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Short Communication

Tuberculosis screening for prospective migrants to high-income countries: systematic review of policies



A. Garner-Purkis ^{a,*}, P. Hine ^b, A. Gamage ^c, S. Perera ^c, M.C. Gulliford ^a

^a King's College London, School of Population Health and Environmental Sciences, London, UK

^b Liverpool School of Tropical Medicine, Clinical Sciences Department, Liverpool, UK

^c Ministry of Health, Nutrition and Indigenous Medicine, Sri Lanka, Management Development and Planning Unit, Colombo, Sri Lanka

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ABSTRACT

Objective: To compare predeparture tuberculosis (TB) screening policies, including screening criteria and screening tests, and visa requirements for prospective migrants to high-income countries that have low to intermediate TB incidence and high immigration. **Study design:** Systematic review of policy documents.

Methods: We systematically identified high-income, high net-migration countries with an estimated TB incidence of <30 per 100,000. After initial selection, this yielded 15 countries which potentially had TB screening policies. We performed a systematic search of governmental and official visa services' websites for these countries to identify visa information and policy documents for prospective migrants. Results were summarized, tabulated, and compared.

Results: Programs to screen for active TB were identified in all 15 countries, but screening criteria and screening tests varied substantially between countries. Prospective migrants' country of origin represented an initial assessment criterion which generally focused on elevated TB incidence based on World Health Organization data but also focused on the countries of origin that sent the most migrants, and this varied between destination countries. Specific categories of migrants represented a second assessment criterion that focused on duration of stay and reasons for migration; the focus of which showed variation between the destination countries. Specific screening tests including medical examination and chest X-rays were used as the final stage of assessment, and there were differences between which tests were used between the destination countries.

Conclusions: Current approaches to migrant TB screening are inconsistent in their approach and implementation. While this variation might reflect adaptation to local public health situations, it could also indicate uncertainty concerning optimal strategies. Comparative research studies are needed to define the most effective and efficient methods for TB screening of migrants.

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* Corresponding author. King's College London, School of Population Health and Environmental Sciences, Addison House, Guy's Campus, London, SE1 1UL, UK. Tel: +0207 848 6631; fax: +207 848 6620.

E-mail address: aphragarnerpurkis@gmail.com (A. Garner-Purkis).

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Introduction

Global migration continues to increase. In 2017, it was estimated that some 258 million people were living outside their country of birth, up from 173 million in 2010.¹ Migration results from ‘push’ factors that influence migrants’ reasons for leaving home countries and ‘pull’ factors that are associated with the need for skilled and unskilled migrants in other countries. The health of migrant populations is of increasing concern. Tuberculosis (TB) is much more frequent in the low-income countries that often provide a key source of migrant labor for emerging markets and high-income countries. Mass human migration creates an opportunity for infectious diseases such as TB to spread from these high-incidence source countries to low-incidence destination countries.² In low-incidence countries, migrants from high-incidence countries account for a high proportion of new TB cases.³ As one element of overall TB control efforts, governments of high-income countries, particularly those with substantial in-bound migration, have developed and implemented policies to test migrants for possible active TB disease. These strategies aim to reduce the spread of TB into the general population. However, there is a lack of evidence concerning the effectiveness of migrant screening.⁴ There is also uncertainty concerning the selection of migrants for testing and the screening tests to be employed.^{5,6} This study aimed to compare TB screening policies, including screening criteria and screening tests, and related visa requirements for migrants in selected high-income countries with intermediate-to-low incidence of TB and high levels of in-bound migration. As the countries have high inbound migration, this provides potentially greater motivation to control imported infectious diseases and therefore made it more likely that they would have specific TB screening procedures for migrants.

Methods

Focus and search strategy

For the purpose of this review, we define ‘migrants’ as persons migrating for work, education, or for family reasons,⁷ in which the individual has taken an official path to migrate (temporarily or permanently) to the destination country. To identify policy documents for countries where TB screening of migrants is of relevance, we initially identified countries with TB incidence of <30 per 100,000 as per World Health Organization (WHO) 2016 data, World Bank income category ‘high-income’ and net migration of $\geq 10,000$ per year. We performed an initial review of European Union countries based on previous published literature^{3,5,6,8,9} and an internet search. One author (AGP) systematically searched government websites for each country to identify TB screening guidelines and visa information for prospective migrants. Documents were identified in French, Spanish, and English and translated accordingly. We contacted government ministries directly to request further information where required. For Chile and Saudi Arabia, the visa information for migrants is organized by country of origin and data for these countries were taken from

websites of their UK Embassy. Additionally, the search included documents from the Gulf Cooperation Council (GCC) which provides policy guidance for the Gulf States.

