Strategies to reach and motivate migrant communities at high risk for TB to participate in latent tuberculosis infection screening program: a community-engaged mixed methods study among Eritreans

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Abstract

Background: In the Netherlands, migrant populations with a high TB incidence are an important target group for TB prevention programs. However, there is a lack of insight in community-engaged strategies to reach and motivate those migrants to participate in a latent TB infection (LTBI) education, screening and treatment program.

Methods: In co-creation with Eritrean key figures and TB care staff, we designed and executed six strategies to reach and motivate Eritrean communities to participate in LTBI screening and treatment programs in five regions in the Netherlands. We registered participation in LTBI education and screening, and uptake and completion of LTBI treatment. We used semi-structured group and individual interviews with Eritrean participants and key figures, and TB care staff to identify program facilitators and barriers.

Results: Uptake of LTBI education and consequent screening varied between strategies (13% - 75% and 10% - 124% respectively). The program resulted in high treatment initiation and completion (both 97%) among those diagnosed with LTBI. Strategies using face-to-face promotion and targeting smaller groups were most successful. Reported program barriers included: competing priorities in the target group, perceived good health, poor risk perception, and skepticism towards the program purpose. TB staff perceived the program as useful but demanding in terms of human resources.

Conclusions: Migrant communities can be successfully reached and motivated for LTBI screening and treatment programs, when sufficient (human) resources are in place and community-members, well connected to and trusted by the community,
are engaged in the design and execution of the program.

Background

In most low tuberculosis (TB) incidence countries, the majority (74% in the Netherlands) of TB patients is foreign born (1) and TB rates in this group remain high for at least 5 to 10 years after arrival. (2, 3) Therefore, prevention of TB through screening and treatment of latent TB infection (LTBI) among high risk migrants is suggested as a strategy for low TB incidence countries to stimulate further decreases in TB incidence. (4, 5) In the Netherlands, LTBI screening and treatment among migrants at arrival is feasible. (6, 7) Dutch TB policy advisors are therefore considering to replace current mandatory radiological TB entry-screening among migrants by LTBI screening and treatment. However, this policy change does not target the large pool of persons with LTBI among settled migrants, who account for 60% of annual TB patients. (8) This group should therefore also be considered as a target group for TB prevention.

Reaching and motivating migrant communities to participate in TB screening programs is not without difficulty. Barriers for uptake of those programs are stigma and misconceptions about the disease, unfamiliarity with the concept of screening and preventive care, and limited attention for language barriers and cultural sensitivities. (9) Engaging community-members to reach the population of interest can help overcome these barriers: they have access to the community, can channel information, educate and mobilize their community, and (hereby) alleviate stigma and promote uptake of TB screening. (5, 10–14). Therefore, designing a culturally tailored LTBI education and screening program, engaging the community and other stakeholders would be a promising way to offer LTBI screening and treatment to
settled migrants. (13, 15)

However, we lack insight in which specific strategies - tailored to specific communities - will best promote the uptake of LTBI education, screening and treatment. We therefore engaged local Eritrean key figures and TB care staff to identify and carry out tailored strategies to reach and motivate Eritrean migrants - currently the group of migrants with highest TB incidence (1, 2) - living in Dutch communities to participate in an LTBI education, screening and treatment program.

Methods

Aim, design and setting

We used a community-engaged mixed-methods study design to develop and study strategies to reach and motivate Eritrean migrants to participate in an LTBI education, screening and treatment program. A community-engaged research approach involves community-members who actively participate in generating ideas, contribute to decision-making and share responsibility in the design and execution of a culturally appropriate program. (10, 16)

Eritrean migrants with a maximum duration of stay in the Netherlands of 10 years were eligible for this study as we expect this group to be at highest risk of TB compared to those who migrated more than 10 years ago. (1, 2, 17) We approached Public Health Services (PHS) - responsible for TB care and prevention activities - with large Eritrean communities in their region (seven PHS out of 25), of whom five agreed to participate in this study.

LTBI education screening and treatment program

TB and LTBI screening and treatment activities were performed following the Dutch guidelines (18, 19), and consisted of three components: 1) TB and LTBI education,
2) LTBI screening and 3) LTBI treatment. The education and written materials were provided in Tigrinya (the mother tongue of the Eritreans). LTBI screening and treatment was offered free of charge. Additional file 1 gives a detailed overview of program procedures.

