UK Health Security Agency

UK pre-entry tuberculosis screening report 2020

Contents

Executive summary 3
Acknowledgements 4
1. Tuberculosis screening clinics 5
2. Methods 7
3. Demographics of all applicants 8
5. Conclusion 22
6. References 23
7. Appendices 24
About the UK Health Security Agency 27

Executive summary

The tuberculosis (TB) pre-entry screening programme has been operational in 101 countries since replacing on-entry screening at UK airports in March 2014. The programme is delivered in collaboration with the UK Home Office. The UK Health Security Agency (UKHSA) – formerly Public Health England (PHE) – provides advice, training, clinic audits, and data and information to support the quality assurance and evaluation of the programme.

This report presents data from 152 overseas clinics for the period between January 2014 and December 2020. Since programme roll out, there have been significant improvements in data quality and collection. We are still working with partners to improve data quality.

Pre-entry screening data for 2020 was available for 340,623 UK visa applicants compared to 360,548 in 2019. This slight decrease was achieved despite the coronavirus (COVID-19) pandemic. However, 59% of the personal identifiable information from the non-IOM clinics couldn't be collected because of lockdowns. The largest screening volumes in 2020 were in India [27.6% (94,135 out of 340,623)], China [25.7% (87,573 out of 340,623)], Nigeria [7.6% (25,898 out of 340,623)] and Pakistan [6.8% (23,143 out of 340,623)].

During 2020, there were 385 active tuberculosis cases detected through pre-entry screening, giving an overall tuberculosis rate of 113.0 per 100,000 applicants. The tuberculosis detection rate has decreased from 168.4 in 2014 to 104.6 in 2016 before stabilising at approximately 105 per 100,000 over the past 3 years. There was a 7.8% increase in the rate between 2019 and 2020 (105.1 to 113.0 per 100,000). The tuberculosis screening rates of most countries were within the ranges expected from UK surveillance of active tuberculosis cases of recent migrants from those countries.

This report provides a summary of pre-entry tuberculosis screening activities for the UK during 2020. It also provides trends for TB detection by the programme between 2014 and 2020.

Acknowledgements

We gratefully acknowledge the provision of data by the International Organisation for Migration (IOM), other overseas panel physicians, the Foreign and Commonwealth Office (FCO) posts and the Home Office.

We also acknowledge the help and support of Robert Sookoo, Nicol Black, Vinay Ketkar, Sophia Masud and Bharat Sibal (UKHSA Port Health Unit at Heathrow).

We are thankful for support of the TB Surveillance Unit for the provision of enhanced tuberculosis surveillance system (ETS) data.

Authors

This report was prepared by Morris Muzyamba and Loes WalsGriffith – Tuberculosis Unit (TB Screening Team), National Infection Service, UKHSA.

1. Tuberculosis screening clinics

Introduction

The UK experienced an increase in rates of tuberculosis (TB) and case numbers between 2000 and 2011. Rates peaked in 2011, and since then have decreased by approximately one third. Despite these reductions, the UK still has the third highest TB rate in Western Europe (1).

The UK TB rate has been below 10 per 100,000 since 2015; the rates for England reduced to below 10 per 100,000 in 2017. England, like the rest of the UK, now meets the World Health Organization (WHO) definition of a low incidence country. In 2020, UK TB notifications decreased by 12.9% compared to 2019 (cases reduced from 5,117 in 2019 to 4,458 in 2020; a decrease of 14.3% in the TB rate from 7.7 to 6.6 per 100,000) (2). TB in the UK is concentrated in urban areas and among specific risk groups, such as people with socio-economic risk factors and particularly those who were born in high TB incidence countries. During 2020, where place of birth was known, 72.3% of UK TB cases were among non-UK born persons, a rate 16 times higher than UK born cases (3).

The high percentage of non-UK born cases and the cost of treatment to the NHS means that pre-entry screening of migrants has the potential to reduce the number of active TB cases and the risk of transmission, with financial benefits to the NHS and public health benefits to the population. Pre-entry screening for active pulmonary TB was rolled out from 2012 to replace on-entry TB screening at the airports and help decrease prevalent TB cases in non-UK born individuals in the UK. The high TB incidence countries included in the programme were based on the 2012 WHO TB incidence estimates.

Aims and objectives of the report

The aim of this report is to present the current figures from the pre-entry screening programme for active pulmonary TB, show trends and provide a comparison by demographic and geographical characteristics. This provides insight into the effectiveness of the programme to support quality assurance. A comparison of numbers detected overseas and domestically in the UK will also be presented. Through data analysis and information, the report helps to inform quality assurance, identify issues associated with individual screening clinics and provide feedback for stakeholders.

Pre-entry screening

Visa applicants who intend to stay in the UK for longer than 6 months and who reside in a high TB incidence country (more than 40 per 100,000), are required to take part in the UK pre-entry TB screening programme (4). This is mandated by the UK Immigration Act 1971, paragraph

2(2), schedule 2 (5) and was based on a successful pilot jointly carried out by the Home Office and the International Organization for Migration (IOM). This pilot took place between October 2005 and September 2012 in 15 countries (Bangladesh, Burkina Faso, Cambodia, Cote D'Ivoire, Eritrea, Ghana, Kenya, Laos, Niger, Pakistan, Somalia, Sudan, Tanzania, Thailand and Togo). The programme was rolled out by March 2014 to 101 countries (6, 7) with WHO estimated TB incidence of more than 40 per 100,000 population for 2012 (8) (Figure 2). TB pre-entry screening is now carried out by both the IOM and non-IOM panel physicians.

The UK pre-entry TB screening programme is similar to the screening programmes used by other countries. Most notably, the UK partners with countries from the Migration 5: Australia, Canada, New Zealand and USA but differs from the other 4 programmes as we only screen for TB while they screen for many other infectious and non-infectious diseases (8). Pulmonary TB screening is based on chest X-rays (CXR) and symptom enquiry, followed by sputum smear and culture when TB is suspected (9). Applicants with pulmonary TB are required to successfully complete treatment before they can proceed with their visa application.

2. Methods

Data collection

This report presents data collected from IOM and non-IOM clinics. IOM data was collected by IOM panel physicians, entered via a secure web-based IOM system and collated by the central IOM office in Manila. This data was then securely transferred to UKHSA. Data from non-IOM providers was collected by the clinics, collated via the overseas UK visa application centres and securely transferred to UKHSA.

Because it takes up to 2 months for sputum culture results to be known, we asked non-IOM clinics to send us all sputum culture updates and line lists of all TB cases detected between January and December 2020. Data from IOM clinics was updated via their web-based portal prior to submission to us. Overall, 46.6% (48 out of 103) non-IOM clinics sent sputum culture updates and a line lists of confirmed TB cases in 2020 which resulted in an additional 20 culture confirmed cases. This increased the number of culture confirmed cases and included cases not originally identified by screening. Table A1 in the Appendix shows which countries have IOM and non-IOM clinics.

Data cleaning and analysis

Data was cleaned, validated and missing values completed where possible. Where possible, discrepant examination dates were deduced from other dates such as issue date of medical certificate. Whenever possible, missing values were deduced from other variables. Variables from IOM and non-IOM data were harmonised and merged into a common data set.

Clean data was imported into Stata v.15 (Statacorp LP, College Station, TX, USA) which was used for all statistical analyses. Graphs and tables were created with MS Excel 2016 and exported to MS Word (Microsoft Corp, Redmond, WA, USA).

Data from the period between January 2014 and December 2020, as received by 17 July 2021 was used in this report.

3. Demographics of all applicants

Pre-entry screening data for 2020 was available for 340,623 UK visa applicants which was similar to the number of applicants in 2019 (360,548). Data from non-IOM and IOM clinics is presented together throughout this chapter, except where noted otherwise.

