Latent tuberculosis infection screening in young asylum-seekers in the Netherlands

An analysis of facilitators and barriers to screening uptake

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‘Latent tuberculosis infection screening in young asylum-seekers in the Netherlands -

An analysis of facilitators and barriers to screening uptake’

A thesis submitted in partial fulfilment of the requirement for the degree of Master of Science in International Health

by

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Signature: 

Master of Science in International Health (MIH)

September 2018 – August 2024
KIT (Royal Tropical Institute)/Vrije Universiteit Amsterdam
Amsterdam, The Netherlands

7 August 2024

Organised by:

KIT (Royal Tropical Institute)
Amsterdam, The Netherlands

In cooperation with:

Vrije Universiteit Amsterdam (VU)
Amsterdam, The Netherlands

Abstract

Introduction: In 2023, the Netherlands started screening newly-arriving asylum-seekers under twelve years of age for latent tuberculosis infection (LTBI). Anecdotally, uptake has been low. This thesis is part of the screening's evaluation by GGD GHOR Nederland (GGN). It gives recommendations on how to improve screening uptake based on analyses of barriers and facilitators to LTBI screening in the Netherlands and other low TB-incidence countries.

Methodology: This multi-methods study was guided by Levesque's framework of access to healthcare. A literature review was conducted to find demand-side barriers and facilitators to LTBI screening among migrants in low TB-incidence countries. Health care workers were interviewed to find supply-side barriers and facilitators to the Dutch programme.

Findings: Many potential barriers and facilitators were found. Health literacy problems, including asylum-seekers' supposed unawareness of the Dutch screening programme, were often mentioned. Screening locations, stigma, appointment mechanisms, types of tests used and collaboration between actors could also influence uptake.

Discussion: Not all literature findings can directly be transferred to the Dutch setting, but some can guide much-needed further research, like quantitative research to objectify Dutch screening uptake(s) and find groups to focus on, followed by interviews with children's parents. For now, recommendations to GGN include ideas for raising awareness of the screening, improving communication with asylum-seekers, optimising collaboration between actors and striving for better integrated and more client-centred care. Apart from optimising its uptake, ongoing monitoring and evaluation is needed to critically assess the programme's impact on asylum-seekers' and the public's health.

Key words: latent tuberculosis infection screening, barriers, migrants, asylum-seekers, the Netherlands

Word count: 13072 (including footnotes, excluding figures and tables) or 12653 (excluding footnotes, figures and tables)

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List of tables, figures and diagram

Abbreviations

ASC	Asylum-seekers' centre
BCG	Bacillus Calmette-Guérin
COA	Central Agency for the Reception of Asylum-Seekers
COL	Central reception centre
CPT	Committee for Practical Tuberculosis Control
e.g.	for example (exempli gratia)
FGD	Focus group discussion
GGN	GGD GHOR Nederland
GP	General practitioner
HCW	Health care worker
HR	Human resources
i.e.	that is/in other words (id est)
IGRA	Interferon-Gamma Release Assay
KIT	Royal Tropical Institute
(L)TB(I)	Latent tuberculosis infection and/or tuberculosis
LTBI	Latent tuberculosis infection
MS	Microsoft
MTA	Medical Technical Assistant
PHS	Public Health Service
SSA	Sub-Saharan Africa
SSI	Semi-structured interview
TB	Tuberculosis
TST	Tuberculin skin test
UK	United Kingdom
US	United States

USA	United States of America
WHO	World Health Organization
YHC	Youth Health Care

Acknowledgements

Several people helped me while I was writing this thesis, either by supporting me academically, mentally and/or practically.

I would like to thank GGD GHOR Nederland for their financial and network support, my thesis advisors for their detailed feedback and my academic advisor for actively reaching out to me. My partner helped me by proofreading and is the person I can always count on whenever my computer and I have different plans. A big thank you, too, to all the women who were kind enough to let me interview them. I genuinely enjoyed listening to you and hope I did justice to your experiences and ideas.

The award for best supporters goes to many parents, who saved me by letting me and my baby son stay with them so I could focus on finishing this thesis. For this and for so much more, I cannot thank them enough.

Introduction

I am a medical doctor from the Netherlands. The *Netherlands Course on Global Health and Tropical Medicine* was part of my specialisation in Global Health and Tropical Medicine. I vividly remember discussing the history and social determinants of tuberculosis (TB) on the first day of the course. The lecturer showed McKeown's graph on TB death rates in England and Wales in the 1800s and 1900s, and he highlighted the huge drop that had happened before the introduction of the BCG vaccine and the first antituberculous drug. He mentioned McKeown's theory on this – and theories by others. I know there has been criticism against the McKeown Thesis, but this graph has stuck with me ever since.

Later, I worked with many TB patients in South Sudan and Sudan. Although most presented with pulmonary TB, my colleagues and I also saw quite a lot of people with different types of extrapulmonary TB, ranging from children with TB meningitis to Pott's disease in an elderly man who initially presented with weakness of his right leg. It is safe to say that I became intrigued by this disease, because of both clinical and public health reasons.

From the start, it was clear to me that I wanted my thesis to be on a TB-related topic. After a colleague had told me about GGD GHOR Nederland's evaluation of a new LTBI screening programme, I reached out to the organisation. They asked me to help with the evaluation, which I happily said yes to. I hope this thesis will help to improve LTBI screening uptake among young asylum-seekers in the Netherlands while staying aware of its impact on the target group, their health and the public's health.

1 Background information

This thesis analyses barriers and facilitators to LTBI screening among asylum-seekers and other migrants in the Netherlands and other low TB-incidence countries. It gives recommendations on how to improve the Dutch LTBI screening programme's uptake. For a better understanding, background information is given on the country and the evaluated screening programme.

The Netherlands is a high-income country in western Europe. Between 2010 and 2021, it spent 10.02% to 11.29% of its gross domestic product on health (1). The country scored 85 out of 100 points on the universal health coverage service coverage index[1] in 2021, coming from 75 points in 2000[2] (2). Healthy life expectancy at birth was 71.4 years in 2019, life expectancy at birth 81.8 years. That same year, dementias (as a group) were the leading causes of death, with lower respiratory infections (as a group) being the only communicable diseases in the country's top ten causes of death (3). With a 2022 tuberculosis (TB) incidence of 4.1/100,000 inhabitants, the country has had a low TB-incidence since the 1980s (4).

These are average numbers and differ for subgroups. Due to factors like discrimination, language barriers, financial problems and the migration itself, migrants in the Netherlands are often less healthy and have a lower life expectancy than Dutch-born (5,6). Looking at TB, about 80% of all diagnosed patients in the Netherlands in 2022 were foreign-born (7). Most cases in this group are likely to be reactivated latent TB infections (LTBI) that people acquired in their countries of origin or while travelling to the Netherlands (7–9).

Although the Netherlands screens many migrants[3] for TB by performing X-rays upon their arrival, it has high TB incidences among asylum-seekers and other migrants years after their arrival. This can partly be explained by missed latent TB infections which progressed to active TB after the radiological screening (10,11). LTBI is not detected by X-rays, but by tuberculin skin tests (TST) and blood tests (interferon-gamma release assay (IGRA)).

In 2020, the Dutch Committee for Practical Tuberculosis Control (CPT) advised for newly-arriving asylum-seekers[4] under 12 years of age and coming from countries with a WHO-estimated TB

[1] This index is a measure of sustainable development goal 3.8.1, 'Coverage of essential health services'. Combining 14 indicators, it looks at the coverage of essential health services, including 'infectious diseases', 'non-communicable diseases', 'reproductive, maternal, newborn & child health' and 'service capacity and access' (2).
[2] The country also scored 85 points in 2017 and 2019 (2).
[3] Whether migrants are screened, depends on the group they belong to (immigrants or asylum-seekers) in combination with the (by the World Health Organization (WHO)) estimated TB incidence in their country of origin (see Table 1).
[4] In this thesis, a migrant is defined as 'someone who changes his or her country of usual residence, irrespective of the reason for migration or legal status' (12), while the term 'asylum-seeker' refers to 'a person who has submitted a request to enter a country as a refugee' (13).

incidence of >50/100,000 inhabitants per year (previously and further referred to as 'young asylum-seekers') to be screened for LTBI instead of active TB (14) upon arrival in the Netherlands. A plan for implementation (14) was made and the LTBI screening programme (depicted in **Diagram 1**, which can be found in the **Annexes**) started in July 2023. Over 1500 children are expected to be invited each year, of whom 5% are expected to have a positive IGRA, and 10% a positive TST (14).

Table 1. Characteristics of screening programmes among asylum-seekers

	TB	**LTBI**
Screening method	Chest X-ray	TST with or without IGRA
Target group	Asylum-seekers ≥12 years of age coming from countries with a TB-incidence* of >50/100,000 inhabitants	Asylum-seekers <12 years of age and coming from countries with a TB-incidence* of >50/100,000 inhabitants
When	±3 days after arrival	±8-12 weeks after arrival
Minimum number of consultations	1	2
Location of screening	COL	PHS, sometimes ASC
Mandatory	Yes	Yes
Costs for target group	Screening and treatment free	Screening and treatment free

**Incidence as per WHO estimates. ASC: asylum-seekers' centre; COL: Central Reception Centre; IGRA: interferon-gamma release assay; PHS: Public Health Service; TB: tuberculosis; TST: tuberculin skin test; WHO: World Health Organization.*

Actors involved in the LTBI screening are the Central Agency for the Reception of Asylum-Seekers (COA), Public Health Services (PHSs) and GGD GHOR Nederland (GGN).

- COA is responsible for the reception and guidance of asylum-seekers. Most asylum-seekers live in asylum-seekers' centres (ASCs) led by COA.
- The country's 25 PHSs operate during weekdays and office hours. They each cover their own geographical region and have various departments, including TB control and Youth Health Care (YHC). TB staff include Medical Technical Assistants (MTAs), TB nurses and TB physicians. MTAs are mostly involved in (L)TB(I) screening, while TB nurses and TB physicians focus more on diagnosing and treating patients, together with source and contact tracing. YHC professionals provide free preventative care for all children up to 18 years old. Important tasks include the monitoring of children's development and providing vaccinations according to the country's Expanded Programme on Immunization. Currently, YHC is not officially part of the LTBI screening programme. PHS TB staff and COA or ASC staff have their own software programmes for patient/client files between which some information can be shared.

- Lastly, GGN is the overarching organisation of PHSs. It is responsible for guiding PHSs and is currently performing an evaluation of the LTBI screening, which this thesis is a part of.

The mandatory LTBI screening programme is different from the mandatory screening for active TB (see **Table 1**). For example, the single X-ray for active TB screening takes place immediately upon arrival and is part of the procedure every asylum-seeker has to go through when requesting asylum (15). This happens at one of the country's two Central Reception Centres (COLs), where people spend their first days in the Netherlands. Here, COA staff guides them through the radiological screening. The LTBI screening among young asylum-seekers, on the other hand, takes place weeks after arrival - when people have moved from the COLs to ASCs and sometimes other places[5]. Parents and their invited children should travel to a PHS at least twice: once for having a TST set and 48-72 hours later for having the TST read by an MTA. In case a child is eligible for a Bacillus Calmette-Guérin (BCG) vaccination, this can be given after excluding an LTBI. See **Diagram 1** for an algorithm depicting the LTBI screening.

[5] The CPT originally advised to perform the LTBI screening at the COLs. Some actors involved deemed this impossible, because of logistical reasons regarding TST readings and relocations of asylum-seekers (14).

