Public Health England

Protecting and improving the nation's health

Tuberculosis in England

2019 report

(presenting data to end of 2018)

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Notes on the report

Intended audience

This report is aimed at healthcare professionals involved in the diagnosis and/or treatment of people with TB, commissioners involved in planning and financing TB services, public health professionals working in the control of TB or health of at-risk populations, researchers with an interest in TB, and government and non-governmental organisations working in the field of TB.

Aim of report

This report describes the recent epidemiology of TB in England, providing an update on trends and burden of TB at a national and sub-national level. It also presents data on the implementation of the UK pre-entry TB screening programme, the national roll-out of systematic latent TB infection (LTBI) testing and treatment programme, and BCG vaccination coverage estimates. The data presented is used to inform recommendations on the ongoing implementation of the *Collaborative TB Strategy for England 2015 to 2020* [1], and support the development of a new 5-year national TB Action Plan beyond April 2020, when the current strategy ends.

Data sources

This report presents detailed data on TB notifications made to the Enhanced Tuberculosis Surveillance system (ETS) in England to the end of 2018. Data from notifications made to ETS from 2000 is updated annually to take into account denotifications, late notifications and other updates. The data presented in this year's report supersedes data in previous reports.

Experimental BCG coverage data for areas with universal BCG vaccination is presented using the Cover of Vaccination Evaluated Rapidly (COVER) programme data from April 2017 to March 2019.

Public Health England (PHE) receives 3 different types of LTBI testing and treatment data:

- LTBI testing data: data collected by GPs using clinical templates. This is available for 3 GP systems (EMISWeb, SystmOne and VISION). Clinical and demographic information on tested patients is available through these systems
- LTBI treatment data: This data is collected from secondary care (TB nursing services) using a Microsoft Excel worksheet template providing details of treatment provided to LTBI positive patients with the exception of a few Clinical Commissioning Groups (CCGs), where treatment is provided in either primary or community care.

Information includes prescribing data, treatment outcomes and test results for routine follow-up tests
- Laboratory data: This data is collected by laboratories carrying out the LTBI testing and include basic demographic information and IGRA test results.

Data from the LTBI testing and treatment database (England) are presented for calendar years 2016 and 2018 inclusive.

Data from the UK wide pre-entry screening database is presented to the end of 2018.

Other data displays

High-level data on TB notifications in the UK to the end of 2018, and breakdowns by country, can be found in the Official Statistics for TB, '*Reports of cases of TB to UK enhanced tuberculosis surveillance systems: 2000 to 2018'*. This is available at https://www.gov.uk/government/collections/tuberculosis-and-other-mycobacterial-diseases-diagnosis-screening-management-and-data.

As part of the *Collaborative TB Strategy for England 2015 to 2020*, a suite of TB Strategy Monitoring Indicators has been developed (https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/403231/Collaborative_TB_Strategy_for_England_2015_2020_.pdf). Where data for these indicators is presented in this report, the indicator name is shown (in red boxes), and a summary table of national-level indicators is presented in Appendix V. Data for indicators that are presented by upper-tier local authority and CCGs can be found at http://fingertips.phe.org.uk/profile/tb-monitoring and will be updated with data for 2018 on 6 August 2019. Hyperlinks (in red boxes) for specific indicators are also shown throughout the report where data is presented.

Replacement National TB Surveillance System (NTBS)

The National Infection Service's TB Unit is pleased to announce that a suite of reports based on live data from ETS have been made available to all PHE users of both ETS and the LTBR.

Five reports have been created which provide summaries and detailed information, broken down by Local Authority of residence and treating TB Service, on the following:

- culture and resistance profiles
- treatment outcomes
- trends in notifications over time
- data quality summaries based on data entered for notifications

- an enhanced line list of notifications (with data from the mycobacterium reference laboratories).

Initially, these reports have only been made available to PHE users as they were built on PHE's strategy identity platform. However, they will be availbale to NHS colleagues in the autumn, providing an important surveillance tool for supporting local clinical service improvments.

The National Infection Service's TB Unit commenced development work on the replacement NTBS in July 2019. NTBS will replace 2 existing and separate systems (ETS and LTBR), and will incorporate essential new functionalities to support future TB surveillance and control activities. It is expected to go live in the first half of 2020.

If you would like further information, please send correspondence to NTBS@phe.gov.uk.

Executive summary

The number of people with TB in England has fallen from a peak of 8,280 in 2011 to 4,655 in 2018 – a reduction of approximately 44%. The incidence of TB in 2018 (8.3 per 100,000 population) was the lowest TB rate ever recorded in England. However, if we are to reach the World Health Organization (WHO)'s End TB Strategy target of a 90% reduction in new notifications by 2035 [2], considerable efforts and new, innovative approaches will be needed to eliminate TB in England. Some of the important challenges include:

- understanding that variation in TB incidence and patient profiles faced across the country means no single approach will be sufficient, even within a single city or area
- the need to focus on addressing the needs of people with social risk factors (SRFs) such as alcohol misuse, drug misuse, homelessness and/or imprisonment
- focusing on reducing transmission of TB in the UK using techniques such as Whole Genome Sequencing (WGS) to better understand transmission pathways and networks
- ensuring excellence in MDR-TB management including through referral of people with MDR-TB to the British Thoracic Society MDR-TB Clinical Advice Service
- maintaining latent TB infection (LTBI) testing and treatment to prevent reactivation of TB and further transmission
- build on the work of the *Collaborative TB Strategy for England* 2015 to 2020 by developing a 5-year action beyond 2020 to further drive down TB numbers

It is also important to recognise the work that has been undertaken to date and which forms a good foundation for future work:

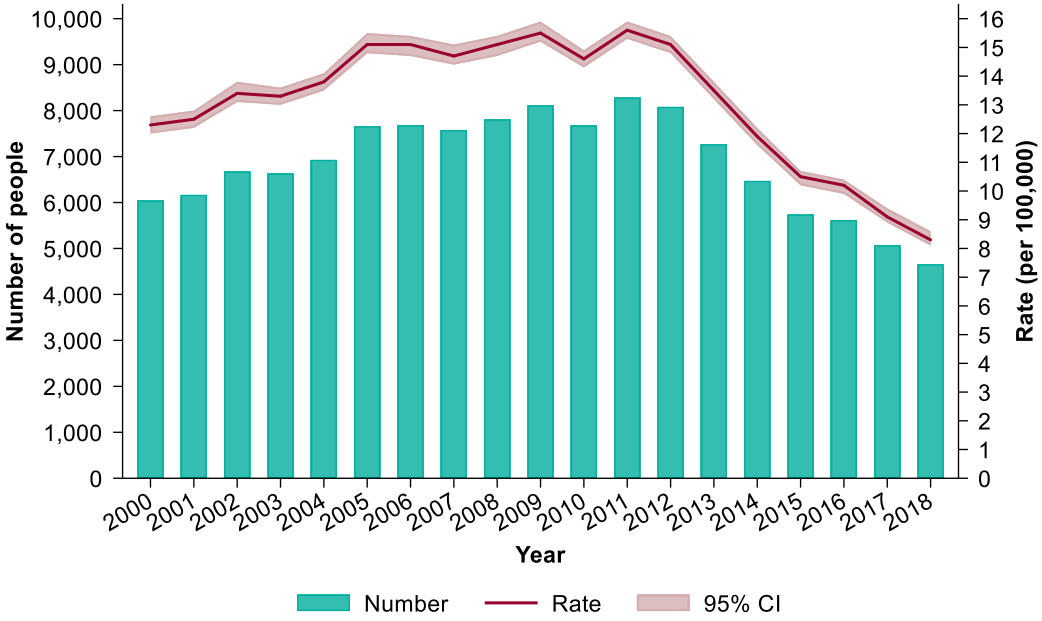
1. The well developed and mature relationships developed by local TB Control Boards (TBCBs) that enable the multi-disciplinary approach will continue to be essential to addressing the complex problems TB control presents.
2. As part of development of the new National TB Surveillance System (NTBS), a suite of reports has been released that allow local teams to have improved access to data. These reports can be used to monitor progress, assess the effectiveness of local interventions and identify problems at an early stage. Further work to replace the legacy systems (ETS and LTBR) will introduce functionality to streamline the process of notifying new TB patients.

This summary now presents the main points of note from the annual *Tuberculosis in England: 2019 report* supported by important figures, in a readily accessible summary for individuals and organisations working in the field of TB.

TB notifications and incidence

In 2018, 4,655 people were diagnosed with TB in England, an 8.2% decline compared to 5,070 in 2017. The rate of TB reached an all-time low of 8.3 per 100,000 population in 2018 (Figure 1), and has been below the 10 per 100,000 WHO definition of a low incidence country since 2017. People born outside the UK accounted for 72% (3,283/4,580) of notifications in 2018, with a TB incidence rate of 39.0 per 100,000 population; this was 14-times greater than the rate among those born in the UK (2.8 per 100,000). There has been a decline in the number and rates of TB among both people born in the UK (number: -9%, rate -9.7%) and outside the UK (number: -8.1%, rate: -5.3%) between 2017 and 2018.

Figure 1: Number of TB notifications and rates, England, 2000 to 2018



Laboratory confirmation of TB

In 2018, 61% (2,850/4,655) of people had their TB diagnosis confirmed by culture compared with 63% in 2017. A further 8% (383/4,655) had their diagnosis confirmed by an alternative positive laboratory result (microscopy, PCR or histology), and 31% (1,422/4,655) had no microbiological results available confirming their TB diagnosis, the notification being on clinical or radiological grounds only. A higher proportion of people with pulmonary TB had their diagnosis confirmed by culture compared with people with extra-pulmonary TB (74% versus 44%) and, as with previous years, culture confirmation was lowest (31%; 47/151) among children (<15 years). Only 65% of people with pulmonary TB had a recorded sputum smear result, of which 56% were positive. As of the beginning of 2018, all new isolates of mycobacteria in England were examined by whole genome sequencing (WGS), providing species identification, drug resistance prediction and assessment of relatedness.

TB Transmission

The rate of TB in children born in the UK is used as a proxy for recent transmission. The rate in England was 1.2 per 100,000 in 2018 and demonstrates a continued decline in incidence (Figure 2). Work continues to develop measurable and reproducible TB transmission metrics incorporating whole genome sequencing data; aimed at tackling the burden of transmitted disease and working towards eliminating TB within England in compliance with the WHO's End TB Strategy.

Figure 2: Overall rate of TB in children (<15 years) born in the UK, England, 2000 to 2018

Delay from symptom onset to treatment start

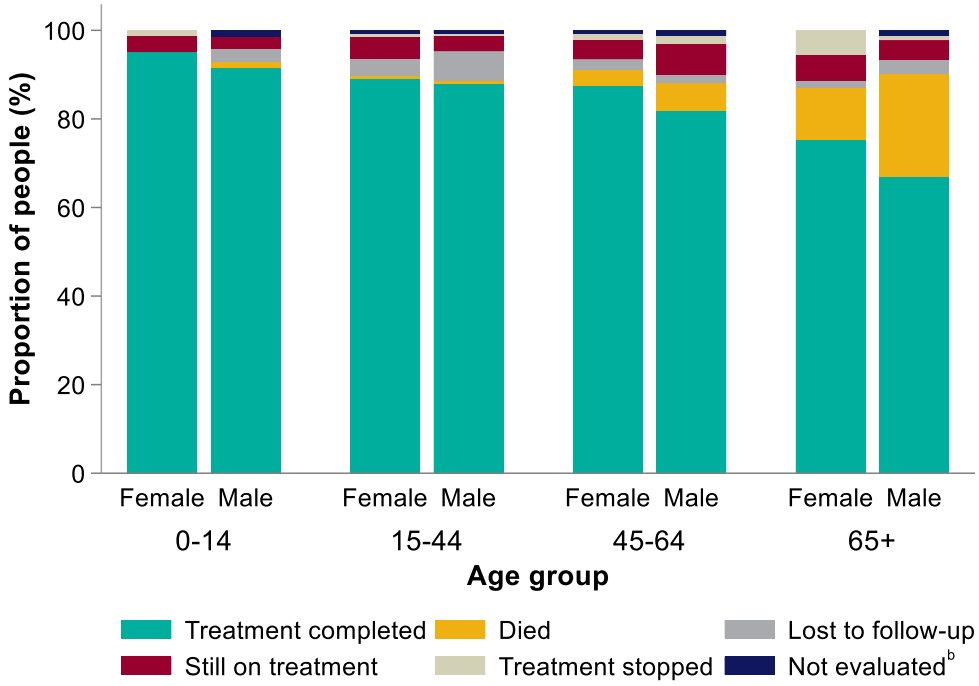
In 2018, the median time between symptom onset and treatment start for people with pulmonary TB was 75 days. Almost 30% (692/2,373) of people with pulmonary TB experienced a delay of more than 4 months between symptom onset and treatment start; most notably for those aged 65 years or older. A higher proportion of people born in the UK (32%; 267/824) experienced a delay of more than 4 months compared to those born outside the UK (28%; 421/1,528).

TB outcomes in the drug sensitive cohort

The proportion of people with drug sensitive TB (with an expected treatment duration of less than 12 months) who completed treatment by 12 months in 2017 was essentially unchanged (84.7% in 2017 versus 85% in 2016) (Figure 3). Compared to 2016, there was a 2.8% decline in the proportion of children completing treatment within 12 months,

following an annual improvement between 2011 and 2016. The difference in treatment completion by sex was greatest in those aged 65 years or older, with more females completing treatment by 12 months than males. The proportion of people with drug sensitive TB notified in 2017 who died (5.3%, 264/5,008) or were lost to follow-up (4.2%; 211/5,008) at the last reported outcome was comparable to previous years.

Figure 3: Outcomes at 12 months, by sex and age group, for people with drug sensitive TB with an expected treatment duration <12 months, England, 2017

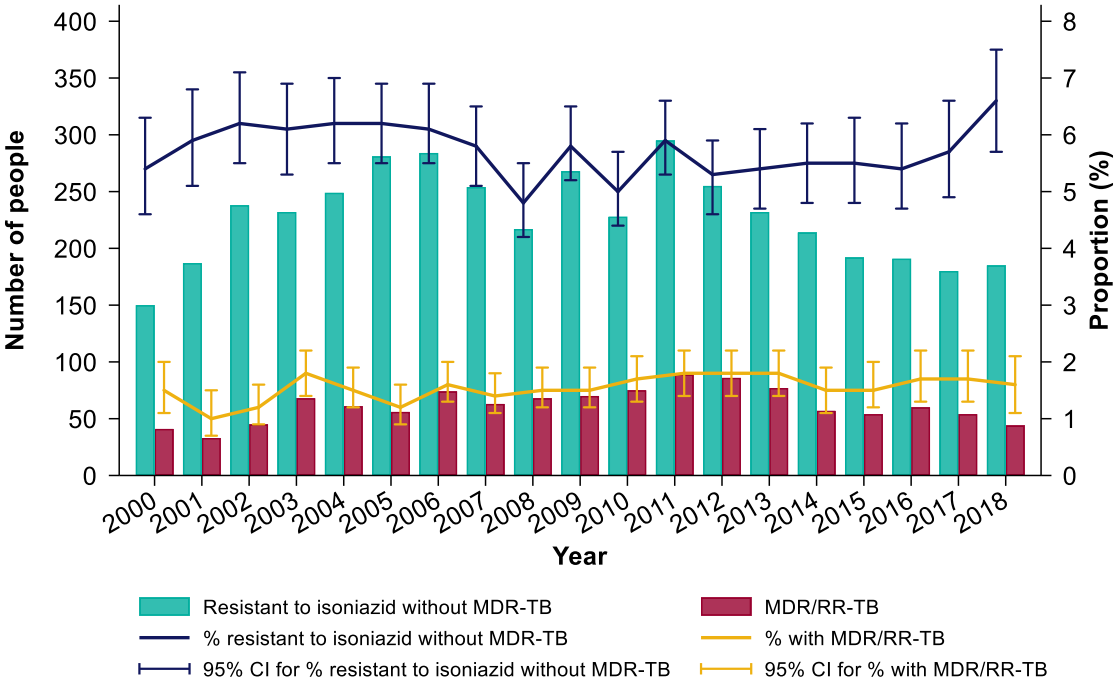


[a] Excludes people in the drug resistant cohort and those with CNS, spinal, miliary or cryptic disseminated TB
[b] Not evaluated includes unknown and transferred out

Drug resistant TB and outcomes in the drug resistant cohort

The proportion of people with initial isoniazid resistance without multi-drug resistant TB (MDR-TB) in 2018 increased to 6.6%, after remaining relatively consistent at an average of 5.4% (range: 4.8-5.9%) over the past 10 years (Figure 4). Drug resistance to pyrazinamide increased from 0.61% (21/3,465) to 3.66% (103/2,814) between 2016 and 2018, with most of these (81.6%) displaying monoresistance. There were less people with multi-drug/rifampicin resistant TB (MDR/RR-TB) in 2018 compared to 2017 (44 versus 54). Of these, 4 had confirmed initial extensively-drug resistant TB. The number of people in the drug resistant cohort (confirmed or treated as MDR/RR-TB) decreased between 2017 and 2018 (62 versus 47). Of people in the 2016 drug resistant cohort, 65.2% (45/69) had completed treatment by 24 months, and 10.1% (7/69) remained lost to follow-up by the last recorded outcome.

Figure 4: Number and proportion of people notified with TB with initial drug resistance, England, 2000 to 2018



[a] People with culture confirmed TB with a result (DST or WGS) for at least isoniazid and rifampicin

TB in under-served populations

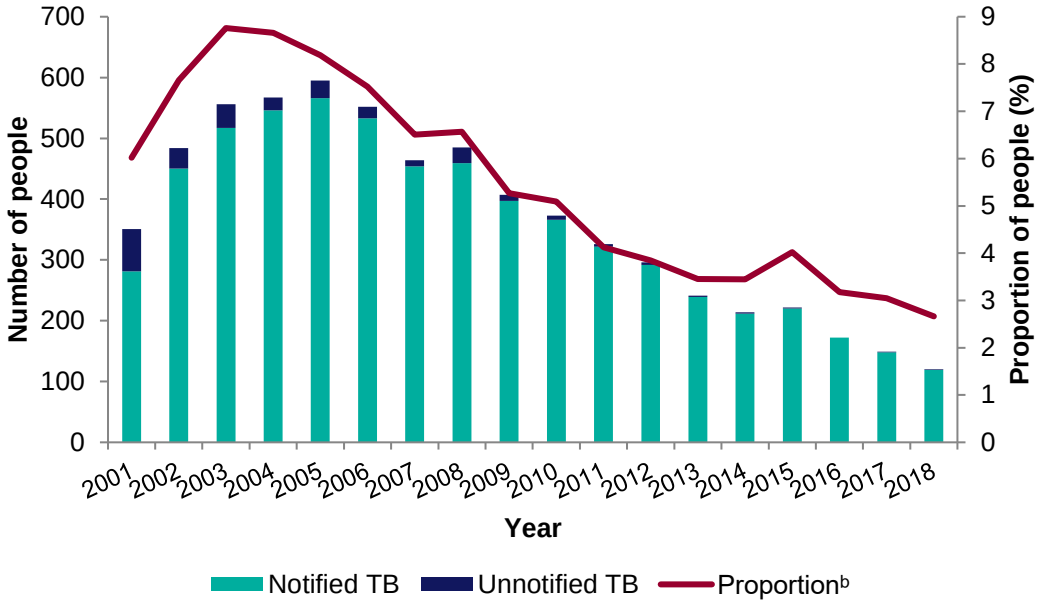
In 2018, 13.3% (539/4,062) of people diagnosed with TB who were aged 15 years or older had a social risk factor (SRF; current alcohol misuse, current or history of drug misuse, homelessness and/or imprisonment); the highest proportion since data collection began in 2010. Of these, 77% (417/539) had pulmonary disease. Among people born in the UK, 20.7% (222/1,075) had a SRF compared to 10.6% (314/2,961) among those born outside the UK. The rate of TB in the most deprived 10% of the population was 16.6 per 100,000 compared to 3.0 per 100,000 in the least deprived 10%. MDR/RR-TB rates were similar for people with and without a SRF (1.2% versus 1.7%, respectively). Among people with drug sensitive TB, treatment completion was however lower for those who had a SRF (78.7%; 418/531), compared to those without a SRF (89.1%; 3,399/3,816). A higher proportion of people with a SRF died at their last recorded outcome compared to people without a SRF (6.2% versus 4%, respectively), and people with a SRF that were lost to follow-up (9.2%) was also 3-times greater than those without a SRF (3.1%).

TB-HIV co-infection and HIV testing among TB cases

In 2018, 2.7% (120/4,504) of people with TB were co-infected with HIV; the lowest proportion of co-infection since data became available in 2001 (Figure 5). The median age of people with TB-HIV co-infection increased from 34 to 46 years old between 2001

and 2018, respectively. Most of these people (81.7%; 94/115) were born outside the UK, most notably in sub-Saharan African countries (73.4%; 69/94).

Figure 5: Number and proportion of people with TB who have HIV co-infection, England, 2001 to 2018



[a] Includes people with TB-HIV co-infection aged 15 years and older.
[b] Proportion is calculated using the number of TB notifications with HIV co-infection plus the number who are un-notified with an MTBC isolate which matched to a person with HIV as the numerator, and the number of all TB notifications (with or without HIV co-infection) plus the number of un-notified TB isolates which matched to a person with HIV as the denominator.

BCG vaccination

There were 5 local authorities, all in London, that offered a universal BCG vaccination programme in 2018 to 2019, compared with 6 in 2017 to 2018. Among the 5 areas, BCG coverage ranged from 36.8% in Brent to 68.9% in Newham. BCG vaccination coverage increased in 3 of the 5 areas (Brent, Ealing and Redbridge) compared to 2017 to 2018.

Latent TB infection testing and treatment

There was a 3.5% increase in the number of LTBI tests received between 2017 (15,343) and 2018 (15,883). The LTBI test positivity rate declined to 15.8% in 2018, compared to 17% in 2017 and 18.1% in 2016. A higher proportion of men tested positive for LTBI than women across all age groups. People born in India and Pakistan have been the most represented groups since 2016. Overall, LTBI treatment completion has increased annually from 65.1% (358/550) in 2016 to 76.5% (349/456) in 2018.

United Kingdom TB pre-entry screening programme

In 2018, there were 304,234 screening episodes and 318 people with active TB were detected. The number of prevalent people notified with pulmonary TB in the UK (within 1 year of entry to the UK) from countries within the pre-entry scheme decreased from 154 in 2014 (when the implementation of the scheme was completed) to 69 in 2018.

Conclusions

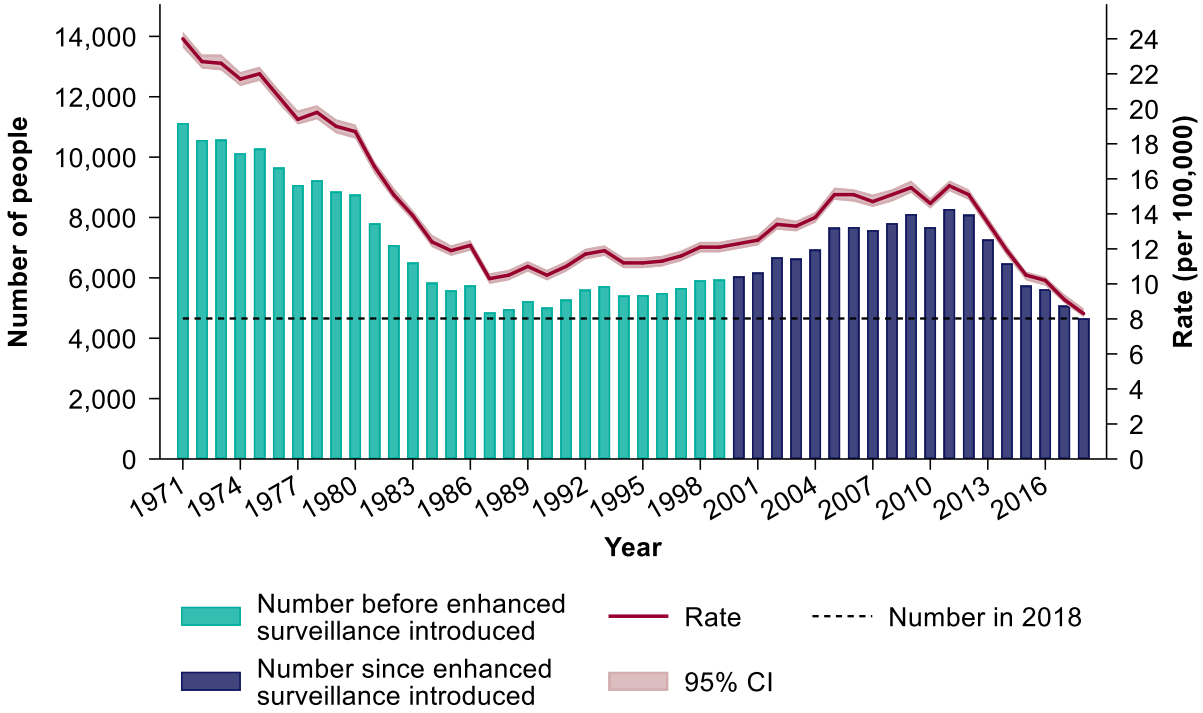
TB notifications and rates in England have declined for the seventh consecutive year. Since 2014, the last year before the launch of the *Collaborative TB Strategy for England* 2015 to 2020 [1], England has seen an almost 28% reduction in TB incidence. The number of TB notifications and rates in 2018 are the lowest recorded and England has been classified as a low incidence country by the WHO since 2017 (defined as a rate of less than 10 per 100,000 population). However, further work is needed to improve the outcomes for those most at risk of TB, reduce in-country TB transmission and maintain the decline in TB incidence and numbers. Important recommendations based on the findings of the *Tuberculosis in England: 2019 report* are available in the full text version of the annual report. Wider recommendations on improving TB control in England are available in the Strategy.

Work is now focusing on preparing a 5-year TB Action Plan (2020 to 2025) to move England towards TB elimination. This TB Action Plan will build on the work carried out during the current Strategy period, refocus this to deliver any outstanding areas-for-action, consider new ideas, technologies and research and build on co-ordinated, multi-stakeholder working to deliver improved TB control across England. We must now work collectively to maintain and extend the downward trend in TB incidence and move England toward TB elimination by 2035.

Preface

TB has been a notifiable disease in England and Wales since 1913. During the first year of statutory notification, over 117,000 people were notified with TB, resulting in a rate of 300 per 100,000 population. There was a subsequent decline in TB notifications, reaching a low in England during 1987 (Figure A). However, between 1987 and 2011, a 70% increase in the number of notifications was observed in England, which occurred against a background of poor global TB control with the World Health Organisation (WHO) declaring TB a global public health emergency in 1993.

Figure A: Number of TB notifications and rates, England, 1971 to 2018



More recently, the WHO adopted a new and holistic strategy that places patients and communities at the heart of the response. The WHO End TB Strategy was established in 2015 and aims to eliminate the global TB epidemic by 2045, by:

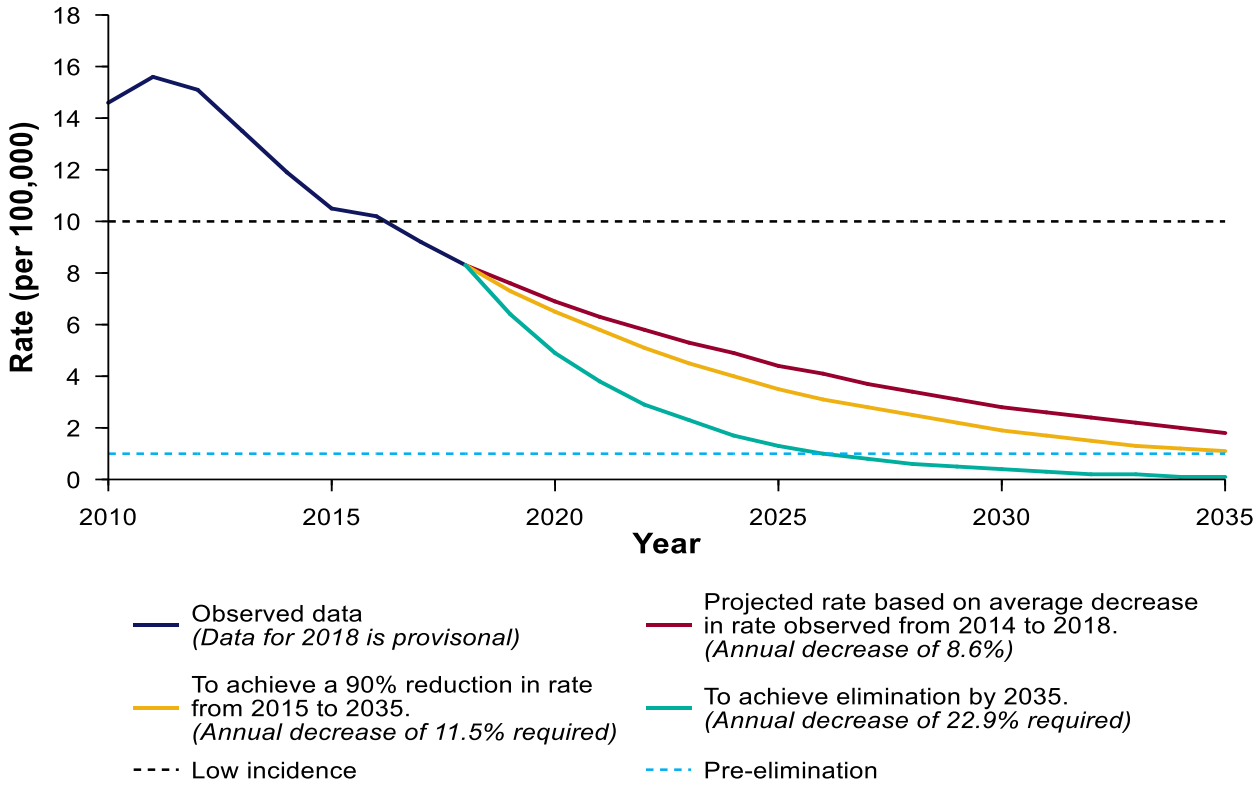
- reducing TB deaths by 95%
- reducing new TB notifications by 90%
- ensuring that no family is burdened with catastrophic expenses due to TB

To meet these targets, the annual decline in global TB incidence rates needs to accelerate from 2% per year (in 2015) to 10% per year by 2025.