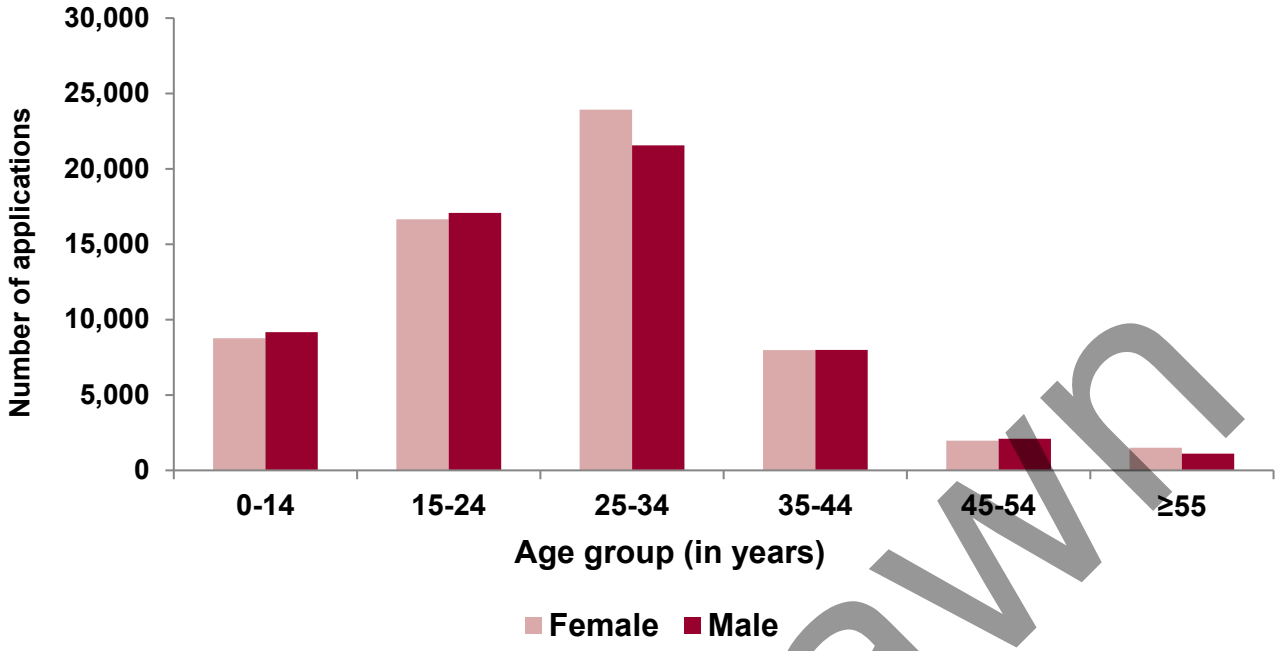
Age and sex distribution of all applicants

Of all applicants screened by the IOM (see Table A1), the median age for applicants was 26 years and the largest number of applicants was in the 24 to 34 year age group (38.0%, 45,481 out of 119,807), followed by the 15 to 24 year age group (28.2%, 33,734 out of 119,807). Only 5.6% (6,679 out of 119,807) of the applicants were aged 45 years and over (Figure 1). There were more male applicants in all age groups except the 25 to 34 and those aged 55 years or more age groups.

Distribution of all applicants by screening provider, country and region

As of 31 March 2014, screening was being conducted in approved clinics in 67 countries on behalf of 101 countries. Some countries do not have screening clinics and applicants are screened in neighbouring countries. For example, applicants from Lesotho are screened in South Africa. Data was available for 96 out of the 101 countries in 2020. We estimate that the remaining 5 countries (Papua New Guinea, Turkmenistan, Kiribati, Tuvalu and Vanuatu) from which data was missing, screened only 0.1% (255 out of 340,623) of the total UK visa applicants received for 2020 (10).

Figure 1. Distribution of IOM applicants by age group and sex, 2020



Of the applicants that underwent screening in 2020, 39.9% (135,971 out of 340,623) and 39.7% (135,064 out of 340,623) took place in South East Asia and the Indian subcontinent, respectively. Most of the applications from South East Asia were from China, which accounted for just over a quarter [25.7% (87,573 out of 340,623)] of all applications. India contributed the largest number of applicants consisting 27.6% of total number screened (94,135 out of 340,623). 17.2% (59,011 out of 340,623)] were from Africa and a small number of applicants were from Europe and the Commonwealth of Independent States[1] (CIS) [2.1% (7,200 out of 340,623)], the Middle East [0.7% (2,448 out of 340,623)] and South and Central America [0.3% (939 out of 3,623)].

The number of applicants by region between 2018 and 2020 is shown in Figure 3. The number of applicants substantially increased in every region between 2018 and 2019 except Europe and the CIS and South and Central America where only modest increases of 0.9% and 0.8%, respectively, were observed. Between 2019 and 2020, the number of applicants decreased in all regions except for Africa (5.4% increase) and the Indian subcontinent (2.1% increase). Although numbers remained low for both South and Central America and the Middle East, they decreased by 24.9% and 27.5% (3,259 to 2,448 and 1,285 to 939, respectively).

[1] Europe and CIS includes data from Azerbaijan, Belarus, Georgia, Kazakhstan, Moldova, Russia, Ukraine and Uzbekistan.
[2] South East Asia includes data from China, Hong Kong, Mongolia, South Korea and various Pacific Island Countries in addition to 10 of the South East Asian countries.
[3] Middle East includes data from Afghanistan, Iraq and Jordan.

Figure 2. Map of the countries in the UK pre-entry screening programme and the phase in which each country joined