2 Problem statement and justification

About a quarter of the world's population is infected with *Mycobacterium tuberculosis* (16). To put this in absolute numbers: in 2014, 1.7 billion people were estimated to have LTBI (17). These 1.7 billion people have an average chance of 5-10% of developing TB disease within their lifetime (18). In 2022, the disease was diagnosed in 10.6 million people globally, among them being 1.3 million children. That same year, 1.3 million people died from TB, making it the second leading infectious killer only after COVID-19. These are global numbers, but the burden of TB and LTBI is unequally distributed. Over 80% of TB cases and deaths occur in low- and middle-income countries (18). Besides, in many countries with a low TB-incidence, migrants face a higher burden than the host population. This burden is often due to reactivation of a latent TB infection acquired in the country of origin (9) and influenced by health-related (e.g., age and comorbidities) and socioeconomic factors (e.g., living conditions) (8). In the Netherlands, around 80% of all TB cases in 2022 were foreign-born (7).

TB and LTBI are on the global agenda. Ending the TB epidemic by 2030 is part of target 3.3 of the United Nations' Sustainable Development Goals (19). Furthermore, WHO aims to eliminate TB by 2035 with its *End TB Strategy* (20). This strategy includes several indicators, one of them being a 90% reduction in TB incidence rate by 2035 compared to 2015. In 2014, the Netherlands endorsed the *End TB Strategy* (21). With its TB-incidence being 5.1 per 100,000 inhabitants in 2015, reaching the strategy's 90% reduction would mean the country should strive for a TB-incidence of less than one TB case per 100,000 inhabitants per year by 2035, the so-called pre-elimination level (22). To further reduce the country's 2022 TB-incidence of 4.1 per 100,000 inhabitants per year (21), a new screening programme was added to the existing TB control programme. From July 2023, apart from radiologically screening high-risk migrants for active TB, PHSs have been inviting asylum-seeking children[6] to screen and – if necessary – treat them for LTBI. The screening consists of a health questionnaire and TST, sometimes followed by IGRA. Screening and treatment are free of charge, and the screening is officially necessary to request asylum. Because of characteristics of the screening programme, however, there is a fear the screening uptake will be suboptimal – and initial results indeed show a low turnout.

TB and LTBI screening programmes in European low TB-incidence countries are described as 'heterogeneous' (24), 'very different' (25) and '[facing] different challenges in reaching migrant populations' (25). Experts have stressed the need for further research in improving access to

[6] The specific target group includes newly-arriving asylum-seeking children under 12 years of age coming from countries with a WHO-estimated TB-incidence of ≥ 50/100,000 inhabitants (14), in this thesis referred to as 'young asylum-seekers'.

preventive services for migrants (26) and - more specifically - in (paediatric) immigration TB screening (27).

Literature on LTBI often refers to the LTBI cascade of care (see **Figure 1**). Several studies write about facilitators and barriers to its last steps, including a systematic review and meta-analysis (8) specifically focusing on migrants' initiation and completion of LTBI treatment. Less is known about factors influencing the first step that needs to be taken: eligible people being screened (28-30), although individual, interpersonal and structural factors seem to influence this step differently and to a greater extent than the last steps (30). Moreover, the largest losses seem to occur in this very first step: a systematic review and meta-analysis of 58 studies (28) found that only 71.9% of all people eligible for LTBI screening was screened (see **Figure 1**). For migrants, this percentage was lowest of all groups identified: 43.4% (28). The authors stated that losses before starting therapy negatively impacted public health more than non-adherence to therapy did.

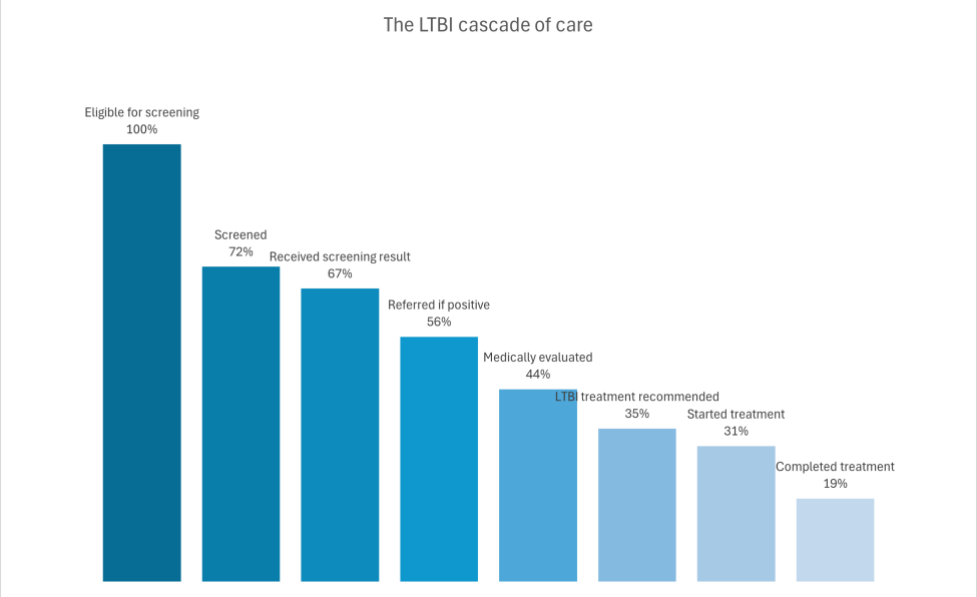

Figure 1. The LTBI cascade of care

LTBI cascade of care losses. The first step shows the largest loss, which is even bigger when looking at migrants only. Source: Alsdurf et al., (28), 2016.

In study settings, authors (31, 32) found willingness among migrants in the Netherlands to be screened and treated for LTBI. These same authors studied facilitators and barriers in the uptake of LTBI screening in asylum-seekers aged 12 years and older (31). However, to my knowledge, very little is known about facilitators and barriers in the uptake of LTBI screening among the age group that is being screened in the current and running programme: children under 12 years of age. Apart from differing in age, this group is different from the one previously studied in terms of adults deciding on

behalf of children.[7] Different facilitators and barriers could be influencing this group's screening uptake. Finding these and using them to adapt the Dutch LTBI screening programme may help increase its uptake. This could lead to more prevention (and to a lesser extent diagnosis) of TB in individuals (individual benefit) and thereby its transmission to other people (public health benefit). Some even argue that increasing the acceptability of a screening programme is a moral aim (33). Moreover, by endorsing the *End TB Strategy*, the Netherlands endorsed the pillars that it was built on. These pillars, e.g., 'integrated, patient-centred care and prevention' and 'bold policies and supportive systems', require engagement of patients and high-risk groups, together with participation of communities (34). Analysing the experiences of people using and providing the Dutch LTBI screening programme is needed to strengthen the pillars that should hold it.

[7] In the Netherlands, parents and guardians need to give permission for medical interventions on their children when their children are younger than 12 years of age .

3 Objectives

3.1 General objective

This thesis's general objective is to help improve LTBI screening uptake among young asylum-seekers in the Netherlands by analysing barriers and facilitators to LTBI screening among migrants[8] in low TB-incidence countries.

3.1.1 Specific objectives

- To analyse demand-side barriers and facilitators to LTBI screening among migrants in low TB-incidence countries
- To analyse supply-side barriers and facilitators to LTBI screening among newly-arriving young asylum-seekers in the Netherlands
- To provide recommendations to GGN to improve LTBI screening uptake among young asylum-seekers in the Netherlands

[8] The reason for (also) looking at migrants instead of only asylum-seekers is explained in the section '4.1 Methodology - Literature review'.

4 Methodology

This thesis is part of GGN's evaluation of the Dutch LTBI screening programme. It employed a multi-methods approach, including:

- a literature review on demand-side barriers and facilitators to LTBI screening among migrants in low TB-incidence countries[9] and
- a qualitative study (i.e., semi-structured interviews (SSIs) with PHS TB staff) on supply-side barriers and facilitators to LTBI screening among young asylum-seekers in the Netherlands.

[9] This thesis considers countries with a TB-incidence of ≤10/100,000 inhabitants per year according to the Dutch TB country list (35) low TB-incidence countries. Using an 'incidence scope' was expected to retrieve more evidence than limiting the thesis to a geographical region, because low TB-incidence countries from several regions report on screening migrants for LTBI. Besides, TB-incidences within geographical regions can vary considerably.

The *Levesque conceptual framework of healthcare access* (36) (see **Figure 2**) was used throughout the writing of this thesis. It helped phrase objectives; guide interview questions; structure and analyse results; draw conclusions and propose recommendations.

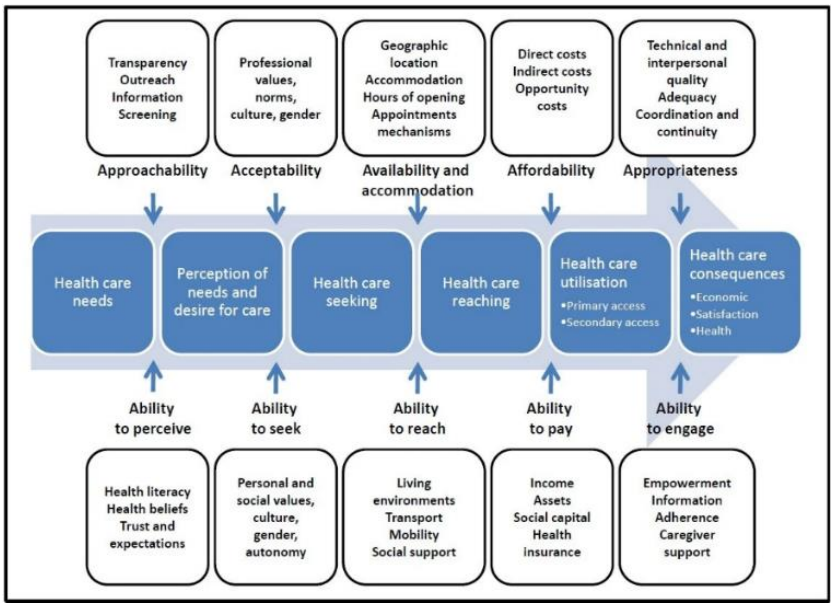

Figure 2. Levesque's conceptual framework of access to healthcare

Source: Levesque et al. (36), 2013.

During the first months of the LTBI screening programme, barriers related to the healthcare system had been experienced anecdotally - and were expected for the target population. Because Levesque's framework looks at both these sides, by using 'supply-side dimensions' and 'demand-side abilities' (see Error! Reference source not found.), this framework seemed very fitting to help reach the thesis's objectives. Furthermore, its concrete examples seemed useful for extracting literature data and guiding interview questions. Lastly, Levesque et al. (36) pay specific attention to the 'perception of needs and desire for care', which seemed especially important for this thesis's topic: a programme that screens people's children for an infection they have no symptoms of and that might never progress to active disease.

4.1 Methodology - Literature review

Literature was reviewed to find demand-side (migrants') barriers and facilitators to LTBI screening in low TB-incidence countries. Because a preliminary review found very few articles that focused specifically on asylum-seekers, the studied population was broadened to 'migrants'.

4.1.1 Search strategy

PubMed, VU Library and Google Scholar were searched for literature. **Table 2** shows the search terms that were used. The search entry can be found in **Annex II – Search entry**. Searches were performed on 10 May 2024 (PubMed and Google Scholar) and on 26 June 2024 (VU Library). Language restrictions were used to only search for articles in English and Dutch. No restrictions on the timeframe of publications were used. In VU Library, the option 'hide duplicates' was checked.