Data for England (without Wales) on the number and rates of TB notifications is available from 1971 (Figure A; Table Ai.A). This data is used to monitor TB trends in England over time and understand the changing epidemiology of TB. Enhanced Surveillance was introduced in England by 2000, which involved the systematic collection of detailed demographic data, clinical information and other risk factors for TB at the point of notification. This enhanced information provides the principle source of data for public health action based upon detailed local knowledge of the epidemiology of TB in England. It is also this data that forms the basis of this report.

Figure B shows the likelihood of meeting the WHO's End TB target of a 90% reduction in new notifications by 2035 (yellow line). Based on the current incidence trend in England between 2010 and 2018 (dark blue line), the average annual decline is of 8.6%. If this average decline is maintained (red line), in itself a difficult task, then England would fall just short of achieving the End TB Strategy's 90% reduction. Achieving TB elimination by 2035 would require a sustained annual decline of 22% (teal line).

Figure B: Observed and projected rate of TB notifications, UK, 2010 to 2035



In 2018, the *Collaborative Strategy for England 2015 to 2020* [1] moved into the second half of its implementation period, with planning commenced for the continuation of TB control efforts in England beyond 2020. These efforts will align with the direction provided by the United Nations General Assembly on accelerating efforts to end the global TB epidemic, and respond to local epidemiology of TB across England.

Collaborative TB Strategy for England, 2015 to 2020

In January 2015, Public Health England and NHS England jointly launched the *Collaborative Tuberculosis Strategy for England 2015 to 2020* [1]. The strategy aims to achieve a year-on-year decrease in TB incidence, a reduction in health inequalities, and ultimately the elimination of TB as a public health problem in England.

To achieve these aims and deliver significant improvements in TB control the strategy sets out 10 important areas for action:

1. Improve access and earlier diagnosis
2. Provide universal high-quality diagnostics
3. Improve treatment and care services
4. Ensure comprehensive contact tracing
5. Improve BCG vaccination uptake
6. Reduce drug resistant TB
7. Tackle TB in under-served populations
8. Implement new entrant latent TB (LTBI) testing and treatment
9. Strengthen surveillance and monitoring
10. Ensure an appropriate workforce to deliver TB control

Since the launch of the Strategy, significant steps have been taken to deliver its 10 ‘areas for action’, and in the past year it has achieved:

- continued implementation of the Strategy by the 7 multi-agency TB Control Boards
- a relaunch of an updated USP Resource to ‘tackle TB in under-served populations' – including new epidemiology, exemplars and recommendations
- on-going work to support a ‘National Integrated Outreach Service to reduce health inequalities’
- collaboration with National Prison Radio, to raise awareness of TB among prisoners and prison staff
- work to sustain the new migrant latent TB infection (LTBI) testing and treatment programmes in priority CCGs, supported by PHE and funded by NHS England
- the sharing of TB Alert’s innovative communication approaches to increase the uptake of LTBI testing (funded by NHS-England)
- an LTBI screening pilot in foreign national prisons successfully delivered
- support to TB nurses through strengthened local TB nurse networks and a third national TB nurse conference
- two, 1-day TB nurse leadership workshops held in March 2019 to further develop the nursing workforce
- a successful first year of the British Thoracic Society’s MDR-TB Clinical Advice Service supported by PHE and NHS England

- TB awareness raising on World TB Day supporting WHO's 'It's TIME…' campaign with a UK 'TB pledge' campaign
- dissemination of quarterly 'TB Strategy Update' newsletters to over 6,200 subscribers
- development of a national TB Communications Plan to raise awareness of TB in people at risk and health care workers
- development of a Part 2A Orders resource for use by Health Protection Teams
- initiation of a 'National Point Prevalence Study of Social Needs of TB patients' to gather an accurate social needs profile of all TB patients in England to inform future work
- a huge amount of innovative TB work has been led by TBCBs – for example, developing pathways and funding mechanisms to house and support patients who are homeless and have no-recourse to public funds and improving TB awareness through prison staff training
- initiation of work to prepare a new 5-year national TB Action Plan for time beyond April 2020 when the current Strategy ends

This year's annual TB report describes the epidemiology of TB in England, provides data on the implementation of the UK pre-entry TB screening programme, the national roll-out of systematic LTBI testing and treatment and BCG vaccination coverage estimates. Based on data presented, recommendations are made on future work required to deliver the aims of the *Collaborative TB Strategy*, to continue the decline in TB incidence and ultimately lead to improved TB control in England.

1. TB notifications and incidence

Important messages

In 2018, 4,655 people were notified with TB, a rate of 8.3 per 100,000 population.

Between 2017 and 2018, there was a 8.2% decline in the number of TB notifications and a 8.8% decline in the rate, continuing an overall declining trend since 2011.

People born outside the UK accounted for 72% of TB notifications in 2018.

The rate of TB among people born outside the UK in 2018 remained 14 times higher than among those born in the UK.

Decreases in the numbers and rates of TB were seen among both people born in the UK (number: -9%, rate: -9.7%) and those born outside the UK (number: -8.1%, rate: -5.3%).

Overall numbers, rates and geographical distribution

In 2018, 4,655 people were notified with TB, a rate of 8.3 per 100,000 population (95% confidence interval (CI) 8.1-8.6) (Figure 1.1, Appendix I Table Ai.1.1), continuing to fall below the 10 per 100,000 threshold which the World Health Organisation (WHO) defines as a low incidence country. Between 2017 and 2018, there was a reduction in the number of people notified with TB (2017: 5,070, -8.2%) as well as in the rate of TB (2017: 9.1 per 100,000, 95% CI 8.9-9.4, -8.8%) (Table Ai.1.1).

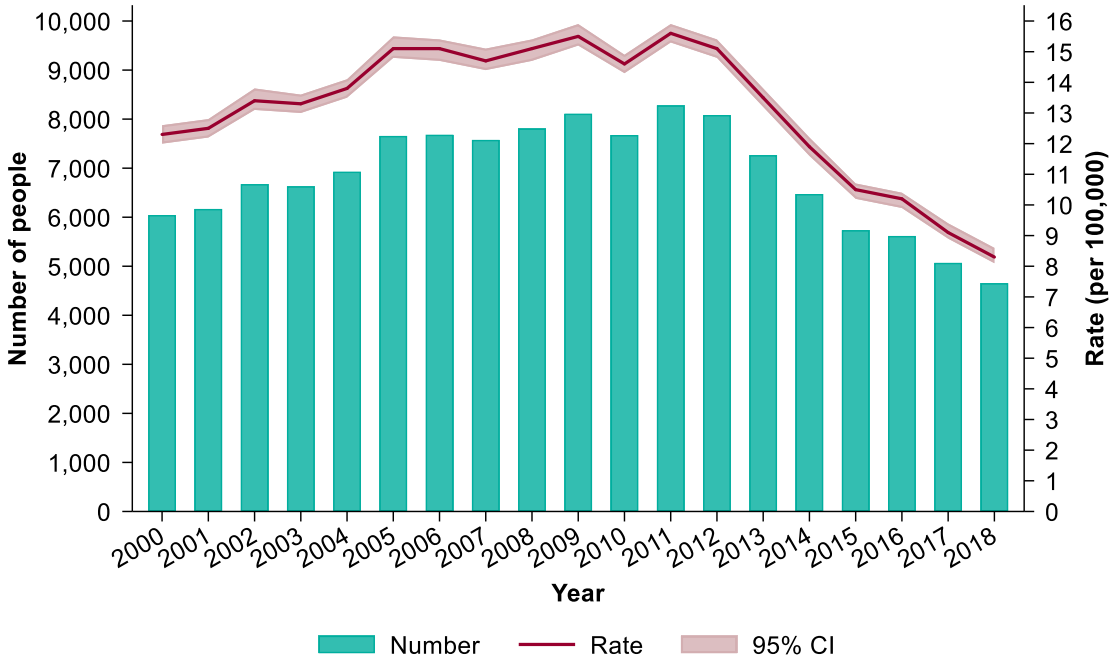
The number of TB notifications and rate in each of the 7 TB Control Boards[1] in 2018 is shown in Figure 1.2.

The main burden of the disease remains concentrated in large urban areas; London PHE Centre (PHEC) accounted for 36.3% (1,691/4,655) of notifications, with a rate of 19.0 per 100,000 (95% CI 18.1-19.9). The number of people with TB continued to decline across all PHECs between 2017 and 2018, with the exception of Yorkshire and the Humber and the North East, which increased by 2% and 7.3%, respectively (Figure 1.3, Table Ai.1.2).

[1]The TB Control Boards (TBCBs) have been functioning since September 2015 and are aligned with PHEC boundaries other than the North East and Yorkshire and the Humber PHECs, which together form the North East, Yorkshire and Humber TBCB, and the South East and South West PHECs, which together form the South of England TBCB.

Between 2016 and 2018, almost half (48.7%, 93/191) of clinical commissioning groups[2] had an average TB rate of less than 5.0 per 100,000, of which 3 had achieved the pre-elimination rate of less than 1.0 per 100,000 (Figure 1.4, Table Aii.1.2).
The proportion of local authority districts with a 3-year average rate of TB of less than 5.0 per 100,000 increased from 42.3% (134/317) in 2011 to 2013, to 58.4% (185/317) in 2016 to 2018 (Figure 1.5, Appendix II Table Aii.1.1). Eleven local authority districts had reached the pre-elimination rate of less than 1.0 per 100,000, 3 of which reported no notifications.

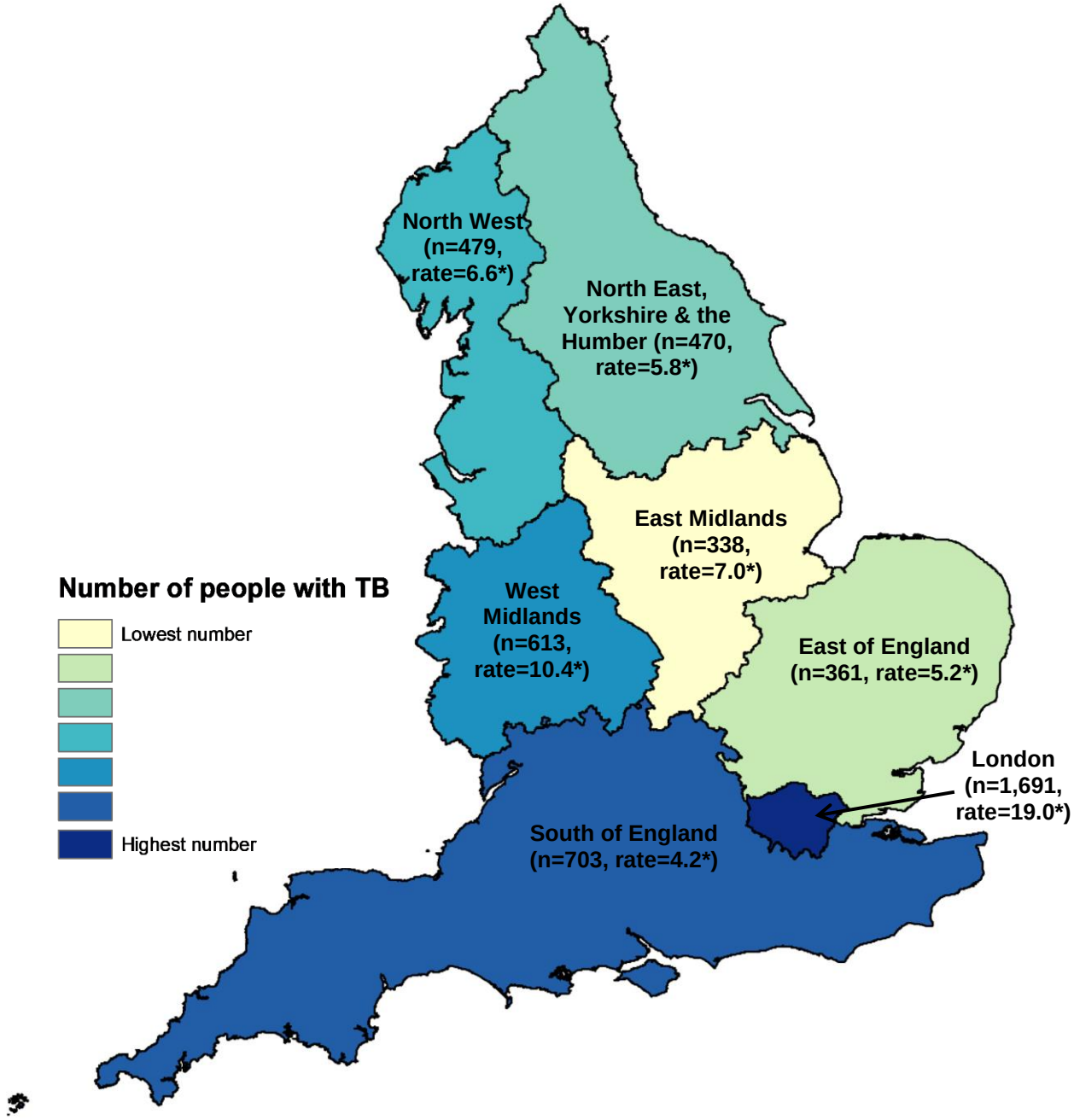
Figure 1.1: Number of TB notifications and rates, England, 2000 to 2018



TB Monitoring Indicator 1: Overall TB incidence per 100,000 population (England and PHEC)

[2] Clinical commissioning group boundaries as at April 2019

Figure 1.2: Number TB notifications and rates by TB Control Board, England, 2018



* per 100,000

Figure 1.3: Number of TB notifications and rates by PHE Centre, 2000 to 2018

Please note: the axes on the London figure are different to that of other PHECs due to the higher number of TB notifications and rate in London.

Figure 1.3: Number of TB notifications and rates by PHE Centre, 2000 to 2018 continued

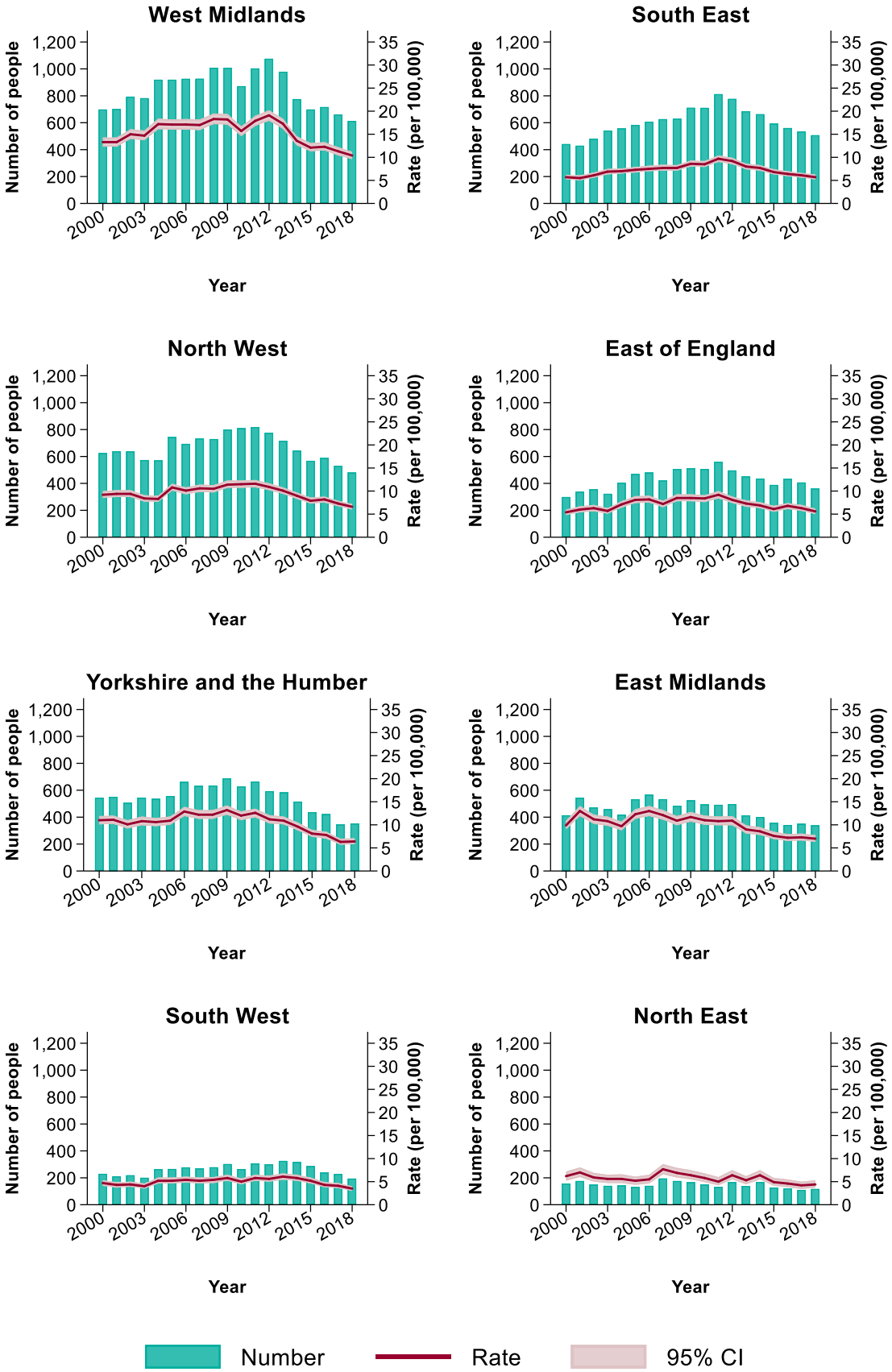


Figure 1.4: Three-year average TB rates by clinical commissioning group (CCG), England, 2016 to 2018 (box shows enlarged map of London area)

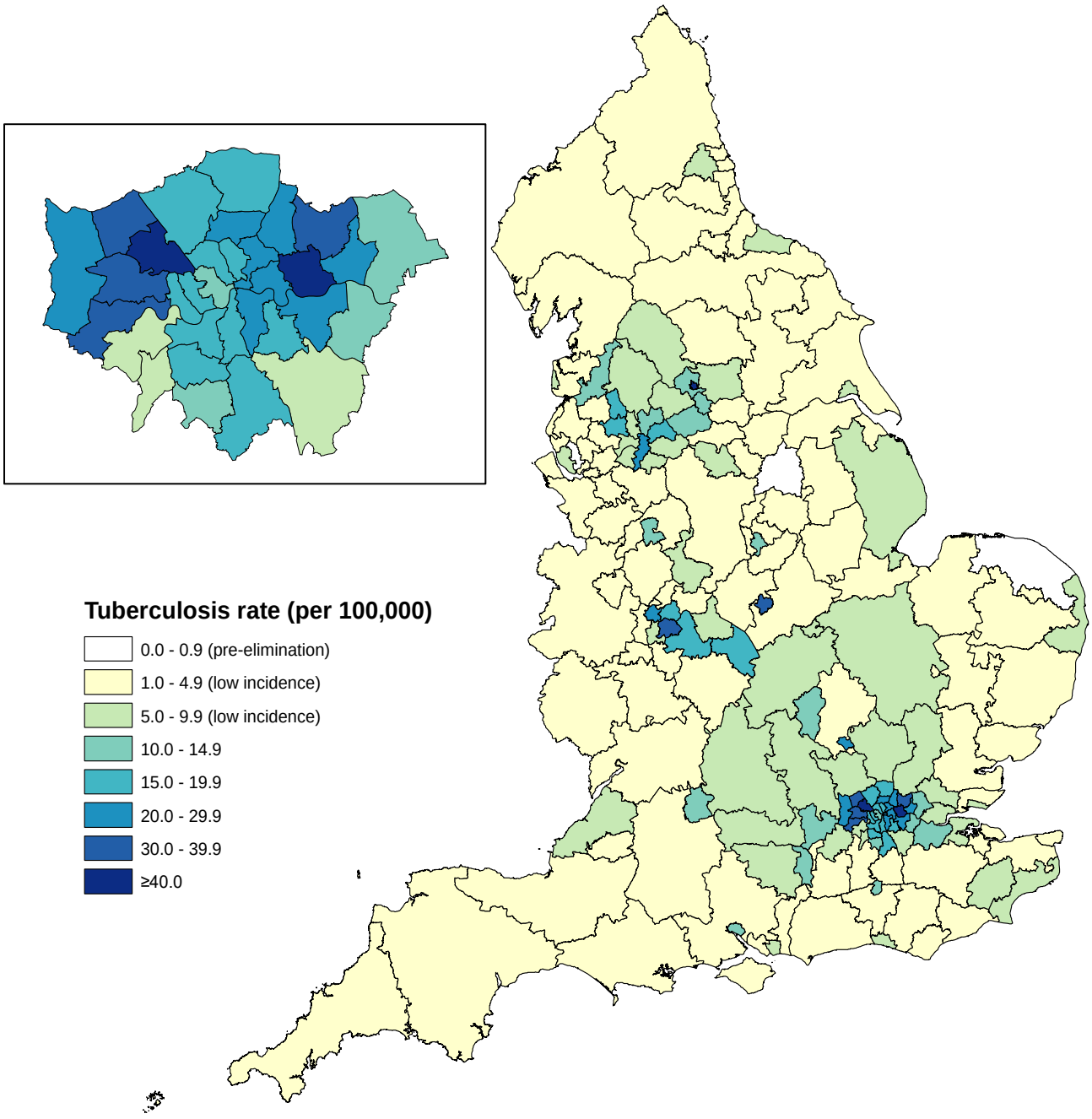
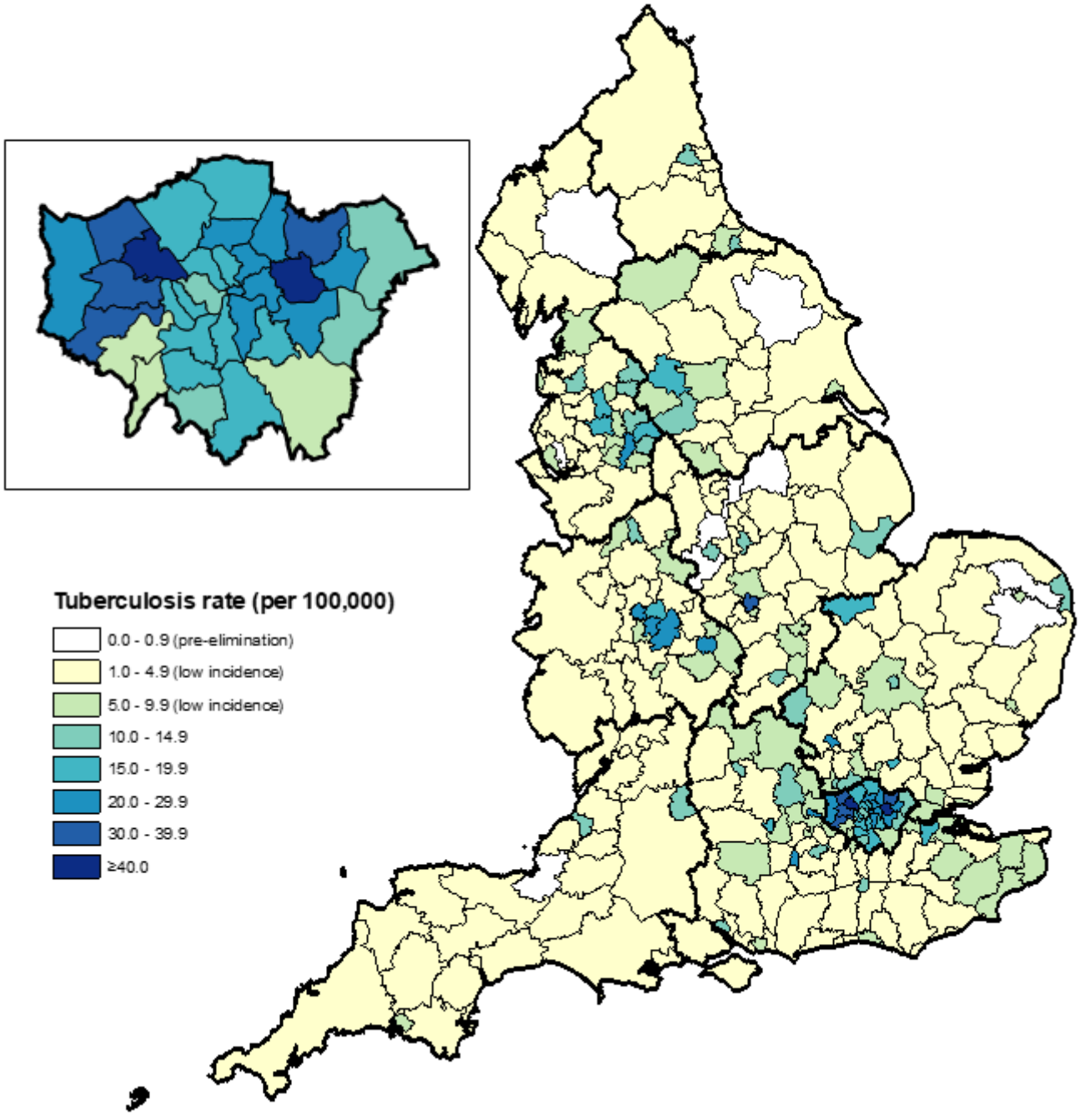


Figure 1.5: Three-year average TB rates by local authority district[a], England, 2016 to 2018 (box shows enlarged map of London area)



[a] PHEC boundaries are outlined in black.