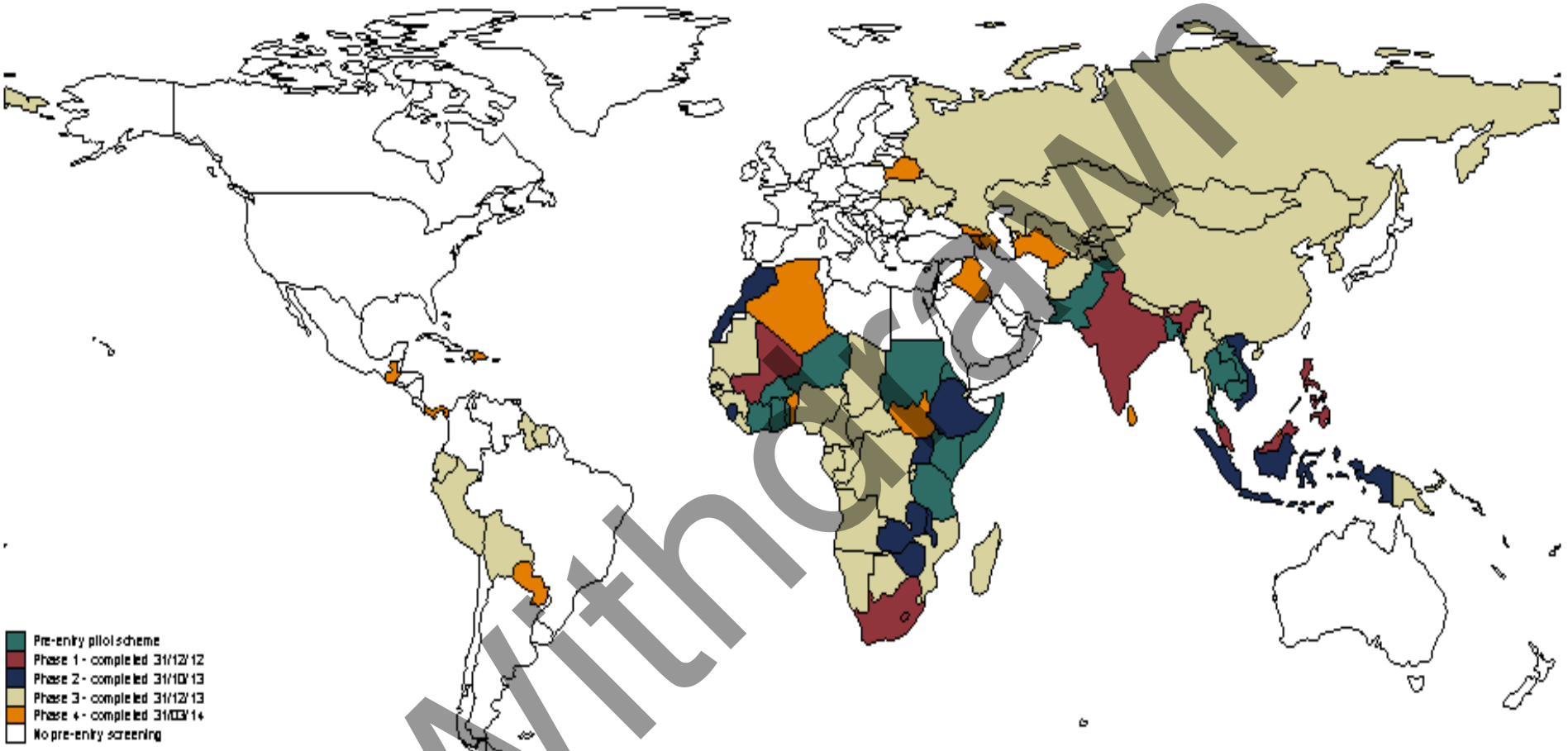
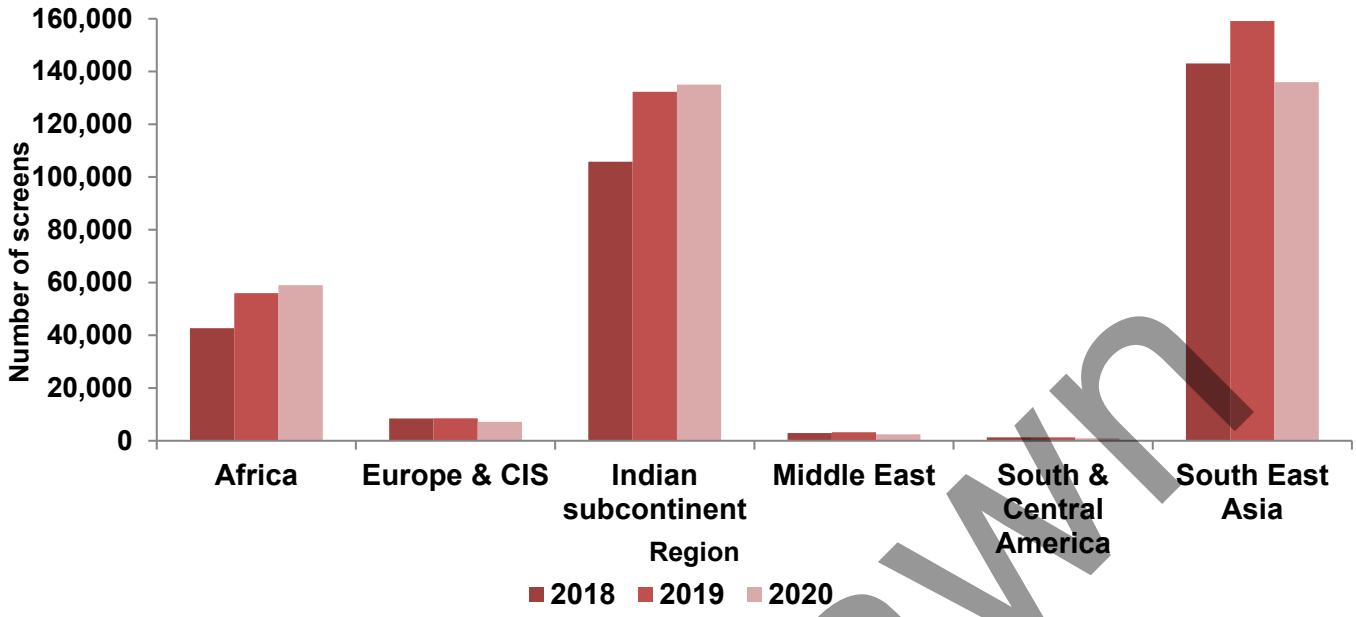


Figure 3. Number of applicants by region for the last 3 years, 2018 to 2020*



* Data from some non-IOM providers was missing.

4. Diagnostic tests and case detection

Chest X-rays (CXR)

Complete data on chest X-rays and culture was available only from IOM managed clinics with 119,807 applicants (Figure 4). Most of the applicants (88.6%, 106,143 out of 119,807) had chest X-rays done. Reasons for not obtaining a CXR were known for all applicants where CXRs were not done. This figure included 13,561 applicants that were children under 11 years old and 96 women that were pregnant.

Of the 106,143 individuals that had CXR examinations, 92.6% (98,274 out of 106,143) had a normal CXR and 2.1% (2,189 out of 106,143) had abnormalities that were consistent with TB. Of 2,189 applicants with abnormalities consist with TB, 330 were classified as having old pulmonary TB and 4 had clinical TB. These 334 were not requested to submit sputum samples.

Sputum tests

The UK tuberculosis technical instructions (UKTBTI) mandate sputum culture for the diagnosis of active TB because of the low sensitivity of smears (9). For chest X-rays with TB-related abnormalities, the UK Technical Instructions (9) require 3 sputum samples to be submitted for smear and culture. The use of sputum cultures is supported by recent studies on migrants undergoing screening for pulmonary tuberculosis (11, 12, 13).

Sputum smears

Of the 1,953 individuals who had sputum smear results, 2.0% (39 out of 1,953) were sputum smear positive and 97.8% (1,910 out of 1,953) sputum smear negative (Table 1).

Sputum cultures

Sputum culture results were available for 99.9% (1,972 out of 1,974) of the samples taken. Two samples were not cultured following clinical diagnosis of TB. Of the 1,972 samples, 87 cases were culture confirmed. A further 27 cases were clinically diagnosed with TB bringing to total number of cases to 114. These 114 TB cases were not issued with clearance certificates and were instead referred for TB treatment. The rest of the individuals with abnormalities consistent with TB [(95.4% (1,882 out of 1,972)] had negative sputum cultures.

Sputum cultures were positive in 4.4%, (87 out of 1,972) and were identified as *Mycobacterium tuberculosis* complex. Of applicants with positive cultures, 16 out of 87 had positive microscopy for acid fast bacilli (smears). This supports the use of sputum culture to improve

the rate of detection for active disease, as the 71 individuals (81.6%, 71 out of 87) that were smear negative but culture positive would not have been detected by screening under the previous protocol (Table 1). Twenty-three individuals were sputum smear positive but culture negative, and one result was inconclusive. The majority of the applicants were [95.4% (1,882 out of 1,972)] were culture negative.