TB and LTBI education
Based on experiences of Eritreans described in previous studies (6, 7), authors IS and DTH designed an education on TB and LTBI. It consisted of a presentation, a short film (20), and interactive quizzes. DTH invited Eritreans from his social network to participate in 3 group discussions (respectively with n = 11, n = 4, n = 3) in which we piloted and discussed the education. Participants were mainly young adult men (only two females participated) and received a 10-euro voucher for their participation. Following the group discussions, we adjusted the education session and consequently gave a one-day training to seven Eritrean key figures (see below), hired by the project, to provide the education as part of the program.

LTBI screening
LTBI screening consisted of a health questionnaire, filled out by participants, and QuantiFERON-TB Gold Plus (QFT-Plus; Qiagen, Germantown, MD).(19) To allow participants to make an independent and informed decision on participation in the screening, the PHS organized the LTBI screening at least two days after the education session of the PHS.

LTBI treatment
The PHS invited all participants with a QFT-plus test result ≥0.35 IU/ml for consultation with the TB physician. TB physicians confirmed LTBI diagnosis after exclusion of TB disease and offered eligible participants 3-month Isoniazid and Rifampicin combination therapy. TB nurses provided LTBI treatment support through regular contact based on the client’s needs.
Community engagement and strategies

We engaged seven Eritrean community-members: four adult females, one young adult men and two middle aged men, who commanded both the Dutch and Tigrinya language. They functioned as key figures in the development and execution of strategies to reach and motivate the Eritrean community. The key figures were, as such, already under contract with the PHS for other health-related projects. The key figures were active members of this study’s PHS project teams, which further consisted of a TB nurse -functioning as the PHS project coordinator-, the primary researcher (IS), and additional PHS staff. In a first project team meeting, key figures explained the characteristics of the Eritrean community within the PHS region, such as age, male/female rate, and community size. Additionally, the key figures identified places and gatherings where community-members would regularly come together. Based on this information, the project team discussed strategies to reach and motivate the community-members, including the number of community-members that could potentially be reached. Next, a plan of action was designed and discussed in a second project team meeting. Table 1 provides a detailed description of the strategies used by the PHSs.

Data collection and analyses

Quantitative data collection and analysis

During the screening all participants filled-in health questionnaires, including additional information on level of education and household composition. For each person eligible for LTBI treatment, TB physicians filled-in questionnaires about language barriers, occurrence of side-effects, challenges experienced during the treatment, and -if applicable- reason(s) for discontinuing LTBI treatment. We double entered data from questionnaires in MS-Access (Microsoft Corp, Seattle 206 WA,
USA). Additionally, we collected data from the electronic TB client registration of the PHS and from the Netherlands TB register. Before analysis, all data were merged, validated, cleaned and completely anonymized. We calculated proportions for participants’ characteristics and the cascade of care, including reasons for not initiating or completing LTBI treatment.

Qualitative data collection and analyses

We used semi-structured group interviews with the project teams (n = 4), and individual interviews (n = 10) plus group interviews (n = 5) with Eritrean participants, to evaluate strategies and identify LTBI screening and treatment program facilitators and barriers. (Table 2) After familiarization with the data, we developed and refined schemes to guide the coding of transcripts from the interviews. In regular meetings authors DTH, IS, JS discussed coding, categories and interpretation of the data.(21) We used MAXQDA (Version 11, VERBI GmbH, Berlin, Germany) to assist in analyses of qualitative data.

Results

Quantitative results

We estimated to reach a total of 904 Eritrean migrants through all strategies employed in the five PHS settings. In total 401 (44%) persons attended LTBI education and 257 persons (64% of attendees; 28% of number envisioned to reach) received LTBI screening. The uptake of LTBI education differed between strategies from 13% (Strategy 3.3) to 75% (Strategy 5). Invitations through mail and social media (strategy 1) and church meetings (strategy 6.1 and 6.2) were most promising in reaching large numbers of the target population. However, only strategy 6.1 succeeded to screen many persons (n = 70). Strategies 2.1, 2.2 (face-to-face), 4.3
(group housing) and 5 (sport club) were most successful and screened respectively 84%, 89%, and 50% of the envisioned target group. (Table 3)

Of 257 persons screened for LTBI, 30 (12%) were diagnosed with LTBI. (Figure 1)

Additional file 2 presents characteristics of population screened and treated for LTBI. Of those diagnosed with LTBI, 29 (97%) participants started and 28 (97%) completed LTBI treatment. (Figure 1) Seven (24%) participants had reported side-effects, of whom three hepatotoxicity. To overcome language barriers, professional interpreters translated during 13 (45%) and Ethiopian and Eritrean TB nurses of the PHS translated during 14 (48%) of consultations with clients. All clients received demand-driven LTBI treatment support. Additional file 3 shows results from LTBI treatment evaluation.