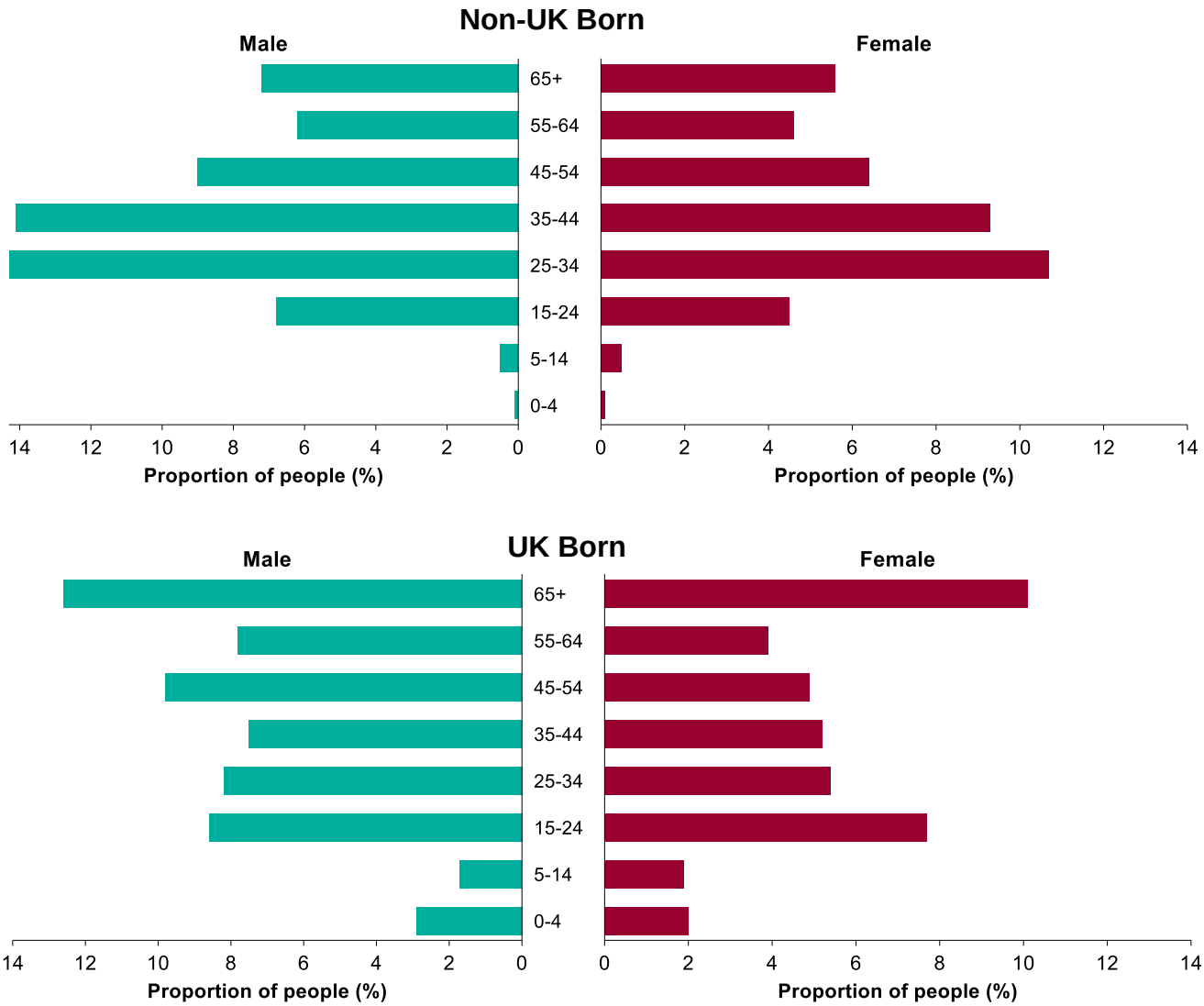
Demographic characteristics

Age and sex

In 2018, 58.4% (2,716/4,655) of people with TB were male and 54.7% (2,546/4,655) were aged 15 to 44 years old. Overall the rate of TB was highest in people aged 30 to 39 years (14.4 per 100,000), and was lowest in children (<15 years; 1.5 per 100,000), with a total of 151 children notified with TB (Table Ai.1.3). For data on how the rate of TB among children born in the UK has changed over time, used as a proxy for TB transmission in England, see Chapter 3.

A large proportion of people born outside the UK were aged between 25 and 44 years. In contrast, the largest proportion of people born in the UK were aged 65 years and older (Figure 1.6).

Figure 1.6: Proportion of people with TB by age, sex and place of birth, England, 2018



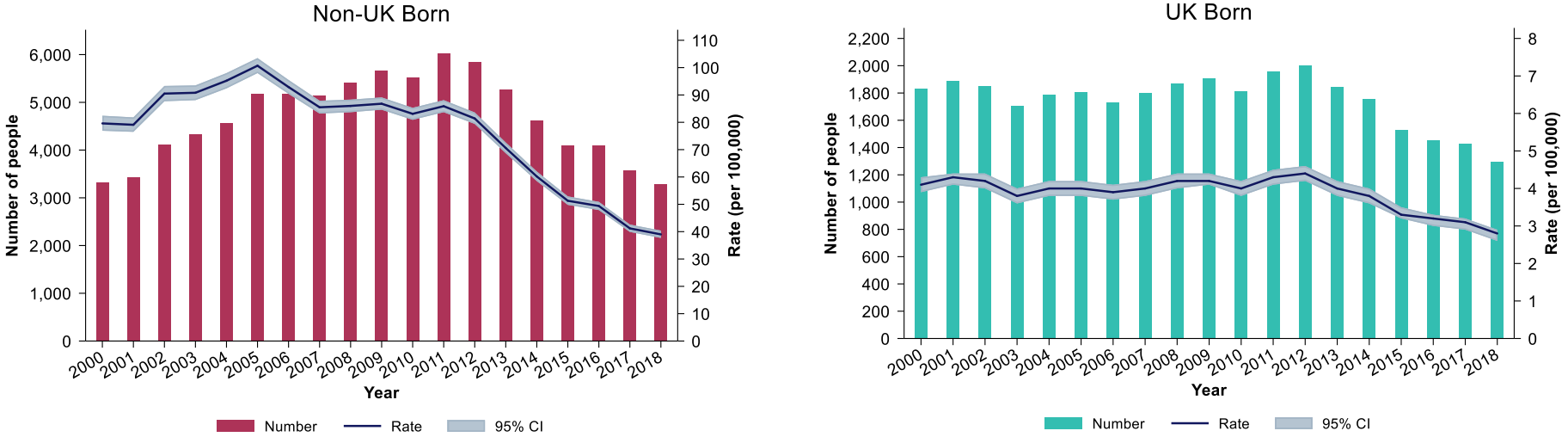
People with TB born outside the UK

In 2018, where the place of birth was known, 71.7% (3,283/4,580) of people with TB were born outside the UK. Between 2017 and 2018, there was a decrease in both the number of notifications (-8.1%) and the rate (-5.3%) among this population, having halved since 2012 and is now the lowest rate since 2000 (Figure 1.7, Table Ai.1.4).

However, in 2018 the rate of TB among people born outside the UK was still 14 times higher than in those born in the UK. Over time this difference in rate has decreased; peaking in 2005 at 25-times higher.

In 2018, among people born outside the UK, the highest rate of TB was in those aged 25 to 34 years (47.1 per 100,000) and was lowest in children (<15 years; 6.1 per 100,000) (Figure 1.8, Table Ai.1.3). Since 2000, the rate of TB in this population has fluctuated over time, with the largest overall declines seen in the younger age groups (<35 years).

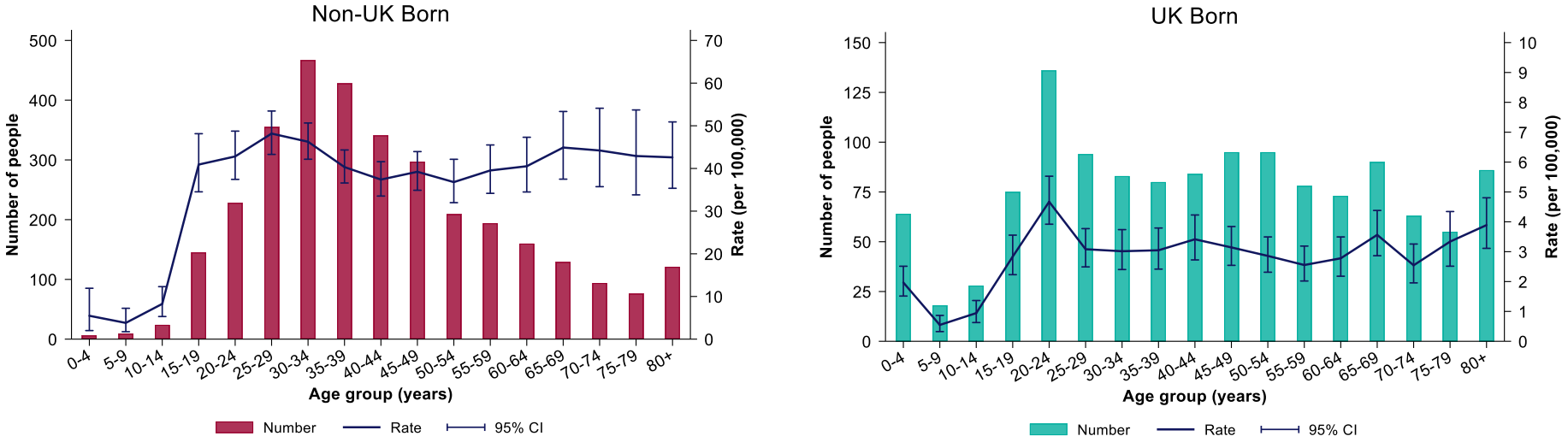
Figure 1.7: Number of TB notifications and rates by place of birth, England, 2000 to 2018



Please note: the axes differ between UK and Non-UK born graphs due to the difference in the number of notifications and rates between the 2 populations

TB Monitoring Indicator 2: TB incidence in UK born and non-UK born populations (England)

Figure 1.8: Number of TB notifications and rates by age group and place of birth, England, 2018



Please note: the axes differ between UK and Non-UK born graphs due to the difference in the number of notifications and rates between the 2 populations

Between 2017 and 2018, the number of TB notifications and rates for people born outside the UK remained stable or declined across all PHECs, with the exception of the East Midlands, where there was an increase in the number and rate of 15.1% and 18.1%, respectively (Figure 1.9, Table Ai.1.5). The largest proportional decline in numbers was seen in the South West (-20.5%), and the largest decline in the rate was also seen in the South West as well as the West Midlands (-13.4% and -13.5%, respectively).

Figure 1.9: Number of TB notifications and rates by PHE Centre and place of birth, 2000 to 2018

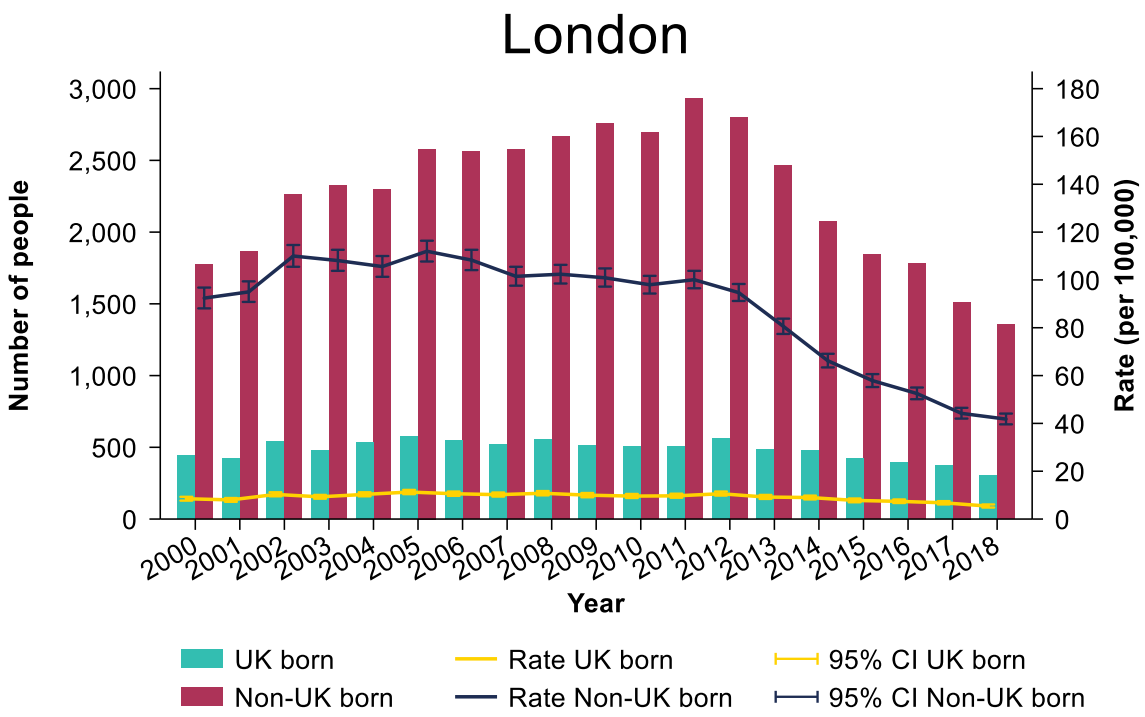
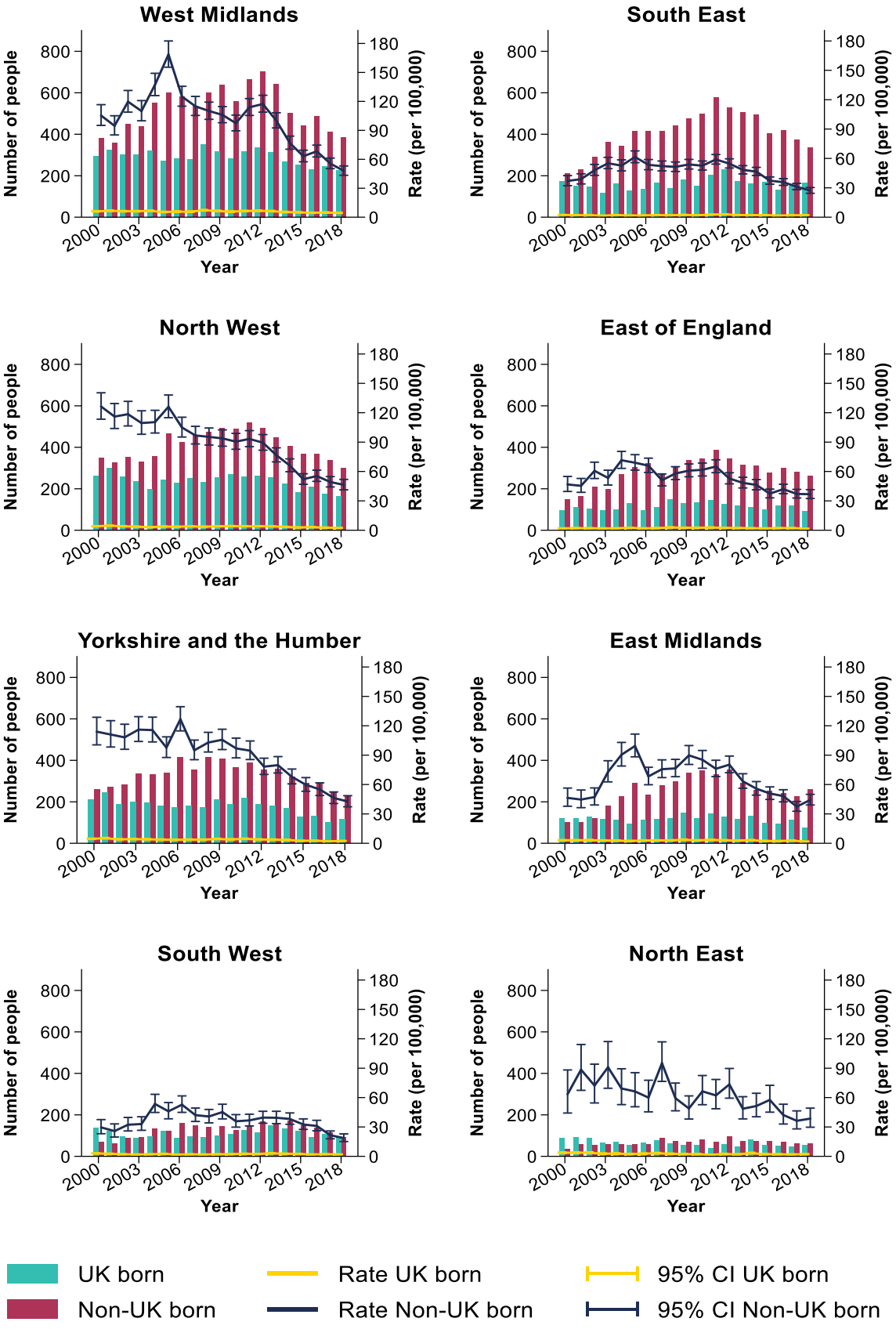
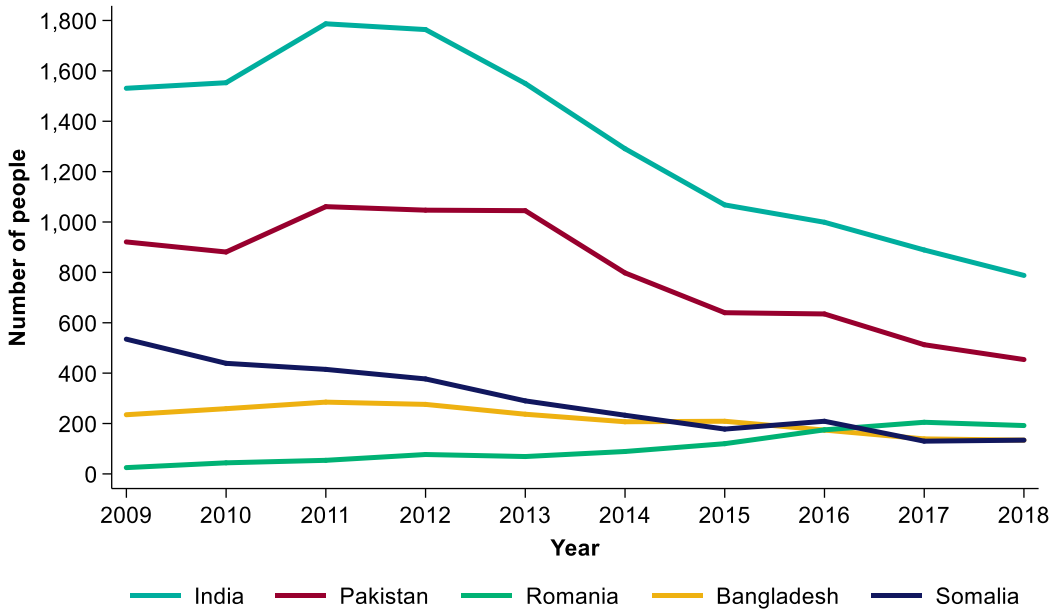


Figure 1.9: Number of TB notifications and rates by PHE Centre and place of birth, 2000 to 2018 continued



For those born outside the UK who were notified with TB in 2018, the most frequent countries of birth were India, Pakistan, Romania, Bangladesh and Somalia (Table 1.1, Table Ai.1.6). Between 2017 and 2018, the number of notifications continued to decline among people born in both India and Pakistan (-11.4% and -11.5%, respectively). In the same time period, the number born in Romania has remained fairly stable after a steady increase between 2013 and 2017 (2017: 205 versus 2018: 192). The number born in Bangladesh and Somalia has also remained fairly stable after a continual overall decline between 2011 and 2017 (Figure 1.10, Table Ai.1.6).

Figure 1.10: Trend in the number of people with TB for the top 5 countries of birth[a] for those born outside the UK, England, 2009 to 2018



[a] Five most frequent countries of birth in 2018

There was considerable variation by country of birth in the median time between a person's first entry into the UK and the time of their TB notification (Table 1.1). For people[3] born in 4 of the 5 most frequent countries of birth (India, Pakistan, Bangladesh and Somalia), the median time increased between 2013 and 2018 by an average of 5 years. In contrast, for people born in Romania, the median time has remained low and stable at 2 years.

[3] Where time between entry to the UK and notification was known

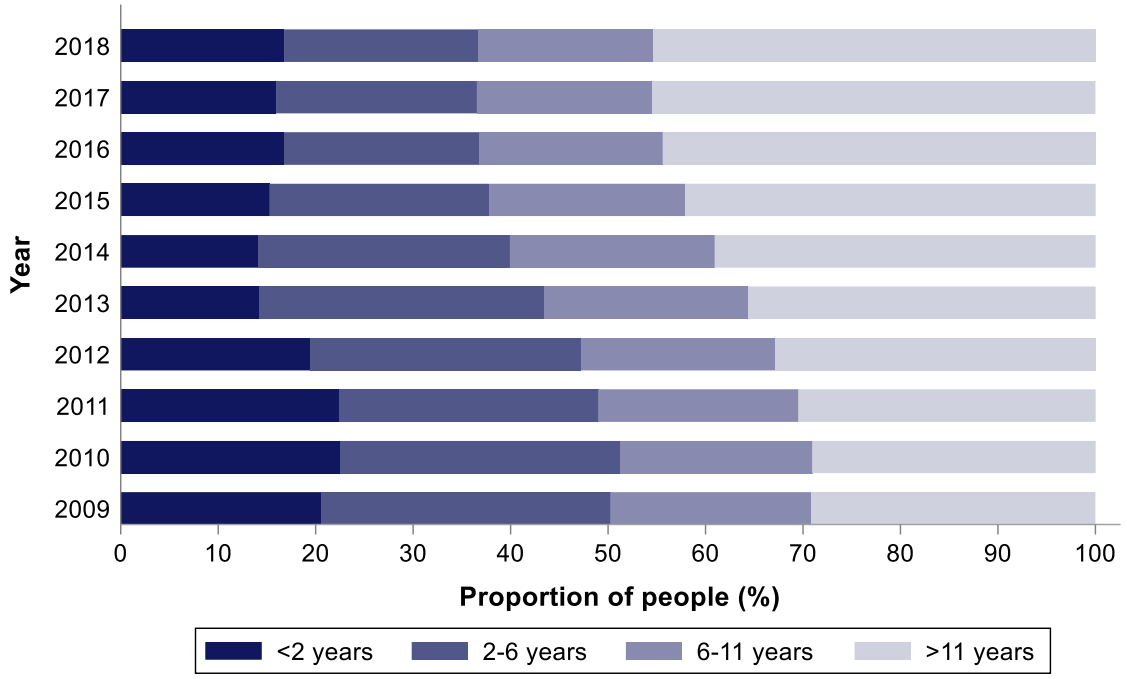
Table 1.1: Most frequent countries of birth for people with TB and time between entry to the UK and TB notification, England, 2018

Country of birth	Number of people	Proportion of people (%)[a]	Median time since entry to UK (IQR)[b]
United Kingdom	1,297	28.4	-
India	788	17.3	10 (4-21)
Pakistan	454	10.0	14 (6-32)
Romania	192	4.2	2 (1-4)
Bangladesh	134	2.9	11 (4-29)
Somalia	134	2.9	13 (4-18)
Eritrea	97	2.1	2 (0-5)
Philippines	91	2.0	9 (2-16)
Nigeria	90	2.0	11 (4-17)
Poland	82	1.8	9 (4-13)
Nepal	72	1.6	6 (3-10)
Sudan	57	1.3	2 (1-4)
Zimbabwe	54	1.2	15 (12-17)
Kenya	51	1.1	19 (10-44)
Lithuania	51	1.1	7 (4-11)
Afghanistan	49	1.1	6 (2-13)
Ethiopia	48	1.1	2 (1-6)
Other (<1%)	818	17.9	11 (3-19)
Total[a]	**4,559**	**100.0**	**9 (3-18)**

[a] Where country of birth was known
[b] Years; IQR refers to interquartile range

Overall; in 2018, 36.7% (1,113/3,034) of people were notified less than 6 years since entering the UK, with 16.8% (509/3,034) being notified within 2 years (Figure 1.11, Table Ai.1.7). The proportion of people notified more than 11 years since entry to the UK remained stable (45.4%), following a continual annual increase since 2010 (29%).

Figure 1.11: Time between entry to the UK and TB notification for people born outside the UK, England, 2009 to 2018



People with TB born in the UK

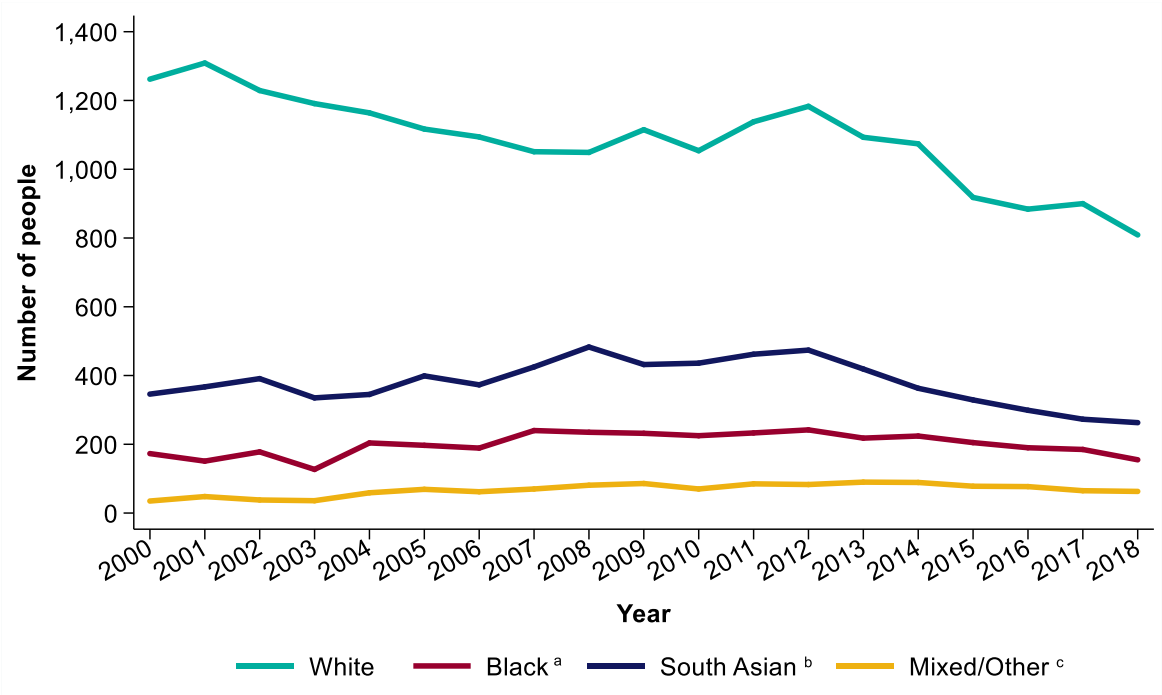
In 2018, 1,297 people born in the UK were notified with TB, a rate of 2.8 per 100,000 (95% CI 2.6-2.9) (Figure 1.7, Table Ai.1.4). Between 2017 and 2018, there was a large decline in the number of notifications (2017: 1,426, -9%) and the rate of TB (2017: 3.1 per 100,000, -9.7%), the largest decline since 2015.

The age distribution of people with TB born in the UK differs substantially to that of those born outside the UK; with a fairly even distribution in both the numbers and rates across all adult (≥15 years) age groups. The highest rate was in those aged 80 years and older (3.9 per 100,000, 95% CI 3.1-4.8), and in those aged between 20 and 24 years (4.7 per 100,000, 95% CI 3.9-5.5) (Figure 1.8, Table Ai.1.3). Similar to in people born outside the UK, however, the lowest rates of TB were among the younger age groups (<15 years).

Between 2017 and 2018, the number of people with TB born in the UK decreased in most PHECs, with the exception of the South East (2017: 150 versus 2018: 164), the North East (2017: 46 versus 2018: 53) and Yorkshire and the Humber (2017: 101 versus 2018: 118) (Figure 1.9, Table Ai.1.5).

Where ethnic group was known, the majority of people with TB born in the UK (62.7%, 809/1,290) were White, while 20.4% (263/1,290) were from South Asian[4] ethnic groups and 12% (155/1,290) from Black[5] ethnic groups (Figure 1.12). Rates, however, were highest among people from non-White ethnic groups, being up to 9-times higher than in the White ethnic group (1.9 per 100,000) (Figure 1.13, Table Ai.1.8).