Table 2. Search terms used for the literature search

Topic	Issue	Population	Outcome
"latent tuberculosis"	screen*	migra*	use
"latent TB"		asylum	using
LTBI		refuge*	usage
"tuberculosis infection"			access*
"TB infection"			facilitat*
			barrier*
			determinant*
			factor
			knowledge
			attitude*
			perspective*
			belie*
			qualitative

All search terms within columns were connected by the Boolean operator 'OR'. Columns were connected using the Boolean operator 'AND'.

4.1.2 In- and exclusion criteria

Primary studies written in English and/or Dutch that reported on barriers and/or facilitators to LTBI screening among migrants of any age who (are going to) live in a low TB-incidence country were included. Records were excluded when they reported on facilitators and barriers to both the first step and other steps of the LTBI cascade of care without being clear about which facilitators and/or barriers specifically related to the first step. Another exclusion criterion was not being clear about which facilitators and/or barriers specifically related to LTBI screening when records reported on screening for LTBI and screening for other infections.

4.1.3 Selection of records

All results from PubMed and VU Library, together with Google Scholar's first 200 hits[10] were imported into Zotero version 6.0.37. After merging the duplicates found by Zotero and removing extra duplicates that were found manually, all remaining records were screened for relevance by reading their title and abstract. Screened records were either excluded or preliminary included. Preliminarily included records were read in full and checked for inclusion and exclusion criteria, after which they were excluded or included. Snowballing was performed by checking the reference lists of fully-read records for possibly eligible records that had not been found with the search strategy. These then underwent the same selection process. Snowballing was also performed on reviews that met the inclusion criteria (except the primary study component) and none of the exclusion criteria.

4.1.4 Data extraction

The following data were extracted from the included articles: *authors, year of publication, country, study design, methods of data collection, description and size of the population studied, qualitative and quantitative barriers and/or facilitators to LTBI screening, type of screening (TST and/or IGRA), whether the screening discussed was voluntary or compulsory* and *whether information on/from people who were not tested was included.* An overview of all extracted data can be found in **Table 5** in **Annex III – Overview of included articles**.

[10] The amount of hits found by Google Scholar (see 5.1.1 Article selection) was too high to screen. However, since this search engine works differently from traditional databases, it was believed to be a good complementary source of evidence, mostly because of its ability to search across various disciplines and types of literature documents.

4.2 Methodology - Qualitative study

4.2.1 Recruitment and selection

The author recruited PHS TB staff involved in the execution of the screening by sending e-mails to 10 PHSs, including those that had screened (relatively) many and (relatively) few children in their region. E-mails were sent to executing staff and/or their managers. Staff members who replied and agreed to participate were selected for an interview. No incentives were used.

4.2.2 Coding and saturation

Interviews were held in-person or in videocalls. Only audio was recorded, using the dictaphone app on the author's GGN's smartphone. The author transcribed all interviews verbatim in Microsoft (MS) Word 365. Transcripts were not shared with participants for comments and/or corrections. The author analysed the data by thematic analysis, using the Levesque framework. After familiarizing herself with the data by (re)reading all transcripts, she coded all interviews using the comments feature in MS Word. After exporting all codes to MS Excel, she categorised the codes into (sub)categories and used these to analyse the data.

Inductive thematic saturation – here defined as 'the point at which no more new themes seemed to be emerging from the interviews' - was assessed at the author's discretion. Furthermore, she retrospectively assessed this by using a method proposed by Guest, Namey and Chen (37). This method looks at three elements: base size, run length and new information threshold. Together, these give an estimation of the possibility of new themes emerging in subsequent interviews. The base size is the denominator and corresponds to the number of interviews reviewed (mostly 4, 5 or 6) to calculate 'the amount of information already gained'. The run length corresponds to the number of interviews in which new themes are counted. The amount of new themes found in the run length makes up the numerator. The new information threshold represents the evidence with which saturation has been reached (e.g., ≤ 5% or 0%). The elements' sizes can be adjusted, making saturation either more or less difficult to reach. This thesis used a base size of 4, run length of 2 and new information threshold of ≤ 5%.

4.2.3 Ethical considerations

Full ethical clearance was obtained (see **Annex IV – Ethical clearance**). Important aspects taken care of were privacy of and informed consent by the interviewees. Days prior to the interview, they were sent a consent form by e-mail. This informed interviewees about their rights and requested them to not mention any names of people and PHSs. Accidentally mentioned names were anonymised by replacing them with '[…]' in the transcripts. Further anonymisation of the transcripts was done at the author's discretion, e.g., of names of hospitals and geographic locations. Audio recordings were deleted after transcribing them. Transcripts were protected by a password only known to the author and her thesis advisor, stored on the author's professional laptop and shared with her thesis advisor.

4.3 Methodology – Limitations and strengths

The methodology used in this thesis has several limitations and strengths, which will partly be discussed (see **6 Discussion**) and of which examples will be shown (see **5 Study findings**) later.

For this thesis, all data were collected, extracted and analysed by the author only. Although understandable for the context, and according to KIT's rules, a second person performing these same tasks would have added interrater reliability.

Broadening the studied population from 'asylum-seekers' to 'migrants' in the literature review makes it more difficult to compare the studies and to apply findings to the Dutch setting, since 'migrants' make up an even more diverse group than asylum-seekers.

To not miss any relevant articles, this thesis did not require articles to use specific definitions for 'barriers' and 'facilitators', complicating comparing studies' findings. It also did not require articles to (always) use these specific terms, which may have led to analysis bias (by the author).

Furthermore, the use of language restrictions and a limited number of search engines might have led to missing relevant literature. However, extensive snowballing was performed on not only the included, but all fully-read literature, including several reviews. The decision to only include primary studies was taken after the author had found two reviews that had included articles and drawn conclusions she did not agree with.

No tools were used to systematically assess the quality of the included studies. However, examples of observed and expected biases, other limitations and strengths of the included literature are presented and discussed.

Having the transcripts checked by the interviewees might have led to different or more nuanced insights.

Although the author tried not to use pre-set codes, the use of Levesque's framework in guiding the questions and structuring the results might have (subconsciously) led to looking at the framework's dimensions as themes. Therefore, deductive thematic saturation – here defined as 'the extent to which pre-determined codes or themes are adequately represented in the data' (38) – was looked for at the author's discretion. Further possible limitations and strengths related to the qualitative study's methodology are closely linked to the used framework and therefore discussed later (see **6.3 Relevance of the analytical framework**).

5 Study findings

5.1 Study findings - Literature review

5.1.1 Article selection

The literature search yielded 268 results in PubMed, 456 in VU Library and thousands of hits in Google Scholar, of which the first 200 were used in the identification part of this thesis. As shown in **Figure 3**, 473 duplicates were removed, after which 451 records were screened by title and abstract. Forty-three records were fully read and assessed for eligibility using beforementioned inclusion and exclusion criteria. Two included articles were found by snowballing. In total, thirteen articles were included.

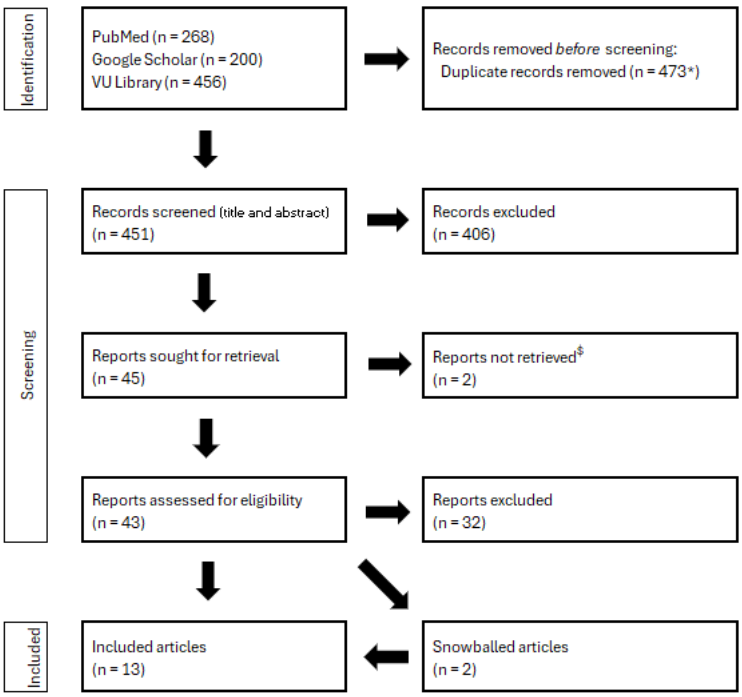

Figure 3. Article selection

**467 duplicates were found by Zotero, six manually. Many duplicates were found within VU Library's search results, despite selecting 'hide duplicates'. $A scoping review* (29) *that was fully read by the author described one of these articles* (42)*. It mentioned that the not-retrieved article did not write about factors regarding completing the first step in the LTBI cascade of care, which would have excluded the article from this literature review.*

5.1.2 Overview of included articles

Most articles reported on qualitatively found barriers and facilitators. Their authors had collected data in various ways, from interviewing migrants and/or refugees (using questionnaires, SSIs and focus group discussions (FGDs)) to organising migrant community panels lasting two days. Two articles (30,39) found barriers and facilitators by using a purely quantitative approach, others (40,48) presented descriptive statistics on for example uptake (48) and test preferences (48) and linked those to people's reasonings. Studied populations included migrant workers, asylum-seeking children, refugee learners, second-generation migrants and more. Population sizes that had been specified ranged from 14 (41) to 5591 (39). One study (45) looked at an existing mandatory screening programme, the rest studied either voluntary programmes or discussed hypothetical screenings with migrants. One study (48) specifically looked at asylum-seeking children's uptake of LTBI screening and mentioned their parents' decisions, though those were retrieved retrospectively from registers. Not all authors gave definitions or criteria for 'barriers' or 'facilitators', nor did they all specifically use those terms. For an overview of all extracted data per article, please see **Annex III – Overview of included articles**.

5.1.3 Barriers and facilitators to LTBI screening uptake - Demand-side

The included articles presented various (possible) demand-side barriers and facilitators to LTBI screening among migrants in low TB-incidence countries. They were structured using the five abilities from Levesque's framework as shown in **Figure 4**.

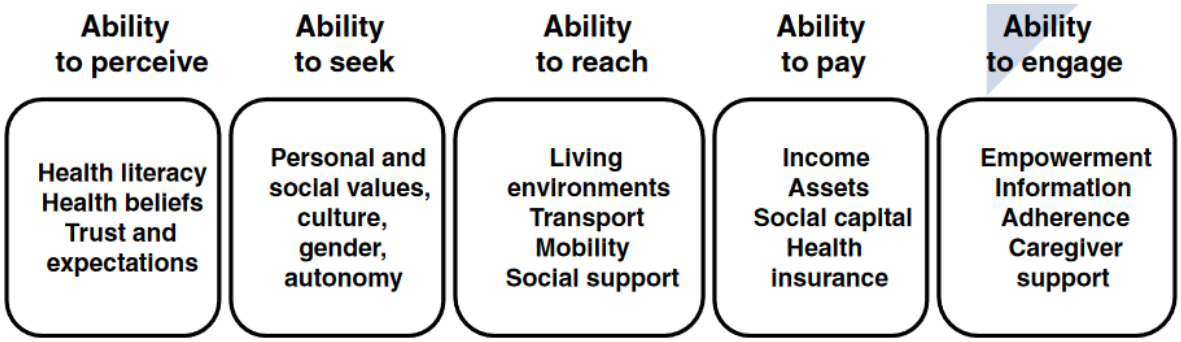

Figure 4. Levesque's five abilities to healthcare access

Source: Levesque's conceptual framework of access to healthcare (36), 2013.