Qualitative results

Overall experience with the program

Overall, interview respondents appreciated the opportunity to be educated and tested for LTBI. They perceived the education as eye-opening and important, and hoped the program would continue to reach more Eritreans. Some respondents expressed their desire to be tested for other diseases, particularly HIV. Respondents on LTBI treatment perceived the treatment support as important and respectful. Furthermore, respondents were thankful for the reimbursement of screening and treatment costs: some indicated they would not have been able to cover those costs themselves.

Eritrean respondent: “Well, I think it is a huge support for us to get it for free! How would we have paid for this? I don’t know if these medicines exist in our country? So, I consider me lucky to get this opportunity.” [Individual interview 1]

Overall, PHS staff perceived the program as relevant for this target population.
However, they experienced the organization and execution of strategies as time-consuming. All strategies required a flexible attitude from TB care staff to organize promotion activities - and some LTBI screenings - on location or outside office hours. Most PHS staff doubted feasibility to execute the activities in regular practice with current available resources. Furthermore, PHS staff questioned the effectiveness of the program because of low LTBI screening uptake.

Program facilitators

Between the different strategies, we identified the following overarching facilitators: 1) active, face-to-face outreach to the community, and 2) engagement of key figures. Furthermore, respondents suggested that repeating the information and screening opportunities would increase uptake of the program.

Eritrean respondent: “People keep saying they are healthy, but we all said the same thing. I never had any complaints, I was not coughing. Still it was sleeping in my body. Now we can prevent it from developing into TB disease. Therefore, we should share our experience with those who didn’t come, if you could organize a health education again.” [Individual interview 7]

Key figure 2: “They need time to really understand the purpose and importance. (…) So, several announcements and several registration opportunities. After the first time, they will share their experience [with LTBI screening] among each other. Then organize a second time. Eventually, it will gain publicity and then they will cooperate.” [Group interview PHS 4]

Active face-to-face outreach to the community

Strategies that actively approached smaller groups in a face-to-face manner (Strategies 2, 4, 5) had highest uptake of LTBI education and screening. Key figures explained that face-to-face explanation is effective as it allows them to explain and
emphasize the importance of the program, and immediately address emerging misunderstandings and scepticism. Opposed to face-to-face contact are strategies 1, 3.3 and 6.2 using written materials, such as letters, flyers and posters. Respondents described these strategies as less effective because of the overload of information from different organizations send to Eritreans who recently migrated (61% of those screened for LTBI, migrated less than 3 years ago). Many Eritreans have difficulties understanding and prioritizing invitations. Consequently, they only take letters from the municipality into consideration, which can be recognized by their envelope and are known to contain compulsory appointments.

Engagement of key figures and community-members
Most PHS staff said that the key figures were crucial in approaching and reaching the target population. Key figures from PHS 3 were very well connected to the community: they were young, from the same generation of migrants and thus their acquaintance already originated during the journey, including transit places, to the Netherlands. However, respondents from PHS 1 and 2 reported mistrust and lack of respect towards key figures. Those key figures -often also functioning as interpreters- migrated during the nineties and are often perceived as supporters of the current Eritrean regime, for which the new generation of Eritrean migrants fled. Furthermore, media and public discourse of incidents where Dutch immigration authorities have expelled interpreters because of their connection to the Eritrean government perpetuates mistrust towards those key figures.

Key figure: “The young generation do not trust the key figures, who have been in the Netherlands for twenty years. They [young generation] think that certain things happen to them personally because of the key figures, because they are the translators and are always around procedures such as housing.” [Group interview
To overcome the issue of mistrust and to make future campaigns catchier and more appealing, some interview respondents suggested to engage Eritreans -from the same generation- who have participated in the program, for example through short promotion films.

Program barriers

We identified the following overarching barriers: 1) competing priorities, 2) perceived good health poor risk perception, and 3) scepticism about the project’s purpose. Additional file 4 provides an overview of strategy specific facilitators, barriers and suggestions for future improvements.