Figure 1.12: Number of people with TB born in the UK by ethnic group, England, 2000 to 2018

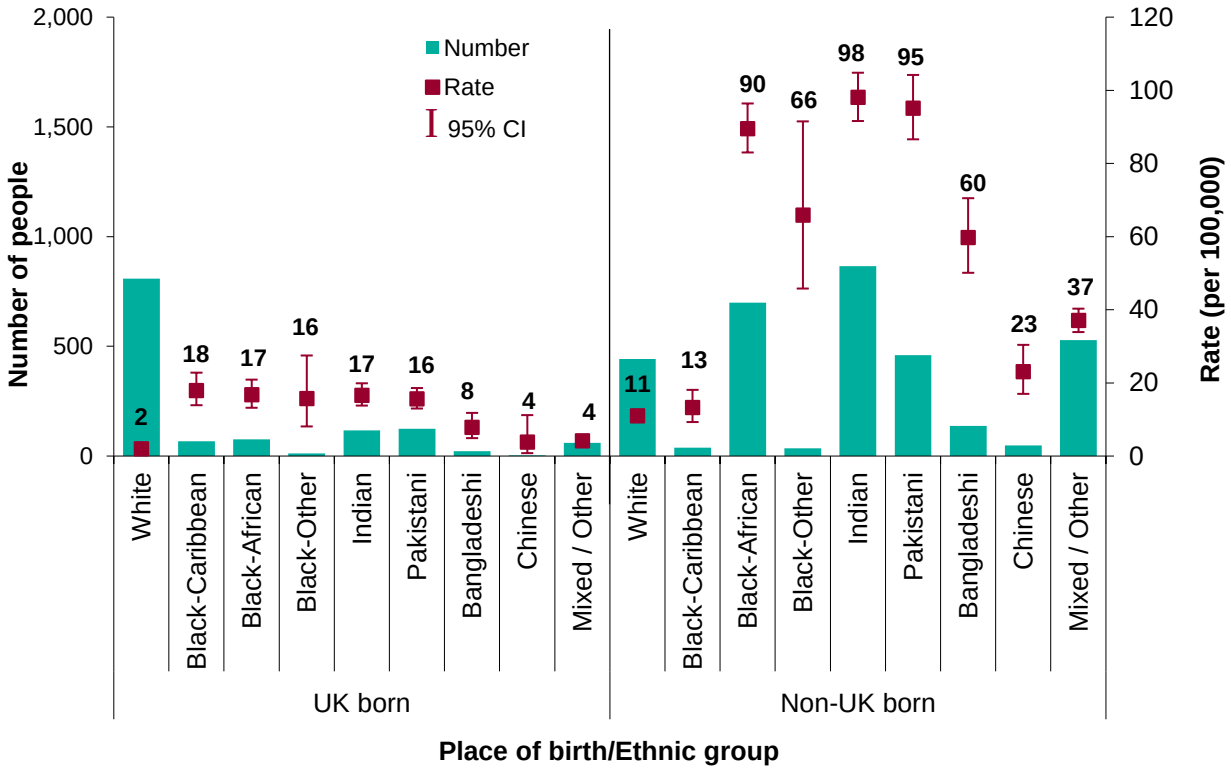


[a] People from Black-Caribbean, Black-African and Black-Other ethnic groups were grouped as 'Black'
[b] People from Indian, Pakistani and Bangladeshi ethnic groups were grouped as 'South Asian'
[c] People from Mixed/Other and Chinese ethnic groups were grouped as 'Mixed/other'

The number of people with TB born in the UK from South Asian ethnic groups has decreased year-on-year since 2012, with a 3.7% decrease in the number between 2017 and 2018 (2017: 273 versus 2018: 263). The number of people from a Black ethnic group (2017: 187 versus 2018: 155, -17.1%) and a White ethnic group (2017: 919 versus 2018: 809, -12%) also decreased between 2017 and 2018, after remaining stable or even increasing in the previous year (Figure 1.12, Table Ai.1.9).

[4] Indian, Pakistani and Bangladeshi ethnic groups
[5] Black-Caribbean, Black-African and Black-Other ethnic groups

Figure 1.13: Number of TB notifications and rates by place of birth and ethnic group, England, 2018



Please note: rates by ethnic group are displayed as labels.

Occupation

Among people[6] notified in 2018, 32.4% (1,133/3,497) were not in education or employment (for further information see Chapter 7); 10.4% (364) were either studying or working in education, 7.5% (264) were healthcare workers, and the remaining individuals (49.6%, 1,736) were classed as working in other occupations.

Clinical characteristics

Site of disease

Over half of people with TB[7] notified in 2018 had pulmonary disease (57.3%, 2,664/4,651) (Table 1.2), over one-quarter (29%, 772/2,664) of whom also had extra-pulmonary disease in at least 1 other site. A much higher proportion of people with TB born outside the UK had extra-pulmonary disease only (48.5%, 1,591/3,282), compared with those born in the UK (27.8%, 360/1,294) (Table Ai.1.10).

[6] Aged 16 to 64 years where occupation was known
[7] Where site of disease was known

Table 1.2: Number of people with TB by site of disease, England, 2018

Site of disease[a]	Number of cases	Percentage[b]
Pulmonary	2,664	57.3
Miliary	116	2.5
Laryngeal	12	0.3
Extra-pulmonary	2,759	59.3
Extra-thoracic lymph nodes	958	20.6
Intra-thoracic lymph nodes	575	12.4
Unknown extra-pulmonary	735	15.8
Pleural	418	9.0
Other extra-pulmonary	410	8.8
Gastrointestinal	254	5.5
Bone – spine	147	3.2
Bone – not spine	90	1.9
CNS – meningitis	98	2.1
CNS – other	76	1.6
Genitourinary	93	2.0
Cryptic disseminated	31	0.7

[a] With or without disease at another site
[b] Proportion of people with TB for which sites of disease were known (4,651); total may exceed 100% due to disease at more than 1 site
CNS - Central Nervous System

Directly observed therapy (DOT)

Information on whether a person received DOT[8] was known for 94.7% (4,407/4,655) of people notified with TB in 2018. Of these, 13.7% (603) were reported to have received DOT (for further information see Chapter 7), with 37.3% (53/142) of children (<15 years) having received DOT (Table Ai.1.11).

Previous history of TB

In 2018, 6.2% (276/4,480) of people with TB[9] had a previous diagnosis more than 12 months before their current notification. Of these, 95.8% (206/215) were known to have previously been treated for TB, and 31.3% (80/256) received DOT during their current notification. Time since previous diagnosis was known for 87.7% (242/276) of these people, with a median time since previous diagnosis of 7 years (IQR 2 to 24 years).

[8] In the Enhanced TB Surveillance system (ETS), the relevant variable is “Patient to begin a course of treatment under direct observation”; in the London TB Register (LTBR) the relevant variable is “Patient was taking Directly Observed Therapy at any time during the episode of care”.
[9] With known previous history of TB

Co-morbidities[10]

Overall, in 2018, where information on co-morbidity status was known, 20.8% (934/4,482) of all people with TB were known to have at least 1 co-morbidity, similar to in 2017 (20.6%). From these, the most frequent co-morbidity was diabetes (11.7%, 518/4,422) (Table 1.3).

Table 1.3: Number of people with TB by co-morbidity status, England, 2018

Co-morbidity	n	%	Total[a]
Diabetes	518	11.7	4,422
Hep B	73	1.8	4,110
Hep C	63	1.5	4,095
Chronic liver disease	66	1.5	4,351
Chronic renal disease	128	2.9	4,383
Immunosuppression	262	6.0	4,354
Biological therapy	46	17.6	262
Transplantation	16	6.1	262
Cancer	159	60.7	262
Steroids	41	26.8	262
Auto-immune disease	24	15.7	262
Other	7	4.6	262
Unknown	81	52.9	262

[a] Where information on co-morbidity status was known

Travel and visitor risk factors[11]

Information on history of travel to, and visitors received from a country[12] outside the UK, in the 2 years prior to TB diagnosis was known for 82.4% (2,442/2,964) and 73.8% (2,186/2,964) of people notified in 2018, respectively. Of these, 20.1% (491/2,442) had travelled outside the UK and 6.2% (135/2,186) had received a visitor from outside the UK (Table 1.4).

Over one-quarter (26.6%, 423/1,590) of people born outside the UK had travelled abroad, compared with only 7.8% (66/844) of those born in the UK. For people born outside the UK where the country of travel or origin of their visitor was known, 87.8% (351/400) had travelled to their own country of birth, and 85.1% (97/114) had received a visitor from their own country of birth.

[10] Information on co-morbidity status has been collected on ETS since mid-2015 and on LTBR since mid-2016 for London
[11] Excludes people with TB notified in London, as these data fields were not available in LTBR in 2018
[12] Excludes countries in Western Europe, US, Canada, New Zealand and Australia

Table 1.4: Number and proportion of people with TB with history of travel to and visitors received from a country[a] outside the UK in the last 2 years prior to diagnosis, England[b], 2018

Place of birth[c]	Travel to a country outside the UK			Visitor received from outside the UK		
	n	%	Total	n	%	Total
UK born	66	7.8	844	17	2.2	786
Non-UK born	423	26.6	1,590	118	8.5	1,396
Total[d]	**491**	**20.1**	**2,442**	**135**	**6.2**	**2,186**

[a] Excludes countries in Western Europe, US, Canada, New Zealand and Australia
[b] Excludes people with TB notified in London
[c] Where place of birth was known
[d] Total includes those with unknown place of birth

In 2018, a high number of people born in India (15.2%, 120/788), Pakistan (15.6%, 71/454) and Romania (15.1%, 29/192) had travelled outside the UK in the 2 years prior to their TB diagnosis, the majority of whom had travelled to their own country of birth.

2. Laboratory confirmation among people notified with TB

Important messages

In 2018, 61% of people notified with TB had their diagnosis confirmed by culture, a decrease from 63% in 2017.

As in previous years, a higher proportion of pulmonary TB was confirmed by culture compared with extra-pulmonary TB (74% versus 44%)
culture confirmation was lowest (31%) among children (<15 years), similar to previous years.

Only 65% of people with pulmonary TB had a sputum smear result recorded in ETS, 56% of which had a positive result.

Thirty-one percent of people notified did not have any laboratory results reported (culture, microscopy, PCR or histology) to confirm their TB diagnosis.

The number and proportion of isolates in 2017 (40, 1.3%) which could not be matched to a notification within the same, previous or subsequent year were at the lowest level since 2009 (503, 9.7%).

Laboratory tests data collection

Data for all culture confirmed TB isolates from the National Mycobacterium Reference Service (NMRS) were matched to TB notifications, and the results were used to report culture confirmation. Results for microscopy, PCR and histology were manually recorded in ETS (see Appendix III: Methods).

Culture confirmation

In 2018, 61.2% (2,850/4,655) of people notified with TB had their diagnosis confirmed by culture, a slight decrease from 62.5% (3,171/5,070) in 2017, but similar to previous years (Table Ai.2.1). In 2018, 97.9% (2,791) had *Mycobacterium tuberculosis (M. tuberculosis)* identified in their sample, 0.8% (23) *Mycobacterium bovis (M. bovis)*, 1.2% (33) *Mycobacterium africanum (M. africanum)*, 0.1% (2) *Mycobacterium microti (M. microti)* and 0.04% (1) *Mycobacterium tuberculosis complex* (MTBC) not further differentiated (Table Ai.2.2).

As in previous years, culture confirmation was higher among people with pulmonary TB compared to those with extra-pulmonary TB (74%, 1,972/2,664 versus 44.2%, 878/1,987). For both pulmonary and extra-pulmonary TB, 2018 figures were lower than in 2017 (75.6%, 2,129/2,815 and 46.2%, 1,039/2,247, respectively) (Table Ai.2.3). In 2018, the proportion of people with culture confirmation varied by PHEC; the highest was the North East (75.4%, 89/118) and the lowest in the East of England (57.6%, 208/361 (Table Ai.2.1). Between 2017 and 2018, the proportion increased in the North West, North East and Yorkshire and the Humber PHECs, while all other PHECs remained stable or decreased.

In 2018, as in previous years, the proportion of culture confirmation was lower among children (<15 years) with TB (31.1%, 47/151) compared with people aged 15 to 44 years (65.7%, 1,672/2,546), 45 to 64 years (56.8%, 697/1,228) and 65 years and older (59.5%, 434/730). Compared to 2017, this proportion increased among children (2017: 26.1%, 46/176) and decreased among those 65 years and older (2017: 64.9%, 517/797). Among children, the proportion of culture confirmation was low for both pulmonary and extra-pulmonary TB (37.5%, 42/112 and 12.8%, 5/39, respectively).

Sputum smear test results

In 2018, 65.3% (1,739/2,664) of people with pulmonary TB (regardless of culture confirmation) had a sputum smear (microscopy) result recorded in ETS, of which 56.4% (981/1,739) had a positive result. Of those with a positive sputum smear result, 92.6% (908/981) also had their TB diagnosis confirmed by culture, compared with only 61.5% (466/758) of those who had a negative sputum smear result. Twelve percent (12.3%, 327/2,664) of people notified with pulmonary TB had neither a sputum smear result nor positive culture to confirm their diagnosis.

The proportion of people with pulmonary TB with a reported sputum smear result was lower in children (<15 years) (40.2%, 45/112), compared with people aged 15 to 44 years (68.4%, 962/1,406), 45 to 64 years (68%, 464/682) and 65 years and older (57.8%, 268/464).

The proportion of people with pulmonary TB who had a sputum smear result recorded in ETS also varied by PHEC, with the highest in London (77.1%, 701/909) and the lowest in the North East (44.2%, 34/77). For further information on data completeness, see Chapter Appendix IV: Surveillance data quality.

Other laboratory test results

In 2018, only 21.2% (383/1,805) of the people who did not have their diagnosis confirmed by culture had an alternative positive laboratory result (microscopy, PCR or histology) indicative of TB. Of these, the highest proportion (11.5%, 208/1,805) had a

positive histology result (Table 2.1). Overall, 30.5% (1,422/4,655) of all people with TB were not reported to have their TB diagnosis confirmed by any laboratory method (culture, microscopy, PCR or histology), an increase from 29.6% (1,500/5,070) in 2017.

Table 2.1: Number and proportion of people without culture confirmed TB by alternative method of confirmation, England, 2018

Laboratory test results[a]	Pulmonary		Extra-pulmonary		All[b]	
	n (692)[c]	%	n (1,109)[c]	%	n (1,805)[c]	%
Sputum smear positive	73	10.6	N/A	N/A	73	4.0
Smear positive (not sputum)	15	2.4	19	1.7	35	2.0
Histology positive	53	7.7	155	14.0	208	11.5
PCR positive	29	4.2	49	4.4	78	4.3
No known positive lab result	531	76.7	888	80.1	1,422	78.8

[a] Some people may have more than 1 test result therefore the total percentage may exceed 100%
[b] Total number of people including those with an unknown site of disease
[c] Total number of people without culture confirmed TB, used as the denominator in proportion of laboratory test results shown

Under-notification of TB cases

Unmatched isolates[13] may occur if a person with TB is not notified, and can therefore provide an estimate of under-reporting. However, some isolates may also have failed to match to a TB notification if personal identifiers were incomplete or inaccurate, and a small number may represent contaminated samples which were not identified as such in surveillance reporting.

The number and proportion of isolates received from NMRS that could not be matched to a TB notification in the previous, same or subsequent year, decreased from 503 isolates (9.7%) in 2009 to 40 isolates (1.3%) in 2017 (Table 2.2). In 2018, isolates from 229 (7.8%) people could not be matched to a TB notification in the previous or same year (Table 2.2). The proportion of unmatched isolates is likely to decrease further once matched to 2019 notifications.

[13] Isolates are deduplicated to only count one isolate per TB notification per notification period, see Appendix III: Methods for further information

Table 2.2: Unmatched isolates by specimen year, England, 2009 to 2018

Specimen year	Unmatched to a notification within the previous or same year		Unmatched to a notification within the previous, same or subsequent year		All isolates[a]
	n	%	n	%	n
2009	735	14.2	503	9.7	5,176
2010	514	10.5	271	5.5	4,909
2011	490	9.2	192	3.6	5,328
2012	398	8.0	132	2.6	4,988
2013	312	7.0	100	2.2	4,453
2014	237	6.0	74	1.9	3,918
2015	234	6.5	43	1.2	3,576
2016	199	5.6	45	1.3	3,566
2017	179	5.6	40	1.3	3,184
2018	229	7.8	-	-	2,928

[a] Deduplicated based on patient identifiers to represent 1 isolate per TB notification and notification period

3. TB transmission

Important messages

In compliance with WHO's 'End TB' strategy, and in order to eliminate TB within England, it is essential we tackle the burden of transmitted disease.

In 2018, the rate of TB in children born in the UK, a proxy for recent transmission in England, was 1.2 per 100,000; a 64.7% reduction from the peak of 3.4 per 100,000 in 2007 to 2008.

Whole genome sequencing (WGS) for TB molecular cluster identification has been conducted for all new isolates across England in 2018, to assess the number of single nucleotide polymorphisms (SNPs) between TB isolates.

Two cases are suspectedly related if their respective TB isolate sequences are within a 12 SNP difference of each other, indicating a potential transmission event.

In 2018, of the people notified with culture confirmed TB in England, 94.5% had a WGS result that could be used to report relatedness; of which a quarter clustered with at least 1 other person within a 12 SNP cut-off.

Work continues to develop TB transmission metrics incorporating WGS data.

Whole Genome Sequencing of Mycobacterium isolates

Whole genome sequencing (WGS) of positive Mycobacterium isolates was implemented by PHE's National Mycobacterial Reference Service to replace MIRU-VNTR typing[14] during December 2016 in North and Central England, and in January 2018 across the South of England. As well as enhancing diagnostic capability to identify *M. tuberculosis* complex and determine genotypic drug resistance, WGS provides enhanced relatedness information based on single nucleotide polymorphism (SNP) differences between isolates [3]. When combined with clinical and epidemiological data, this offers greater discrimination than conventional typing methods to the probability of isolates belonging to the same transmission chain.

WGS is now utilised routinely to identify clusters in which people are within 12 SNPs of each other. There is no consensus as to which SNP cut off is best utilised in

[14] The National TB Strain Typing Service was established in 2010 to prospectively type TB isolates using 24 loci mycobacterial interspersed repetitive units - variable number tandem repeats (MIRU-VNTR)

relatedness analysis; although 12 SNPs represents the maximum SNP difference between 2 isolates for which epidemiological links have previously been identified [4], and is a conservative measure for reporting isolate relatedness. Cases, and those linked to them by WGS, are reviewed by regional health protection teams with complex clusters being escalated to a national review panel for further public health action recommendations. These include extended contact tracing or awareness raising, with the ultimate goal of limiting ongoing TB transmission.

The capacity for generating WGS data has grown substantially, and by the end of 2019, PHE will have 2 years of WGS data for England. Utilising this, there is an opportunity and surveillance requirement to develop reproducible and measurable indicators of transmission; a priority for reducing UK TB incidence in compliance with WHO elimination targets. Current areas of development include:

- utilising WGS data to estimate the timing and directionality of TB transmission between cases
- monitoring TB transmission over time and identifying rapidly expanding clusters to provide targeted surveillance intervention
- identifying where potentially preventable transmission events arise to prospectively apply interventions and reduce forward transmission
- developing risk stratification metrics of cases to identify those more likely to propagate infection
- using probabilistic models to derive transmission risk and evaluate interventions

PHE continue to collaborate in the development of a singly managed, integrated, comprehensive, automated, end-to-end, pathogen whole genome sequencing surveillance platform; which will integrate and promptly display epidemiological and microbiological WGS information to local health protection teams. This will enhance national communicable disease control, inclusive of TB, and meet Public Health England's Regional, National and International obligations.

Whole Genome Sequencing in England

In 2018, of the people notified with culture confirmed TB in England, 94.5% (2,693/2,850) had a WGS result that could be used to report relatedness (based on sequencing coverage and quality). A quarter of cases with a high quality WGS (25%, 672/2,693) clustered with at least 1 other person within a 12 SNPs cut-off.

Rate of TB in England for children born in the UK

TB in children born in the UK indicates likely recent transmission as children have a limited time during which they could have become infected, and in most cases progress to disease within 12 months. Therefore, the rate of TB in children (<15 years) born in

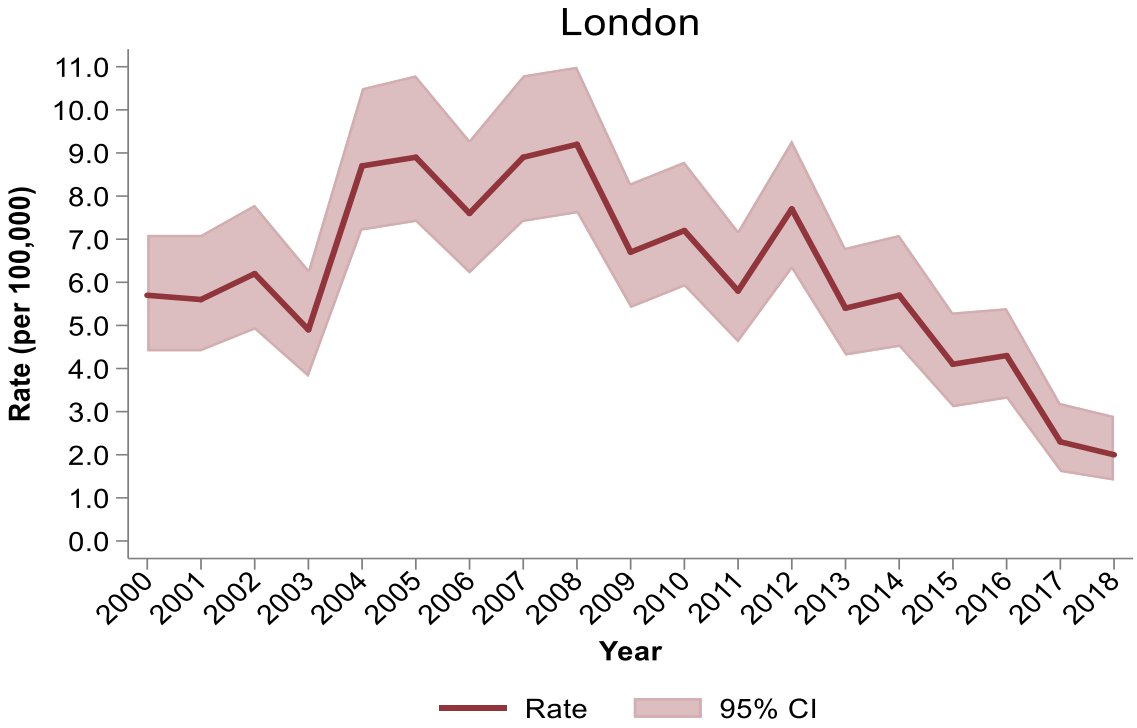
the UK is a proxy for recent transmission within England. In 2018, this rate was 1.2 per 100,000 (95% CI 1.0-1.4). There has been a 64.7% reduction in this rate between its peak of 3.4 per 100,000 (95% CI 3.0-3.8) in 2007 to 2008 and the rate in 2018 (Figure 3.1, Table Ai.3.1).

Figure 3.1: The overall rate of TB in children (<15 years) born in the UK, England, 2000 to 2018

TB Monitoring Indicator 5: Incidence of TB in UK born children (<15 years) (England)

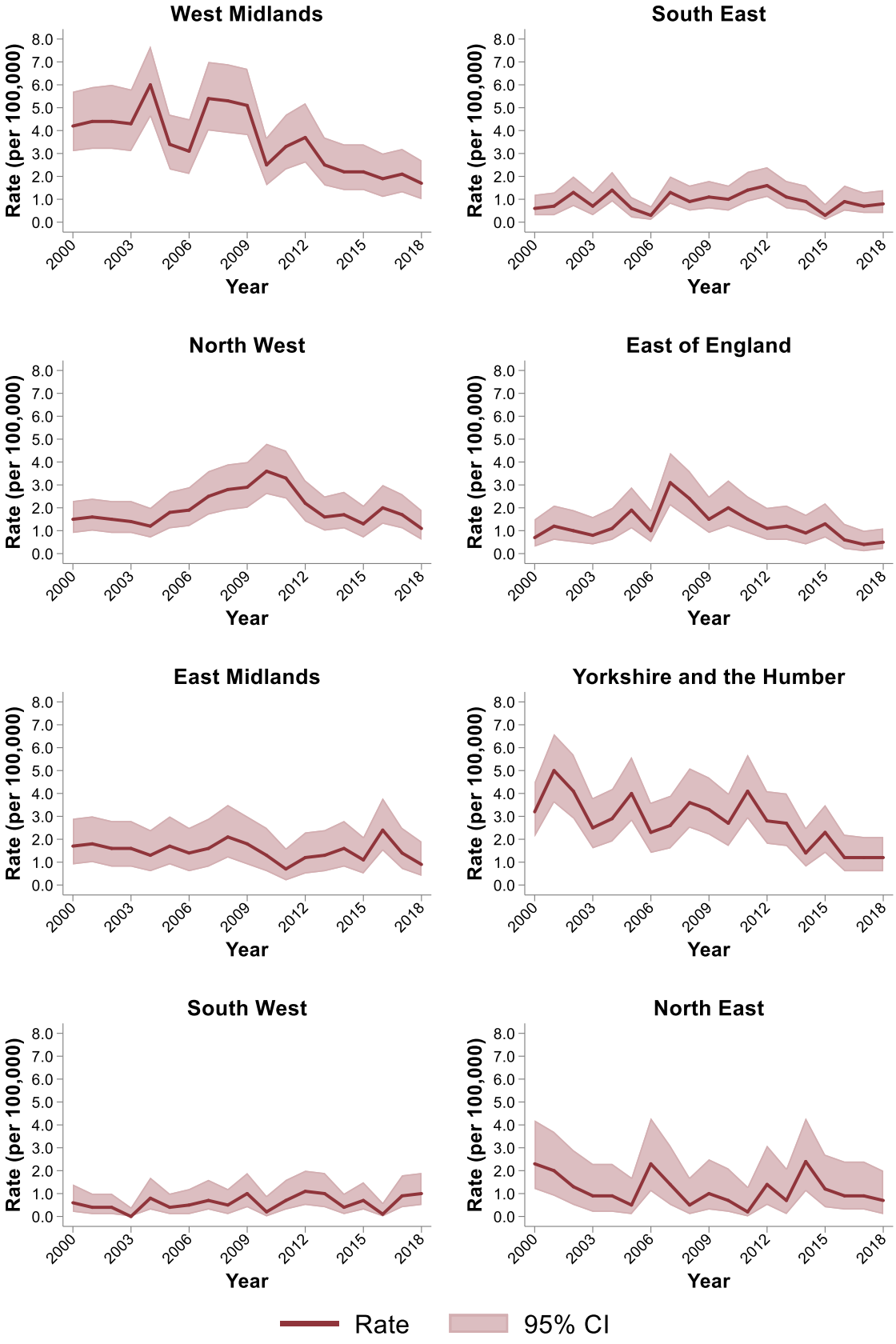
Generally, the rate of TB in children decreased in all PHEC regions between 2017 and 2018 (Figure 3.2); with the exception of a small increase in the South West and East regions (Table Ai.3.2). Within Yorkshire and the Humber, the TB rate in children has remained consistent at 1.2 cases per 100,000 (95% CI 0.6-2.2) between 2016 and 2018. London continues to have the highest rate of TB in UK-born children, although a substantial decline has been observed from 9.2 cases per 100,000 (95% CI 7.6-11) in 2008, to 2 per 100,000 (95% CI 1.4-2.9) in 2018.

Figure 3.2: Rate of TB in children (<15 years) born in the UK by PHE Centre, England, 2000 to 2018



Please note: the axes on the London figure are different to that of other PHECs due to a higher TB rate in London.

Figure 3.2: Rate of TB in children (<15 years) born in the UK by PHE Centre, England, 2000 to 2018 continued



4. Delay from symptom onset to treatment start

Important messages

In 2018, among people with pulmonary pTB the median time between symptom onset and treatment start was 75 days.

Nearly 30% (29%) of people with pTB experienced a delay of more than 4 months between symptom onset and treatment start, with no improvement seen over time (2011: 26%).

A low proportion (15%) of children (<15 years) with pTB experienced a delay of more than 4 months – in contrast, 34% of those aged 65 years and older experienced a delay of more than 4 months.

A higher proportion of people with pTB born in the UK (32%) experienced a delay of more than 4 months compared with those born outside the UK (28%).

Time from symptom onset to treatment start for people with pulmonary TB

Information on time from symptom onset to treatment start was available for 90.3% (2,373/2,629) of people with pulmonary TB (pTB) notified in 2018. Data on the time from symptom onset to treatment start has been available for more than two-thirds of people with pTB since 2011, and data completion has improved during this period. Uncertainties about the quality of data collected for date of first presentation to health services means it is not possible to distinguish late presentation to health services from delays occurring within the health service. For further information on data completeness, see Appendix IV. Surveillance data quality.

In 2018, among people with pTB, the median time between symptom onset and treatment start was 75 days (IQR: 37-136). Fourty-one percent (40.6%, 963/2,373) of people started treatment within 2 months, 30.3% (718) between 2 and 4 months and 29.2% (692) experienced a delay of more than 4 months. The proportion of people who experienced a delay of more than 4 months was slightly lower in 2018, compared with the previous 2 years (2016: 31.3%, 895/2,855 and 2017: 31.8%, 829/2,606) (Table 4.1).

Table 4.1: Number and proportion of people with pulmonary TB by time from symptom onset to treatment start, England, 2014 to 2018

Year	Time from symptom onset to treatment start						
	0-2 months		2-4 months		>4 months		Total[a]
	n	%	n	%	n	%	n
2014	1,174	39.5	897	30.2	904	30.4	2,975
2015	1,199	42.1	851	29.9	796	28.0	2,846
2016	1,093	38.3	867	30.4	895	31.3	2,855
2017	992	38.1	785	30.1	829	31.8	2,606
2018	963	40.6	718	30.3	692	29.2	2,373

[a] Number of people with pulmonary TB for whom time from symptom onset to treatment start was known

TB Monitoring Indicator 6: Proportion of pulmonary TB cases starting treatment within two months of symptom onset (England, PHEC, UTLA, NHS sub-region and CCG data shown on Fingertips)

TB Monitoring Indicator 7: Proportion of pulmonary TB cases starting treatment within four months of symptom onset (England, PHEC, UTLA, NHS sub-region and CCG data shown on Fingertips)

Age

As in previous years, in 2018 the proportion of people with pTB who experienced a delay of more than 4 months increased with age (<15 years: 14.9%, 15-44 years: 27.3%, 45-64 years: 32%, 65+ years: 34.2%) (Table 4.2). Between 2017 and 2018, the proportion of people who experienced this delay decreased in all age groups (2017; <15 years: 19% (19/100), 15-44 years: 28.7% (411/1,432), 45-64 years: 36% (228/634) and 65+ years: 38.9% (171/440)).