Clinically diagnosed cases

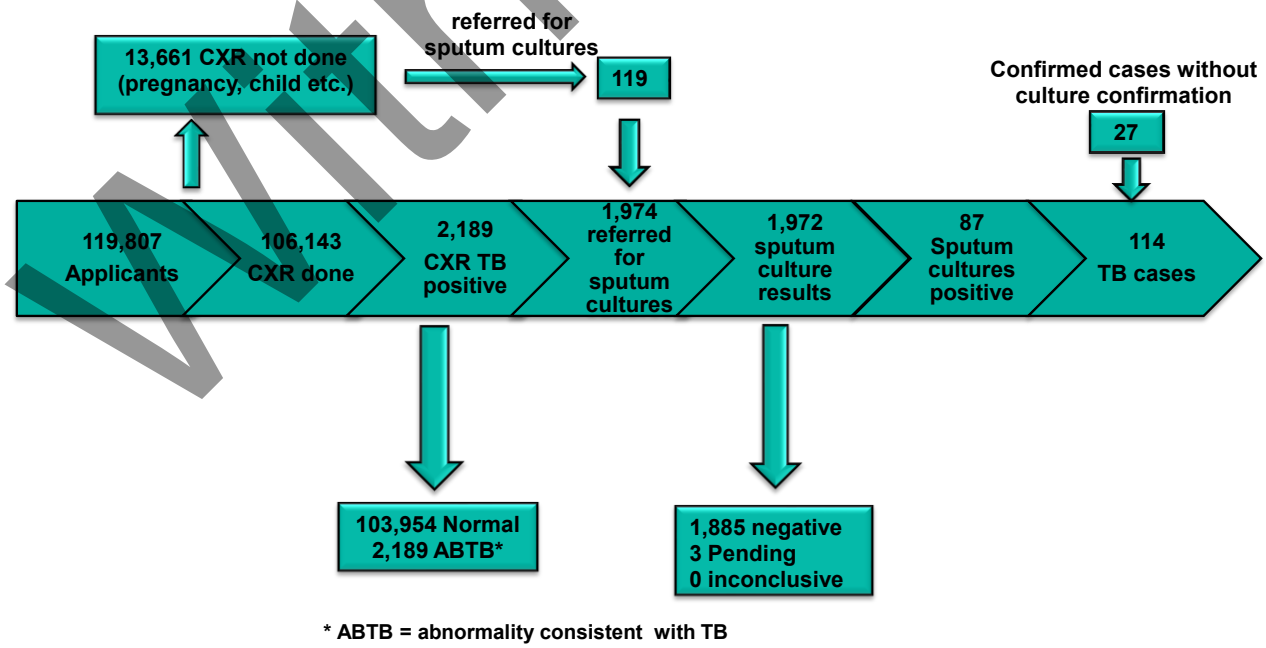
An additional 27 applicants were diagnosed according to the clinical case definition (see Appendix 7.1) due to TB-related CXR changes and clinical presentation. TB-related CXR changes included interstitial fibrosis, single or multiple pulmonary nodules, cavity lesions and notable apical pleural capping.

A total of 114 TB cases diagnosed by IOM represents in 2020 compared to 137 in 2019 (a decrease of 16.8%).

Descriptive analysis of CXR and sputum test positivity by country

Figure 5 shows the proportion of positive CXRs and the TB detection rate for the top 15 throughput countries, all of which screened more than 3,300 applicants in 2020. There were large variations between CXR positivity and TB detection rate. The reasons for this are complex and may be related to the quality and interpretation of CXRs or sputum tests.

Figure 4. Flow-through of IOM data, January to December 2020



Alternative text for Figure 4

Overall, 119,807 applicants were screened in 2020 and:

- chest X-rays were not done for 13,661 applicants because of pregnancy or applicant being under 11 year of age
- most of the applicants [106,143 (96.7%) had chest X-rays done

Where chest X-rays were not done:

- one hundred and nineteen individuals were referred for sputum cultures; a pregnant woman among this group was diagnosed with TB as she had positive a sputum culture

Among those that had chest X-rays done:

- there were 2,189 (2.1%) applicants with abnormalities consistent with TB – these were referred for sputum cultures.
- most of them [103,954 (97.9%)] had normal chest X-rays or had abnormalities not consistent with TB.

The 2,189 applicants with chest X-ray abnormalities consistent with TB were triaged as follows:

- most of them [1,855 (84.7%)] were referred for sputum culture
- fifteen percent (330 out of 2,189) had old TB
- a small number (4) were clinically diagnosed with TB and did not undergo sputum cultures

A total of 1,974 applicants were referred for sputum cultures, and:

- the majority (99.9%, 1,972) had sputum cultures done
- two further applicants were clinically diagnosed, and cultures were not done
- of the 1,972 sputum culture samples taken, 87 [87 out of 1,972, 4.4%] were positive for TB
- most samples were negative [95.4%, (1,882 out of 1,972)]
- three sputum culture sample results were pending

The total number of TB cases identified by the IOM was 114 and was broken down as outlined below:

- sputum cultures were positive for TB in 87 applicants
- clinical diagnoses were made in 27 applicants

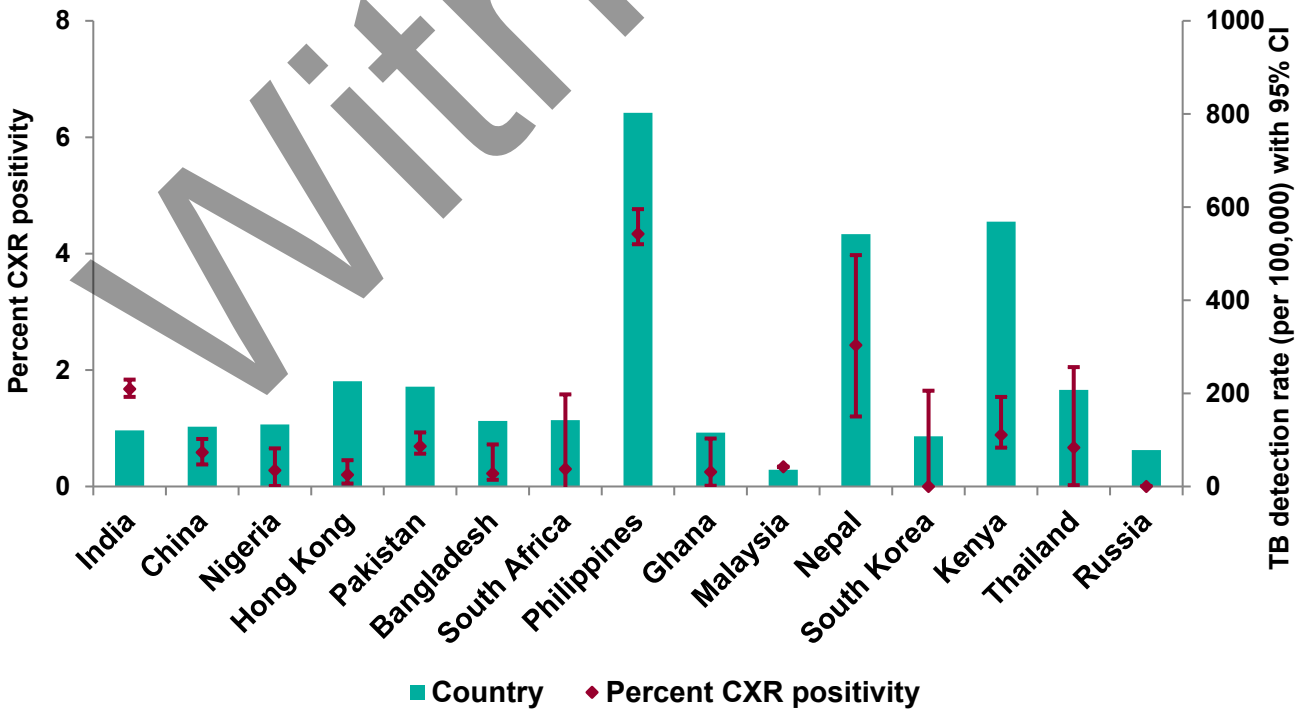
Table 1. Sputum smear and culture test results for individuals tested between January and December 2020 by IOM clinics