Competing priorities of the target population

Key figures said that it was sometimes difficult to motivate the target population to participate in the program because of competing priorities (Strategy 3.1 and 4.2). Some community-members are occupied with pressing issues such as housing, family reunification, Dutch language school appointments and examinations, and employment, hence influencing participation in the program.

TB nurse: “The men said: ‘I thought you guys came to tell us something about TB related to our housing condition. If not, why would I come? I don’t care if I have TB, anything better than living in this house’.” [Group interview PHS 2]

Perceived good health and poor risk perception

Some key figures said that at first the target population did not understand the relevance of attending the education about TB because they felt healthy, had a normal chest X-ray for TB at entry, and were unfamiliar with LTBI. Furthermore, the young age of some participants (Strategy 3.1) influenced the ability to relate the information to one’s own health: despite the education they felt the disease would not affect them.
Eritrean respondent: “I participated only because I was at home, if I had a trip somewhere, I would not have come. I always thought I was healthy, and the education was not important. (...) I only found out that I had LTBI because I did the blood test. So, I learned a lesson from my situation, and I try to explain it to others.” [Individual interview 6]

Stigma and scepticism about the project’s purpose
Some respondents felt stigmatized by the fact that the program targeted only Eritreans and not Arabic migrants. It made them feel like only Eritreans “brought TB to the Netherlands”. Furthermore, some respondents were sceptical about the project’s purpose. They suspected the “real” project’s goal was to test a new diagnostic test for TB. One key figure explained that this scepticism comes from gossip in the community about Western countries testing medical devices on African refugees, such as vaccines. Despite addressing these concerns, the scepticism may have resulted in negative peer pressure to participate in LTBI education and screening, especially in Strategy 6.2.

Eritrean participant: “They said this is a pilot project to do blood test for TB. What do you say about the fact that they are testing it on us? They did not test it on the Arab people? What if the virus stays in the needle, they are using to test this new method and infect us? It is normal to be sceptical about this.” [Group interview PHS 3]

Discussion
We engaged Eritrean key figures and TB care staff in developing and evaluating culturally-appropriate strategies to reach and motivate Eritrean communities to participate in a LTBI screening and treatment program. Strategies in which key
figures were well connected to the community, applied face-to-face promotion with individuals or small groups of community-members, and in which participants brought friends and family to the LTBI screening were most successful in terms of LTBI education and uptake. After the education session, most participants perceived the LTBI screening as important and appreciated the opportunity to get educated, tested -and if necessary- treated, free-of-charge. Twelve percent of the screened population had LTBI. LTBI treatment initiation and completion proportions were very high (both 97%).

In line with other study findings, we could reach the target group in places like churches, football clubs, language classes and community centres.\(^{13, 22, 23}\)

However, uptake of LTBI screening was suboptimal. Whereas Walker et al. showed great success, reaching LTBI screening uptake of 75%, by using English language classes as outreach activities, targeting through Dutch language classes was one of the least successful strategies in our study.\(^{24}\) In Walkers’ project the ownership and shared responsibility among school management and staff -which was limited in our study- was likely key to their success. Furthermore, the LTBI screening uptake in our study is also low compared to the uptake of contact investigation (LTBI screening) among foreign-born in the Netherlands (77%).\(^{25}\) The difference could be, partly, explained by the lack of intrinsic motivation among our target group: they are no recent (close) contacts of TB patients and therefore do not feel at high risk. Other barriers for program uptake were: other pressing priorities of participants, perceived stigma and scepticism towards the project, and perceived good health and misconceptions about TB susceptibility. These are in line with previous study findings.\(^{9, 26, 27}\)

To overcome barriers for uptake of the program, studies have identified the
engagement of community-members and stakeholders in the design and execution of the project as highly valuable. (5, 10-14, 22, 26) Some of the key figures engaged in our study were from a different migrant generation and were mistrusted by the Eritrean participants in our study. This may have impeded the uptake of the program and shows that a culture sensitive approach includes attention for cultural, political and religious differences within populations and even communities.