Data analysis and synthesis

Data were extracted from source documents (Appendix). Initial appraisal identified three common approaches to migrant TB screening for each destination country. These included selection for screening according to migrant country of origin, selection based on the circumstances of the migrant’s visit, and selection of TB screening tests. We extracted data for each of these aspects, tabulated data, and made comparisons to enable synthesis of our findings. All the countries were searched for following the same steps and were found to have the same common features as discussed above.

Results

We identified screening programs for active TB in all 15 selected countries and in the GCC guidelines. We identified predeparture screening for prospective migrants for 14 of the 15 countries, only Japan did not require predeparture screening. Table 1 presents the predeparture screening requirements and tests for the remaining 14 countries and the GCC. Screening guidelines at the predeparture stage employed three levels of assessment, focusing on screening criteria and screening tests including selection by country of migrant origin and migrant category, and the selection of TB screening tests. Thus, the screening process can be conceptualized as using migrant origins and migrant categories as initial screening criteria with TB screening tests reserved for migrants from groups deemed to be at higher risk.

Country of migrant origin

The 14 destination countries used migrant country of origin to identify individuals for predeparture TB screening. However, destination countries varied widely in the target migrant countries of origin that they selected for screening and on the evidence used to guide this decision. Four countries used WHO-defined high TB incidence, but this ranged from estimated TB incidence of ≥ 20 cases per 100,000 population for the USA to estimated TB incidence of ≥ 40 cases per 100,000 population for the UK. New Zealand screened migrants from countries that were not included on a list of countries with a low-incidence of TB, though the source for these estimates was not identified. The other countries had different reasons for their decisions to screen different migrants: two countries screened migrants from all countries; three countries did not clearly state the reasons for the decision; and four destination countries selected those countries of origin sending the most migrants. These destination countries were all Gulf States. In the GCC policy document, 11 countries of origin were identified as requiring to have predeparture health screening programs in place in order for migrants to work in the Gulf states. The reasons given are that three million migrant workers come from these 11 countries, and these tests are used to ensure physical fitness.

Table 1 – Comparison of active TB screening assessment criteria for countries included in the review.

Destination country	Origin countries selected (basis for country selection)	Migrant categories selected	Screening tests used
Australia	China, India, Indonesia, Malaysia, Pakistan, Philippines, Russia, South Africa, South Korea, Thailand, and Vietnam (Based on WHO data)	Length of stay: temporary entry: >3 months	CXR (aged 11+ years)
Bahrain	All countries: required GAMCA clinics only: Bangladesh, Egypt, Ethiopia, India, Indonesia, Nepal, Pakistan, Philippines, Sri Lanka, Sudan, and Syria	Category of visa: Expatriate job applicant	Medical examination; CXR
Canada	Any country that meets the WHO 2009 definition. (WHO 2009 definition of high TB incidence, ≥ 30 per 100,000 for all forms of active TB [3-year average]).	Length of stay: temporary: >6 months stay residence: + have spent 6 or more consecutive months in high TB incidence country	Medical examination; CXR (aged 11+ years) ^b
Chile	^a	Category of visa + length of stay: work contract, student for >90 days, temporary residence (work, study, and family)	Medical examination
GCC	Bangladesh, Egypt, Ethiopia, India, Indonesia, Nepal, Pakistan, Philippines, Sri Lanka, Sudan, and Syria	Not mentioned	Medical examination; CXR
France	Armenia, Cameroon, Mali, Morocco, Senegal, Tunisia, Turkey, and Romania	Category of visa: family reunification	Medical examination; CXR; verification of vaccination status
Israel	All countries	Category of visa: work visa approved for limited period of time	Applicants must obtain a 'certificate of medical examination including normal results in tests for tuberculosis'
Destination country	Origin countries selected (basis for country selection)	Migrant categories selected	Screening tests used
Kuwait	All countries	Category of visa: all except private or government working entrance visa or temporary residence	Not stated
New Zealand	If not listed as low-incidence TB countries (54 countries)	Length of stay + category of visa: 6 months or more (student/worker)	Medical examination; CXR ^c
Oman	India, Pakistan, Philippines, Bangladesh, Indonesia, Sri Lanka, Egypt, Syria, Sudan, and Ethiopia	Category of visa: for employment and family residence (aged 21+ years), Student	Not stated
Qatar	Bangladesh, Egypt, Ethiopia, India, Indonesia, Nepal, Pakistan, Philippines, Sri Lanka, and Sudan	Category of visa: job seekers	Not stated
Saudi Arabia	^a	Category of visa: job seekers (not for family or student visas)	Medical examination; CXR
UAE (Abu-Dhabi)	Indonesia, Sri Lanka, and Ethiopia	Category of visa: all migrants intending to apply for a UAE visa	CXR (18 + years)
UK	102 countries (countries where WHO estimated TB incidence ≥ 40 per 100,000 population)	Length of stay: 6 months or more	CXR abnormal CXR: sputum smear
USA	WHO estimated TB incidence of ≥ 20 cases per 100,000 population	All and if 2–14 years and from high-incidence country more clinical screening required	Medical examination; CXR (aged 15+ years) ^d