Sputum test	Smear [n, (%)]	Culture [n, (%)]
Negative	1,910 (97.8)	1,882 (95.4)
Positive	39 (2.0)	87 (4.4)
Inconclusive	1 (0.1)	0 (0.0)
Pending	3 (0.2)	3 (0.2)
Total	**1,953 (100.0)**	**1,972 (100.0)**

Descriptive analysis of TB cases

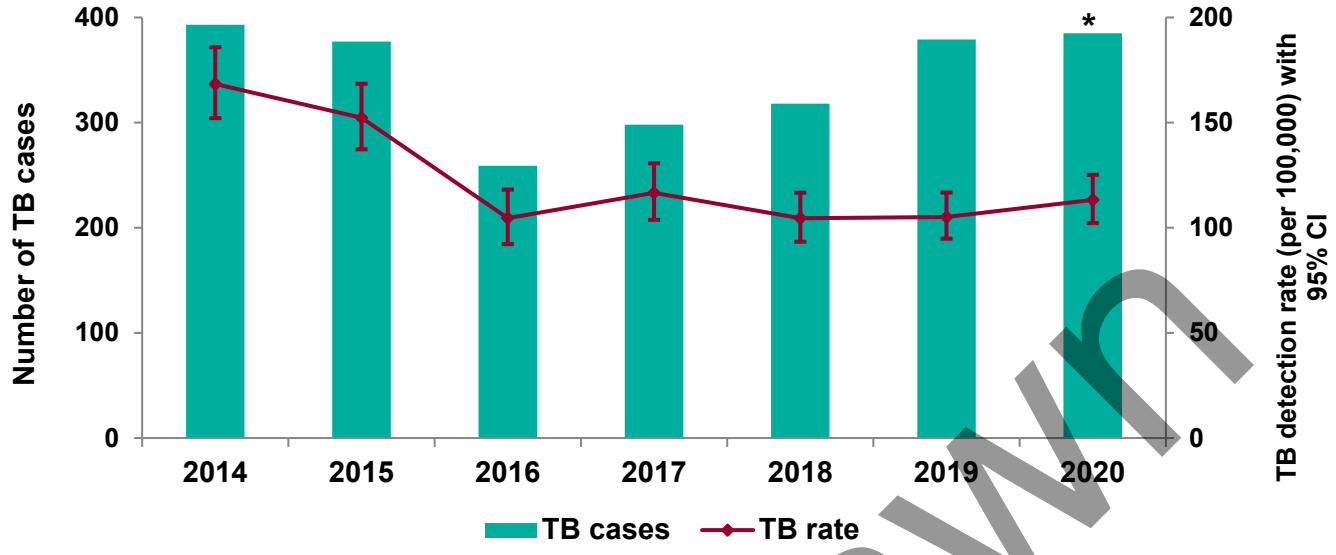
In 2020, 385 cases of active TB were detected and notified through the entire screening programme, giving an overall tuberculosis yield of 113.0 per 100,000 visa applicants. As of 17 July 2021, a total of 887 sputum culture results from 2020 were still pending (compared to 830 in 2019) and the number of cases may increase when these are available. Figure 6 shows the number of TB cases and rates detected by the UK pre-entry TB screening programme between 2014 and 2020. The rate has decreased from 168.4 per 100,000 in 2014 to 104.6 in 2016 but has since stabilised with minor variations.

Figure 5. CXR positivity and applicants' TB detection rate by country, January to December 2020*



*For countries that had screened more than 3,300 applicants.

Figure 6. Annual number of TB cases and detection rates, January 2014 to December 2020

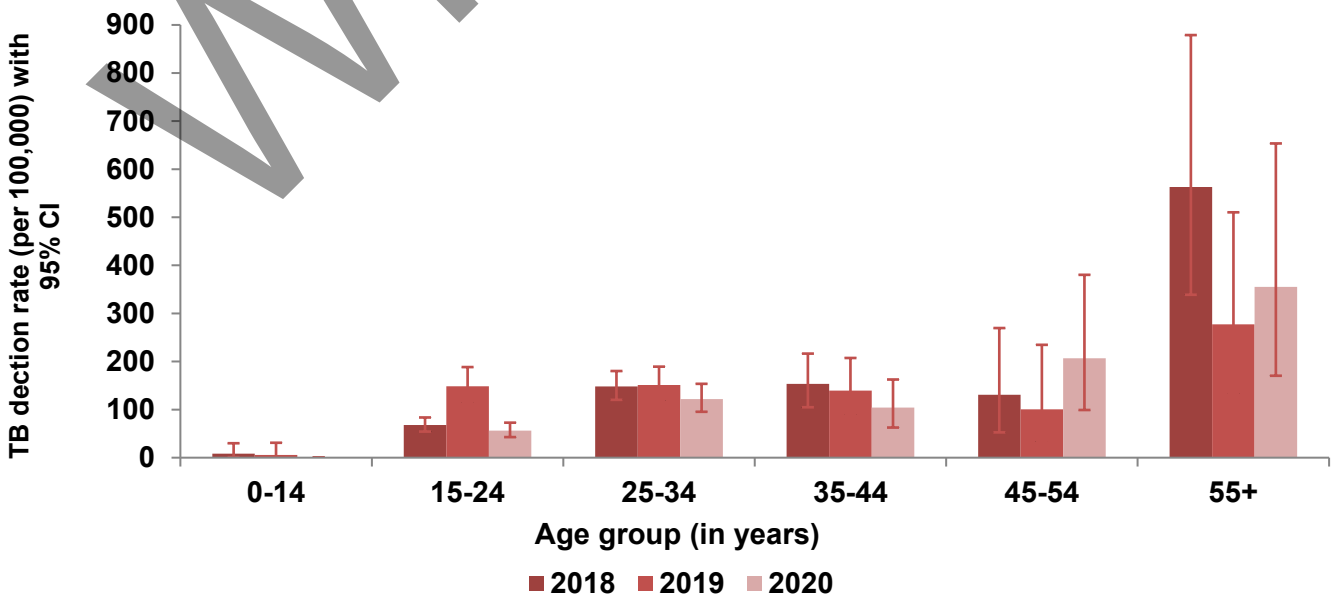


*As of 17 July 2021, 887 sputum culture results were pending and the rate may increase when final results are available.

Figure 7 shows TB detection rates by age group for the years 2018, 2019 and 2020. The highest case detection rates occurred among the oldest age group (55 and over) and lowest in the youngest age group (0 to 14 years old). The TB detection rates were relatively stable in all age groups without any significant changes over the 3 years.