Ability to perceive

Most studies wrote about health literacy (31–33,39–41,43–47). Brewin et al. (33), for example, found that 'knowing that TB is serious, but preventable and treatable' contributed to screening attendance. Loutet et al. (39) retrospectively looked at 5591 eligible migrants who had been offered an IGRA test at primary care clinics. They found that diabetics and people with chronic liver disease were more likely to accept screening. However, patients' reasonings had not been reported, but were suggested by the authors of this retrospective study. Also, they compared the group of people with a recorded IGRA test result (40.6%) with the combined groups of people who had clearly declined a test (22.4%) and those that had no test result recorded (37.0%). Hypotheses were that the diabetics and chronic liver patients might have been aware of their higher risk of progression to active TB and might have had 'increased access' to care because of their health status (39). More articles, however, wrote about a lack of knowledge and awareness of TB and LTBI, ranging from misconceptions regarding transmission (41) and protection (32,33,44,46) to participants being unaware of the existence of LTBI (40,41,44).

Although Khan et al. (30) found a positive association between being BCG vaccinated and screening uptake (30), participants in several other studies believed their BCG vaccination protected them from LTBI, and hence considered screening unnecessary for them (33,45,46). These studies also found that some did not want to be screened because of a recent TB or LTBI test.

Migrant farmworkers in Osuchukwu et al.'s (40) study found TB an important health problem and considered themselves at risk of it. However, 66% (of a subset of 29 of them) believed that LTBI could progress to active TB and 76% believed that LTBI screening could help prevent TB. More of the (total of) 83 interviewees thought LTBI could be detected by IGRA (88%) than by TST (71%). One in ten did not think TST could detect LTBI.

Confusing LTBI for TB was common according to some authors (45,47). However, authors themselves at times did not distinguish clearly between TB and LTBI (33,41). Nonetheless, mistaking LTBI for TB was seen as an important reason for stigma, which - both perceived and enacted, within and against communities – posed barriers (41,43–45). Many Indian and Pakistani migrants in Hall et al.'s study (44) nuanced this by stating they expected an LTBI diagnosis to be less stigmatised in Australia than in India and Pakistan. Educating the public about LTBI was thought to help reduce stigma (41). Several interviewees assumed a mandatory screening could also do this - by making screening ordinary (43,44), although others in an actual mandatory setting did feel stigmatised (45) (also see **Ability to seek**).

Apart from health literacy, studies discussed 'regular' literacy and language barriers. Illiteracy among target groups was seen as an important factor to consider (41). In one study by Spruijt et al. (31), most mentioned illiteracy and 'expected complexity' as reasons for not reading an information brochure on

LTBI screening. This same study found that the use of professional interpreters enhanced screening uptake. Other authors (45) talked to people who had received a screening invitation by letter which had come in a language most recipients were not fluent in or did not understand at all. This led to people ignoring the letter or feeling insecure, because they had to ask others to translate this confidential document (45). Several authors (39,40,43,48) did not mention anything about the possibility of language barriers in their own study. Some (30,41,44) stated that participants and interviewers in their studies spoke a communal language (near) fluently. Others used non-professional interpreters (33,46) or a combination of non-professional and professional interpreters (31,32,45,47).

Authors (41,43) further reported barriers and facilitators linked to trust and expectations. A lack of trust in countries of origin's health systems sometimes led to people mistrusting the host country's. This was suggested to negatively influence screening uptake (41,43). Some expected their new country's health system to be complicated and inaccessible because this had been their experience in their home countries (41). When it came to 'believing test results', 77% of all 83 participants in Osuschukwu et al.'s study (40) would believe a blood test result over a skin test result; 17% would trust both and 5% would only believe a skin test result. Lastly, in both studies by Spruijt et al. (31,32), gossip acted as a possible barrier to screening uptake. Rumours about the amount of blood collected and 'being tested upon' made some feel hesitant to be screened (31) and caused scepticism (32).

Ability to seek

Though the wish for children to be screened was mentioned in Brewin et al.'s study (33), only Ahmad et al. (48) wrote about parental decisions on behalf of children. They attributed the almost 22% testing decline in their register-based study - which focused on asylum-seeking children - mostly to parents not consenting to blood draw. Another reason for refusal was 'fear'. The authors did not specify whose fear and of what this fear was, neither did they clarify in how many cases a reason for refusal was reported (48).

Walker et al. (46) studied migrant students at a community college in the United Kingdom (UK) and analysed questionnaires filled by students who had and who had not agreed to be screened. Many questionnaire's statements had been unanswered by members of both groups. Several not-screened students had reported a dislike of needles or blood tests. On the other hand, students' desire to protect themselves and their family was common among those who had been screened (46).

Khan et al. (30) found that people who had a family member or close friend with TB were more likely to accept screening. Also, those in Nordstoga et al.'s study (45) who knew or had known people with TB saw screening as relevant and good. Though viewing screening as 'a responsible thing to do', many had also been screened simply to obey the rules of mandatory screening (45). Several others described the possibility of programmes' mandatory or voluntary nature influencing screening uptake. In three studies (41,43,44), migrants expected little intrinsic motivation to get screened and therefore low participation in voluntary screening programmes. They gave explanations like LTBI's asymptomatic and non-acute nature (44), people being distracted by other priorities when settling in a new country (43) and "[…] all human beings need to be pushed to get tested" (41).

Spruijt et al. (32) mentioned housing issues, family reunifications and educational responsibilities as 'competing priorities' barring their voluntary screening programmes. However, being distracted by other priorities was also mentioned as a reason for missed screenings in a mandatory setting (45).

Negligence was a reason for people to not read an information brochure on LTBI (see also **Ability to perceive**) (31). Immigrants in another study (45) mentioned people are 'lazy' and advised (information on) consequences for non-attendance of their setting's mandatory screening.

More positively, some saw mandatory screening as a value, because of its potential benefits to more individuals and public health (44). Similarly, Degeling et al. (43) found that migrants preferred screening strategies that were expected to reach most migrants (and create as little stigmatisation as possible) and concluded that their participants found equitable access to health benefits important. It should be noted that both these studies talked about hypothetical screening programmes that their interviewees were not expected or invited to actually participate in. In the actual mandatory screening setting, some felt stigmatised and singled out (45). Brewin et al. (33) quoted a woman who had

declined screening because of feeling singled out and pushed. However, according to them, few others in their study felt unfairly targeted.

Authors wrote about stigma-related barriers that were more linked to people's feelings and opinions - as opposed to those primarily originating from a lack of knowledge (see **Ability to perceive**). Some participants in Hall et al.'s (44) group found the targeted screening of migrants 'unfair' and 'unjustified'. However, for the mostly young migrants in this group, the screening's – mostly individual – benefits justified targeting. Elderly were less concerned about targeting and saw it as a way to uphold the Australian health standards, which had been an important reason for their migration (44).

Ability to reach

Brewin et al. (33) interviewed people in three screening settings (primary care, a social service centre for asylum-seekers and a hospital clinic) and found that all were acceptable to the people who went there. The authors found the preference to be screened in a different setting and having a limited number of screening settings as barriers to uptake. They concluded that screening should be offered in a range of settings. Although people could and would attend the screening settings for different reasons than being screening, only four out of 53 interviewed people had declined being screened (33). Similarly, migrant students generally saw their community college, the setting used by Walker et al. (46), as an acceptable screening setting. However, about 13% preferred other settings, like the general practitioner (GP) or a hospital. Fixed appointments – as opposed to 'drop-in' ones - were preferred by almost all of Nordstoga et al.'s (45) interviewees. They expected this appointment mechanism to lower the risk of procrastination and make it easier to arrange time away from work. However, it was mostly preferred because migrants thought it would underline the mandatory nature of this screening programme (45).

Wieland et al. (47) wrote about screening centres' limited opening hours. Participants in their focus groups further discussed difficulties with transportation to screening centres and screenings taking too much time. Hall et al.'s (44) participants talked about 'time' and 'inconvenience' related to LTBI screening participation, and one of Shamputa et. al's (41) quoted interviewees mentioned participating meant one would be spending that time away from work and family (41). Another study found that finding the facilities, getting transport and covering long distances were other inhibitory factors (45). Despite this, Khan et al. (30) did not find a significant association between 'travel time to the clinic' and receiving an IGRA when studying 5311 US-bound Vietnamese immigrants in a voluntary programme. However, they did find that people who owned their own mode of transportation were more likely to agree to be screened than those who did not (30).

Two articles (43,44) discussed pre- and post-migration screening. When talking to Sudanese, South Sudanese and Vietnamese migrants in Australia about options for LTBI screening strategies and communication thereof, Degeling et al. (43) found a unanimous preference for pre- as opposed to post-migration screening. Migrants expected a lower risk of stigmatisation when screening were to happen outside Australia – and feared outrage about costs if it were to happen in Australia. Another key reason for this preference, however, had less to do with the setting than with the fact that pre-migration screening would be mandatory (see **Ability to perceive** and **Ability to seek**). In this same study, participants expected post-migration screening by GPs to raise awareness of LTBI among affected groups in Australia, in which they saw value. However, they thought post-migration would result in lower uptake than pre-migration screening, due to 'a lack of urgency', 'not being used to regular health check-ups' and 'language and access barriers' (43). Hall et al.'s (44) study described similar benefits of pre-migration screening, also suggesting expected lower risks of stigmatisation and benefits linked to its mandatory nature (see **Ability to seek**).

Ability to pay

Participants in several articles talked about the barring effect (expected) costs for migrants could have on screening uptake (41,43,44,46,47). Participants in Degeling et al.'s (43) study also considered expected costs of the testing and treatment programmes for the host country (see **Ability to reach**). Shamputa et al. (41) had a setting in which people did not have to pay for LTBI testing and treatment. Participants still mentioned personal costs as a barrier to screening. The authors did not clarify whether this was (only) based on wrong assumptions, participants' future expectations or whether they had other, indirect costs in mind (41). In another study (46), on the other hand, the eligible students that did not use an LTBI screening option were not believed to worry about costs. Degeling et al.'s (43) participants were somewhat concerned about (extra) costs linked to mandatory screening, but that did not change their preference for a mandatory screening (see previous Abilities) (43). Hall et al.'s (44) participants found uncertainty about up-front costs of screening a barrier. Without elaborating, Wieland et al. called the cost of screening a 'practical consideration' (47).

Ability to engage

Both authors and participants mentioned the need for and importance of information on LTBI (31,32,43,45,47). Participants in Nordstoga et al.'s study (45) wanted (more) information on why the screening was performed and on what would happen after a positive test. This study's authors stressed the importance of empowering people, especially in mandatory screening programmes, which impair target groups' autonomy. Providing information in a language people understand was one example of empowering measures they gave (45).

In one study by Spruijt et al. (32), key Eritrean community figures tried to reach and motivate other Eritreans to be screened. This study compared different strategies for LTBI education and screening uptake. Strategies that involved approaching people face-to-face resulted in highest uptakes, which was explained by the possibility for live explanation, emphasizing the programme's importance and directly addressing misunderstandings or scepticism. Contrastingly, strategies that used written materials, such as letters and flyers, were less effective. Key figures stated that the target audience was overloaded with information by several organisations and implied they would therefore not take letters on (non-voluntary) screening into consideration. Key figures themselves were seen as crucial to reaching the target population by some, but were mistrusted by others, depending on (assumed) Eritrean political preferences (32). Clients in the other study by Spruijt et al. (31) appreciated in-person and verbal education about LTBI and saw this as an important facilitator to screening uptake, although they believed that better timing of this information could have led to more people attending screening appointments. Collaboration with a partner organisation (COA) and screening at their location was another enhancer for screening uptake in this study, e.g., by making it easier to plan screenings, contact people in case of missed appointments and have people call friends and family eligible for screening (31).