Table 4.2: Number and proportion of people with pulmonary TB by time from symptom onset to treatment start and age group, England, 2018

Time from symptom onset to treatment start	Age group (years)									
	0-14		15-44		45-64		65+		Total[a]	
	n	%	n	%	n	%	n	%	n	%
0-2 months	58	61.7	553	43.2	222	36.6	130	33.2	963	40.6
2-4 months	22	23.4	377	29.5	191	31.5	128	32.7	718	30.3
>4 months	14	14.9	350	27.3	194	32.0	134	34.2	692	29.2
Total	**94**	**100.0**	**1,280**	**100.0**	**607**	**100.0[b]**	**392**	**100.0[b]**	**2,353**	**100.0**

[a] Number of people with pulmonary TB for whom time from symptom onset to treatment start was known
[b] Percentages may not sum to total of 100% due to rounding

Sex

In 2018, a similar proportion of females with pTB (30.9%, 280/905) experienced a delay of more than 4 months compared with males (28.1%, 412/1,468) (Table 4.3).

Table 4.3: Number and proportion of people with pulmonary TB who experienced a delay of more than 4 months between symptom onset and treatment start by age group and sex, England, 2018

Age group (years)	Female		Male		Total[a]
	n	%	n	%	n
0-14	5	10.6	9	19.1	14
15-44	153	31.0	197	25.1	350
45-64	62	32.1	132	31.9	194
65+	60	35.1	74	33.5	134
Total	**280**	**30.9**	**412**	**28.1**	**692**

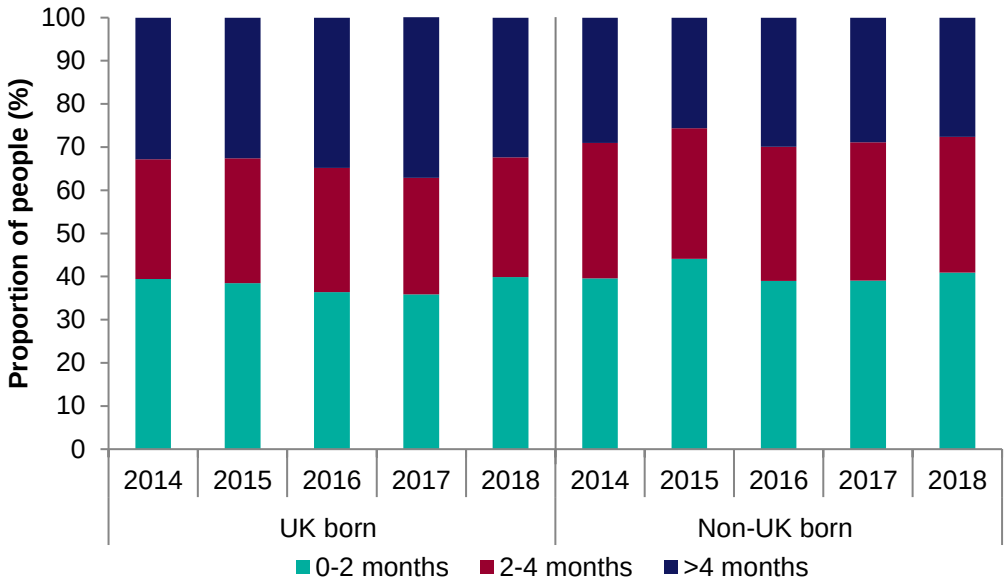
[a] Number of people with pulmonary TB for whom time from symptom onset to treatment start was known

Place of birth

In 2018, as in previous years, people with pTB who were born in the UK experienced a longer delay than those born outside the UK (Figure 4.1 and Table Ai.4.1). Among people born in the UK, there was a decrease in the proportion with a delay of more than 4 months between 2017 (37.2%, 342/920) and 2018 (32.4%, 267/824). Among people born outside the UK, there was a slight decrease in the proportion over the same time period (2017: 28.9%, 481/1,665 versus 2018: 27.6%, 421/1,528).

The difference in delay by place of birth was similar between females (born in the UK: 34.4%, 110/320 versus born outside the UK: 29.1%, 168/577) and males (born in the UK: 31.2%, 157/504 versus born outside the UK: 26.6%, 253/951) in 2018.

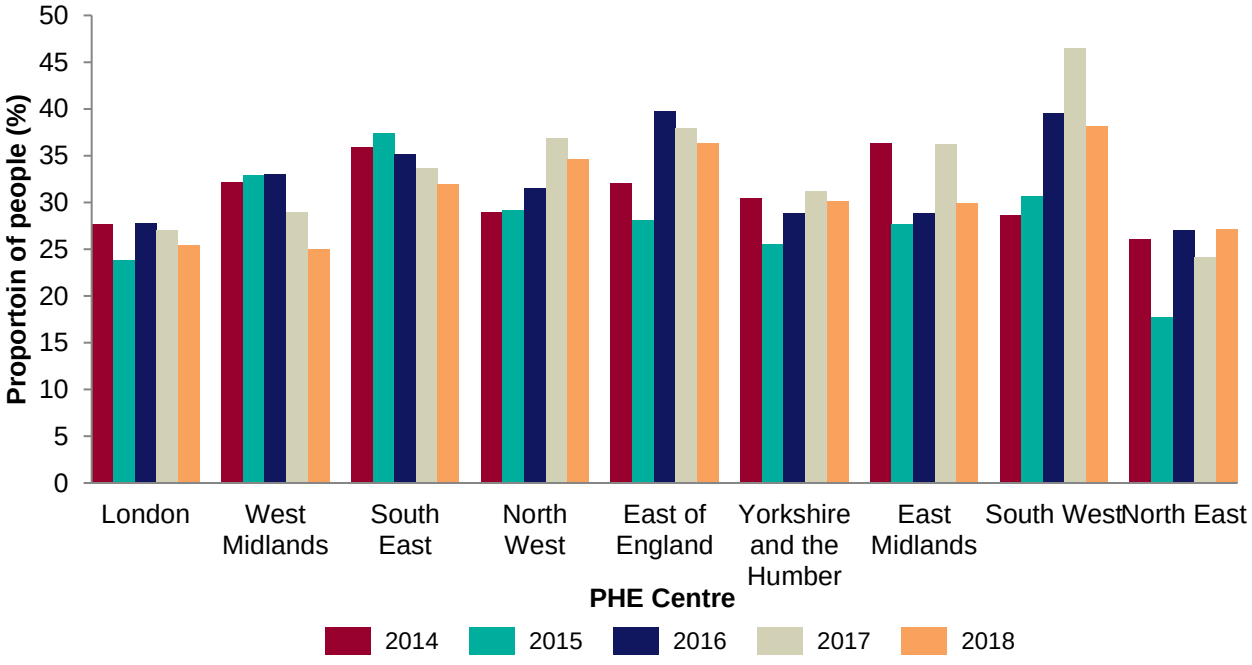
Figure 4.1: Proportion of people with pulmonary TB by time from symptom onset to treatment start and place of birth, England, 2014 to 2018



Geographical distribution

The proportion of people with pTB who experienced a delay of more than 4 months varied by PHEC. In 2018, this was highest in the South West (38.1%, 45/118), although there was a decrease from the previous year (2017: 46.5%, 67/144). In contrast, the West Midlands had the lowest proportion (25%, 83/332) (Figure 4.2,Table Ai.4.2).

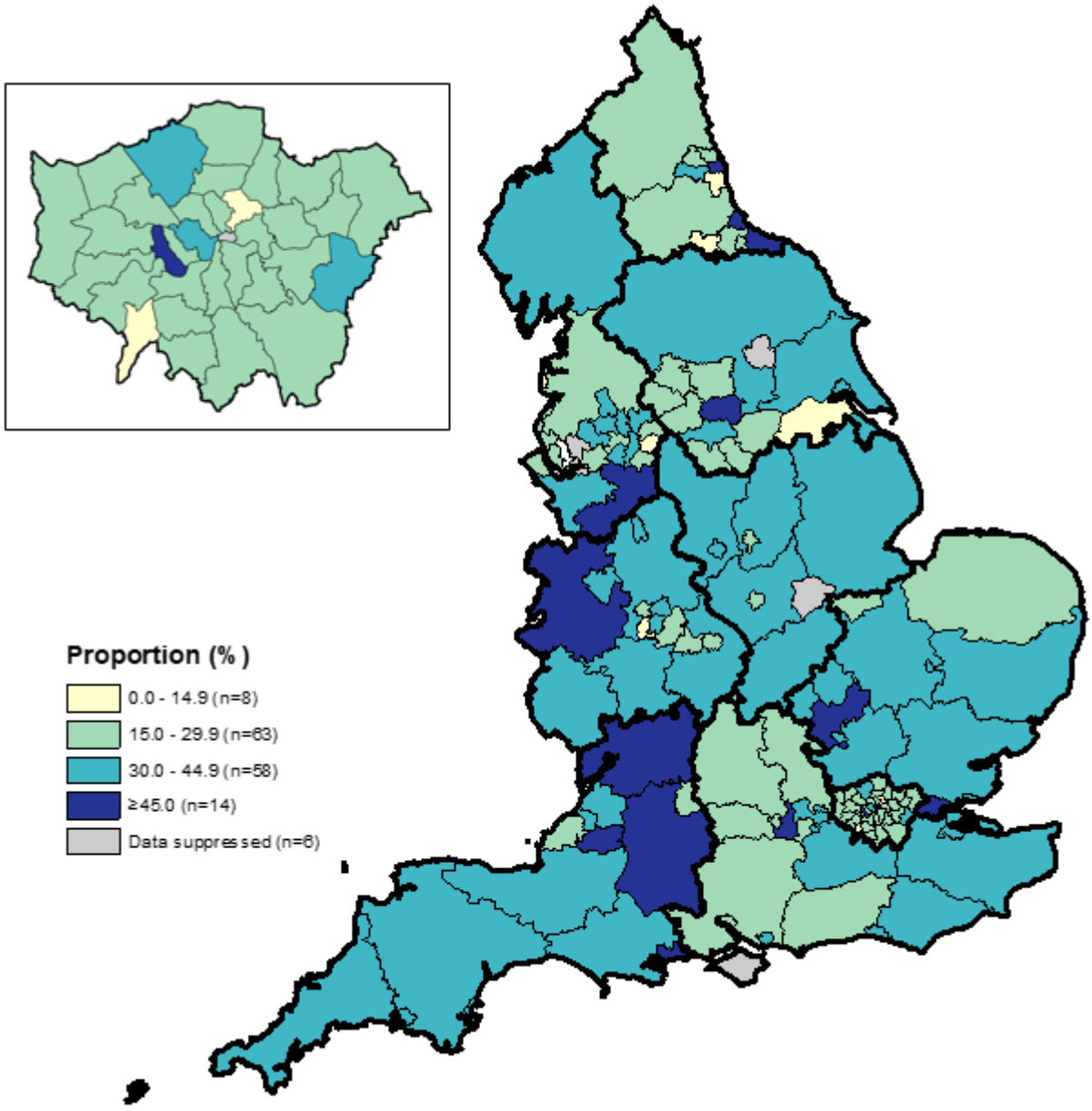
Figure 4.2: Proportion of people with pTB with a delay of more than 4 months between symptom onset and treatment start by PHE Centre[a], England, 2014 to 2018



[a] Ordered by decreasing total number of TB notifications in 2018

For the 3 years of 2016 to 2018, there was considerable variation by upper-tier local authority in the proportion of people with pTB who experienced a delay of more than 4 months between symptom onset and treatment start (Figure 4.3).

Figure 4.3: Proportion of people with pulmonary TB[a] who experienced a delay of more than 4 months between symptom onset date and treatment start by upper-tier local authority[b], England, 2016 to 2018 (box shows enlarged map of London area)



[a] People with pulmonary TB for whom time between symptom onset to treatment start was known
[b] Data for upper-tier local authorities with less than 5 people with pulmonary TB and known time between symptom onset to treatment start are suppressed due to the effect of small numbers on the proportion. PHEC boundaries are outlined in black

5. TB outcomes in the drug sensitive cohort

Important messages

In 2017 there was a slight decrease in the proportion of people notified with drug sensitive TB (with an expected treatment duration of less than 12 months) who completed treatment by 12 months (84.7% versus 85% in 2016).

A decrease in treatment completion was most marked in males over 65, and death as the recorded outcome was also highest in this group.

There was a 2.8% decline in the proportion of children completing treatment within 12 months between 2016 and 2017.

The proportion of all people with drug sensitive TB who died at the last reported outcome was 5.3%, comparable to 2016 (5.5%).

In 2017, 4.2% of people notified with drug sensitive TB were lost to follow-up at the last recorded outcome, which was proportionately greater in people born outside the UK (5%) compared with those born in the UK (1.9%).

Drug sensitive cohort, 2008 to 2017

For the purposes of reporting outcomes for people with TB, the drug sensitive cohort is defined as all people notified with TB, excluding those in the drug resistant cohort (see Chapter 6 for a complete definition of the drug resistant cohort). Under this definition, people with TB resistant to isoniazid, ethambutol and/or pyrazinamide but *without* resistance to rifampicin are included in the drug sensitive cohort. Outcomes are reported according to the year of notification for people with drug sensitive TB up to, and including, 2017. See Chapter 6 for TB outcomes in the drug resistant cohort.

TB outcomes for the drug sensitive cohort are reported separately for the following groups:

1. For people with TB that have an expected treatment duration of less than 12 months, TB outcomes at 12 months are reported. This group excludes people with CNS disease. In addition, those with spinal, cryptic disseminated or miliary disease are excluded, as CNS involvement cannot be reliably ruled out for the purposes of reporting.
2. For people with CNS, spinal, cryptic disseminated or miliary disease, the last recorded TB outcome is reported.

Detailed data on mortality and people lost to follow-up at last recorded outcome are presented for the entire drug sensitive cohort.

TB outcomes for the drug sensitive cohort with expected treatment duration of less than 12 months

Treatment completion

Table 5.1: Outcome at 12 months for people with drug sensitive TB with an expected treatment duration <12 months[a], England, 2017

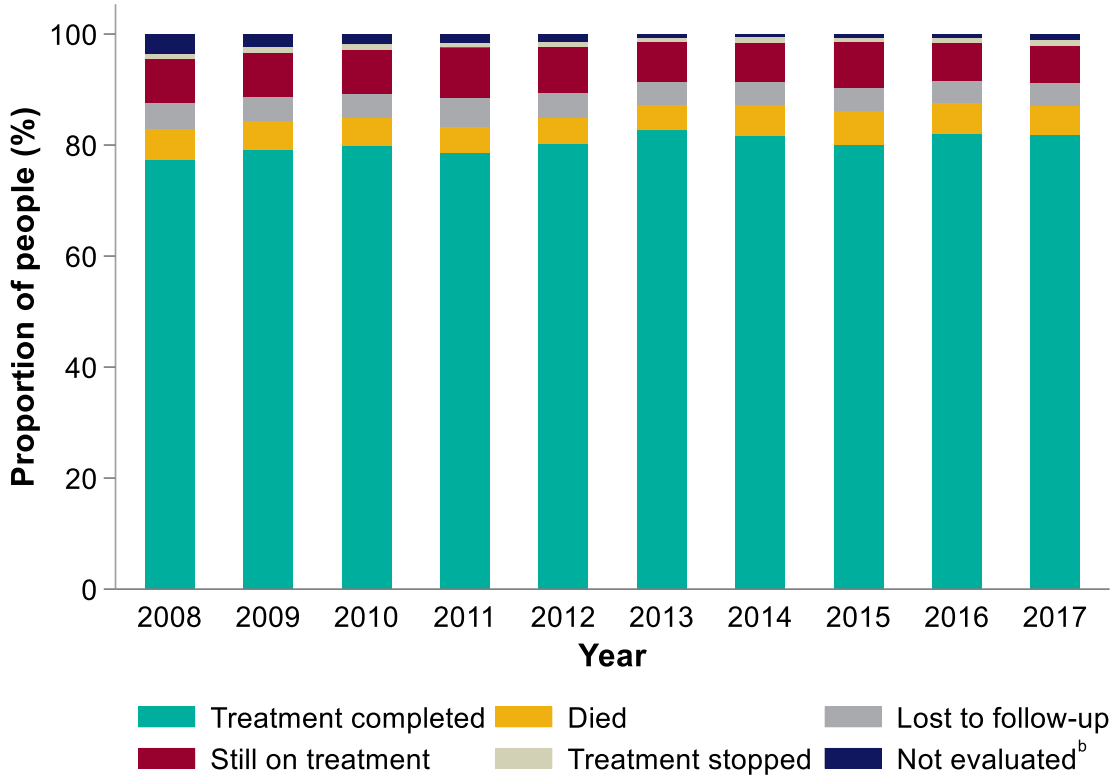
TB outcome	n	%
Treatment completed	3,796	84.7
Died	204	4.6
Lost to follow-up	183	4.1
Still on treatment	209	4.7
Treatment stopped	55	1.2
Not evaluated[b]	35	0.8
Total	**4,482**	**100.0[c]**

[a] Excludes people in the drug resistant cohort and those with CNS, spinal, miliary or cryptic disseminated TB
[b] Not evaluated includes unknown and transferred out
[c] Percentages may not sum to a total of 100% due to rounding

In 2017, 84.7% (3,796/4,482) of people notified with drug sensitive TB completed treatment within 12 months, which was comparable to that observed in 2016 (85%; 4,223/4,967) (Table 5.1, Figure 5.1, Table Ai.5.1). A further 3% (135/4,482) of people notified in 2017 are known to have completed treatment after 12 months, bringing the overall treatment completion to 87.7% (3,931/4,482) at the last recorded outcome (Table Ai.5.2).

Of those who completed treatment and had a known treatment duration, 96.5% (3,731/3,866) completed within 12 months. Almost three-quarters of people (71%, 2,743/3,866) completed treatment in 6 to 8 months. However, 5.9% (230/3,866) completed treatment in less than 6 months (168 days), which is shorter than the full duration of a short-course treatment. This may arise if patients start treatment abroad and therefore do not require a full course of treatment post-arrival in the UK from non pre-entry screening countries. The proportion of people completing treatment in less than 6 months during 2017 was greater than in 2016 (5.5%; 241/4,372) and 2015 (5.1%; 224/4,371 (Table Ai.5.3).

Figure 5.1: Outcomes at 12 months for people with drug sensitive TB with an expected treatment duration <12 months[a], England, 2008 to 2017



[a] Excludes people in the drug resistant cohort and those with CNS, spinal, miliary or cryptic disseminated TB
[b] Not evaluated includes unknown and transferred out

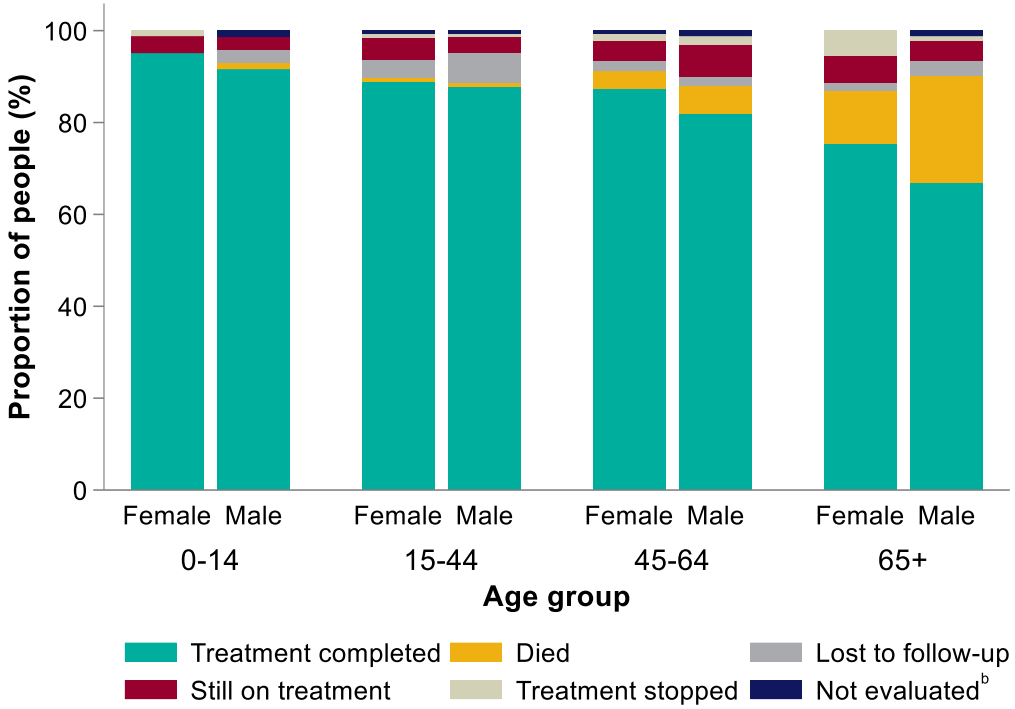
Age and sex

Treatment completion within 12 months was 3.6% higher for females (86.8%; 1,616/1,862) than males (83.2%; 2,180/2,620) notified in 2017.

As observed in previous years, the proportion of people notified in 2017 that completed treatment within 12 months decreased with increasing age, from 93.5% (144/154) in children (<15 years) to 70.4% (491/697) in those aged ≥65 years (Table Ai.5.4). Among people aged 65 years and older this proportion was higher than in 2016 (69.6%). There was, however, a 2.8% decline in the proportion of children completing treatment within 12 months between 2016 and 2017 (96.3% versus 93.5%). A year-on-year improvement had previously been observed between 2011 (85.5%) and 2016 (96.3%).

The difference in treatment completion by sex increased with age. The difference was greatest in people aged 65 years and older; 66.9% (271/405) of males completed treatment compared to 75.3% (220/292) of females (Figure 5.2, Table Ai.5.5).

Figure 5.2: Outcomes at 12 months, by sex and age group, for people with drug sensitive TB with an expected treatment duration <12 months[a], England, 2017



[a] Excludes people in the drug resistant cohort and those with CNS, spinal, miliary or cryptic disseminated TB
[b] Not evaluated includes unknown and transferred out

Site of disease

Treatment completion at 12 months was lower in people who had pulmonary compared to extra-pulmonary TB (81.2%; 2,056/2,531 verses 87.9%; 2,192/2,494, respectively). See Table Ai.5.6 for a detailed breakdown of treatment completion by site of disease at the last recorded outcome.

Geographical distribution

Treatment completion at 12 months varied by PHEC for people notified in 2017; from 88.6% (271/306) in Yorkshire and the Humber, to 74.7% (74/99) in the North East (Table Ai.5.7). There was a reduction in the proportion of people completing treatment at 12 months in the North East between 2016 and 2017 (84.1% versus 74.7%, respectively). Contrastingly, the East Midlands had the largest increase in treatment completion at 12 months from 75.4% in 2016 to 80.3% in 2017. Following a year-on-year improvement in treatment completion between 2011 (68.8%) and 2016 (82.9%), the South West saw a reduction in treatment completion for people notified in 2017 (79.7%) (Table Ai.5.8).

Still on treatment

Almost 5% (4.7%, 209/4,482) of people notified in 2017 were still on treatment at 12 months (Table 5.1, Table Ai.5.1), of which almost two-thirds (64.6%, 135/209) went on to complete treatment by the last recorded outcome (Table Ai.5.2).

Where the reason for still being on treatment was recorded (80.9%; 169/209), 54.4% (92/169) were on a planned regimen exceeding 12 months, 25.4% (43) had their treatment changed, and 20.1% (34) had their treatment interrupted.

TB outcomes for drug sensitive cohort with CNS, spinal, miliary or cryptic disseminated TB

Table 5.2: Last recorded TB outcome for the drug sensitive cohort with CNS, spinal, miliary or cryptic disseminated[a] TB, England, 2017

TB outcome	n	%
Treatment completed	392	74.5
Died	59	11.2
Lost to follow-up	26	4.9
Still on treatment	31	5.9
Treatment stopped	6	1.1
Not evaluated[b]	12	2.3
Total	**526**	**100.0[c]**

[a] Excludes people in the drug resistant cohort and only includes people with drug sensitive CNS, spinal, miliary or cryptic disseminated TB
[b] Not evaluated includes unknown and transferred out
[c] Percentages may not sum to a total of 100% due to rounding

At the last recorded outcome, 74.5% (392/526) of people notified in this cohort in 2017 had completed treatment, whilst 5.9% (31/526) were still on treatment (Table Ai.5.9). Due to a shorter follow-up period for cases notified in 2017, the proportion of people that complete treatment is expected to increase, as in previous years. For people notified with TB in 2016, 82.5% (480/582) completed treatment at the last recorded outcome (Table Ai.5.9).

TB outcomes in the entire drug sensitive cohort

At the last recorded outcome, 86.3% (4,323/5,008) of all drug sensitive TB notifications in 2017 had completed treatment, 5.3% (264) had died, and 4.2% (211) were lost to follow-up (Table 5.3). These proportions were comparable to that observed in 2016 (Table Ai.5.10).

Table 5.3: Last recorded TB outcome for the entire drug sensitive cohort[a], England, 2017

TB outcome	n	%
Treatment completed	4,323	86.3
Died	264	5.3
Lost to follow-up	211	4.2
Still on treatment	102	2.0
Treatment stopped	61	1.2
Not evaluated[c]	47	0.9
Total	**5,008**	**100.0[b]**

[a] Excludes people in the drug resistant cohort
[b] Percentages may not sum to total of 100% due to rounding
[c] Not evaluated includes unknown and transferred out

Death in the entire drug sensitive cohort

In 2017, 5.3% (264/5,008) of people notified were reported to have died at the last recorded outcome; a slight decrease compared with 2016 (5.5%) (Table Ai.5.10). For people notified in 2017 who had died, TB caused or contributed to 42.4% (112) of deaths and was incidental to 22.7% (60) of deaths (Table Ai.5.11).

Of those who had died at the last recorded outcome, 12.9% (34/264) were diagnosed post-mortem. Of the cases with known information on all social risk factors, 20% (3/15) had 1 social risk factor. Additionally, of those with known co-morbidities (8), 4 had diabetes; 2 were immunosuppressed and there was 1 person each with chronic liver and renal disease, respectively.

The median time to death after starting treatment (known for 71% (147/207) of those who were not diagnosed post-mortem) was 42 days (range=0-429 days). Eighty-nine people (60.5%; 89/147) died within 2 months of starting treatment; 12 (17.7%) of which had a SRF. For those with a SRF, the median time to death after starting treatment was 10.5 days (range=1-59 days).

A higher proportion of males died at last recorded outcome (6.2%, 181/2,939) compared with females (4%, 83/2,069), with the greatest mortality observed in those aged 65 years and older (21.1%, 167/791). This compared to 5.8% (74/1,276) in the 45 to 64 age group and 0.8% (22/2,769) in the 15 to 44 age group.

In 2017, a higher proportion of people with pulmonary TB died at the last recorded outcome compared to those with extra-pulmonary disease (7.4%, 206/2,770 versus 4.1%, 124/3,020, respectively) (Table Ai.5.6). Additionally, a higher proportion of people with a previous diagnosis of TB (10.1%, 27/268) died compared with those who had not

previously had TB (4.3%, 196/4,563). This difference was greater than in 2016 (5.9% vs 4.7%, respectively).

Almost a fifth (17.7%, 33/187) of the adults (aged ≥15 years) that died had a SRF, which was greater than in 2016 (14.3%), but lower than that observed in 2015 (20.7%).

The proportion of deaths varied by PHEC; from 8.9% (20/224) in the South West, to 3.9% (74/1,890) in London (Table Ai.5.12).

Lost to follow-up in the entire drug sensitive cohort

Of the people notified in 2017, 4.2% (211/5,008) were lost to follow-up at the last recorded outcome (Table 5.3). This proportion was higher among people born outside the UK (5%, 177/3,527) compared with those born in the UK (1.9%, 27/1,408). Where the reason was known, 58.1% (90/155) of people born outside the UK had left the country. The proportion of people lost to follow-up was highest in those aged 15 to 44 years (5.7%, 157/2,769) and over two-thirds (70%, 147/210) had pulmonary disease.