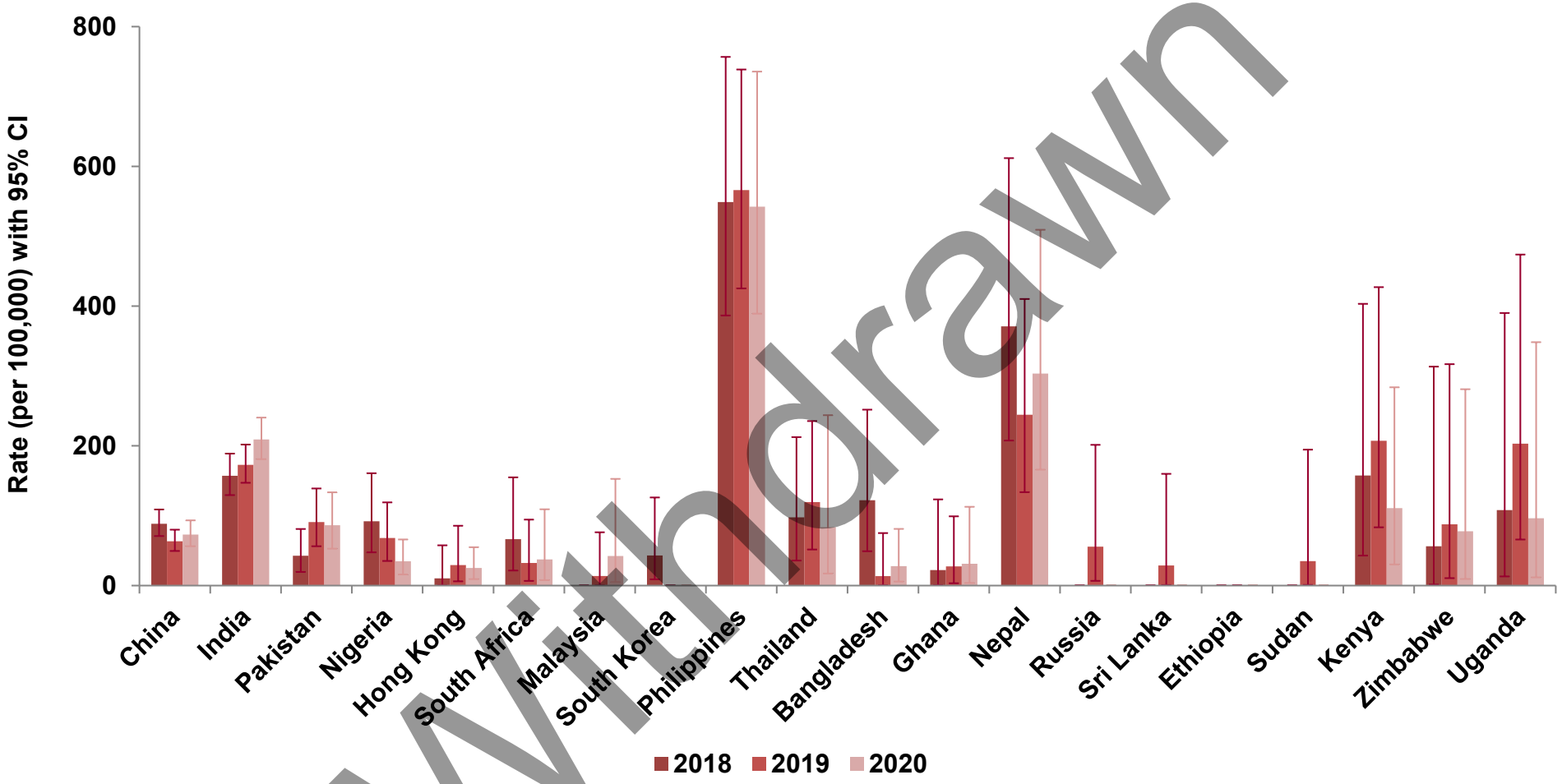
The TB detection rates (with 95% CI) between 2018 and 2020 in 20 countries with the highest throughput are shown in Figure 8. The TB rates were stable in most countries with non-significant changes in the period 2018 to 2020.

Figure 7. IOM TB detection rates by age group by year, 2018 to 2020



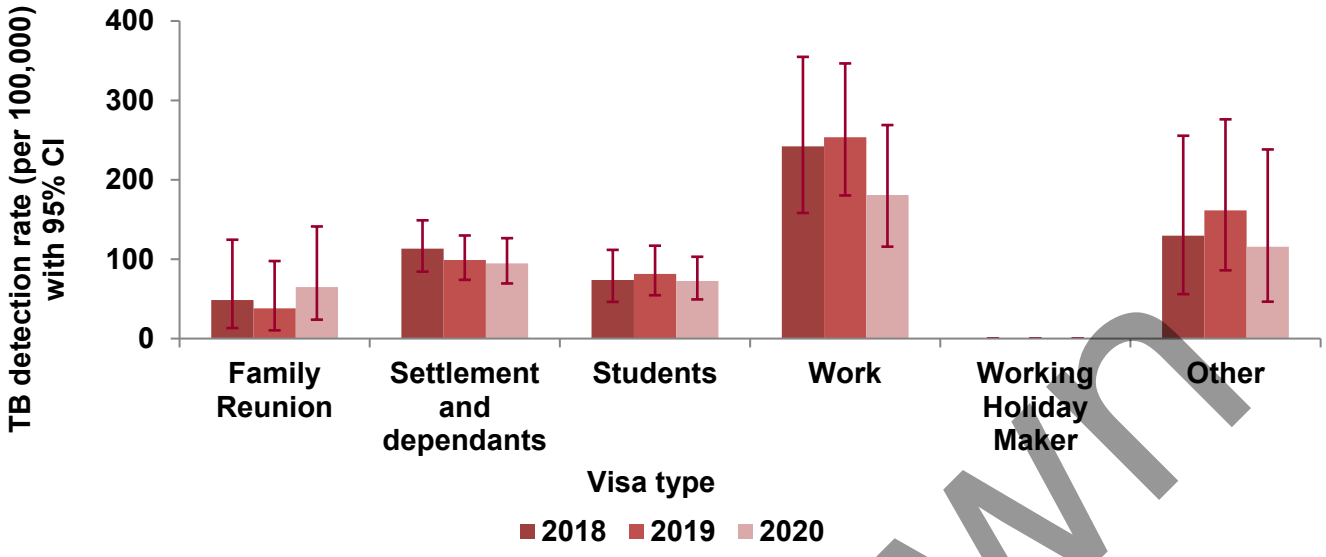
TB detection rates among IOM applicants by visa category for years 2018 to 2020 are shown in Figure 9. The TB detection rates were stable for all visa categories although there were decreasing detection rates for ‘Settlement and dependants’, while the rates for ‘Work’ and ‘Other’ visa categories decreased between 2019 and 2020. The fluctuations result from changes in the numbers of applications for the different visa categories. There were no TB cases detected among the ‘Working Holiday Maker’ category but this category consisted of a very small number of applicants (less than 1%, 13 out of 119,807). The ‘Other’ category also included applicants classified as being on ‘Government Sponsored’ visas.

Figure 8. TB detection rates in the 20 countries with the largest number of applicants for years 2018 to 2020



*As of 17 July 2021, 887 sputum samples are pending and the rates for 2020 may increase when final results are available.

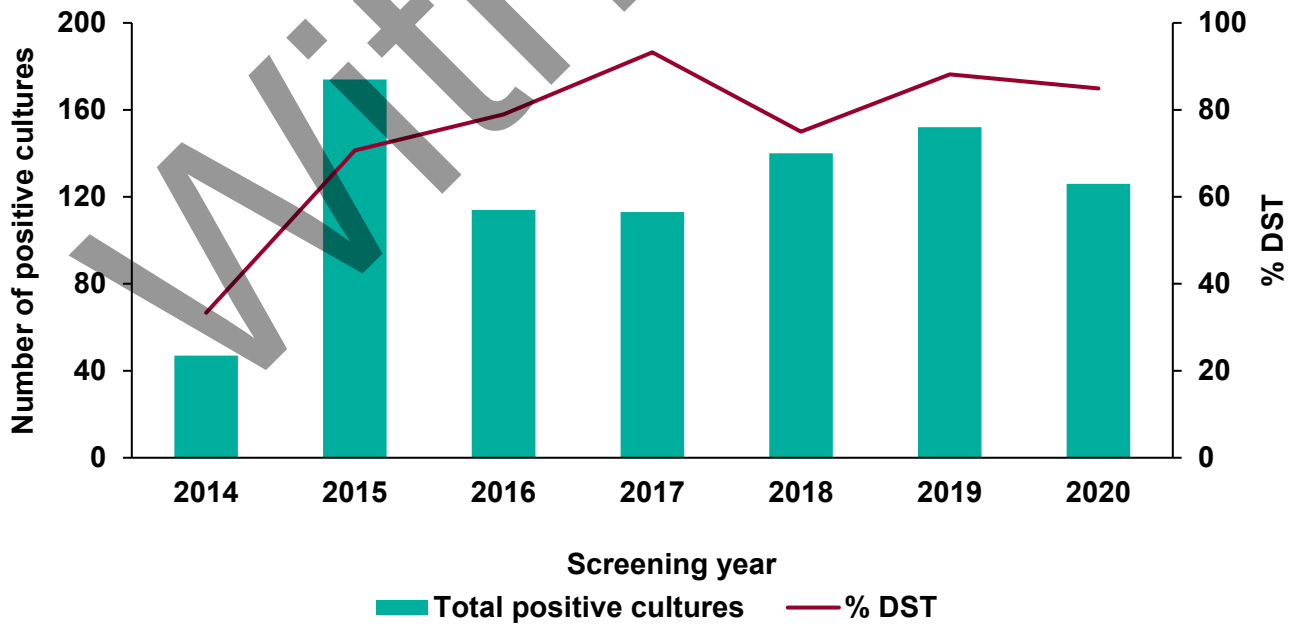
Figure 9. IOM TB detection rates by applicant visa type, 2018 to 2020