Degeling et al. (43) found a preference for community-specific communication with 'tailored messages in appropriate languages', broadcast on specific radio channels and social media platforms (43). Key reasons for this preference were the expectation that community-specific communication would reach more people because of fewer language restrictions and at the same time could work on intra-community stigmatisation by educating people about LTBI. Uncertainty about being able to cope with a positive test, because of a lack of mental resources or social support was identified as a barrier by Shamputa et al. (41).

Lastly, Khan et al. (30) found that people who were currently enrolled in school and/or employed were more likely to be screened than those who were not. This finding could have been influenced by the fact that some employers and schools require a test for TB infection.

Factors not corresponding to one specific ability

Both Khan et al. (30) and Loutet et al. (39) found positive associations between screening uptake and factors like age (18-35 years (30) or over 50 years old (39)) and sex (female (30)). Of all individuals offered screening in Loutet et al.'s (39) study, less than 1% was under 16 years old. In this same study, smokers were less likely to take up screening, as were people from SSA and East and Southeast Asia, while those born in SSA were more likely to test positive for LTBI (39).

5.2 Study findings – Qualitative study

5.2.1 Interviews

Eight female health care workers (HCWs) were interviewed: seven MTAs and one TB nurse: six using videocalls (MS Teams), two face-to-face at the PHS they worked at. Interviewees worked at six different PHSs. One had screened the majority of children at an ASC, all others at their PHS. Though not all remembered the exact date they had started screening, most had started a few months prior to the interviews. The number of people their teams had seen so far ranged considerably: one had organized one screening and seen one person, while another mentioned they had invited 76 people and performed 37 TSTs. **Table 3** gives an overview of characteristics of the interviews and interviewees.

Table 3. Characteristics of interviews and interviewees

Code	Type of interview	Profession of interviewee	PHS	Screening location(s)
HCW 1	Videocall	MTA	A	PHS
HCW 2	Videocall	MTA	B	PHS
HCW 3	Face-to-face	MTA	C	PHS
HCW 4	Face-to-face	Nurse	C	PHS
HCW 5	Videocall	MTA	D	PHS
HCW 6	Videocall	MTA	E	PHS
HCW 7	Videocall	MTA	E	PHS
HCW 8	Videocall	MTA	F	ASC and PHS

5.2.2 Barriers and facilitators to LTBI screening uptake - Supply-side

The interviewees mentioned various (possible) supply-side barriers and facilitators to the current LTBI screening among young asylum-seeking children in the Netherlands. They are structured using the five dimensions from Levesque's framework as shown in **Figure 5**.

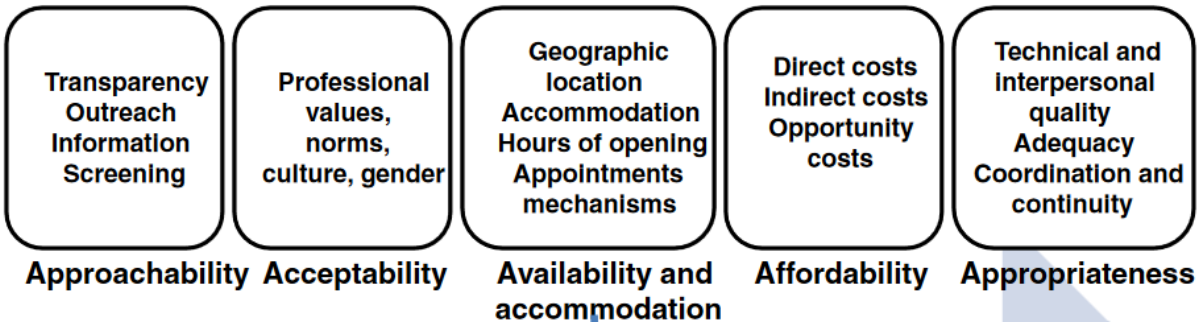

Figure 5. Levesque's five dimensions to healthcare access

Source: Levesque's conceptual framework of access to healthcare (36), 2013.

Approachability

All HCWs invited eligible children by sending an invitation letter to their parents with information about the screening. This letter contains a QR code that leads to a video explaining the screening. Some also contacted the ASC in which invited people lived, notifying its staff about the invitations and sometimes asking them to remind residents or make them aware of the screening. One HCW mentioned she would always send a list with an overview of invited people[11] and ask ASC staff to hang this for residents to check. Another HCW's team had had the intention to visit an ASC and give information there themselves, but this had not been carried out.

Most HCWs were positive about the written materials provided to them by GGN. They saw the invitation letter and information documents as appropriate, 'not too complicated' and complete. However, invitations and consultations were often in English and though one person said that most children came with at least one parent who spoke English well, problems due to illiteracy and language barriers were mentioned and expected by HCWs. One said that even when they did try to send a letter in what they thought was a family's mother tongue, people would sometimes not understand. Attempts to overcome language barriers included translation apps and telephone interpreting by an official service. One team had intended to make picture-based instructions to be used during the consultations. HCWs were positive about the different apps. Telephone interpreting was sometimes seen as necessary, but also frequently as (too) time-consuming. HCWs said it often took a long time before they were connected to an interpreter. One talked about frustrations when the line was disconnected in the middle of a consultation and they had to start all over again - often with a different interpreter. Telephone interpreting seemed to be used as a last resort. One interviewee implied they would sometimes ask children who spoke Dutch to translate for their parents. Translation by other non-professional interpreters also happened. Overall, many HCWs felt that when they saw clients, communication went well.

Nonetheless, they did not see that many clients. Attendance was low - sometimes 'very low' - according to all but two interviewees. The latter (working at the same PHS) felt that turnout was quite high, but had expected to invite more and still talked about a small group that they had screened. HCWs mostly wondered whether the invitation and information reached the clients and if so, if this was in a way clients understood. One mentioned different modes of communication:

'I don't know if they received [the information] in writing or that they told the people or explained them, because… well… we do often experience that when you give info in writing, people don't read it. So it could very well be that they did receive the information but did not read it. And that's different from telling people – talking to people and saying what will happen.' – HCW 3

[11] This list consisted of invited people's identification numbers instead of their names.

Several HCWs brought up the role of the two COLs. There, staff should give information about the screening to asylum-seekers when they first arrive in the country. Some doubted whether this was done at all, others wondered which information was given or in which way. Interviewees also doubted that ASC staff reminded people of their invitation (also see **Appropriateness**). Many experienced that most people who did visit screenings seemed unaware of what they visited (see **Table 4**). Some thought they were there for their children's vaccinations, others were simply surprised to hear about a screening. According to some HCWs, people often did not know about TB, let alone LTBI or the difference between the two. Others did not know whether clients knew the difference.

Table 4. Interviewees' experiences with and perceptions on the LTBI screening

Access dimension	**Subcategory (number of interviewees that mentioned it)**	**Quote**
Approachability	Clients not knowing about the screening or its purpose (6)	*'To be honest, I always feel like – that's an assumption, of course – people don't know what they come for.' – HCW 1*
Acceptability	Little intrinsic motivation (8)	*'It's not that they think: 'It is for me, do it for me or for my child.' I think it's more that they think: 'You want this, so fine. I'll do it." – HCW 1*
Availability and accommodation	Blood drawing at a hospital as part of the appointment mechanism (7)	*'It is a lot for people, there's many visits, because they have to go to us, […], then the hospital [for blood drawing], then back to us for the BCG.' – HCW 5*
Affordability	Possible travel expenses (3)	*'Whether that is paid for by COA or not, that I don't know.' – HCW 2*
Appropriateness	Problems with electronic patient/client files (including PHS and COA) (6)	*'The system's not working, which is a true nuisance. It generates a lot of extra work for us.' – HCW 3*

Acceptability

According to the interviewees, most clients who visited the consultations underwent the screening. HCWs were under the impression that clients accepted because they felt this was expected of them, not because of public or individual health reasons (see **Table 4**). The few refusals they had experienced were with parents who believed their children were protected by a BCG vaccination, and people who did not want their children to be injected.

Interviewees frequently mentioned ways in which they tried to overcome language barriers (see **Approachability**), also letting clients use their own translation apps. HCWs showed more flexibility towards clients by for example using a videocall to read a baby's (negative) TST, because the child could not come to the consultation. The way HCWs dealt with clients who had missed their first appointment (meant for performing a TST) and only showed up for their second (meant for reading the TST – which they did not have) was another example. Though these clients should officially be rescheduled, some MTAs had arranged with their TB physician that they could start the screening during that visit.

Other examples of professional values and norms were the expression of concerns about the screening's costs (in terms of money, time and human resources (HR)) compared to its yield: the highest number of diagnosed children was three[12]. However, one HCW nuanced this by sharing her opinion that preventing TB is (even) more important in children than in adults and that one would 'go the extra mile' for them.

All HCWs were white and female. None mentioned these characteristics or their own cultures during the interviews. A few did expect that clients' cultures or countries of origin could influence the screening uptake. They gave examples – e.g., of clients asking very few or many questions regarding the reason for the screening and clients not easily asking for help when they did not understand information - and (partly) linked these to culture and countries of origin. Two described parents from one specific country as 'more difficult' regarding accepting the screening, like refusing the injection that is part of the TST. Felt stigma in this same group was implied by one interviewee, who also mentioned a recent workshop they had had on cultures.

[12] This was the case for one PHS. In most other PHSs, no TBI infections had been found as far as the interviewed HCWs were aware.

Availability and accommodation

All MTAs screened people at their PHS. One also screened at an ASC. Fixed appointments were used and announced in the invitation letters. Some expected a higher uptake if screenings were to be organised at the ASCs.

'If we really want a good uptake […] then maybe just screening on location. And then it's not such a barrier, so to say, to come all the way to the PHS.' – HCW 5

Reasons this did not happen were mostly a combination of logistics and small numbers of invitees. Several mentioned the combination of relatively few eligible children per ASC and the short timeframe within which they officially need to be screened. Because of this, organising ASC-located screenings frequently enough would result in frequent visits to the ASCs and very small numbers per screening, which made this option not attractive to PHSs. Moreover, the one HCW who did screen at an ASC, thought the turnout was higher at her PHS than at the ASC. She partly linked this to the different groups' countries of origin.

As mentioned before, people were often surprised to hear they had visited a screening consultation. Despite being explained in the invitation letter, the appointment mechanism, too, seemed unclear to many: almost all showed surprise, and sometimes annoyance, when they heard they were expected to come back to have the TST read. Though many accepted the screening and returned for the second consultation, HCWs remembered several clients who refused and/or did not come back.
Two HCWs said the screening was not mandatory. One of them mentioned clients would sometimes ask her about this, and she would say it is not mandatory.

All interviewees talked about referring clients when they needed an IGRA, because they had little to no experience with drawing blood from children. One HCW could walk people to another department in the same building for this, but most referred to hospitals located elsewhere. Some MTAs would help people make an appointment, one mentioned asking ASC staff to help people do this. Appointments were not always possible on the same day as the TST readings. Two HCWs said that people would usually have this test done. However, they and others did view this construction as 'not ideal'. One said it took a lot of time and energy trying to arrange blood samples to be taken.

One MTA suggested their PHS's relatively good uptake might have been due to its location (next to a train station). Many mentioned distances and duration of travel as possible barriers for people to get screened. They estimated and had heard it could take people up to 90 minutes to reach their PHS from ASCs. Clients would usually have to take at least one type of public transport. For clients travelling with babies, ASC staff would sometimes order a taxi. However, arranging a taxi back from the PHS could take up to hours, despite the help of MTAs.