We tend to measure the success of a LTBI education and screening program solely by LTBI screening uptake. However, LTBI treatment initiation and completion proportions in this program were higher than those observed among TB contacts in the Netherlands. (25) This shows that the culturally appropriate approach of the program is highly successful in motivating high risk Eritrean migrants to accept and complete LTBI treatment. Furthermore, creating awareness among community-members through education could decrease stigma and potential future diagnostic delays (9) and improve uptake of future LTBI education and screening activities. (13)

This study only targeted Eritreans because they currently have the highest TB incidence among migrants living in the Netherlands. (1, 2) We are therefore limited in extrapolating study results to other migrant populations. However, considering the overlap of the study’s identified barriers with those identified in previous literature, one might expect to find similar barriers when working with other migrant populations. We offered LTBI treatment free of charge, whereas normally the cost of medication is deducted from the obligatory deductible excess (385 euros) for health insurance in the Netherlands. We therefore do not know what effect out of pocket expenditure for treatment would have on LTBI treatment acceptance. Despite these limitations, this study is unique in its evaluation and comparison of multiple strategies to reach and motivate a target population for TB prevention programs.
Our study therefore provides evidence-based information on the use of strategies which before were used more naturally and intuitively.

PHS staff considered the program as time demanding and requiring extended organizational flexibility. Given the unpredictable uptake of the screening, they doubted the feasibility and effectiveness of the program in daily practice. Yet, the organization of TB contact investigation requires similar flexibility and effort, and Dutch PHSs have proved to be very effective and ingenious in the execution of TB contact investigation. (25, 28) The effectiveness of the program could be increased by joining forces with other (infectious) disease screening programs with mutual target populations. (13, 29) This collaboration could diminish stigma surrounding one or two particular disease(s) and meet the migrants’ unmet health needs to be tested for other (infectious) diseases. (7, 13) We are currently employing models to give further insights in cost-effectiveness of community-based outreach LTBI screening programs and its impact on TB incidence and transmission.

Conclusion

Migrants eligible for TB prevention can be reached and motivated by engaging community-members well connected and trusted by the community, using strategies which apply face-to-face promotion activities. Despite awareness-raising and culturally appropriate education, the uptake of the education session varied between PHSs and strategies and was often disappointing. Competing priorities and poor risk perception of the target population were among the main barriers for the uptake of the program. The educational program proved successful in motivating the target population to participate in the LTBI screening and led to very high LTBI treatment initiation and completion rates among those with LTBI.
List of Abbreviations
CXR: Chest X-ray
LTBI: Latent Tuberculosis Infection
PHS: Public Health Service
QFT-Plus: QuantiFERON-TB Gold Plus
TB: Tuberculosis

Declarations

Ethics approval and consent to participate

The Medical Ethical Committee (METC) of University Medical Centre Amsterdam (UMC-AMC) waived the need for ethical approval of the study. The Dutch Medical Research Involving Human Subjects Act does not apply given that the study was primarily focused on finding and treating TB, and in the Netherlands, Public Health Services are licensed to conduct screening for TB infection in high risk populations. We followed the ethical principles of the Declaration of Helsinki, adopted by the World Medical Association (WMA Declaration of Helsinki 2000).

All participants gave a-priori written consent for participating in the LTBI screening. Additionally, Eritrean interviewees gave written informed consent and project team members and TB care interviewees gave audiotaped verbal consent for participation in and audiotaping of the interviews. This was deemed sufficient because we guaranteed the interviewee’s anonymity by removing any personal identifiers from the data through designated coding.

Consent for publication

Not applicable
Competing interests

The authors declare that they have no competing interests

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Authors’ contributions

IS wrote the study protocol in collaboration with the other authors, participated and supervised the design and execution of the strategies, performed data management and analyses and wrote the manuscript. DTH supervised the execution of the strategies, performed and transcribed qualitative interviews among Eritrean participants, CE was daily supervisor of IS and approved the study protocol. JS supervised the qualitative research of this study. SvdH supervised the epidemiological component of this study and approved the study protocol. All authors read, commented and approved the final manuscript.

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**Availability of data and material**

The dataset generated and/or analysed during the current study are not publicly available due to the sensitivity of this study’s data and the privacy of our participants, but are available from the Dutch Tuberculosis Data Registration Committee (Henrieke.schimmel@rivm.nl) on reasonable request.