GCC = Gulf Cooperation Council; GAMCA* = Gulf Approved Medical Clinics Association; UAE = United Arab Emirates; CXR = chest X-ray.
 *GAMCA—an association established to provide medical examinations to those seeking work to join labor market in the GCC countries.^{*1}
 *1 International Labor Organization., 2016. *Law and Practice: The recruitment of low-skilled Pakistani workers for overseas employment*. Pakistan: International Labor Organization.

^a A medical report was required for the UK and USA; however, owing to the available information only being accessible on each country's Saudi Arabian embassy website, this was not able to be checked for every country. This was the same for Chile.
^b For those with evidence of previous TB, suspicious CXR or not screened due to pregnancy.
^c For individuals from or having visited a country that is not low-incidence for TB/spent more than 3 months in the last 5 years in a country not at low-incidence for TB.
^d If symptoms of TB or they have HIV, then required to complete three sputum specimens.

Circumstances of migrant's visit

There were 13 countries that used the circumstances of the migrant's visit to determine the need for screening. Three countries used length of stay as a criterion (for Australia, those seeking entry of greater than three months, required TB screening if they originated from designated countries of origin); eight countries used category of visa (Qatar used category of visa with job seekers from selected countries required to have TB screening); two countries used a combination of length of stay and category of visa (Chile used both criteria—for a student staying longer than 90 days screening was required). These categorizations were used in conjunction with the country of origin to select migrants for individual TB screening.

Screening tests used

The TB testing procedures required by countries and the GCC are outlined in [Table 1](#). Most countries employed a combination of medical examination and chest X-ray to identify possible cases of TB. Chile did not specifically require a chest X-ray but required a medical report to certify that the applicant did not have contagious diseases. Three countries, including the UK, employed the chest X-ray alone as the primary screening procedure for TB. Several countries also set a lower age limit, ranging from 11 to 18 years, on the requirement for a chest X-ray. The specification of medical examination requirements also varied between countries: Canada recommended specific questions concerning symptoms of pulmonary TB, while in other countries, the form of examination was less clearly specified.

Discussion

Main findings

The review identified 15 countries with screening programs for active TB for migrants. Predeparture screening involves three levels of initial assessment including (1) country of migrant origin, (2) migrant category, and (3) TB screening tests. These factors determine which migrants require further TB screening. We identified considerable variation in both initial assessment, including by country of origin, and in mode of further clinical assessment.

Strengths and limitations

This represents the first study to systematically review screening for prospective migrants using national policies and visa instructions for the migrants. Restricting our search to public websites and language restrictions may have introduced ascertainment bias. However, this mirrors the experience of potential migrants and clinicians providing predeparture screening.

Variability in screening policy and justice

The wide variability is indicative of uncertainty concerning optimal policies and suggests that countries screen based on

criteria which may not be evidence-based. Any screening program requires careful assessment of possible benefits and harms. Predeparture TB screening differs from mass population screening in that it is a precautionary step taken before individuals enter the destination country. There are certain selective criteria for who should be screened, and there is no choice for the population being screened. This raises the question of acceptability and ethics of the screening program for the migrant population. In migrants' countries of origin, confirmatory tests may be expensive to access, and TB treatment and follow-up may not always be easily accessible, consistent or free of charge. By requiring access to TB testing, predeparture screening might also benefit the migrant's country of origin, if this facilitates detection and treatment of TB. While there are no studies to date that specifically evaluated the acceptability of predeparture screening, a study in East London¹⁰ showed that TB screening had high acceptability in migrants following arrival. It was valued and viewed as a socially responsible activity.

Conclusion

This review highlights a lack of standardization of TB screening policies across a range of high-income countries. This variation might be partly explained by contextual differences between countries, including differences in the numbers and origins of prospective migrants. This variation may also reflect a lack of clear evidence as to which approach is more efficient and cost-effective at identifying migrants with active TB, because trials and other suitable comparative studies have not been conducted. The variations identified in this review demonstrate that it is not known which approaches are most effective and efficient for detecting TB in migrant populations. Prospective comparative effectiveness studies are required to provide evidence concerning the optimal TB screening policies.

Author statements

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Ethical approval

As this short communication reports on publicly available data, ethical approval was not sought.

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Competing interests

None declared.

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