Drug susceptibility testing of positive TB cultures

TB culture and drug susceptibility testing (DST) is a mandatory requirement under the UKTBTIs. DST allows for appropriate treatment for the TB cases. Figure 10 shows the number of positive sputum cultures and the proportion that have had DST performed. Between 2014 and 2020, the proportion of cultures with DST ranged between 33.3% and 93.2% and there was no consistent pattern.

Figure 10. Trends in drug susceptibility testing, 2014 to 2020*



* The graph partially reflects low but increasing drug sensitivity testing as it was rolled out among IOM clinics (2007 to 2011) and low drug sensitivity testing among non-IOM clinics (2012 to 2016).

In 2020, 84.9% (107 out of 126) of the positive TB cultures underwent DST. The outcomes for DST testing were divided into non-MDR/RR cohort (all cases with TB excluding MDR/RR-TB) and the MDR/RR-TB cohort (cases with MDR or RR TB , that is, multiple drug resistant and rifampicin resistant TB). Most of the cases (99.1%, 106 out of 107) were in the non-MDR/RR cohort. The DST results are summarised in Table 2. Between 2014 and 2020, 75% (18 out of 25) of the MDR TB cases were from China, Philippines, India, Pakistan and Thailand. Drug susceptibility terms are defined in the Appendix 7.2.

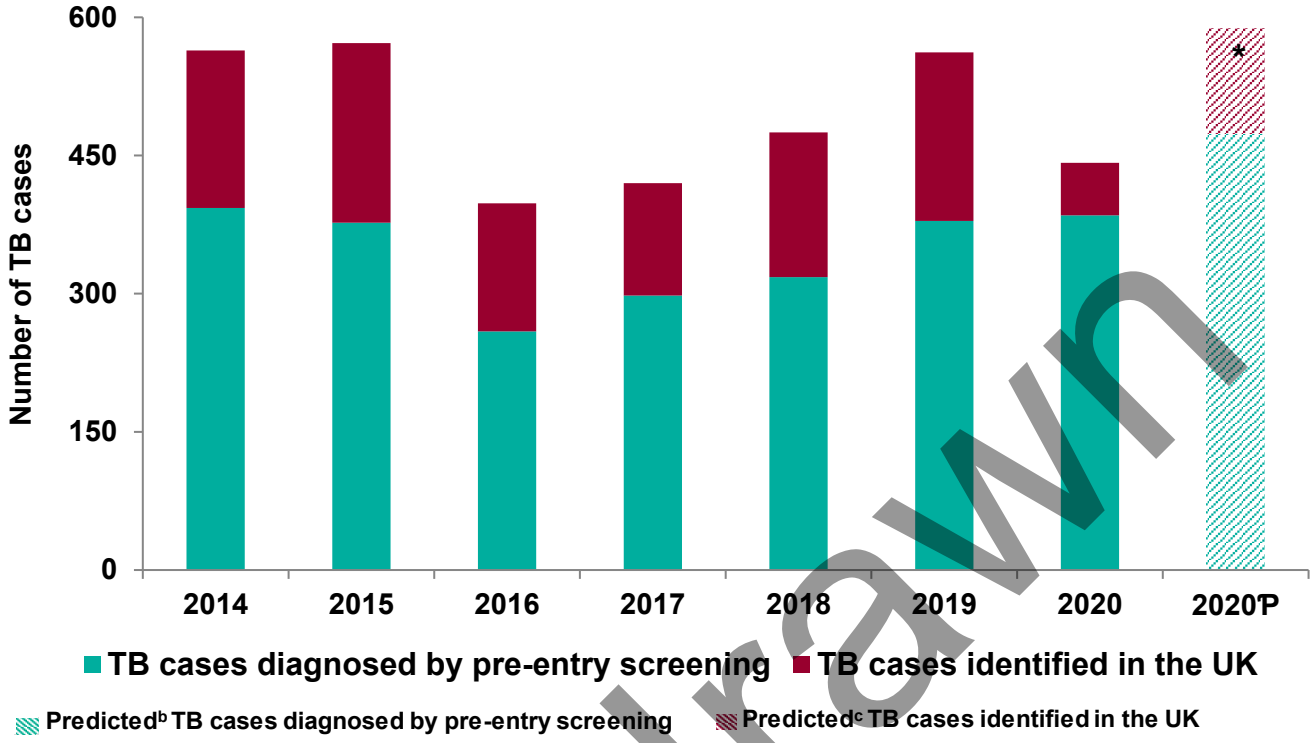
Table 2. Summary of drug susceptibility patterns for the 107 positive TB cultures, 2020

Non MDR/RR-TB	**n (%)**
Fully sensitive to firstline drugs (ethambutol, isoniazid (INH), Rifampicin (RR) and Pyrazinamide (PZA)	98 (91.6)
INH Monoresistant	4 (3.7)
Resistant to one first-line drug other than INH and Rif	1 (0.9)
Resistant to 2 or more firstline drugs (but not MDR)	3 (2.8)
MDR/RR-TB	
XDR TB	1 (0.9)
Total	**107 (100.0)**

Comparison of screening yields between ETS and pre-entry screening data

Overall, TB numbers detected through the pre-entry TB screening programme decreased from 393 in 2014 to 259 in 2016 but have increased to 385 in 2020. During the same period, the total number of UK pulmonary TB cases (as reported to national surveillance, ETS) identified within the year of entry from the 101 countries (6) in the screening programme ranged from 122 (2017) to 57 in 2020 (Figure 11). In general, the number of cases detected in the UK within the first year of entry from screening countries has decreased. In 2020, 87.3% (336 out of 385) of the TB cases diagnosed by pre-entry screening were from the 5 highest detection countries (India, China, Philippines, Pakistan and Nepal). These same countries contributed 45.6% (26 out of 57) of the cases identified within the first year of entry into the UK.

Figure 11. Number of TB cases diagnosed by pre-entry screening in the 101 programme countries and those identified within one year of UK entry, 2014 to 2019[2]



* As of 17 July 2021, 887 sputum culture results were pending and the number of cases may increase when final results are available.

[P] Projected number of TB cases detected based on pending sputum samples (pre-entry screening) and lag in detection for final year in graph for ETS cases.

[2] For countries which only became part of pre-entry screening during the global roll-out in 2012 to 2013, there is a possibility of under-ascertainment, as clinics were establishing reporting systems during this transition phase.