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Tables
| Strategies | Description of strategy | PHS |
|------------|-------------------------|-----|
| **Strategy 1:**<br><i>Invitation through mail and social media</i> | The local community of PHS 1 lacked regular social gatherings, for example a church, which could be used as approaching strategy. Therefore, the PHS 1 project team approached the target group through individual invitation - consisting of a flyer in Tigrinya - by mail, for which addresses of the target group where obtained by the PHS through the municipality. Additionally, the key figure posted an invitation on a Facebook group for Eritreans in that city (approximately 120 members).<br><br>**LTBI education:** organized twice, during a week night, at two different local community centres<br><br>**LTBI screening:** approximately one week after education, on appointment, at the PHS | 1,3 |
| **Strategy 2:**<br><i>Face-to-face promotion</i> | The key figure of PHS 1 asked other key figures - working for other PHS departments - to spread the invitation and promote participation within their network during face-to-face contacts. (Additional to strategy 1)<br><br>The project team of PHS 3 identified various places - Dutch language classes, libraries, the church, and the gym - where Eritreans regularly gather. At those places, key figures approached individuals to promote the upcoming education session verbally and by handing out flyers with invitations.<br><br>**LTBI education:** organized twice, during week night, at a local community centre<br><br>**LTBI screening:** organized three times, approximately one week after the education, during week day, at the PHS | 1,3 |
| **Strategy 3:**<br><i>Dutch language classes</i> | PHS 1 and 2 used Dutch language classes (PHS 1 at one school, PHS 2 at two schools) to reach Eritrean migrants. The project team approached the school management to discuss the possibility to organize education sessions at the school. After agreement, a teacher (Strategy 3.1 - PHS 1) or the key figures (Strategy 3.2 - PHS 2) approached students to come to the education session and handed out flyers. One school handed out flyers and displayed posters in the school (Strategy 3.3 - PHS 2) to promote the education session.<br><br>**LTBI education:** organized three times, at two different schools<br><br>**LTBI screening:** approximately one week after education, at the PHS | 1,2 |
**Strategy 4: Group housing**

The key figures of PHS 2 (Strategy 4.1 and 4.2) and the TB nurse of PHS 4 (Strategy 4.3) utilized existing contacts with resident(s) of group housings. Group housings are temporary residents with up to 35 young adult females or males, who transferred from an asylum seeker centre and are waiting individual housing to come available. In consultation with the residents, the key figures organized an education session in a community space of the houses.

- **LTBI education:** during a week night, at the house
- **LTBI screening:** organized approximately one week after the education, during a week day at the house (strategy 4.3 (PHS 4)) or on appointment at the PHS (strategy 4.1 and 4.2 (PHS 2))

**Strategy 5: Sports club**

The TB nurse of PHS 2 approached an Eritrean soccer coach who organizes weekly soccer trainings for Eritrean migrants. In consultation with the coach, the TB nurse organized an education session after soccer training.

- **LTBI education:** during a week night, after training at the sport club
- **LTBI screening:** organized approximately one week after the education, during a week night, at the PHS

**Strategy 6: Eritrean church**

- **Strategy 6.1:** One PHS4 key figure was a member of the church board of trustees and obtained their consent to promote the LTBI education and screening after a church service. Interested church members were asked to sign up for the screening. Registered members received an invitation by mail. Those who did not show-up for the first screening appointment were invited a second time.

- **Strategy 6.2:** The key figure of PHS 4 brought the project researcher (IS) in contact with a priest of a church in the PHS 5 region. The priest allowed the team to promote the LTBI education and screening after a church service. After the promotion, church members were handed-out invitations with date and time of screening.

- **LTBI education:** promotion of the intervention organized after the church service
- **LTBI screening:** organized one week (PHS 4) / two weeks (PHS 5) after education session on appointment at the PHS

We arranged for church members who did not live in the PHS 4 or PHS 5 region to visit the PHS in
Table 2. Qualitative research methods

| Group interviews with project teams (n=4) | Participation | The PHS project coordinator, the key figure(s), additional PHS staff (such as the TB physician, TB nurse, Medical Technical Assistant). |
|----------------------------------------|---------------|----------------------------------------------------------------------------------------------------------------------------------|
| Time                                   | Approximately one hour |
| Location                                | At the PHS office |
| Informed consent                       | A-priori audio-taped verbal consent |
| Communication                          | Dutch |
| Transcript                              | Verbatim in Dutch (by IS) |
| Incentive                               | None |