6. Drug resistant TB and outcomes in the drug resistant cohort

Important messages

The proportion of people with initial isoniazid resistance without MDR/RR-TB has slightly increased between 2017 and 2018 (by approximately 1%) after remaining relatively stable over the past 10 years.

Resistance to pyrazinamide has increased fivefold between 2016 and 2018, with the majority of these (81.6%) displaying monoresistance.

The number of people with confirmed initial MDR/RR-TB decreased slightly between 2017 and 2018 (54 versus 44); however, the proportion was similar (1.7% versus 1.6%).

In 2018, of the 44 people with MDR/RR-TB, 4 had confirmed initial XDR-TB, the same as in the previous year.

The number of people in the drug resistant cohort (confirmed or treated as MDR/RR-TB) decreased between 2017 and 2018 (62 versus 47).

65.2% of people in the drug resistant cohort notified in 2016 completed treatment by 24 months, a higher proportion than for those notified in 2015 (58%).

By the last recorded outcome, 10.1% of the 2016 cohort were lost to follow-up, a slightly higher proportion than in 2015 (8%).

Identification and classification of drug resistance

Susceptibility testing is conducted for all people with culture confirmed TB. Whole genome sequencing (WGS) (see Chapter 3 for further details) provides resistance predictions for first line drugs (isoniazid, rifampicin, ethambutol and pyrazinamide), aminoglycosides and fluoroquinolones, whilst also determining species and strain relatedness. Recognition and reporting of drug resistance using WGS is more rapid than conventional phenotypic drug susceptibility testing (DST), although DST is still performed for first line drugs, with additional testing for second line drugs if first line resistance is detected [5]. Results from these tests are presented in this chapter, alongside additional data for those who had resistance identified by a PCR method, or were treated with an MDR-TB regimen in the absence of resistance confirmation.

Drug resistance may be classified as initial resistance if identified early during the diagnosis and treatment phase (on isolates within 1 monthof the first specimen date). Drug resistance is classed as acquired if identified on repeat culture 1 or more months after the first specimen date. In addition, people with a change from a sensitive to resistant result following treatment start are reclassified as having acquired resistance, even if this is within the 1-month period.

Data presented in this chapter includes people notified with initial isoniazid resistance (INH-R) without MDR-TB and for those in the drug resistant cohort**.** The drug resistant cohort includes: people with confirmed[15] initial or acquired MDR/RR-TB and people treated with a second line regimen for MDR/RR-TB without confirmation of this resistance [6].

Initial first line drug resistance

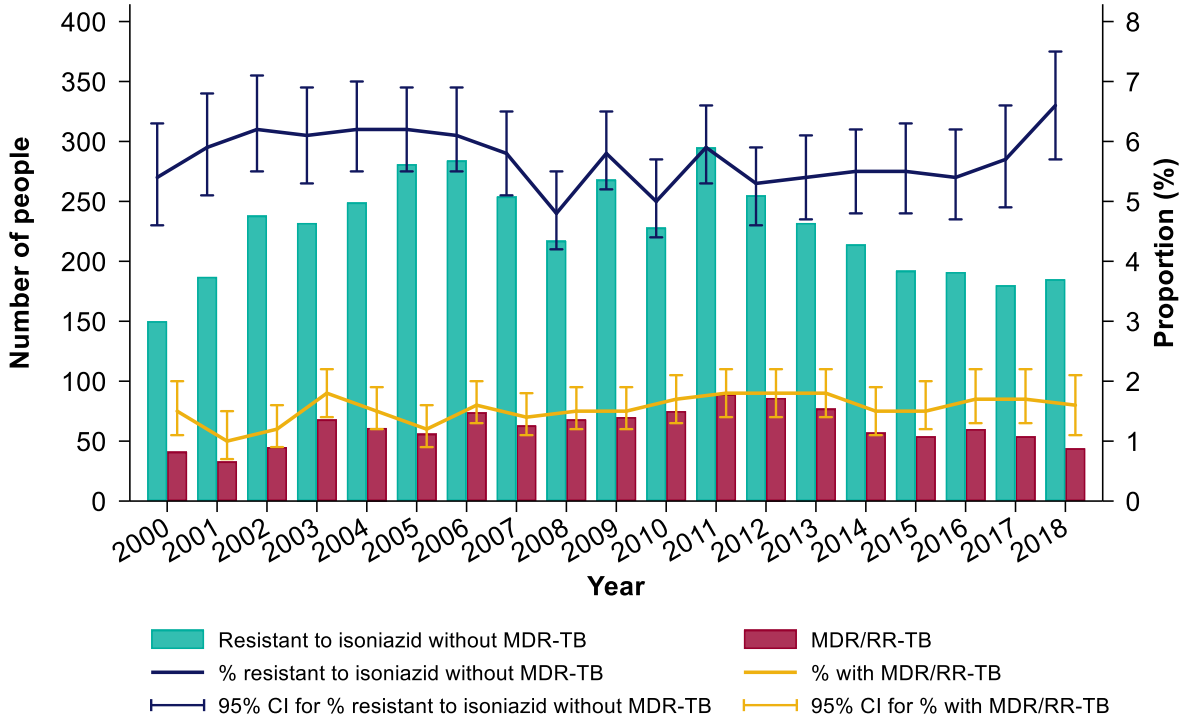
In 2018, 99% (2,821/2,850) of people with culture confirmed TB had results for at least isoniazid and rifampicin susceptibility and 97.3% (2,773/2,850) had results for all first line drugs, a similar proportion to previous years (Table Ai.6.1). Of these people, 6.6% (185/2,821) had resistance to isoniazid without MDR-TB (INH-R), 1.6% (44/2,821) to rifampicin (MDR/RR-TB), 1.5% (41/2,773) to ethambutol and 3.7% (103/2,773) to pyrazinamide (Table Ai.6.2). Between 2016 and 2017, pyrazinamide resistance has increased by over 5 times (2016: 0.6%, 20/2,773), with 81.6% (84) of these being monoresistant. Overall, 11.4% (321/2,821) of people had resistance to at least 1 first line drug, and 1.2% (34/2,821) had MDR-TB[16] (Tables Ai.6.2, Ai.6.3).

Isoniazid resistance without MDR-TB

The proportion of people with initial INH-R without MDR-TB (INH-R TB) in 2018 increased to 6.6% (185/2,821) compared to previous years (Figure 6.1, Table Ai.6.3). Seven percent (7.1%, 78/1,103) of females had INH-R TB compared with 6.2% (107/1,718) of males, which overall increased, which increased from compared to previous years (Table 6.1). The most frequent countries of birth for these individuals were the UK (39), India (27) and Pakistan (18). Within England, the highest proportions of people with INH-R TB between 2014 and 2018 were in the London (6.6%, 423/6,450) and East of England PHECs (6.4%, 81/1,267) (Table Ai.6.4).

[15] Culture confirmed TB with phenotypic DST or WGS resistance predictions conducted
[16] MDR-TB is defined as resistance to at least isoniazid and rifampicin

Figure 6.1: Number and proportion[a] of people notified with TB with initial drug resistance, England, 2000 to 2018



[a] People with culture confirmed TB with a result (DST or WGS) for at least isoniazid and rifampicin

Table 6.1: Number and proportion of people with drug resistant TB by characteristic, England, 2018

Characteristic	Total number[a]	Isoniazid resistance without MDR-TB		MDR/RR-TB	
	n	n	%	n	%
Sex					
Female	1,103	78	7.1	21	1.9
Male	1,718	107	6.2	23	1.3
Age					
0-14	46	2	4.3	1	2.2
15-44	1,658	114	6.9	35	2.1
45-64	692	54	7.8	6	0.9
65+	425	15	3.5	2	0.5
Most frequent countries of birth[b]					
United Kingdom	764	39	5.1	9	1.2
India	451	27	6.0	9	2.0
Pakistan	252	18	7.1	2	0.8
Romania	162	4	2.5	3	1.9
Somalia	79	11	13.9	3	3.8
Philippines	59	14	23.7	3	5.1
Nepal	46	4	8.7	2	4.3
Lithuania	40	5	12.5	5	12.5
At least 1 social risk factor[c]	402	30	7.5	5	1.2
Previous diagnosis	154	14	9.1	10	6.5

[a] People with culture confirmed TB with a result (DST or WGS) for at least isoniazid and rifampicin
[b] Included if 4 or more people had either isoniazid resistance without MDR-TB or MDR/RR-TB, ordered by number of people with a result (DST or WGS) for at least isoniazid and rifampicin
[c] Includes people aged 15 and over

Drug resistant cohort

In this chapter, where possible, we report on the entire DR cohort[17]. To report on the proportion of people with MDR/RR-TB, only those with initial MDR/RR-TB confirmed by DST or WGS are included, as there is no denominator data for people with acquired MDR/RR-TB or those treated with a second line regimen without confirmation.

The number of people in the DR cohort has been continuously decreasing since a peak of 95 people in 2011, to 47 in 2018 (Table 6.2), the proportion has however remained fairly constant over the same time period (2011: 1.15% versus 2018: 1.01%). In 2018, 10 people had RR-TB and 37 had MDR-TB; 34 of whom had confirmed resistance and 3 were treated with a second line regimen without confirmation (Table 6.2). One of the 3 people without confirmation was diagnosed abroad, while the other 2 were either diagnosed by PCR or treated based on clinical decision.

Multi-drug resistant/rifampicin resistant (MDR/RR) TB

The proportion of people with MDR/RR-TB who had initial resistance decreased from 1.7% (54/3,137) in 2017 to 1.6% (44/2,821) in 2018 (Figure 6.1, Table Ai.6.3)[18]. In 2018, the proportion of females with MDR/RR-TB (1.9%, 21/1,103) was slightly greater than in males (1.3%, 23/1,718) (Table 6.1). In females, this proportion decreased from 2.5% (31/1,249) in 2017. The difference in proportions for people with MDR/RR-TB increased between those born in the UK (1.2%, 9/764) and those born outside the UK (1.8%, 35/2,003) between 2017 and 2018 (2017: 1.6% (13/843) and 1.8% (41/2,239) respectively). There was also considerable variation by country of birth. A very high proportion of people born in Lithuania had MDR/RR-TB (12.5%, 5/40), compared with other countries of birth (Table 6.1), although this proportion has almost halved since 2017 (23.1%, 9/39). In 2018, and in contrast to previous years, a lower proportion of people with a social risk factor (SRF) had MDR/RR-TB than those without a SRF (1.2%, 5/402 versus 1.7%, 35/2,103). The proportion of people with MDR/RR-TB was higher among those with a previous diagnosis of TB compared to those without (6.5%, 10/154 versus 1.3%, 32/2,545) (Table 6.1). Between 2014 and 2018, the East of England and East Midlands PHECs had the highest proportions of people with MDR/RR-TB (2.4%, 30/1,267 and 2.4%, 26/1,094, respectively) (Table Ai.6.4).

[17] The drug resistant (DR) cohort includes people with culture confirmed initial and acquired MDR/RR-TB, as well as those treated with a second line regimen for MDR/RR-TB without a DST or WGS result indicating resistance. People with TB may be treated with a second line regimen in the absence of this confirmation if they were diagnosed abroad, were a contact of a person with MDR/RR-TB or for other clinical reasons

[18] Proportions are calculated using the denominator of all people with culture confirmed TB with phenotypic DST or WGS resistance predictions for at least isoniazid and rifampicin

Table 6.2: Number of people with TB in the drug resistant cohort, England, 2000 to 2018

Year	Rifampicin resistant without MDR-TB[a]			MDR-TB including XDR-TB				Drug resistant cohort[b]
	Initial resistance	Acquired resistance	Total	Initial resistance	Acquired resistance	Treated with MDR-TB regimen	Total	
2000	13	0	13	28	0	0	28	**41**
2001	10	0	10	23	2	3	28	**38**
2002	11	1	12	34	2	0	36	**48**
2003	19	0	19	49	2	0	51	**70**
2004	16	1	17	45	6	3	54	**71**
2005	15	0	15	41	2	1	44	**59**
2006	20	0	20	54	4	2	60	**80**
2007	14	1	15	49	5	3	56	**71**
2008	18	0	18	50	6	6	62	**78**
2009	11	1	12	59	2	4	65	**77**
2010	10	1	11	65	2	1	68	**79**
2011	8	0	8	81	4	2	87	**95**
2012	10	0	10	76	2	6	84	**94**
2013	10	1	11	67	0	6	73	**85**
2014	4	0	4	53	4	11	68	**72**
2015	9	0	9	45	1	12	58	**67**
2016	7	0	7	53	0	9	62	**69**
2017	10	1	10	44	1	7	52	**62**
2018	10	0	10	34	0	3	37	**47**

[a] People with culture confirmed TB with a result (DST or WGS) for at least isoniazid and rifampicin
[b] Total number of people with initial or acquired MDR/RR-TB, and people treated with a second line regimen.

Second line drug resistance and Extensively Drug Resistant (XDR) TB

In 2018, of the 44 people (1.6%, 44/2,773) with confirmed initial MDR/RR-TB and results for all first line drugs, 22.7% (10/44) were resistant to all 4. Among people with MDR/RR-TB tested for resistance to injectables[19,20] and/or fluoroquinolones[21,22], 19.5% (8/41) and 19% (8/42) were resistant to at least 1 injectable agent and at least 1 fluoroquinolone, respectively (Table Ai.6.5) [7]. The resistance patterns of people with MDR/RR-TB with injectable or fluoroquinolone resistance is strongly associated with country of birth; most notably for people of Lithuanian origin (Figure 6.2, Table Ai.6.6).

In 2018, 4 people had initial XDR-TB, the same as in 2017. None was treated for XDR-TB without confirmation (Tables 6.3 and Ai.6.3), compared to 3 in the previous year. All 4 people with XDR-TB were aged 15 to 44 years, born outside the UK and had pulmonary TB. Three were female and 1 had a previous history of TB diagnosis. Between 2014 and 2018, the highest numbers of people with confirmed XDR-TB were born in Lithuania (10), followed by the UK (6), India (3), Romania (2) and Pakistan (1) (Figure 6.2, Table Ai.6.6).

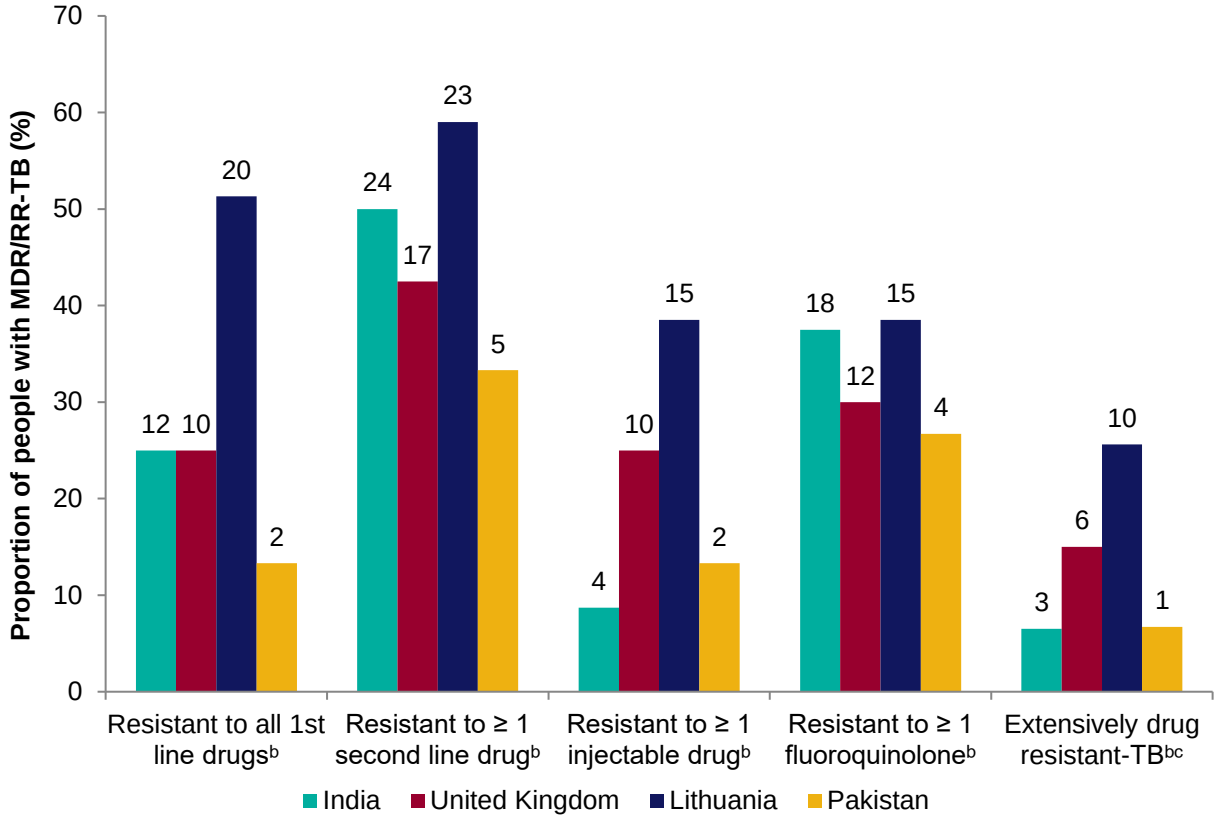
Table 6.3: Number of people with TB with initial and amplified XDR-TB, England, 2009 to 2018

Year	XDR-TB[a]			
	Initial resistance	Acquired resistance	Treated with an XDR-TB regimen	Total
2009	2	0	0	2
2010	2	1	0	3
2011	6	0	0	6
2012	2	0	0	2
2013	3	0	0	3
2014	3	0	0	3
2015	10	0	0	10
2016	7	0	3	10
2017	4	0	3	7
2018	4	0	0	4
Total	**43**	**1**	**6**	**50**

[a] Prior to 2009, only 5 people were confirmed or treated as XDR-TB: 1 in 2000 who acquired XDR, 1 in 2003 and 2 in 2008 with initial confirmed XDR and 1 in 2007 treated with an XDR regimen without confirmation

[19] Includes those with a DST result for at least one injectable or a WGS result for aminoglycosides
[20] Injectables include amikacin, capreomycin or kanamycin
[21] Includes those with a DST result for at least one fluoroquinolone or a WGS result for quinolones
[22] Fluoroquinolones include ofloxacin, moxifloxacin or ciprofloxacin

Figure 6.2: Number and proportion of people with MDR/RR-TB[a] by full resistance profile and most frequent country of birth, England, 2014 to 2018



[a] People with culture confirmed TB with results (DST or WGS) for at least isoniazid and rifampicin
[b] Denominators only include people with results for the drugs in question
[c] Resistant to both a fluoroquinolone and an injectable

Please note: numbers of people with MDR/RR-TB are displayed as labels.

Acquired drug resistance on repeat culture

No one with culture confirmed TB notified in 2018 was identified to have acquired resistance on repeat testing, compared to 6 people in 2017.

Among people with culture confirmed TB notified between 2000 and 2018[23], 165 (0.2%) were known to have acquired resistance while on treatment in England, of which 30.3% (50) acquired resistance to rifampicin and 35.2% (58) acquired resistance to isoniazid.

[23] People who acquire resistance are recorded in the year of notification, not the year resistance was acquired. Numbers for recent years may increase for those still on treatment

TB outcomes for the drug resistant cohort

TB outcomes are reported for the entire DR cohort; outcomes are reported at 24 months so the most recent year of reporting is for people notified in 2016. The 2016 cohort comprised of 69 people; 7 had rifampicin resistance without MDR-TB, 53 had MDR-TB including XDR-TB, 7 had XDR-TB, and 10 were treated with a second line regimen without confirmation (Table 6.2, Table 6.3).

Sixty-five percent (65.2%, 45/69) of people notified in 2016 completed treatment within 24 months (Figure 6.3, Table 6.4, Table Ai.6.7). A further 2 people are known to have completed treatment after 24 months, bringing overall treatment completion for people notified in 2016 to 68.1% (47/69) (Table 6.4, Table Ai.6.8).

Table 6.4: 24-month and last recorded TB outcomes for the drug resistant cohort[a], England, 2016

TB outcome	At 24 months		At last recorded outcome	
	n	%[b]	n	%[b]
Completed	45	65.2	47	68.1
Died	6	8.7	6	8.7
Lost to follow-up	7	10.1	7	10.1
Still on treatment	10	14.5	7	10.1
Treatment stopped	1	1.4	2	2.9
Not evaluated[c]	0	0.0	0	0.0
Total	**69**	**100.0**	**69**	**100.0**

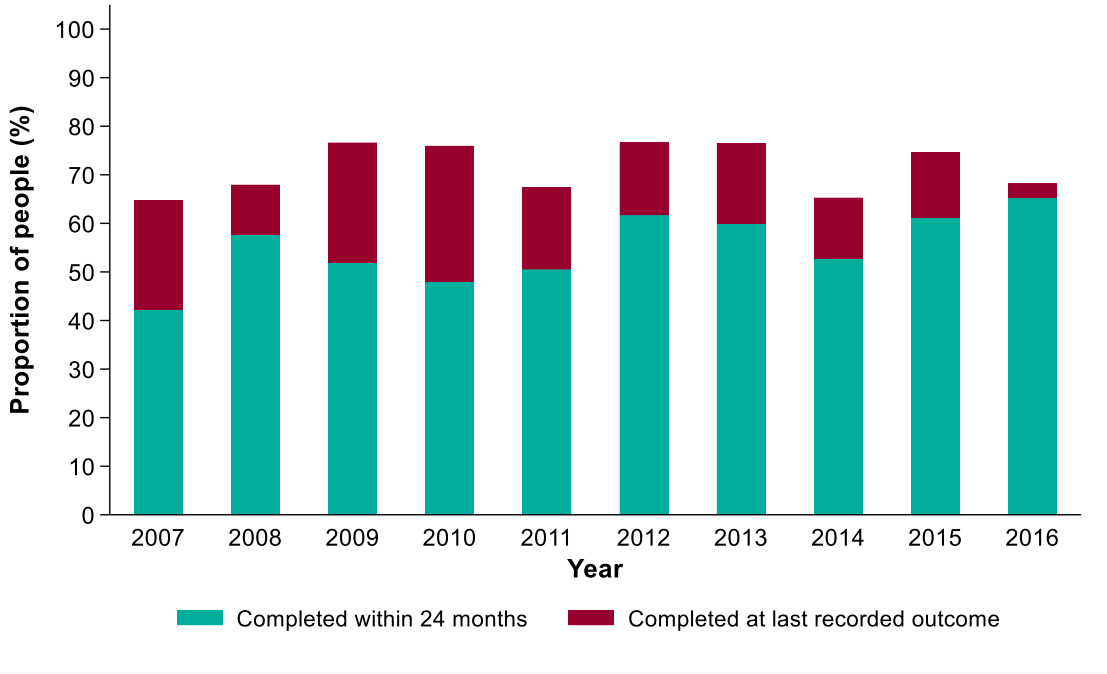
[a] Includes people with initial and acquired MDR/RR-TB and people treated with a second line regimen
[b] Percentages may not sum to total of 100% due to rounding
[c] Not evaluated includes unknown and transferred out

For people with known treatment start and completion dates, 12 (27.3%, 12/44) had less than 18 months of treatment, of which 2 had less than 12 months of treatment (Table Ai.6.9).

Six (8.7%, 6/69) people had died at their last recorded outcome, compared to 5 (7.5%) from the drug resistant cohort notified in 2015 (Table 6.4, Table Ai.6.8). Seven (10.1%) people were lost to follow-up; all were born outside the UK with 6 being lost to follow-up abroad. From 2007 to 2016, only 2 people (out of 115) from the drug resistant cohort born in the UK were lost to follow-up.

Of the 7 people notified with XDR-TB in 2016, 3 had completed treatment, 1 was lost to follow-up and 3 were still on treatment at the last recorded outcome.

Figure 6.3: Treatment completion for the drug resistant cohort[a], England, 2007 to 2016



[a] Includes people with initial and acquired MDR/RR-TB and people treated with a second line regimen

7. TB in under-served populations

Important messages

In 2018, 13.3% of people notified with TB had a social risk factor (SRF), the highest proportion since data collection began in 2010.

Twenty-one percent of people born in the UK had a SRF, compared with 10.6% for those born outside the UK.

The proportion of men with TB who had a SRF (19%) was almost 4-times higher than women (5%).

A higher proportion of people with a SRF had pulmonary disease (77%) compared to those without a SRF (53%).

1.2% of people with a SRF had MDR/RR-TB, similar to those without a SRF (1.7%).

Outcomes in people with drug sensitive TB who had a SRF were worse (6.2% died and 9.2% were lost to follow-up) compared to those without a SRF (4% and 3.1%, respectively).

Treatment completion was lower among people with drug sensitive TB who had a SRF (79%), compared to those without a SRF (89%).

The rate of TB in the most deprived 10% of the population was 16.6 per 100,000, more than 5 times higher than in the least deprived (3.0 per 100,000).

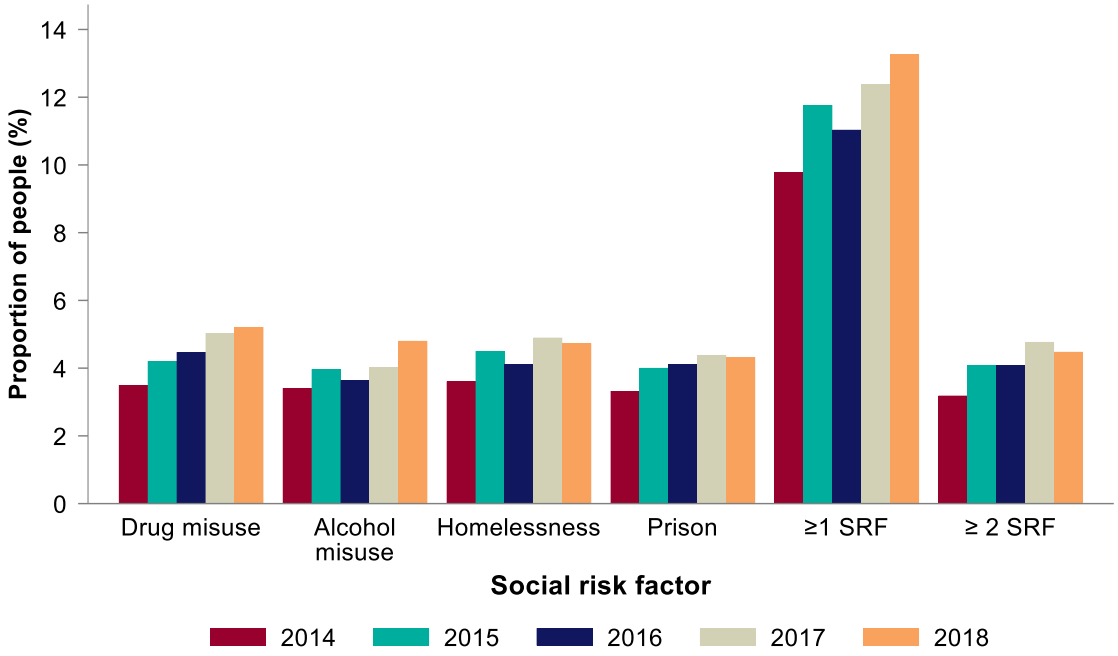
In the Enhanced TB Surveillance system (ETS), data is collected on the presence or absence of 4 social risk factors (SRF) known to increase the risk of TB: current alcohol misuse that would impact on the patient's ability to take treatment, current or history of drug misuse, homelessness and/or imprisonment[24]. This chapter presents data for people notified with TB with SRFs and in addition, for people with TB who were remanded in an immigration removal centre, identified as asylum seekers, or unemployed. TB rates by area level deprivation are also presented (see Appendix III: Methods). Data in this chapter, with the exception of area level deprivation, is presented for people with TB aged 15 years and older, for whom information was known.

[24] For people notified with TB in London a history of imprisonment is only recorded if imprisonment was in the UK, which will lead to an underestimate of the total number of people with TB with any history of imprisonment in that area.

Social risk factors

Overall in 2018, 13.3% (539/4,062) of people with TB had at least 1 SRF (hereafter referred to as a SRF), an increase from 12.4% (545/4,400) in 2017 and the highest proportion since data collection began in 2010 (Figure 7.1, Table Ai.7.1). In 2018, one-third (33.8%, 182/539) of people with a SRF had 2 or more SRFs. The proportion of people with 2 or more SRFs (4.5%, 182/4,062) was similar to 2017 (4.8%, 210/4,400). In 2018, 4.8% (204/4,245) of people had current alcohol misuse, an increase from 4% (186/4,628) in 2017. For the other SRFs, 5.2% (220/4,222) had current or a history of drug misuse, 4.7% (200/4,219) of homelessness, and 4.3% (177/4,093) of imprisonment (Table Ai.7.1). These were close to the proportions observed in 2017.