5. Conclusion

This report presents data from the UK pre-entry TB screening programme until the end of 2020, representing the sixth year of operation since full roll out among 101 countries. Over the last few years, the screening throughput has remained stable at between 250,000 and 360,000 assessments annually, and the demography of applicants, a relatively young cohort with a slight female preponderance, has remained similar. This year we received 5.5% fewer number of records compared to 2019 (360,548 in 2019 versus 340,623 in 2020). Unfortunately, the Home Office was unable to provide demographic details for applicants from the non-IOM clinics for analysis due to lockdowns imposed because of the COVID-19 pandemic. The lockdowns prevented people from submitting personal details at the UK embassies. As in previous years, TB detection rates vary significantly between countries, sites, age groups and visa types. The variations could be due to either differences in TB prevalence among applicants or changes in TB screening quality, or a mixture of both. Further work is required to better understand these variations.

In 2020, 385 TB cases were detected by the programme – a rate of 113.3 per 100,000. This was higher than that of 2019 (105.1 per 100,000 with 379 cases) with a slightly lower number of applicants to 2019 (340,623 in 2020 versus 360,548 in 2019). Although data quality (particularly in the non-IOM data) remains of concern, significant data quality improvements were made in 2020, including culture confirmation updates which identified an additional 30 TB cases. We continue to closely collaborate with key stakeholders in the pre-entry screening programme and carry out regular training to improve data quality and consistency.

With regards to drug resistance across the programme in 2020, most people with culture confirmed TB were sensitive to all first-line drugs (91.6%, 98 out of 105). The proportion of drug-resistant TB cases detected through pre-entry screening (8.4%) was slightly lower than the one reported through the domestic ETS for all TB cases in the UK (10.3%). The early detection and treatment of drug resistant active TB cases prior to arrival in the UK may yield additional benefits for domestic TB control.

The number of cases detected among migrants from screening countries within one year of entry into the UK (by ETS) compared with the number of cases detected by pre-entry screening shows that as the numbers detected abroad increased, the number detected in the UK fell. This is reflected at country level too. This suggests that pre-entry screening, as expected, reduces the prevalent active TB cases that could potentially present in the UK if the diagnosis were not made pre-entry.

In conclusion, our report shows that a number of significant improvements have been made, including near-universal sputum culture confirmation among IOM applicants (11, 12, 13), and improved procedures in non-IOM clinics.

6. References

1. 'ECDC Tuberculosis surveillance and monitoring in Europe 2021' (accessed September 2021)
2. UKHSA. 'Reports of cases of TB to UK enhanced tuberculosis surveillance systems 2000 to 2020' (accessed October 2021)
3. Public Health England (2020) 'Tuberculosis in England: 2019 report' (accessed September 2021)
4. 'Migrant tuberculosis screening' Statement by Immigration Minister 2012 (accessed September 2021)
5. 'Immigration Act 1971' (accessed September 2021)
6. 'New phase of tuberculosis screening launched as part of Immigration rules changes' (accessed September 2021)
7. World Health Organisation. 'Global Tuberculosis Report 2012' (accessed September 2021)
8. 'Migration 5 Updates Meeting - International Panel Physicians Association' (accessed September 2021)
9. 'UK Tuberculosis Technical Instructions (UKTBTI)' (accessed September 2021)
10. Home Office (2021). 'Immigration statistics data tables, year ending June 2021: How many people come to the UK each year?' (accessed September 2021)
11. Liu Yand others. 'Effect of a culture-based screening algorithm on tuberculosis incidence in immigrants and refugees bound for the United States: a population-based cross-sectional study'. Annals of Internal Medicine 2015 March 17: volume 162, issue 6, pages 420-428
12. Aldridge RW and others. 'Pre-entry screening programmes for tuberculosis in migrants to low-incidence countries: a systematic review and meta-analysis'. Lancet Infectious Diseases 2014 November (cited 2014 November 8)
13. Aldridge RW and others. 'Prevalence of and risk factors for active tuberculosis in migrants screened before entry to the UK: a population-based cross-sectional study'. Lancet Infectious Disease 2016: volume 16, pages 962-970

7. Appendices

7.1 Case definition

Tuberculosis case definition

A TB case was defined as outlined in the enhanced (ETS) data dictionary and using the following criteria:

- TB confirmed by microbiological tests (for example, sputum tests, including culture and/or smear tests)
- in the absence of sputum test confirmation, a case that met the following criteria:
  - a clinician's judgement that the patient's clinical and/or radiological signs and/or symptoms are compatible with tuberculosis, AND
  - a clinician's decision to treat the patient with a full course of anti-tuberculosis therapy

7.2. Definitions of drug susceptibility terms

Extensively-drug resistant TB (XDR-TB)

Extensively-drug resistant is defined as resistance to isoniazid and rifampicin, plus any fluoroquinolone and at least one of 3 injectable second-line drugs (that is, amikacin, kanamycin or capreomycin).

Multi-drug resistant TB (MDR-TB)

Multi-drug resistant TB (MDR TB) is defined as resistance to at least isoniazid and rifampicin, with or without resistance to other drugs.

INH resistant

TB that is resistant to isoniazid, a first-line anti-TB drug, and not other drugs.

Monoresistant to a drug other than INH

Resistance to a first-line treatment drug other than INH, for example, ethambutol.

Pansensitive

Fully sensitive to all first line drugs, for example, isoniazid.

Poly-drug resistant

Poly-drug resistance refers to resistance to 2 or more first-line drugs but not to both isoniazid and rifampicin.

RR-TB

Resistant to rifampicin, a first-line drug, and not other drugs.

Table A1. UK pre-entry tuberculosis screening countries by screening provider

IOM countries	Non-IOM countries
Afghanistan	Algeria
Angola	Armenia
Bangladesh	Azerbaijan
Belarus	Bhutan
Benin*	Bolivia
Botswana	Brunei
Burkina Faso*	China
Burma	Dominican Republic
Burundi*	East Timor*
Cambodia	Ecuador
Cameroon	Georgia
Cape Verde*	Guatemala
Central African Republic*	Guyana
Chad*	Haiti
Congo*	Hong Kong
Côte d'Ivoire	India
Democratic Republic of the Congo	Indonesia
Djibouti*	Kiribati*
Equatorial Guinea*	Macau*
Eritrea*	Malaysia
Ethiopia	Marshall Islands*
Gabon*	Mauritania*
Gambia	Micronesia*
Ghana	Mongolia
Guinea*	Morocco
Guinea Bissau*	North Korea*
Iraq	Panama
Kazakhstan	Paraguay
Kenya	Peru
Kyrgyzstan*	Russia**
Laos*	South Korea
Lesotho*	Suriname*
Liberia*	Tajikistan
Madagascar	Turkmenistan
Malawi	Tuvalu*
Mali*	Uzbekistan
Moldova	Vanuatu*

*No screening facilities in this country - applicants travel to neighbouring countries.
**Russia has both IOM (Moscow) and non-IOM clinics (St. Petersburg, Novosibirsk and Yekaterinburg).

Table A1. UK pre-entry tuberculosis screening countries by screening provider (continued)

IOM countries	Non-IOM countries
Mozambique	
Namibia	
Nepal	
Niger	
Nigeria	
Pakistan	
Palau	
Papua New Guinea	
Philippines	
Russia**	
Rwanda	
São Tomé and Principe*	
Senegal	
Sierra Leone	
Solomon Islands*	
Somalia*	
South Africa	
South Sudan*	
Sri Lanka	
Sudan	
Swaziland*	
Tanzania	
Thailand	
Togo*	
Uganda	
Ukraine	
Vietnam	
Zambia	
Zimbabwe	

*No screening facilities in this country - applicants travel to neighbouring countries.
**Russia has both IOM (Moscow) and non-IOM clinics (St. Petersburg, Novosibirsk and Yekaterinburg).

About the UK Health Security Agency

The UK Health Security Agency is an executive agency, sponsored by the Department of Health and Social Care.

Prepared by: TB Unit
For queries relating to this document, please contact: TBSection@phe.gov.uk

Published: October 2021
Gateway number: GOV-10175