants from countries with incidence >200 per 100 000, biannual follow-up screening is offered [33]. Since this screening has low coverage and only 48% of incident cases are diagnosed by this method, Dutch TB policy advisors considered replacing it with LTBI screening [33, 34]. Using cohort data from three studies promoted by the Dutch TB ENDPoint project, with the implementation of an LTBI algorithm that aims to replace active TB screening with CXR, it was shown that with this algorithm, the prevalence of active TB was higher when compared to CXR screening (cases of extrapulmonary TB unlikely to be found by this method were found) and the risk of missing active TB cases was very low [35].

In France, screening for active TB is carried out in primary care, by nongovernmental organisations, or at TB control centres or healthcare access centres on migrants from countries with a TB incidence >40 per 100 000, is voluntary, and can be repeated up to 2 years after arrival [6]. LTBI screening is carried out on children from high-incidence countries and adults between 18 and 40 years of age who live with children and come from countries with an incidence >100 per 100 000 [6].

The UK implemented pre-entry screening for active TB in 2011 and, according to our results, appears to be one of the few European countries with this type of screening. This screening is carried out in migrants from countries with a high incidence of TB (≥ 40 per 100 000) who intend to remain in the UK for a period >6 months [36]. The countries of origin carry out a symptom questionnaire and CXR [26], but not all perform sputum culture tests [18]. After arrival, migrants aged between 16 and 35 years, who entered the UK in the last 5 years, who lived for >6 months in countries with a TB incidence >150 per 100 000 or sub-Saharan Africa undergo voluntary screening for LTBI [3, 4, 20]. In primary care settings, LTBI screening is performed with IGRA [3, 4, 20, 21].

In all these countries, there are physical, cultural and professional barriers, common to several countries, leading to a decrease in the registration of migrants in primary healthcare [3, 6, 22, 23, 38]. The most frequently reported cultural barriers are language [10–13], stigma [9, 10, 13, 20], and low health literacy [11, 12, 20]. Differences in language affect the entire screening process, from calls for screening, namely understanding call letters and scheduling screenings [11, 12], to direct communication with health professionals, impairing the perception of screening and the relationship with professionals [11, 13]. Though communication stands as key for quality healthcare [39], at times, even with the help of interpreters, communication is not optimal [11], which has been shown to reduce the chance of preventive screening [40]. Some countries offer the possibility for migrants to attend classes to learn the language of the receiving country [34, 38], which is fundamental for their integration into the receiving country [41]. To overcome this obstacle, measures have been proposed, such as using the migrants' language in communication [12, 34], with the involvement of cultural mediators also helping these migrants [10, 20, 34]. Cultural mediators help the person navigate the health system by facilitating communication with the healthcare providers, ensuring that they receive healthcare adequate to their cultural and social needs [42, 43].

Another barrier mentioned by migrants, but also by healthcare professionals, is stigma [9, 10, 12, 20]. The fact that screening is carried out on migrants and not aimed at nonmigrant populations [13], and the lack of explanation of the screening programme [11, 12] can cause shame and fear of social exclusion in the communities [12, 20]. Furthermore, many migrants lack of knowledge about the diseases and their rights to health services [11, 12, 20, 33]. The involvement of cultural mediators and community organisations in health education is key to reducing stigma [10, 13, 34], which can also be tackled through health education in communities with the help of cultural mediators [10, 20]. Another proposed measure was integrating TB screening into a general check-up in which other pathologies are assessed and screened [10, 23]. Carrying out screening at the community level, in locations other than healthcare facilities, can also help to reduce stigma [10], while also promoting an increase in adherence to screening [10, 34, 38].

In terms of professional barriers, the lack of training for health professionals and other staff in migrant health [6, 10–13, 33], lack of clarification regarding the entire screening process [11, 12], and lack of guidelines/different guidelines to be used by health professionals arise as the main barriers in this scope [6, 7, 13, 25]. Often, both health professionals and other staff do not have an appropriate attitude towards migrants [10–13], a behaviour that also contributes to stigma and reduced registration in healthcare [10]. This is due to cultural differences and stereotypes created about migrants with specific cultures [13]. However, it can also come from staff with a migrant background or belonging to an ethnic minority [10]. A study by LOUTET *et al.* [3] showed that adherence to screening varied from centre to centre and depended on the health professional. For this reason, all staff working with migrants in health services should be trained in screening and cultural competence so that these services become “migrant friendly” [3, 9, 10, 12, 13, 25]. However, as reported by a scoping exercise in healthcare settings, not all vulnerabilities of the migrant population tend to be responded to, as most strategies tend to focus on socioeconomic differences rather than the actual cultural background [44].