Figure 7.1: Proportion of people with TB (≥15 years) with at least 1 social risk factor (SRF), England, 2014 to 2018



In 2018, where information about the timing of drug misuse was known (54.6%, 120/220), in 55% (66/120) of people this was reported to be current. Sixty-four percent (64%, 128/200) of those with homelessness had known information about the timing of their homelessness, of which 60.9% (78/128) were reported to be homeless while receiving care for TB. Seventy-two percent (71.8%, 127/177) of those currently in prison or with a history of imprisonment were reported to have been in prison in the UK, 25 of whom were currently in prison.

Demographic characteristics

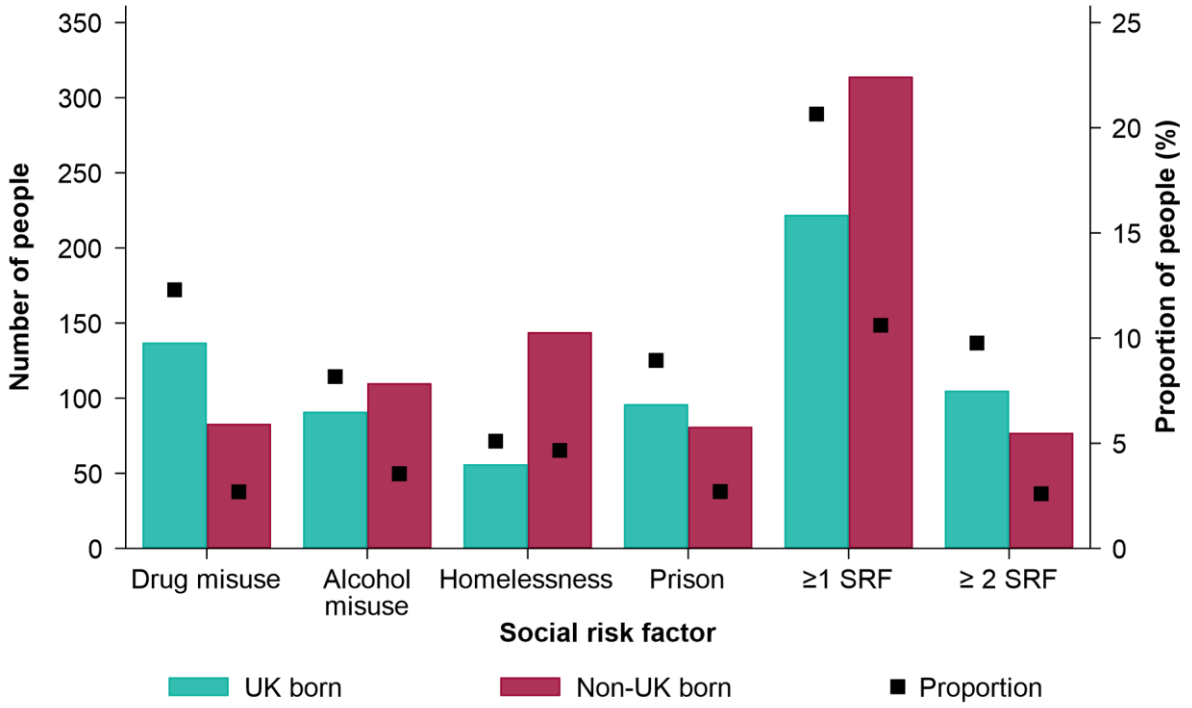
Age and sex

The proportion of men with TB who had a SRF was almost 4-times higher (19.3%, 456/2,363) than women (4.9%, 83/1,699) (Table 7.1). Among men born in the UK, 29% (185/638) had a SRF. Over 60% of people with a SRF were aged 15 to 44 years (61.2%, 330/539). However, the proportion of people with a SRF was highest among those aged 45 to 64 (16%, 173/1082).

Place of birth and ethnicity

In 2018, the proportion of people with a SRF was almost 2-times higher in those born in the UK than in those born outside the UK (20.7%, 222/1,075 versus 10.6%, 314/2,961 respectively) (Figure 7.2, Table 7.1). Between 2017 and 2018, the proportion of people with a SRF among those born in the UK remained stable (changing from 20.9% to 20.7%) while there was an increase among those born outside the UK (9.1% to 10.6%) (Table Ai.7.1).

Figure 7.2: Number and proportion of people with TB (≥15 years) with social risk factors by place of birth, England, 2018



For individual risk factors reported among people born in the UK, there was an increase in the proportion with alcohol misuse, from 6.9% (85/1,228) in 2017 to 8.2% (91/1,114) in 2018. Meanwhile, the proportion with homelessness decreased from 6.1% (75/1,234)

to 5.1% (56/1,098). However, longer term trends are unclear due to year-on-year variation (Table Ai.7.1). Among people with TB born outside the UK, the largest change was the proportion of people with alcohol misuse, increasing from 2.9% (98/3,371) to 3.6% (110/3,099) (Table Ai.7.1).

Table 7.1: Number and proportion of people with TB (≥15 years) with a social risk factor (SRF) by demographic characteristic, England, 2018

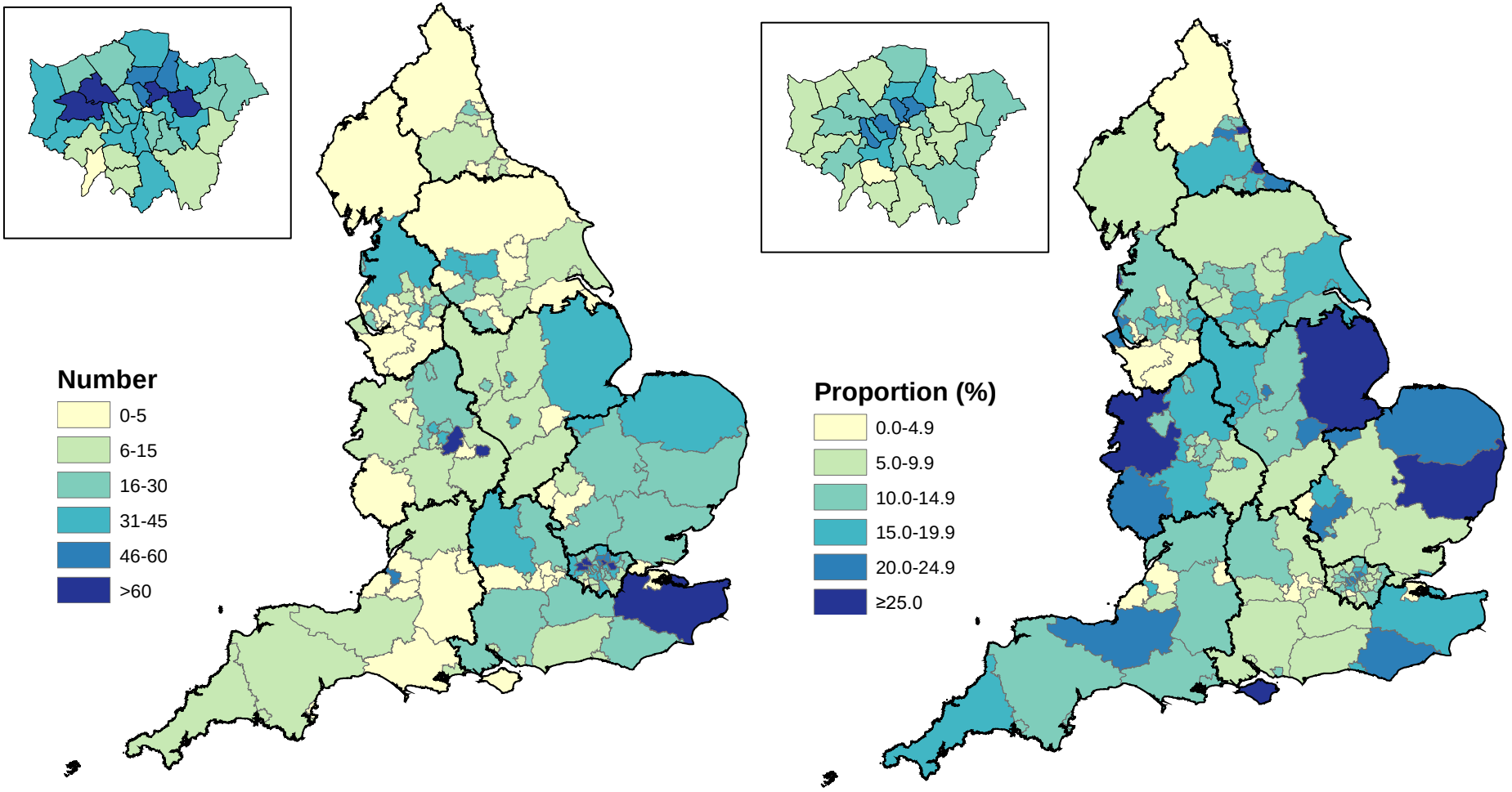
Demographic characteristic	Drug use		Alcohol use		Homeless		Prison		≥ 1 SRF		≥ 2 SRF	
	n	%	n	%	n	%	n	%	n	%	n	%
Sex												
Female	40	2.3	34	1.9	23	1.3	15	0.9	83	4.9	22	1.3
Male	180	7.3	170	6.9	177	7.2	162	6.9	456	19.3	160	6.8
Age												
15-44	144	6.0	87	3.6	128	5.3	115	4.9	330	14.1	105	4.5
45-64	70	6.2	95	8.4	68	6.0	55	5.1	173	16.0	74	6.8
65+	6	0.9	22	3.2	4	0.6	7	1.1	36	5.6	3	0.5
Place of birth												
UK Born	137	12.3	91	8.2	56	5.1	96	8.9	222	20.7	105	9.8
Non-UK Born	83	2.7	110	3.5	144	4.7	81	2.7	314	10.6	77	2.6
Other												
Asylum seekers	4	6.6	3	4.6	21	31.8	12	21.1	31	51.7	9	15.0
Unemployed	109	18.4	92	15.4	94	15.7	78	13.7	208	35.5	106	18.1

Among people born in the UK notified between 2014 and 2018, the Black-Caribbean ethnic group had the highest proportion with a SRF (35.8%, 123/344) (Table Ai.7.2), in particular drug misuse (23.6%, 82/347) and imprisonment (15.9%, 55/347). In people born outside the UK with a SRF, the largest number were born in India (151), Eritrea (118) and Poland (107). Of the 10 countries of birth with the highest numbers of people with a SRF, the highest proportions with a SRF were Poland (33%, 107/324), Sudan (32.3%, 64/198), and Lithuania (31.3%, 67/214) (Table Ai.7.2).

Geographical distribution

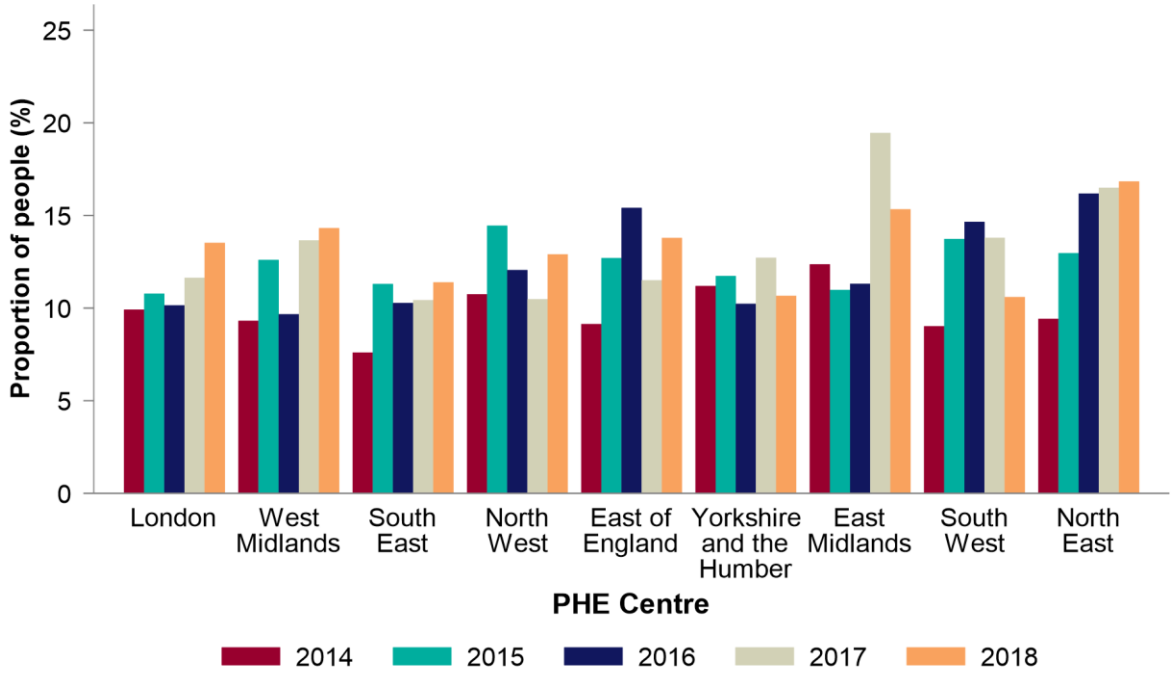
Between 2014 and 2018, there was considerable geographical variation in the number and proportion of people with TB who had a SRF by local authority (Figure 7.3), and by PHEC (Figure 7.4, Table Ai.7.3). Between 2017 and 2018, there were increases in the proportion of people with a SRF in London, West Midlands, South East, North West, East of England and North East, although some of these increases were small. In the remaining PHECs, the proportion of people with a SRF decreased (Table Ai.7.4).

Figure 7.3: Number and proportion of people with TB (≥15 years) with at least 1 SRF[a] by local authority, England, 2014 to 2018 (boxes shows enlarged map of London area)



[a] SRF refers to those with current alcohol misuse, current or history of homelessness, imprisonment or drug misuse. PHEC boundaries are outlined in black.

Figure 7.4: Proportion of people with TB (≥15 years) with at least 1 social risk factor by PHE Centre, England, 2014 to 2018



Clinical characteristics

As in previous years, in 2018 a higher proportion of people with a SRF had a previous history of TB compared to people with no known SRFs (9.8%, 51/519 versus 5.8%, 201/3,491). Over three-quarters (77.4%, 417/539) of people with a SRF had pulmonary TB (Table Ai.7.5).

The proportion of people with pulmonary TB and a SRF who experienced a delay from symptom onset to treatment start of more than 4 months was similar to those without a SRF (29.8%, 111/373 versus 29.9%, 512/1,713). The proportion of people with a SRF who received DOT decreased between 2015 (56.5%, 307/543) and 2018 (45.9%, 228/497) (Table Ai.7.5). Of the 25 people who were in prison at the time of notification, 20 were known to have received DOT.

Where information was known, 19.9% (800/4,030) of people with TB were current smokers. Among people with a SRF, 57.6% (274/476) were current smokers, compared with 13.7% (449/3,288) of people without a SRF.

Drug resistance

In 2018, the proportion of people with resistance to isoniazid without MDR-TB was slightly higher for those with a SRF compared to those without (7.5%, 30/402 versus 6.6%, 138/2,094, respectively). The proportion of people with a SRF that had initial MDR/RR-TB (1.2%, 5/402) was lower than for those without a SRF (1.7%, 35/2,103) (Table Ai.7.5).

TB outcomes

Among people with drug sensitive TB notified in 2017, treatment completion at the last recorded outcome was lower for those with a SRF (78.7%, 418/531) compared to people without a SRF (89.1%, 3,399/3,816). Treatment completion at 12 months for people with TB with a SRF is the TB Strategy Monitoring Indicator 17 and can be found at Appendix V. The proportion of people with a SRF who were lost to follow-up at their last recorded outcome was 3-times greater than people without a SRF (Table 7.2). In addition, a higher proportion of people with a SRF had died at their last recorded outcome (6.2%, 33/531) compared to people without a SRF (4%, 153/3,816).

Table 7.2: Last recorded TB outcome for the entire drug sensitive cohort by social risk factor[a], England, 2017

TB outcome	With at least 1 social risk factor		With no social risk factor		Total[b]
	n	%	n	%	N
Treatment completed	418	78.7	3,399	89.1	3,817
Died	33	6.2	153	4.0	186
Lost to follow-up	49	9.2	118	3.1	167
Still on treatment	14	2.6	73	1.9	87
Treatment stopped	10	1.9	47	1.2	57
Not evaluated[c]	7	1.3	26	0.7	33
Total	**531**	**100.0[d]**	**3,816**	**100.0[d]**	**4,347**

[a] Excludes people in the drug resistant cohort
[b] Total number of people with information reported for all 4 social risk factors
[c] Not evaluated includes unknown and transferred out
[d] Percentages may not sum to total of 100% due to rounding

For people with MDR/RR-TB notified in 2016, treatment completion in those with a SRF was 69.2% (9/13), compared with 72.5% (29/40) in those without.

Unemployment

In 2018, 14.9% (629/4,219) of people with TB were unemployed at notification. Of those, more than one-third (35.5%, 208/586) were known to have a SRF, higher than in all other years since 2010.

People with TB who were asylum seekers or resident in an immigration removal centre

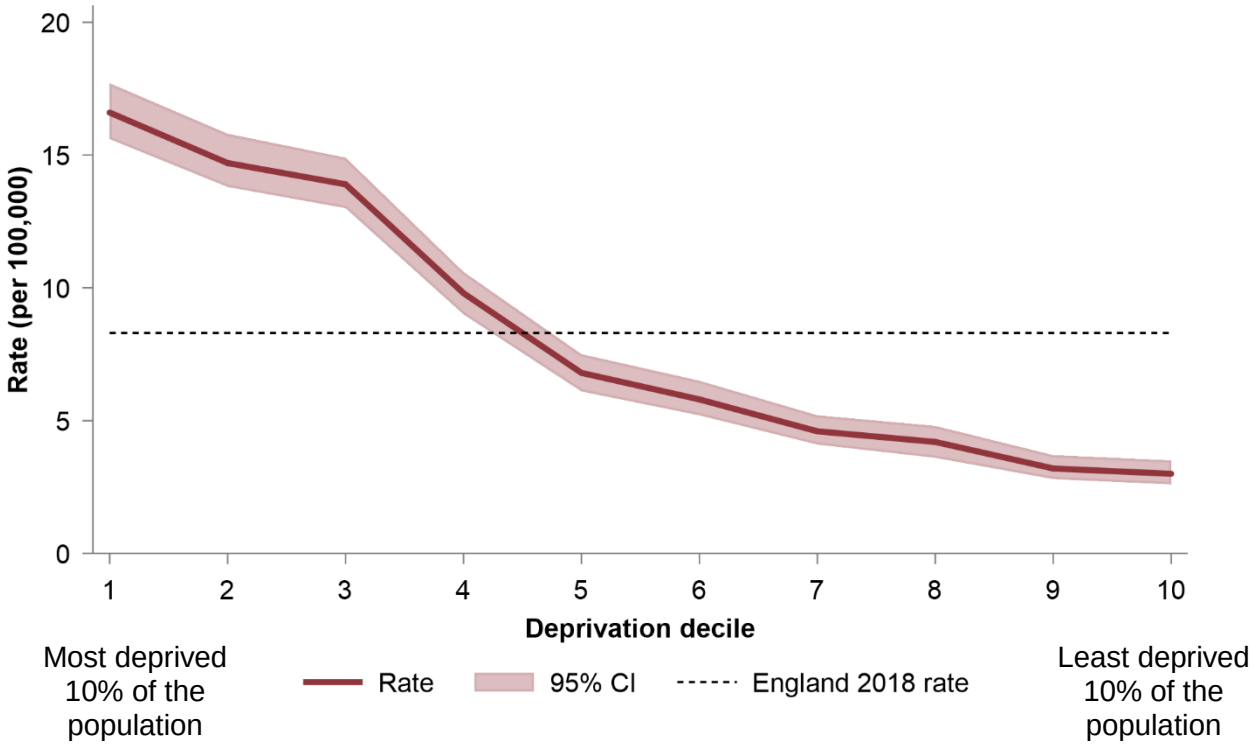
In 2018, 70 people notified with TB were recorded as being asylum seekers and 2 people were recorded as being in an immigration removal centre. Where information was known, over half (51.7%, 31/60) of asylum seekers had a SRF, the majority

(67.7%, 21/31) of whom were currently homeless or had a history of homelessness (Table 7.1). A total of 101 people with TB were recorded as being in an immigration removal centre between 2010 and 2018 (range 2-19 per year).

Deprivation

In 2018, the rate of TB was 16.6 per 100,000 in the 10% of the population living in the most deprived areas compared with only 3.0 per 100,000 in the 10% of the population living in the least deprived areas[25], with a clear trend of an increasing rate of TB with increasing deprivation (Figure 7.5, Table Ai.7.6).

Figure 7.5: Rate of TB by deprivation decile, England, 2018



[25] The Index of Multiple Deprivation (IMD) 2015, part of the English Indices of Deprivation, is an overall measure of multiple deprivation experienced by people living in an area and is measured at Lower Super Output (LSOA) level. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/465791/English_Indices_of_Deprivation_2015_-_Statistical_Release.pdf

8. TB-HIV co-infection and HIV testing

Important messages

In 2018, 2.7% of people with TB were co-infected with HIV. This is the lowest proportion of co-infection since data became available in 2001.

The median age of people with TB-HIV co-infection has increased from 34 years (IQR 30 to 41) in 2001 to 46 years (IQR 38-51) in 2018.

In 2018, the majority (82%) of people with TB-HIV co-infection were born outside the UK, 73% of whom were born in sub-Saharan African countries.

In 2018, 95% of people with TB who had an unknown HIV status were offered and received HIV testing, however, this was lower among children (71%).

TB-HIV co-infection

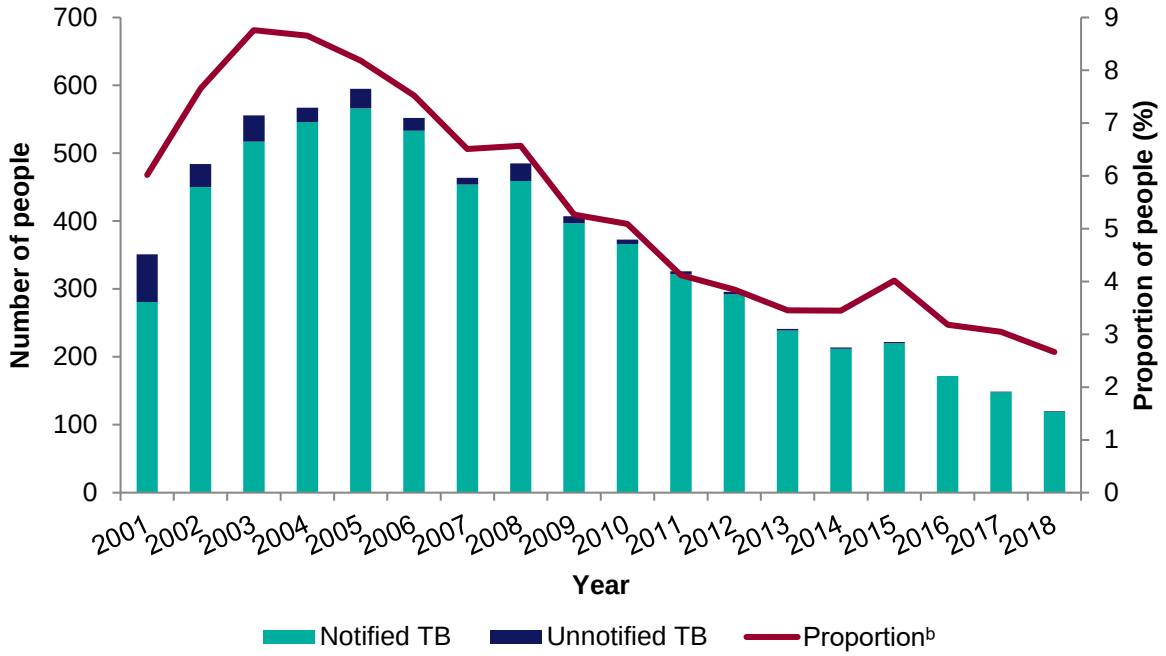
HIV status is not collected in the Enhanced TB Surveillance system (ETS). To estimate TB-HIV co-infection, TB and HIV surveillance data are matched annually for notified people with TB aged 15 years and older (see Appendix III: Methods).

In 2018, 2.7% (120/4,504) of people with TB[26] were estimated to be co-infected with HIV (Figure 8.1, Table Ai.8.1). This is the lowest level of co-infection among people with TB since data became available in 2001. TB-HIV co-infection rates by PHEC are available in Table Ai.8.2.

The age group distribution of people with TB-HIV co-infection has changed over time. The median age increased over time from 34 years (IQR 30 to 41) in 2001 to 46 years (IQR 38-51) in 2018. The biggest reduction in the number of people with co-infection was seen among those aged 25 to 44 years (Figure 8.2, Table Ai.8.3). In 2018, the proportion of people with HIV co-infection was highest among people with TB aged 45 to 54 years (6.3%, 45/713).

[26] Aged 15 years and older

Figure 8.1: Number and proportion of people with TB who have HIV co-infection[a], England, 2001 to 2018

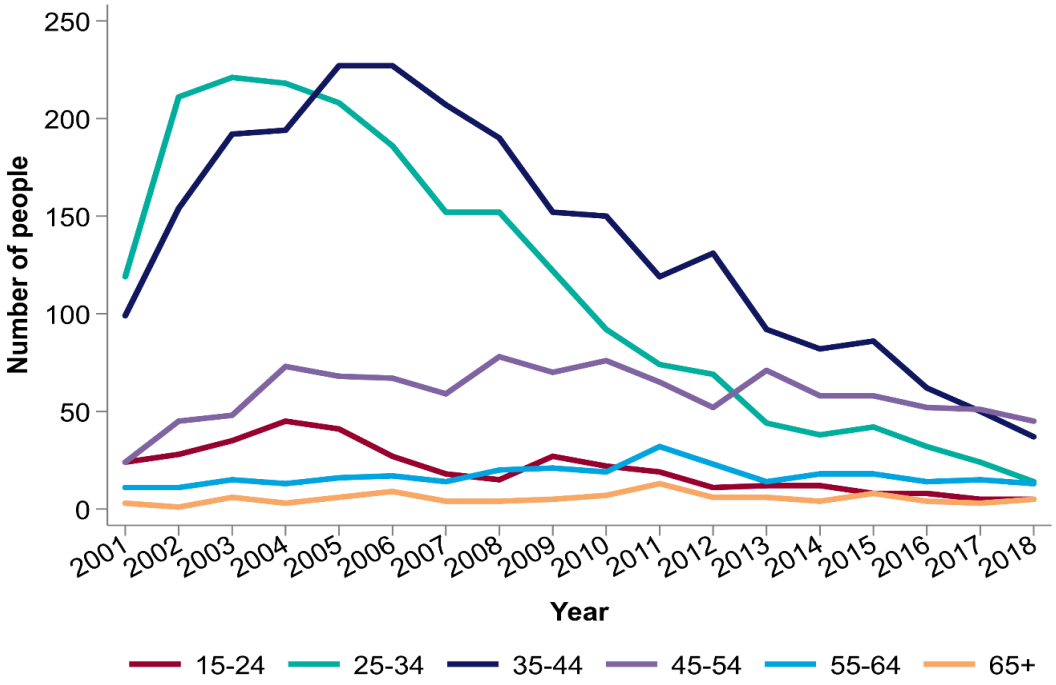


[a] Includes people with TB-HIV co-infection aged 15 years and older.
[b] Proportion is calculated using the number of TB notifications with HIV co-infection plus the number who are un-notified with an MTBC isolate which matched to a person with HIV as the numerator, and the number of all TB notifications (with or without HIV co-infection) plus the number of un-notified TB isolates which matched to a person with HIV as the denominator.

In 2018, where place of birth was known, 81.7% (94/115) of people with TB-HIV co-infection were born outside the UK. This was a slight increase compared to 2017 (79.6%) but lower than the proportions observed in the period from 2001 to 2016 (range: 82.1%-93.3%). Where country of birth was known, 73.4% (69/94) of those born outside the UK originated from sub-Saharan African countries.

In 2018, 75 people with TB-HIV coinfection had culture confirmed TB with results for isoniazid and rifampicin. Of those, 3 (4%) had isoniazid resistance without MDR-TB and 1 (1.3%) had MDR/RR-TB.