| Group interviews with Eritrean participants (n=5) | Participation | Group interviews, each consisting of 4 to 6 participants, took place immediately following the LTBI screening |
|-------------------------------------------------|---------------|----------------------------------------------------------------------------------------------------------|
| Time                                            | Between 30 and 45 minutes |
| Location                                        | At the PHS, in a separate room to ensure privacy |
| Informed consent                                | Written a-priori informed consent |
| Communication                                   | Tigrinya |
| Transcript                                      | Verbatim translated from Tigrinya in English (by DTH) |
| Incentive                                       | None (beverages were provided) |

| Individual interviews with Eritrean participants diagnosed with LTBI (n=10) | Participation | TB nurses asked Eritrean clients on LTBI treatment for consent to be approached by phone for an invitation to participate in an individual interview and to set an appointment if willing to participate. |
|---------------------------------------------------------------------------|---------------|----------------------------------------------------------------------------------------------------------------------------------|
| Time                                                                       | Between 15 and 30 minutes |
| Location                                                                   | Location to the client’s convenience |
| Informed consent                                                           | Written a-priori informed consent |
| Communication                                                              | Tigrinya |
| Transcript                                                                 | Verbatim translated from Tigrinya in English (by DTH) |
| Incentive                                                                  | A 10-euro voucher |

LTBI Latent tuberculosis infection, PHS Public Health Service, TB Tuberculosis

* One project team (PHS 5) was not interviewed because activities were organized, in consultation with the PHS 5 TB care staff, ad-hoc by the authors IS and DTH.
Table 3. Uptake of LTBI education and screening, ranked from most successful to least successful strategy

| PHS   | Strategies                                      | Numbers envisioned to reach n | Participated in LTBI education n (% of n envisioned to reach) | Received LTBI screening n (% of n LTBI education) | (% of n envisioned to reach) |
|-------|-------------------------------------------------|------------------------------|---------------------------------------------------------------|-----------------------------------------------|------------------------------|
| Total |                                                 | 904                          | 401 (44%)                                                   | 257 (64%)                                    | (28%)                        |
| 4     | Strategy 4.3: Female group house                 | 35                           | 25 (71%)                                                   | 31 (124%)                                    | (89%)                        |
| 3     | Strategy 2.1: Face to face promotion            | 47                           | 30 (64%)                                                   | 62 (124%)                                    | (84%)                        |
|       | Strategy 2.2: Face to face promotion            | 27                           | 20 (74%)                                                   |                                              |                              |
| 2     | Strategy 5: Male football team                  | 20                           | 15 (75%)                                                   | 10 (67%)                                     | (50%)                        |
| 2     | Strategy 4.1: Female group house                | 20                           | 12 (60%)                                                   | 9 (75%)                                      | (45%)                        |
| 4     | Strategy 6.1: Eritrean church                   | 200                          | 65+ (33%)                                                  | 70 (108%)                                    | (35%)                        |
| 2     | Strategy 3.2: Dutch language classes            | 50                           | 30 (60%)                                                   | 16 (53%)                                     | (32%)                        |
| 1     | Strategy 1: Invitation through mail and social media | 175                      | 44 (25%)                                                   | 32 (73%)                                     | (18%)                        |
| 1     | Strategy 3.1: Dutch language classes            | 20                           | 12 (60%)                                                   | 3 (25%)                                      | (15%)                        |
| 2     | Strategy 3.3: Dutch language classes            | 60                           | 8 (13%)                                                    | 7 (88%)                                      | (12%)                        |
| 2     | Strategy 4.2: Male group house                  | 50                           | 30 (60%)                                                   | 5 (17%)                                      | (10%)                        |
| 5     | Strategy 6.2: Eritrean church                   | 200                          | 110 (55%)                                                  | 11 (10%)                                     | (6%)                         |

PHS Public Health Service, LTBI Latent tuberculosis infection

a Persons in the church who registered-after promotion talk after church service- to receive an invitation by mail for extensive education session and LTBI screening at the PHS

b One household member had to register to receive an invitation which was valid for the whole household

c Number of invitations handed out after the promotion talk after the church service

Figures
Figure 1

LTBI screening and treatment cascade of care

IGRA: Interferon Gamma Release Assay, LTBI: latent tuberculosis infection, TB: tuberculosis

*Reasons for no / not completing LTBI screening:
- Not eligible for LTBI screening (n=4)
- Blood sampling failed (n=6)
- IGRA result indeterminate / missing (n=4)
- Refused second blood sampling (n=1)