Affordability

Interviewees mentioned clients did not have to pay for the screening, nor for possible treatment[13]. They had not heard clients about any costs they had had to make with regard to the screening. HCWs were not sure about, but made several assumptions regarding clients' travel expenses. They said some travel expenses might be covered by COA, possibly depending on the distance between their ASC and the PHS.

'… and our PHS and the location we work most with is under this 10 kilometres [threshold], so that is… I don't think they are reimbursed for that.' – HCW 1

Two MTAs mentioned (expected) lost income on their side: they said their PHS would not receive any money for missed appointments, nor for the work they had put in preparing these consultations.

Appropriateness

Interviewees seemed to think clients were often more extrinsically than intrinsically motivated to be screened (also see **Acceptability**). Some assumed people were busy with many other responsibilities and did not prioritise this screening. Clients who did attend were sometimes expecting (and possibly – though not stated – hoping for) childhood vaccinations.

MTAs frequently mentioned collaboration with ASC staff as a factor that could influence screening attendance. Good communication was sometimes experienced with staff in 'older' ASCs, where MTAs would know whom to ask for help, for example with missed appointments. However, contact was little to non-existing in the newer and temporary ASCs (sometimes referred to by interviewees as 'pop-ups'), something interviewees saw as a disadvantage.

On contacting ASC staff: *'No, so that is just more tricky… also because it's a pop-up: all of a sudden, it's there and… well, go and see how to find contacts.' – HCW 1*

The frequent moving of asylum-seekers within the country caused many problems with continuity. Some expected this to be another reason for missed consultations. In relation to this, the electronic patient/client files were recurrently brought up during the interviews. MTAs stated that the files would often not be up-to-date regarding people's address, display incorrect information regarding countries of birth or could not be linked to COA's system. These problems led to lots of work for the MTAs, especially on finding out which children (really) were eligible for screening and which of them had a current address that made that they should be invited at the HCW's PHS.

[13] In the Netherlands, all asylum-seekers have medical insurance. They do not pay deductible excess, nor a personal contribution (49).

5.2.3 Thematic saturation

Inductive thematic saturation was reached - both at the author's discretion and when using the method described in the Methodology section. Using a base size of four interviews and a run length of two, no new themes were found. Being more strict by looking at subthemes instead, using the same base size and run length, 4% new subthemes were found, also reaching the ≤ 5% new information threshold.

Regarding deductive thematic saturation, the author expects there might be more information and examples regarding especially Levesque's fifth dimension, i.e. 'appropriateness'.

6 Discussion

6.1 Main findings

Anecdotally, LTBI screening uptake among young asylum-seekers in the Netherlands has been very low, despite being mandatory. According to interviewed HCWs, many do not show up to their screening appointment. Reasons for this are not known. The few people that do come, often do not seem to know what or why they are attending. These people, however, hardly ever refuse (for their children) to be screened.

The reviewed literature and conducted interviews showed various factors influencing LTBI screening uptake among migrants in low TB-incidence countries and young asylum-seekers in the Netherlands, respectively. Expected important barriers to the Dutch setting are the target group's probable unawareness of the screening, suboptimal communication with this group and the sometimes lacking collaboration between actors involved in the screening. The appointment mechanism, linked to the types of tests, is further expected to increase location-related barriers. Lastly, having this LTBI screening executed by specialised TB professionals has the advantage of working with dedicated and knowledgeable staff with lots of experience with the target group, but might not be the most integrated and client-centred option.

6.2 Interlinkages

Both within and between the literature and interviews, some data contradicted each other. However, there were also many instances in which findings were similar or supplementary. Interlinkages are presented between abilities (derived from the literature) and the Dutch setting's dimensions (derived from the interviews). Although arranged per ability and corresponding dimension, headings also discuss interlinkages with other abilities and dimensions.

Ability to perceive and Approachability

Both the literature and HCWs presented health literacy problems as important barriers to screening uptake. Interviewed HCWs had the impression that many clients do not seem to know what and why they are visiting. It is very well possible that this is because of a lack of knowledge about LTBI, both suggested by HCWs and found by various authors (32,33,40,41,44,46). Furthermore, both of these factors might be linked to the *used mode of communication* (i.e., invitation letters – though often not

read according to both interviewees and literature (31,45)), *language barriers* (using official interpreters is believed to enhance screening uptake (31), but is often not realistic in practice), *few outreach activities performed* (even though Dutch studies found highest screening uptakes with face-to-face outreach strategies (32) and verbal, timely explanation of the screening (31)), and often *suboptimal contact and collaboration between PHSs and ASCs* (which could turn into a facilitator if strengthened (31)) *and other actors*. Not trusting a health system might also lead to people not attending appointments (41,43). So could 'not trusting the screening (tests)', of which examples were given by both international (40) and Dutch (31,32) literature. The current Dutch government, being anti-migration (50), might increase trust issues among asylum-seekers.

Ability to seek and Acceptability

Both the literature (41,43,44) and interviewees often mentioned the possibility of people having little intrinsic motivation to get screened. Health literacy problems and having many other priorities might lead to this. In the Dutch setting, HCWs' flexibility and willingness to go the extra mile could help motivate clients. What could facilitate screening uptake, are knowing the benefits of screening on individual health, especially among young people (44), the Dutch screening's target group. Public health reasoning, too, was found to be a facilitator (43,44). It should be noted, though, that children are believed to hardly ever transmit TB (51). Moreover, transmission is often low in low TB-incidence countries, with transmission from migrants to the host population often believed to be modest (52). Some migrants thought low motivation could be tackled by mandatory screening (43,44). Although the Dutch screening officially is mandatory, this might not be known by asylum-seekers, especially when this is not always carried out by HCWs.

Stigma, too, was a common topic within the literature. It was touched upon during the interviews, but not extensively discussed. MTAs' work is focused on TB and LTBI. Their trainings on and experience with working with asylum-seekers from different cultures, together with their flexible attitudes, may help recognise and reduce stigma. On the other hand, the HCWs described factors like a lack of outreach prior to the screening and language barriers that are not always sufficiently overcome. These might increase the risk of stigma and false rumours, which were also described by previous authors studying a Dutch setting (31,32).

While one study (48) reported on many parents refusing to have their children's blood drawn, the HCWs had not experienced that among those who had attended screenings. The fact that the Dutch programme starts with a TST – and that a blood test is often not necessary - might be beneficial in this sense. Nonetheless, among the few actively refusing parents in the Dutch setting, some refused because of TST-injections instead. Moreover, (adult) migrants in another study were found to prefer IGRA results over TST results (40).

Interestingly, the possibility of clients actively weighing the pros and cons of screening – which some TB physicians do for treatment of LTBI (53) - and accepting the risk of undiagnosed LTBI progressing to active disease was never mentioned as a possibility of refusing or not attending a screening.

Ability to reach and Availability and accommodation

Studies (33,47) looking at different screening settings found that most were acceptable to their participants, although they did not talk to many refusers. The Dutch appointment mechanism – visiting the screening location at least twice (inherent to TSTs) and having to go to a hospital in case an IGRA is indicated – could increase the barring potential of factors related to abilities to reach care, e.g. arranging transportation and travel time (41,44,45,47). One could expect these – and financial barriers – to be higher when screening at PHSs (to which people have to travel) versus ASCs (where people live). Contrary, they might be lower when only offering one (IGRA) test. A systematic review (54) looked at costs and cost-effectiveness of two screening strategies: IGRA-only versus confirming a positive TST with an IGRA. It included thirteen studies from low and middle TB-incidence countries, which all found lower costs using IGRA only. Of the six articles that compared cost-effectiveness between the two strategies, (only) two found better cost-effectiveness with the IGRA-only approach (54). In 2018, the American Academy of Pediatrics (AAP) (55) recommended using TSTs in children under 2 years of age. Last year, however, Turner et al. (56) concluded IGRA to be 'an acceptable alternative' in this age group. While in children over 2 years of age both TST and IGRA can be used, the AAP recommends IGRA for children who have recently had a BCG vaccination or are unlikely to return for having their TST read (55). These seem likely possibilities for many of the Dutch programme's target group.

Ability to pay and Affordability

Though several authors (41,43,44,46,47) discussed costs as barriers, it was not commonly given as a reason why people had refused a screening (46), nor did it keep others from preferring a mandatory, not-free screening programme (43). In the Netherlands, the LTBI screening and treatment are free. Besides, by the time their children are invited, parents will most likely not be allowed to have (paid) work responsibilities yet (57), making 'income losses' a less likely barrier. However, other indirect costs, e.g., regarding transportation, are likely but unclear.

Ability to engage and Appropriateness

Some studies (58,59) show barriers on the supply-side that relate to a lack of knowledge of LTBI or little experience with the target group. These are less likely for the Dutch setting, having specialised staff who frequently work with asylum-seekers and only focus on TB and LTBI. On the other hand, the Dutch approach is siloed, while integrated, patient-centred care is especially important for refugees and asylum-seekers (60) and even makes up the *End TB Strategy's* first pillar (34). Moreover, an included Dutch article showed asylum-seekers' desire for more holistic and thorough (infectious disease) screening (31). Also, Baauw et al. (61) concluded that screenings that are more adapted to the individual could lead to better engagement of asylum-seeking parents with the Dutch health system. In this same study, asylum-seeking parents were unable to explain how this system is organised for them. As shown by included literature (41), not knowing how to move within a health system could prevent people from accessing LTBI screening. A lack of empowerment might also do that. Clients could be empowered more, e.g. by making sure correct information reaches them in an understandable way (45), thereby also strengthening people's abilities to perceive and possibly motivation. Informing people could be done by several actors, like TB staff, COA, ASC and YHC. For that, strong collaboration is important. However, current collaboration between actors within the Dutch LTBI screening programme seems infrequent and uncoordinated.

6.3 Relevance of the analytical framework

Using the Levesque framework throughout the writing of this thesis proved very useful and fitting. It helped with structure and – due to its many components and examples – thorough data extraction. The fact that the components are presented neutrally also made it easier to look for barriers without forgetting about possible facilitators.

Similar to others (62) using this framework, the author sometimes experienced difficulties with categorising data. Oftentimes, barriers and facilitators could fit several dimensions or abilities. Besides, multifaceted barriers could be described quite precisely. In these cases, instead of picking one ability, the author broke down those barriers and described their components within several abilities. Although this highlights and respects the complexity of barriers and interconnectedness of abilities, it can also make it more difficult to protect continuity and to clearly and comprehensively present ones findings.

Some abilities and dimensions received more attention than others. While this 'imbalance' challenged other authors (62), this author argues it could be a representation of how dimensions and abilities can be more and less important in different contexts. However, it should be kept in mind that an imbalance could also result from analysis bias from the author (both in preparing, conducting and analysing the interviews), biased interviewees, or bias within the reviewed literature. Although interviewees were always asked if there was anything else they wanted to discuss, using the framework in guiding the interview questions may have led to missing important information that did not fit this framework. Moreover, the coding was officially done inductively, but the framework might have subconsciously led to some steering of themes. Nevertheless, these problems might be inherent to using any framework. Also, with regard to inductive coding and the framework: other authors have had good experiences with using Levesque's framework a posteriori, stating that it fitted very well with their inductively found themes (62).

A last observation from using the framework during the interviews, was the experience of shifting from 'known' dimensions, like locations of health facilities, to assumed abilities, like clients' (in)ability to reach those facilities. It is the interviewer's responsibility to (more strictly) apply the framework, and HCWs always clearly stated these abilities were assumed, but it is something to look out for.