Healthcare professionals often do not know which guidelines to follow when screening for TB, which means that some do not use guidelines [6, 13], or that the guidelines used vary between them [6, 13, 25]. While some professionals use local or national guidelines, others use international guidelines [7, 25]. Sometimes, the guidelines are also unclear as to the populations involved [11]. There is a lack of evidence regarding the population to be screened in each location and the best diagnostic tests for each programme [9], which will vary between and within countries. In addition to international guidelines on TB screening, since migrant populations differ from country to country and contribute differently to the incidence of TB in the receiving country [28, 37], there should be national and regional guidelines based on population studies to determine the screened population, threshold of incidence in countries of origin and timing of screening [9, 37]. In addition, the guidelines should be updated regularly as the migrant population changes [13]. Health professionals who deal with migrant health must be trained and regularly updated on the guidelines to be followed [13].

Furthermore, in some countries, computer programmes have emerged to help health professionals with screening [4, 13, 28, 30].

Limitations

Most articles collected for the present scoping review mentioned screening strategies in European countries not focused on regular migrants, including in their sample asylum seekers and/or refugees. Therefore, some of the articles reviewed in the initial screening of text and abstract were excluded due to the established eligibility criteria. Furthermore, no quality assessment of the evidence was performed on the articles included, as we focused on the exploration and comprehensive analysis of the available evidence on

screening strategies focused on regular migrants arriving in European countries. Though there were studies that were included in this review on most countries of the EU, not all countries had a screening strategy described in the present paper [11, 13, 19, 26, 30, 34, 35]. Some articles were linked to surveys administered to patients, healthcare professionals and relevant stakeholders in the field of TB in their respective countries, regarding general dimensions of the screening strategies and its legislation, and not on the specificity of it [10, 11, 13, 25]. This was also a gap identified in some of the included studies, which resulted in a limitation of the current review, as some of the countries focused on a national screening strategy or programme did not provide enough detail that would allow the characterisation of its core dimensions [13, 19, 30, 34, 35].

Conclusion

The present review highlighted the current panorama of screening strategies for TB and LTBI in European countries, eliciting the main barriers that hinder the screening process of migrant populations. Though some of the articles provided solutions developed to answer these hindrances, not all articles delved into their implementation and/or effectiveness, reducing the replicability of the interventions designed. The focus on a clinical perspective of TB screening, be it for active TB or LTBI, appears to be reductive given the number of social, psychological, environmental and/or determinants of any other order that migrant populations are exposed to. Considering these determinants could pave the way for enhanced screening strategies in future implementations, potentially resulting in improved outcomes for the prevention, diagnosis and care of people with TB and the communities affected by this disease. Though the review focuses on migrant populations, which, according to the United Nations High Commissioner for Refugees, are defined as those who willingly leave their countries for a better quality of life, these factors still exist in this population. Given the major differences between migrants (asylum seekers, refugees and migrants) and their etymology, migrants should not be taken as a whole but rather as individual units of analysis with a wide range of qualities, perceived needs and adjacent vulnerabilities. For these reasons, additional research is needed to determine the patterns through which regular migrants adhere to current screening strategies in European countries, not circumscribing the scope of research to that of asylum seekers and/or refugees, as well as not analysing migrant populations.

Key points

- Screening strategies for active tuberculosis and latent tuberculosis infection among migrants vary across European countries. These differences encompass screening timing, target populations, screening locations and diagnostic methods, according to the characteristics of each migrant population and receiving country, with refugees and asylum-seekers being the most screened populations.
- Several significant barriers, including physical, professional and cultural obstacles, hinder the effective screening of migrants.
- European nations have implemented diverse strategies to surmount identified barriers within each country and their respective migrant communities. However, the limited number of studies examining the efficacy of these suggested strategies calls for further investigation.
- Recognising the substantial diversity among migrants in terms of their backgrounds and origins, it is crucial not to perceive migrants as a homogeneous group. Rather, they should be considered as individual units of analysis. Additional research is imperative to comprehend the patterns through which regular migrants adhere to existing screening strategies in European countries. This research scope should extend beyond asylum seekers and refugees.

Self-evaluation questions

1. Which of the following countries conducts pre-entry screening for active tuberculosis (TB) in migrant populations?
 - a) France
 - b) Netherlands
 - c) UK
 - d) Sweden
2. Choose the correct statement.
 - a) The criteria for selecting the population to be screened in each country are always the same for active TB or latent tuberculosis infection (LTBI).
 - b) Among the tests used to screen for LTBI, the tuberculin skin test is associated with the highest sensitivity and specificity.
 - c) Most TB cases are due to transmission in the recipient country.
 - d) As well as being based on the TB incidence threshold in the country of origin, LTBI screening is also based on the age of the migrants.

3. Identify the false statement.
 - a) Many migrants fear that there will be legal consequences if they are not screened.
 - b) Most health professionals and health service staff are trained to receive migrants.
 - c) Stigma is feared not only within health services but also within migrant communities.
 - d) Language is one of the main barriers to TB screening.
4. Identify the false statement.
 - a) Integrating TB screening into a general check-up and screening at the community level, in places other than healthcare facilities, can help reduce stigma.
 - b) In addition to international guidelines on TB screening, there should be national and regional guidelines.
 - c) Cultural mediators should not be involved in the TB screening process.
 - d) Apps have been developed that have been shown to aid screening for active TB and LTBI.

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Suggested answers

1. c.
2. d.
3. b.
4. c.