6.4 Limitations and strengths

6.4.1 Limitations and strengths - Thesis

The original plan for this thesis was to conduct a mixed-methods approach with an explanatory sequential design. The author planned to analyse secondary quantitative data derived from the Dutch LTBI screening programme, followed by collecting and analysing qualitative data that included interviews with MTAs, but also with parents of children who had been invited to be screened. Despite ethical clearance by KIT, this proved not possible, mostly because of privacy concerns. Although these data would likely have resulted in recommendations that are more specific to the evaluated screening, this thesis still looks at both users and providers and thereby looks at screening access in a holistic way. Besides, it does employ a multi-methods approach. Analysing and combining all these data gives a rich overview and could lead to recommendations that might also be interesting for other low TB-incidence countries.

Only one included study (45) interviewed people in a running, mandatory screening programme (as is the Dutch programme). Even so, these were immigrants, as opposed to asylum-seekers in the Dutch programme. Yet another study (48) was the only one that looked at parents making decisions on their children's behalf, as is the case in the Dutch setting. This discrepancy between populations should be taken into account when drawing conclusions and making recommendations.

6.4.2 Limitations and strengths - Included literature

Although the included literature's quality was not systematically assessed, lower levels of evidence are expected, based on their designs, methodology and applicability. Recruitment and selection procedures were not always (clearly) described, making it difficult to check for selection bias. Information was at times missing. Not defining 'migrants', 'immigrants', 'refugees' and 'asylum-seekers' or mentioning whether incentives were given are some examples. Furthermore, the type of LTBI screening discussed (IGRA, TST or both) (also see Error! Reference source not found.) and the duration people had been living in the host country at the time they were interviewed was not always specified. This makes it more difficult to compare between studies and to compare between studies and the Dutch setting.

During each study, socially acceptable answers might have been given, especially because of the possible vulnerability of some interviewees (63). Participation bias might have skewed results in studies that gave incentives to interviewees (32,40,41). Besides, stigma could have influenced people's answers in various ways (45).

While some authors (30,33,39,45,46,48) tried to look at people who had refused screening, this was not always possible. Whenever it was, it was often the case for small numbers only – and it was not always clear whether considerations could be linked to refusers themselves or whether they were second-hand or guesses from other interviewees. When trying to analyse barriers and improve screening uptake, it is important to listen to people who are not screened.

Language barriers are likely to have played a role in most – if not all – included studies. Some authors (31,32,47) extensively reflected on this possibility, while others (39,40,43,48) did not mention it. Recruitment and selection procedures might have led to underrepresentation of people who did not speak English well, something that at least one study (44) acknowledged.

Apart from having quality limitations and underrepresenting at least one important group (refusers), the reviewed articles were heterogeneous in several aspects. Among the studied populations were adult immigrants of different generations (30,32,33,40,41,43–47), paediatric and adult asylum-seekers (31,48) and refugees (47). Some authors (33,39,43–48) interviewed people from different countries of origin, others focused on one (30–32). Some (31,31,33,45,46,48) talked to people who had (had) to make an actual choice on whether they would undergo a screening or not. These might be quite different from those 'only' discussing hypothetical screenings (43,44). The different countries in which studies were set sometimes used different eligibility criteria for LTBI screening. One (46) actually gave non-eligible people the option to be screened and interviewed.

6.4.3 Limitations and strengths - Interviews

Regarding the interviews conducted for this thesis, several strengths and limitations were mentioned when discussing the methodology and the relevance of the analytical framework. Adding to those, interviewees often talked about small numbers of people, simply because they had not screened many yet. They had hardly talked to people who refused to be screened. Besides, all interviewees were white women. Regarding representation: as far as the author is aware, the majority of MTAs are white and female. However, these characteristics might influence their experiences and answers. Although recruitment was broad regarding the types of professionals addressed, almost only MTAs responded. Although they are the ones who have most experiences with the screening, as mentioned by many recruited professionals, interviewing other professionals might have added more (diverse) insights into the Dutch screening system.

Overall, this thesis has limitations related to quality and heterogeneity between the articles. Moreover, there are differences between the studied population in the literature and the population in the Dutch screening programme. These factors should be taken into account when drawing conclusions and making recommendations on how to improve LTBI screening uptake among young asylum-seekers in the Netherlands. Though the level of evidence for some discussed barriers and facilitators is low, they do give an overview of possible barriers and facilitators that could be checked for the Dutch setting.

7 Conclusions and recommendations

7.1 Conclusions

LTBI is a major global health problem that disproportionally affects vulnerable groups. To help reach pre-elimination levels of TB, the Netherlands started a mandatory LTBI screening programme among young asylum-seekers. Anecdotally, screening uptake has been low. A review of (inter)national literature found various demand-side barriers and facilitators to LTBI screening uptake. Levels of evidence and applicability to the Dutch setting vary. Based on interviews with HCWs, important barriers to the Dutch programme are unawareness of the screening among its target group, the fragmented appointment mechanism, the suboptimal collaboration between partners involved in the screening and the Dutch TB programme's siloed approach. Important facilitators are the flexibility and motivation of TB staff and the absence of direct costs for the target group. These factors should be addressed to improve the programme's uptake. However, several unanswered questions should first be answered.

7.2 Research recommendations

GGN should first use PHSs' quantitative data to objectify both the screening's current uptake and its full cascade of care (which for some includes an important extra step in the form of an IGRA test performed at a different location from the rest of the screening). These numbers are currently unknown but are necessary to help assess the size of the problem(s) and to be used as baselines when evaluating the programme. Furthermore, data of all eligible children should preferably be disaggregated by factors like age, sex, prior BCG vaccination and country of origin. These groups' uptakes should be compared to their respective LTBI incidences to see which should be targeted most. For example, focusing on groups with low uptake, but (expected) high incidences could increase the screening's yield and thereby its impact on both individual and public health level. Targeting groups is especially important in the case of limited resources (e.g. HR, time or financial), which are likely with actors like PHSs, COA and ASCs, especially in the current political climate.

Secondly, GGN should perform qualitative research among parents of eligible children to retrieve first-hand data applying to the Dutch setting. Quantitative data could be used to check whether facilitators and barriers found in the literature are probable in the Dutch setting. An example would be to check if there are statistically lower screening uptakes among BCG vaccinated versus BCG unvaccinated children, which could help hypothesise barriers related to false beliefs. These could then

be used to guide interview topics for SSIs and/or FGDs, which should be conducted with the help of professional interpreters and among both parents who refuse and those who accept.

7.3 Policy recommendations

Strengthen collaboration between actors and involve them in the screening

Strengthened collaboration between TB staff and other actors, like ASC and YHC staff could lead to clearer and more aligned communication with clients. MTAs giving ten-minute presentations to ASC and YHC colleagues on the basics and importance of LTBI screening could increase awareness and motivation to inform or remind clients about the screening. These presentations could be linked to on-location screening sessions, awareness-raising sessions (see below) and/or they could be given online. The presentations could be made part of new employees' briefing sessions. Assign spokespersons per ASC location for TB staff to contact in case of needed help with for example missed appointments.

Improve awareness and understanding of the screening

Many people who do not attend screenings probably do not actively refuse the screening but are not aware of it. Awareness should be raised by active, face-to-face outreach. This should be done in a coordinated manner. Apart from receiving information upon arrival, asylum-seekers should also hear about the screening at ASCs, e.g., by weekly outreach sessions by key figures, if possible or necessary together with rotating ASC, TB and YHC staff. YHC staff could further be asked to raise awareness of the screening during their ASC-located consultation hours, e.g., by mentioning it and/or by showing the videos (as linked to in the invitation letters) in their waiting areas. Apart from this, an unequivocal and clear explanation about the mandatory nature of the screening should be given to all people involved in awareness-raising and screening, together with an easy-to-give answer for them to give to clients who ask about this.

Invest in better communication with clients

GGN and PHSs should invest in the best possible communication with clients, both in- and outside the consultation room. In day-to-day practice, it might not always be possible to only use official interpreters. However, using children or other relatives for translation should be avoided. One option would be to try to arrange a better deal with telephone interpreter companies regarding the speed with which TB staff are helped. Using infographics and continuing the use of translation apps are other pragmatic options, as is showing videos about LTBI screening in waiting areas.

Strive for a more integrated and client-centred approach

A client-centred approach is context-dependent. Specific ideas should come from (talking to) parents (see **7.2 Research** recommendations), a process that in itself is engaging and could lead to more engagement of the target group. Though we have not heard clients' first-hand opinions, and we do not know cascade of care losses yet, it is safe to say that having to travel to a PHS twice, sometimes followed by a hospital trip for blood drawing is a lot to ask from people. Options to consider are to train MTAs in drawing blood from children; to train other HCWs who work at ASCs to set and/or read TSTs or to better enable TB staff to screen at ASCs (e.g., by broadening the maximum time between asylum-seekers arriving in the country and being screened).

Consider investigating the possibility of GPs offering LTBI screening to eligible children who visit them for other reasons.

Performing IGRAs at COLs would be another option, possibly depending on the child's age. It would probably require less staff working on the screening. Moreover, the people who do perform the venipunctures, will gain more experience in it. PHS TB staff, at the same time, will have less workload and fewer missed appointments.

7.4 Future directives

Although LTBI treatment initiation and completion were beyond the scope of this thesis, these are vital components of the LTBI cascade of care that cannot be ignored when making recommendations on an LTBI screening programme. Improving screening uptake and optimizing treatment initiation and completion should go hand-in-hand. Treatment has an impact on individual health and cost-effectiveness, but also on public health, with TB transmission and the emergence of antimicrobial resistance being important examples. Some people might only want to know their child's 'LTBI status' without receiving treatment for it. If this has been a well-informed choice from the beginning, it is not necessarily a problem. However, if suboptimal treatment initiation and completion rates result from clients accepting a screening without having had the chance of making a well-informed decision, something went wrong. Giving clients correct and understandable information on all the steps and purposes of the LTBI screening is important to reach its individual and public health full potential – and prevent problems like antimicrobial resistance. Besides, clients are entitled to be well-informed – and the empowerment that comes with it, might tackle many barriers and increase facilitators to LTBI screening.

Optimising the Dutch LTBI screening's uptake will most likely increase its yield. However, frequent evaluations will remain important to estimate the screening's impact on public health and to look at costs. Especially in the current political climate, it is important to spend money wisely by focusing on those health issues that will improve both the public's and asylum-seekers' health most.

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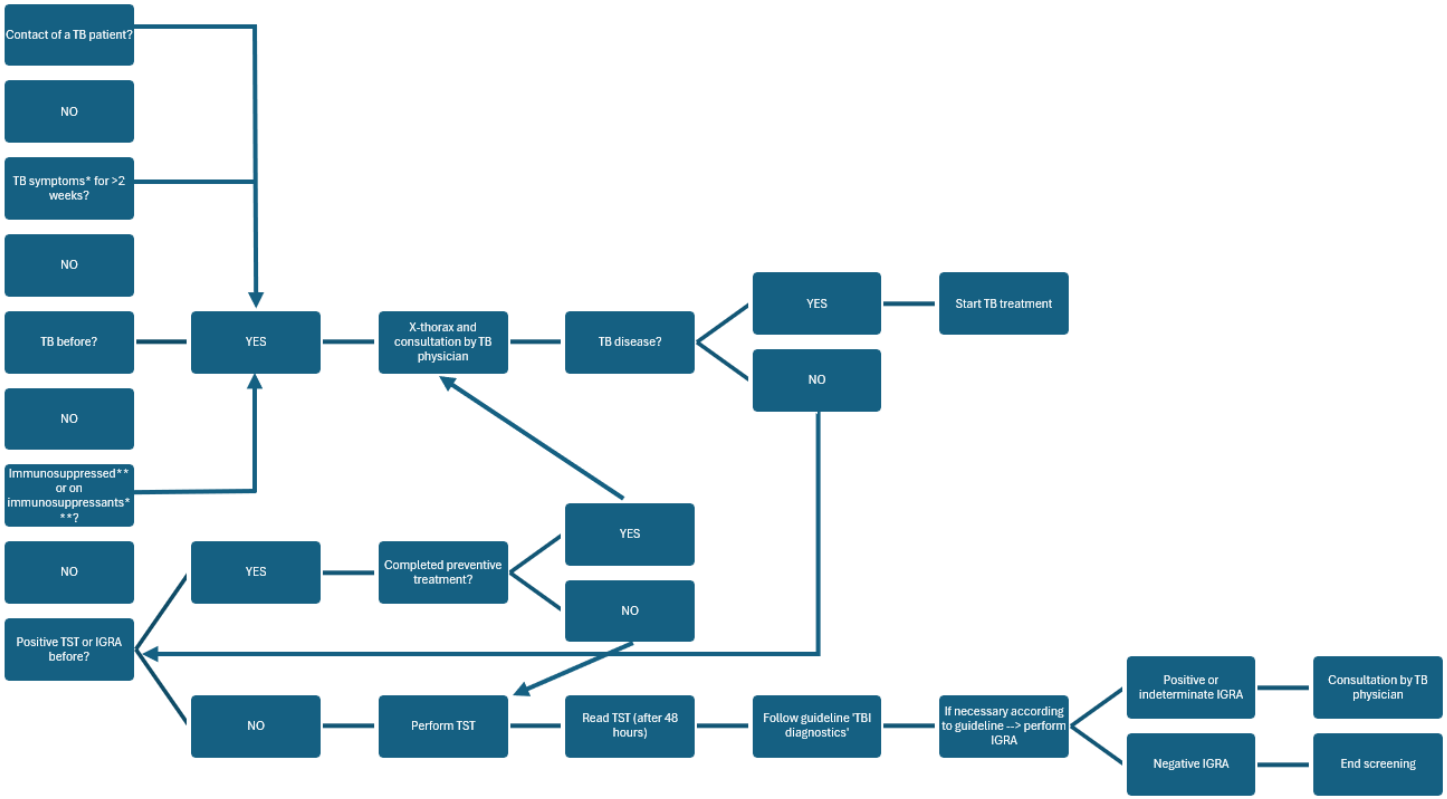
Annexes

Annex I – Algorithm for LTBI screening among young asylum-seekers

Diagram 1. Algorithm for LTBI screening among newly-arriving young asylum-seekers in the Netherlands



*TB: tuberculosis; TBI: tuberculosis infection; IGRA: interferon gamma release assay; TST: tuberculin skin test. *Symptoms: cough, fever (>38 degrees Celsius), night sweats, poor appetite/weight loss. **Immunosuppression: having inflammatory bowel disease, renal failure/dialysis, diabetes, human immunodeficiency virus, acquired immunodeficiency syndrome, malignancy, organ transplant, silicosis. ***Immunosuppressive medication: prednisone, dexamethasone, methotrexate, tumor necrosis factor-alfa inhibitors, medication for cancer treatment, medication following organ transplantation. Source: Implementatieplan Tuberculose-infectie (TBI) screening asielzoekers jonger dan 12 jaar (14), 2023.*

Annex II – Search entry

(LTBI OR "latent TB" OR "latent tuberculosis" OR "TB infection" OR "tuberculosis infection") AND (migra* OR refuge* OR asylum) AND screen* AND (use OR using OR usage OR access* OR facilitat* OR barrier* OR determinant* OR factor OR knowledge OR attitude* OR perspective* OR belie* OR qualitative)

Annex III – Overview of included articles

Table 5. Overview of included articles

Authors, year of publication, country	**Study design**	**Methods of data collection**	**Population studied (description)**	**Population studied (size)**	**Barriers (+) and/or facilitators (-) to LTBI screening (qualitative or *quantitative*)**	**Type of screening**	**Screening voluntary or compulsory**	**Information on eligible population not tested? (n)**
Ahmad et al. (48), 2019, Denmark	Retrospective register-based study	Register-based study, not specified	Asylum-seekers <16 years of age	224	parents not consenting to drawing blood (-) fear, not specified (-)	IGRA	Voluntary	Yes (49)
Brewin et al. (33), 2006, UK	Qualitative	53 SSIs on understandings of (L)TB(I), acceptability on screening and screening setting	Adult immigrants who had been offered screening in east London (in a social services centre, a primary care centre or a hospital clinic)	53	screening setting (+) TB knowledge (+) impression screening is not necessary (-) limited settings for screening options (-) preference for a different setting (-)	Not specifically described, but deducted from the text: at least TST, possibly also IGRA	Voluntary	Yes (4)
Degeling et al. (43), 2020, Australia	Qualitative	Two (migrant) community panels on perceptions on two (hypothetical) LTBI screening strategies and three different strategies to communicate screening strategies	1 panel with Vietnamese (mostly second-generation) migrants, 1 panel with South Sudanese and Sudanese (recent) migrants	20 (11 Vietnamese and 9 (South) Sudanese migrants)	voluntary test (-) mandatory test (+) pre-migration screening (+) post-migration screening (-) costs of pre-migration screening (+/-) information on LTBI (screening) (+) stigma (-) community-specific communication (+) lack of trust in health care in country of origin (-)	Not described	Voluntary and mandatory	N/A

Authors, year of publication, country	**Study design**	**Methods of data collection**	**Population studied (description)**	**Population studied (size)**	**Barriers (+) and/or facilitators (-) to LTBI screening (qualitative or *quantitative*)**	**Type of screening**	**Screening voluntary or compulsory**	**Information on eligible population not tested? (n)**
Hall et al. (44), 2020, Australia	Qualitative	21 in-depth interviews on knowledge of (L)TB(I), impact of a TB diagnosis and perceptions on three (hypothetical) targeted LTBI screening strategies	Indian and Pakistani migrants	28 (15 Indian and 13 Pakistani migrants) aged over 18 years	misconceptions on (L)TB(I) (-) lack of knowledge of LTBI (-) stigma (+/-) targeted screening (+/-) time, costs and 'inconvenience' (-) pre-migration screening (+/-) post-migration screening by GP (+/-) uncertainty regarding costs (+) voluntary screening (-) post-migration screening (+/-) mandatory screening (+)	Not described	Voluntary and mandatory	N/A
Khan et al. (30), 2021, USA	Prospective observational cohort study	5311 questionnaires on acceptance/decline of IGRA test	Vietnamese US-bound immigrants	5311	*aged 18-35 years (+)* *currently in school or employed (+)* *BCG vaccinated (+)* *having a family member or close friend with TB (+)* *private mode of transportation (+)* *female (+)*	IGRA	Voluntary	Yes (2873)
Loutet et al. (39), 2018, UK	Retrospective cohort study	GP's electronic patient record system used to check which migrants accepted a screening test	Documented migrants	5591	*region of origin (+/-) current smokers (-)* *people with chronic liver disease (+)* *people with diabetes (+)*	IGRA	Voluntary	Yes

Authors, year of publication, country	**Study design**	**Methods of data collection**	**Population studied (description)**	**Population studied (size)**	**Barriers (+) and/or facilitators (-) to LTBI screening (qualitative or *quantitative*)**	**Type of screening**	**Screening voluntary or compulsory**	**Information on eligible population not tested? (n)**
Nordstoga et al. (45), 2019, Norway	Qualitative	Six focus group discussions and three individual interviews	Immigrants in Norway, originally from 16 different countries in Africa, Asia and Europe	34	knowing others with TB (+) feeling responsible (+) BCG vaccinated or having had a previous TB test (-) having other priorities (-) health literacy problems (-) stigma (-) fixed appointments (+) transport, locating, distance (-)	Not described	Mandatory	Yes (3)
Osuchukwu et al. (40), 2017, USA	Mixed-methods*	Questionnaires with mostly close-ended and some open-ended questions	Migrant farmworkers working on the US-Mexico border	83 (61 men and 21 women)	lack of knowledge of LTBI (32-69%)[$] (-) trust in IGRA over TST (-)	Both TST and IGRA	Voluntary	No
Shamputa et al. (41), 2023, Canada	Qualitative	3 focus group discussions (FGDs) with 4-5 participants each	Immigrants who had arrived in Canada within the previous five years, aged 19 years and older, coming from eight different countries on three different continents	14 (5 men and 9 women)	lack of knowledge about LTBI (-) literacy issues (-) expected stigma in community (-) lack of trust and understanding of (Canada's and/or country of origin's) healthcare system (-) expected inaccessible healthcare (-) expected personal costs or time and money needed for testing (and treatment) (-) uncertainty about having mental resources and social support to cope with a positive test (-) voluntary nature of screening (-)	Not described	Voluntary	N/A

Authors, year of publication, country	**Study design**	**Methods of data collection**	**Population studied (description)**	**Population studied (size)**	**Barriers (+) and/or facilitators (-) to LTBI screening (qualitative or *quantitative*)**	**Type of screening**	**Screening voluntary or compulsory**	**Information on eligible population not tested? (n)**
Spruijt et al. (31), 2019, The Netherlands	Mixed-methods*	21 group interviews with 2-12 participants each	Eritrean asylum-seekers who were present at the screening	Not specified, but see Data collection	gossip regarding test (-) not reading info (-) in-person verbal education about (L)TB(I) (+) professional interpreters (+) collaboration with COA (+)	Education, health questionnaire and IGRA	Voluntary	Not described
Spruijt et al. (32), 2020, The Netherlands	Mixed-methods*	10 individual and 5 group interviews on six different strategies to reach and motivate Eritrean migrants to be screened for LTBI	Eritrean migrants	257	active, face-to-face outreach (+) engagement of key figures (+/-) outreach strategy with mainly written materials (-) competing priorities (-) perceived good health and poor risk perception (-) scepticism (-)	IGRA	Voluntary	No
Walker et al. (46), 2018, UK	Mixed-methods*	172 questionnaires regarding LTBI screening with statements and questions with 'yes' and 'no' options and space for further comments	Migrant ESOL students at a community college who filled out a student questionnaire	172	wish to protect themselves and their family (+) college as screening setting (+) dislike of needles or blood tests (-) having recently had a test for LTBI or TB and knowing that result (-) impression screening is not necessary (-)	Pretest questionnaire and IGRA	Voluntary	Yes

Authors, year of publication, country	**Study design**	**Methods of data collection**	**Population studied (description)**	**Population studied (size)**	**Barriers (+) and/or facilitators (-) to LTBI screening (qualitative or *quantitative*)**	**Type of screening**	**Screening voluntary or compulsory**	**Information on eligible population not tested? (n)**
Wieland et al. (47), 2012, USA	Community-based participatory research	10 focus groups on TB perceptions (6 with learners and 4 with staff)	Immigrant and refugee ESOL learners and staff at a diverse adult education centre	83 (54 immigrants, 29 staff)	lack of awareness about or perceived low importance of TB (-) lack of knowledge about LTBI (-) asymptomatic nature of LTBI (-) difficulties with transportation to testing centre (-) limited opening hours testing centres (-) time and costs of testing (-)	Not described	Voluntary	N/A

*BCG: bacille Calmette-Guérin; IGRA: interferon-gamma release assay; (L)TB(I): tuberculosis and latent tuberculosis infection; LTBI: latent tuberculosis infection; SSI: semi-structured interview; TB: tuberculosis; TST: tuberculin skin test; UK: United Kingdom. *Studied more than only LTBI screening. Only data relevant to LTBI screening's facilitators and barriers are presented in this table. $Percentages are based on a subset of participants (n = 29) that the authors interviewed on their understanding of LTBI and varied with the number of questions asked.*

Annex IV – Ethical clearance

Ethical clearance.pdf