Figure 8.2: Number of people notified with TB-HIV co-infection by age group[a], England, 2001 to 2018



[a] Based on age at TB notification

Testing for HIV in people notified with TB

Information on HIV testing was reported for 95.1% (4,228/4,446) of people notified with TB[27] in 2018 with previously unknown HIV status. Of these, 94.8% (4,008) were offered and received HIV testing, 3.2% (137) were not offered testing, 1.5% (65) were offered but did not receive this testing, and 0.4% (18) were offered but declined (Table 8.1). The proportion of people with TB who were offered and received HIV testing was higher in 2018 than in the previous 4 years.

The proportion of people with TB who had HIV testing offered and received varied by PHEC; in 2018, the highest was in the South West (98.2%, 164/167) and London (96.8%, 1,558/1,609), and the lowest was in the South East (90.8%, 422/465) (Table Ai.8.4).

[27] Unlike reporting for co-infection, this includes children

Table 8.1: HIV testing in people notified with TB, England, 2014 to 2018

Year	HIV testing								
	Not offered		Offered and received		Offered but not received		Offered but declined		Total[a]
	n	%	n	%	n	%	n	%	n
2014	260	4.6	5,249	92.7	95	1.7	58	1.0	5,662
2015	192	3.7	4,818	93.7	88	1.7	45	0.9	5,143
2016	157	3.0	4,897	94.5	79	1.5	48	0.9	5,181
2017	165	3.5	4,455	94.4	62	1.3	37	0.8	4,719
2018	137	3.2	4,008	94.8	65	1.5	18	0.4	4,228
Total	**911**	**3.7**	**23,427**	**94.0**	**389**	**1.6**	**206**	**0.8**	**24,933**

[a] Total with previously unknown HIV status where HIV testing is known and excluding those diagnosed post-mortem

TB Monitoring Indicator 16: Proportion of TB cases offered an HIV test (England, PHEC, UTLA, NHS sub-region and CCG data shown on Fingertips)

The proportion of people who were offered and received HIV testing was lowest in those aged under 15 years (71.4%, 95/133). In other age groups, the proportion was 90% or higher (Table 8.2).

Table 8.2: HIV testing in people with notified TB by age group, England, 2018

Age group (years)	HIV testing								
	Not offered		Offered and received		Offered but not received		Offered but declined		Total[a]
	n	%	n	%	n	%	n	%	n
0-14	36	27.1	95	71.4	2	1.5	0	0.0	133
15-44	30	1.3	2,261	97.0	29	1.2	11	0.5	2,331
45-64	21	1.9	1,058	95.8	22	2.0	3	0.3	1,104
65+	50	7.6	594	90.0	12	1.8	4	0.6	660
Total	**137**	**3.2**	**4,008**	**94.8**	**65**	**1.5**	**18**	**0.4**	**4,228**

[a] Total with previously unknown HIV status where HIV testing is known and excluding those diagnosed post-mortem

9. BCG vaccination

Important messages

In 2018 to 2019, 5 local authorities offered a universal BCG programme, compared with 34 in 2016 to 2017 and 6 in 2017 to 2018.

Among those 5 areas, BCG coverage ranged from 36.8% in Brent to 68.9% in Newham.

Compared with 2017 to 2018, BCG vaccination coverage increased in 3 of those areas, and decreased in 2.

BCG vaccine coverage data

The BCG immunisation programme is a risk-based programme recommended for individuals at higher risk of exposure to TB. In addition to this risk-based approach, all infants (0-12 months) living in an area with an incidence above 40 per 100,000 population should be offered the BCG vaccine. Detailed information on the BCG programme can be found in the ‘Green Book’, Chapter 32 [8].

From April 2015, as part of the COVER programme, neonatal BCG was included in the data extraction template from local Child Health Information Systems (CHISs) alongside extraction of coverage data for other vaccines offered under the age of 5 years. This provides an opportunity for BCG vaccine coverage to be estimated for Local Authorities (LAs) offering a universal neonatal programme [9]. It is not possible to calculate LA level coverage for the selective programme offered in the rest of England as the number of eligible children is not defined in the CHISs. COVER collections for BCG data have only recently been established and data are of variable quality. Estimates of low coverage may reflect poor data quality and should be interpreted with caution.

In 2018 to 2019, a universal BCG programme was offered by LAs with a 3-year average (2014-16) annual TB rate equal to or greater than 40 per 100,00 population. Five LAs met this criterion, all of which were in London (Newham, Brent, Hounslow, Ealing and Redbridge). A coverage figure is only reported for these LAs running a universal programme. Due to the early publication of the TB Annual report it was not possible to include data on the number children aged 12 months who received BCG in the remaining LAs. These data will be added to this report once they become available.

Annual universal BCG programme vaccine coverage data

At the time when threshold levels for universal BCG vaccination were set (using the average annual rate of TB per 100,000 between 2014 and 2016), there were 6 LAs in England with a TB incidence of ≥40 cases per 100,000 population, 5 of which were in London. In 2018 to 2019, 5 boroughs had a universal BCG programme, all of which are in London. Based on data submitted by CHISs to COVER for 2018 to 2019, estimated coverage for these 5 London LAs ranged from 36.8% to 68.9%, compared with 28.1% to 74.7% in 2017 to 2018 (Table 1).

Table 9.1: Annual BCG vaccine coverage at 12 months in English local authorities with TB incidence ≥40 per 100,000: April 2018 to March 2019 (April 2017 to March 2018)

Upper-tier Local Authority	Three-year average (2015-17) annual TB rate per 100,000[a]	Number of eligible children (1st birthday in 2018-19)[b]	Universal BCG coverage% in 2018-19 (2017-18)
Newham	58.2	5,986	68.9 (74.7)
Brent	51.7	4,726	36.8 (28.1)
Hounslow	39.7	4,283	37.0 (47.1)
Ealing	39.4	5,304	39.9 (37.3)
Redbridge	38.4	4,726	64.9 (44.0)

[a] The BCG vaccination programme was based on the 2012-14 LA TB rates, as published in the Tuberculosis in England Annual report 2015
[b] Cohort born between 1 April 2017 and 31 March 2018

10. Latent TB infection testing and treatment programme for migrants

Important messages

Poor data submissions continue to impact the programme's monitoring capabilities despite the improved quality and frequency of data submissions between 2017 and 2018.

In 2018, 15,883 LTBI tests were received, a slight increase of 3.5% from 2017.

All TBCBs saw a reduction or levelling off for LTBI testing activity apart from London and Yorkshire and Humber and the North East, which saw increased testing activity.

A higher proportion of men tested positive for LTBI than women in all age groups between 2016 to 2018.

The LTBI test positivity rate has declined to 15.8% (2,509/15,835) in 2018 from 17% (2,569/15,115) in 2017 and 18.1% (1,566/8,663) in 2016.

People born in India and Pakistan were the 2 most commonly tested groups between 2016 and 2018.

The proportion of people with a positive LTBI test that accessed LTBI treatment has seen an annual decline from 78.3% (632/807) in 2016, to 65.7% (912/1409) in 2017 to 58.3% (671/1151) in 2018.

Overall LTBI treatment completion has increased annually from 65.1% (358/550) in 2016, to 65.3% (503/770) in 2017 to 76.5% (349/456) in 2018.

Implementing and monitoring programmatic LTBI testing and treatment in England

The national LTBI testing and treatment programme is in its fifth year of operation since it commenced in 2015. This report covers 2016, 2017 and 2018. The implementation and delivery of the programme is supported by NHS England. The eligible population for the treatment and testing programme consists of new migrants aged 16 to 35 years, who entered the UK from a high incidence country (≥150/100,000 or sub-Saharan Africa) within the last 5 years and have been previously living in that high incidence country for 6 months or longer [10].

To ensure the programme is delivered effectively, the following indicators are reported for programme monitoring:

1. LTBI testing and treatment programme coverage
   The number of priority CCGs that have implemented their LTBI programme as a proportion of the total number of priority CCGs
2. LTBI testing acceptance
   The number of people tested for LTBI as a proportion of the total number of individuals offered a test
3. IGRA test performance and LTBI positivity
   The number of people tested positive for LTBI as a proportion of the total number tested with a known result
4. LTBI treatment uptake
   The number of people who access LTBI treatment as a proportion of the number of people who tested positive for LTBI
5. LTBI treatment completion
   The number of people who complete treatment as a proportion of the number who started treatment for LTBI
6. Adverse events from LTBI treatment
   The number of people who reported adverse events due to LTBI treatment as a proportion of the number that started treatment

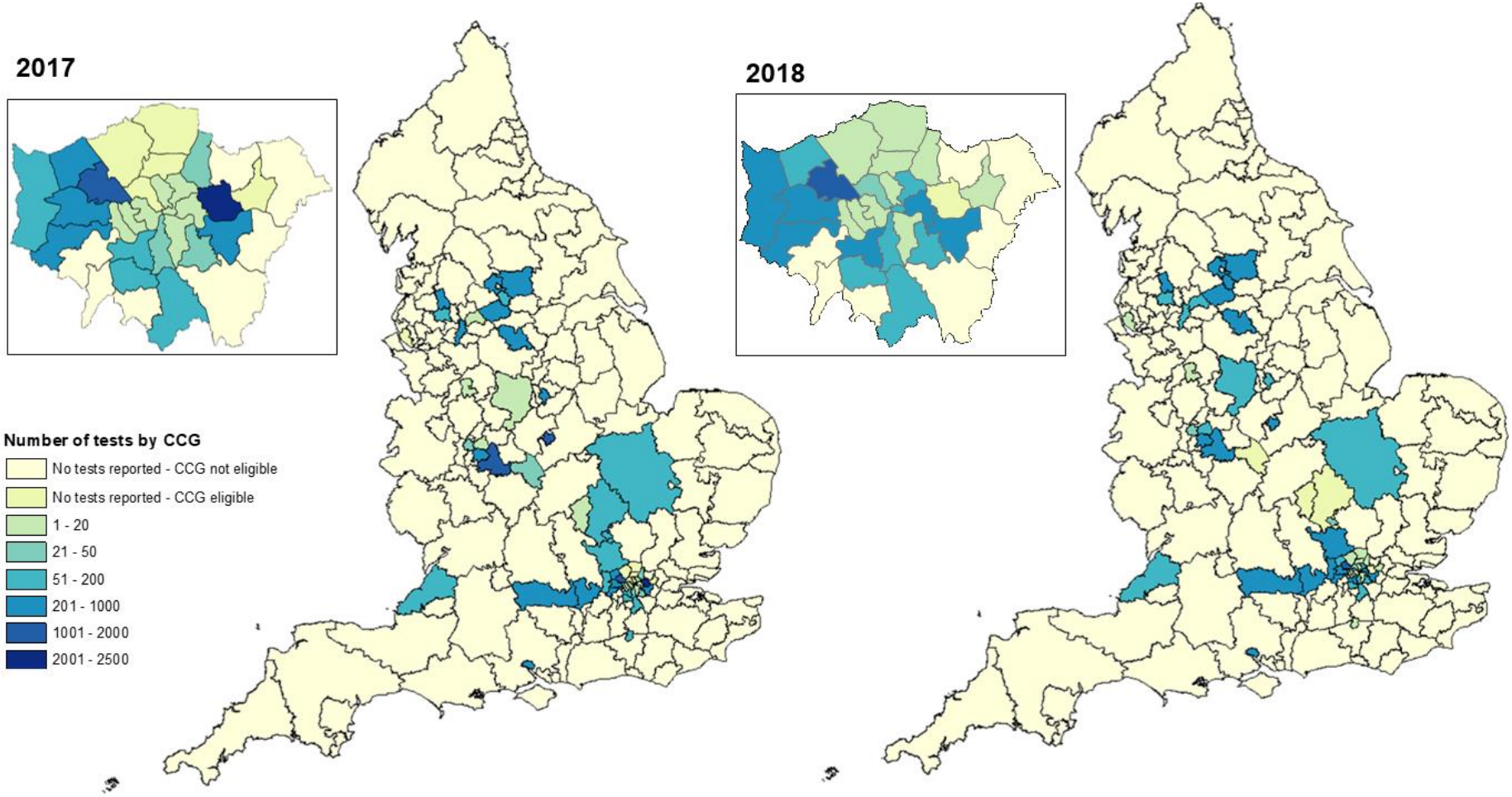
Data in this chapter

CCGs and their LTBI programme providers are required to submit data to PHE for monitoring and surveillance purposes. Data presented in this chapter were reported from 27 CCGs (primary care data), 32 CCGs (secondary/community care data) and 58 CCGs (laboratory data). Data that meets the programme eligibility criteria, submitted to PHE between January 2016 and December 2018, is included in this report. The availability of data submitted from each CCG are shown in Table Ai.10.1. It is important to note that data submissions for some CCGs were poor, which impacted the quality of data and the confidence that can be placed on some reported outcomes. For more information on the data presented in this chapter, please refer to the methods section.

Number of tests

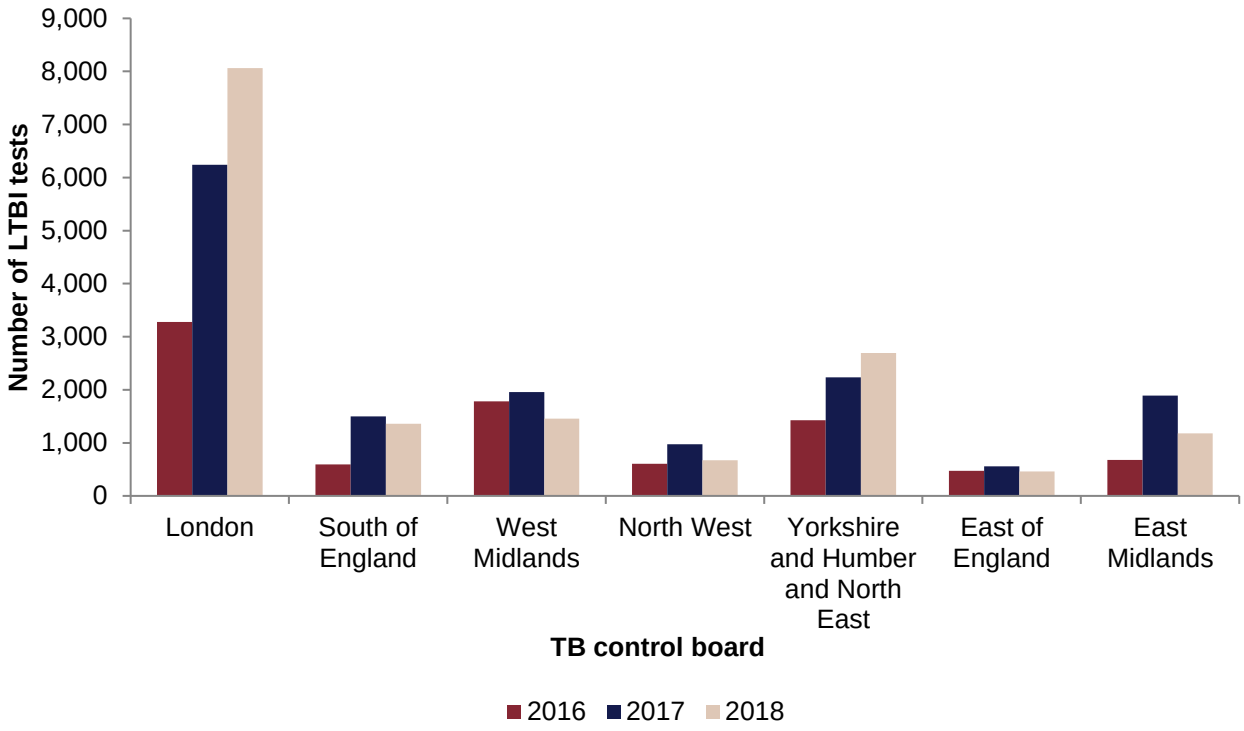
In 2018, 15,883 LTBI tests that met the eligibility criteria for the programme were reported on by PHE. This was a small increase of 3.5% from 15,343 tests received in 2017, compared to an increase of 73.6% from 8,837 to 15,343 between 2016 and 2017 respectively. Newham CCG reported the highest number of tests in 2018, 15.2% (2,789/15,883) followed by Brent CCG, 9% (1,470/15,883) (Figure 10.1). Between 2017 and 2018, all TBCBs saw a levelling off or a decline in the number of people tested apart from London and Yorkshire and Humber and the North East, which increased LTBI testing activity (Figure 10.2) (Table Ai.10.2).

Figure 10.1: Number of LTBI tests by CCG and year, 2017 to 2018 (box shows enlarged map of London area)



LTBI Indicator 1: The number of CCGs with systematic new entrant LTBI testing and treatment in place (England)

Figure 10.2: Number of LTBI tests by TB Control Board[a] and year, 2016 to 2018



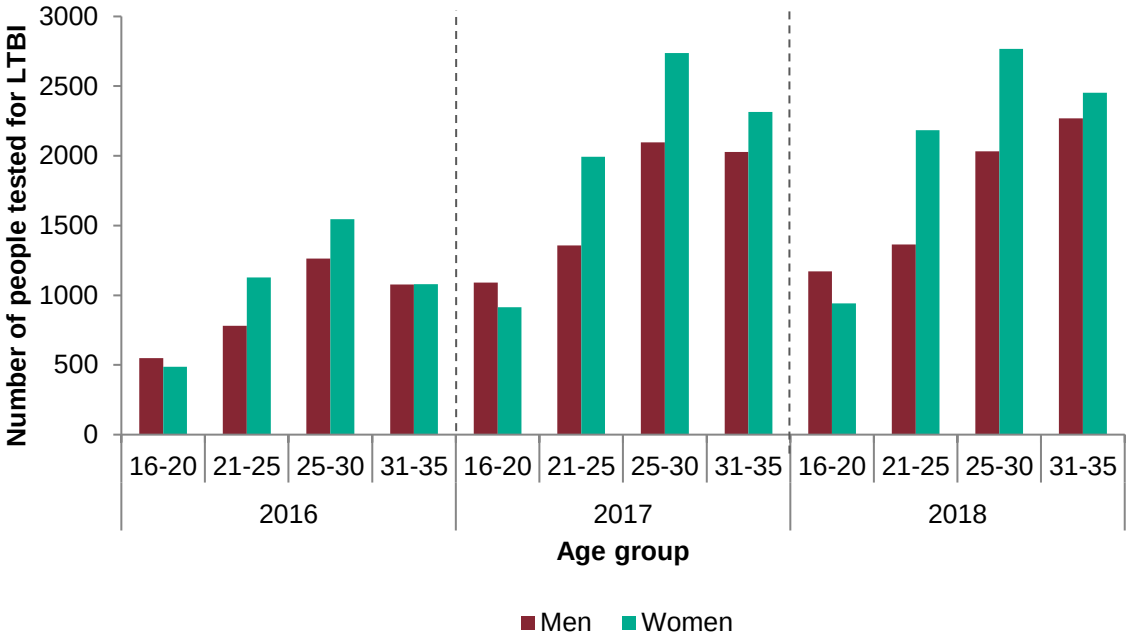
[a] TB control boards presented by order of number of people notified with active TB in 2018

Demographic Characteristics

Age and Sex

Of the eligible tests received between 2016 and 2018, gender was reported for 93.9% (37,626/40,063) of all tests. Those aged 25-30 years old were the highest tested age group in 2016 (2,808/7,911), 2017 (4,835/14,530) and 2018 (4,801/15,185). The proportion of tests in women remained higher than that in men. 55% of total LTBI tests were in women in 2018 (8,348/15,185), 55.2% (7,959/14,530) in 2017 and 53.4% (4,240/7,911) in 2016. Distribution by age and sex are shown in Figure 10.3.

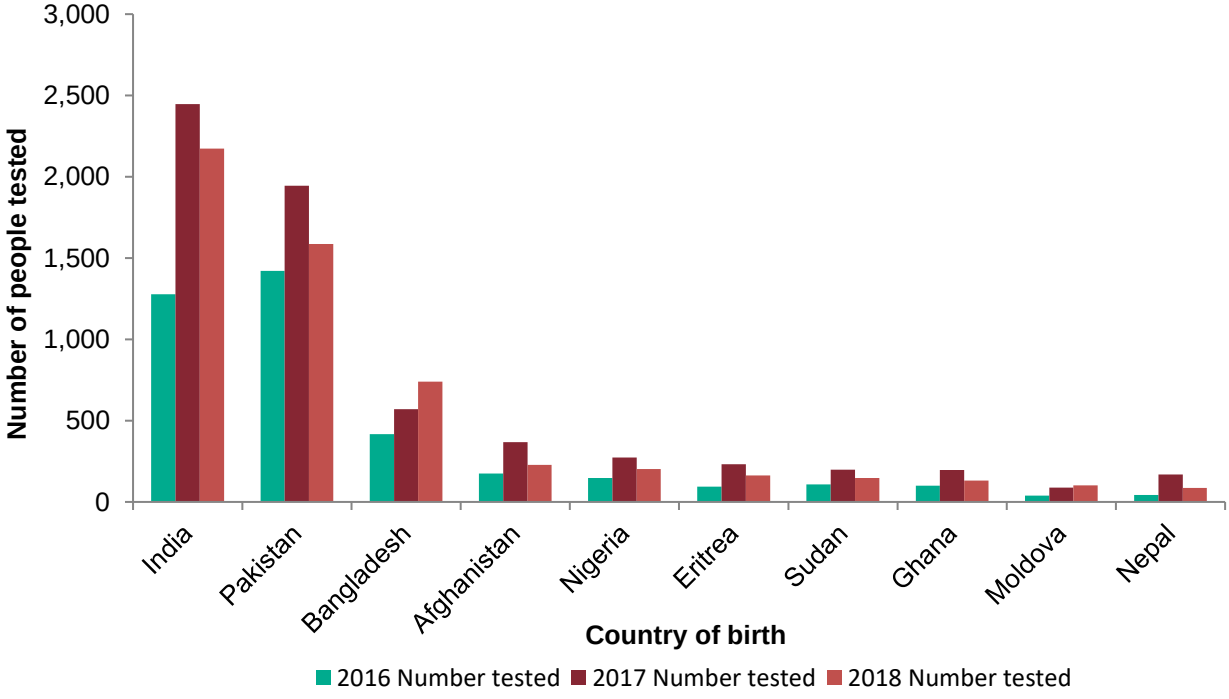
Figure 10.3: Number of people tested for LTBI by sex and age group, 2016 to 2018



Country of birth

Country of birth was available for 40.9% (6,490/15,883) of tests in 2018, 49.1% (7,531/15,343) in 2017 and 49.4% (4,362/8,837) in 2016. People born in India represented the highest number tested in 2018 and 2017, 33.5% (2,173/6,490) and 32.5% (2,443/7,531), respectively. People born in Pakistan represented the second highest group tested in 2018 and 2017. The number of LTBI tests by country of birth are shown in Figure 10.4 (Table Ai.10.3).

Figure 10.4: Number of LTBI tests by country of birth, 2016 to 2018



LTBI testing acceptance

Invitations to screening received varied acceptance rates across CCGs. In 2018, acceptance ranged from 3.5% (21/596) and 84.3% (182/216). In 2017 and 2016, the acceptance ranged from 0% (0/88) to 100% (7/7) in 2017 and from 0% (0/3) to 100% (4/4), respectively. These proportions are presented in Table 10.1 for CCGs that provided information on the number of people offered a test to PHE.

Table 10.1: Proportion of LTBI programme testing invitation acceptance by CCG, 2016 to 2018

Clinical commissioning group (CCG)	2016 (%)	2017 (%)	2018 (%)
NHS Barnet CCG	-	0.0	6.8
NHS Birmingham Crosscity CCG	3.1	4.9	41.9
NHS Bolton CCG	100.0	46.1	84.3
NHS Bradford City CCG and Bradford Districts CCG	NR	NR	NR
NHS Blackburn & Darwen CCG	-	-	33.6
NHS Camden CCG	-	-	3.5
NHS City & Hackney CCG	-	-	54.4
NHS Croydon CCG	-	-	NR
NHS Greater Huddersfield CCG	63.3	66.3	NR
NHS Hammersmith & Fulham CCG	0.0	100.0	NR
NHS Hounslow CCG	44.7	67.7	NR
NHS Leeds South CCG and Leeds East CCG	-	43.0	NR
NHS Newham CCG	25.6	34.2	30.2
NHS North Kirklees CCG	66.1	48.7	NR
NHS Oldham CCG	-	15.6	28.4
NHS Sandwell & West Birmingham CCG	3.2	6.9	32.0
NHS Slough CCG	75.7	NR	NR
NHS Sheffield CCG	68.4	46.6	NR
NHS Waltham Forest CCG	-	-	5.7
NHS West London CCG	-	-	NR
NHS North & Central Manchester CCG	11.8	25.7	22.4

Note: NHS Birmingham cross city and Birmingham South Central CCGs, NHS Bradford City and Districts CCGs and NHS Blackburn with Darwen and East Lancashire submitted joint treatment datasets
NR = Not Reported. The number of tests submitted through laboratories exceeded the number of invitations reported.
- Number of invitations not submitted by CCG

LTBI Indicator 2: Proportion of eligible new entrants covered by the LTBI testing programme who accept LTBI testing (England)

IGRA test performance and LTBI positivity

LTBI test results were available for 99.7% (15,835/15,883) of all tests in 2018, 98.5% of tests (15,115/15,343) in 2017 and 98% (8,663/8,837) in 2016.

The proportion of people who tested positive has been decreasing slightly since programme initiation, from 18.1% (1,566/8,663) in 2016, to 17% (2,569/15,115) in 2017 and 15.8% (2,509/15,835) in 2018. A higher proportion of men tested positive for LTBI than women in all age groups, between 2016 and 2018 (Figure 10.5). The proportion of people who tested positive for LTBI also varied by CCG in 2018, ranging between 0% (0/1) and 33.3% (24/72) (Figure 10.6, Table Ai.10.4).

Figure 10.5: Proportion of people that tested positive for LTBI by sex and age group, 2016 to 2018

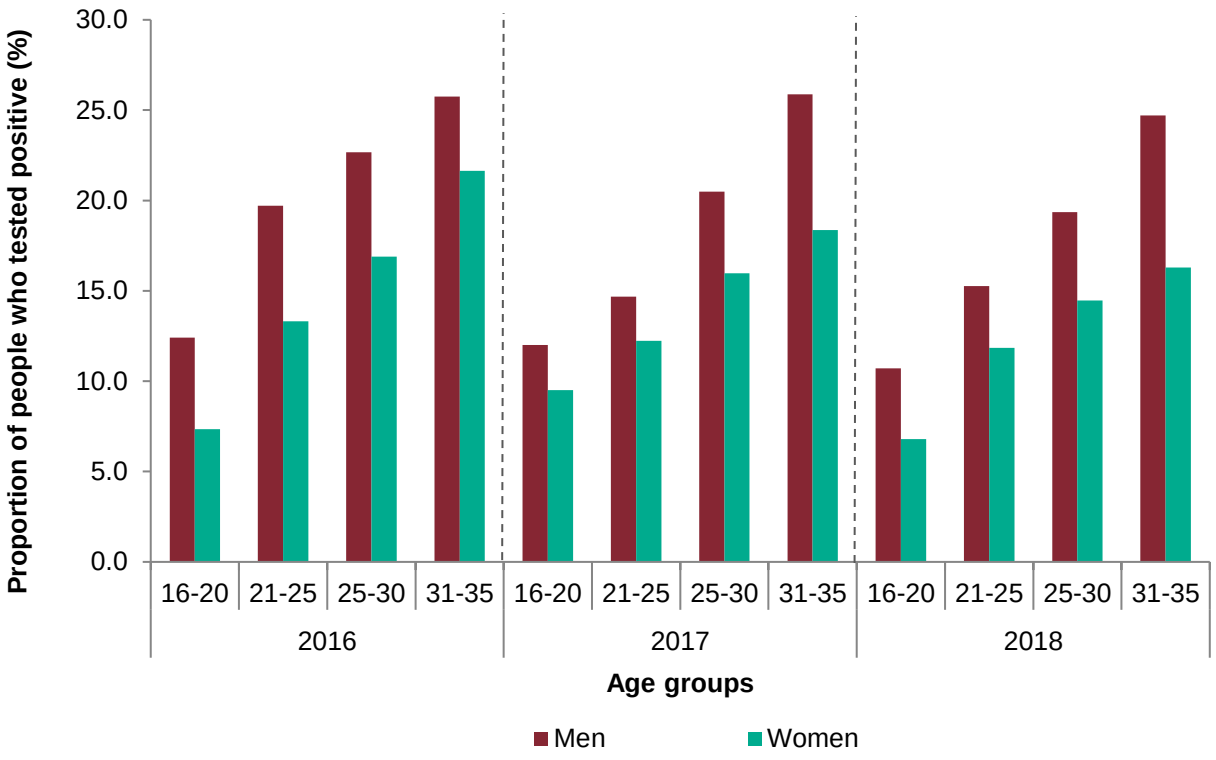
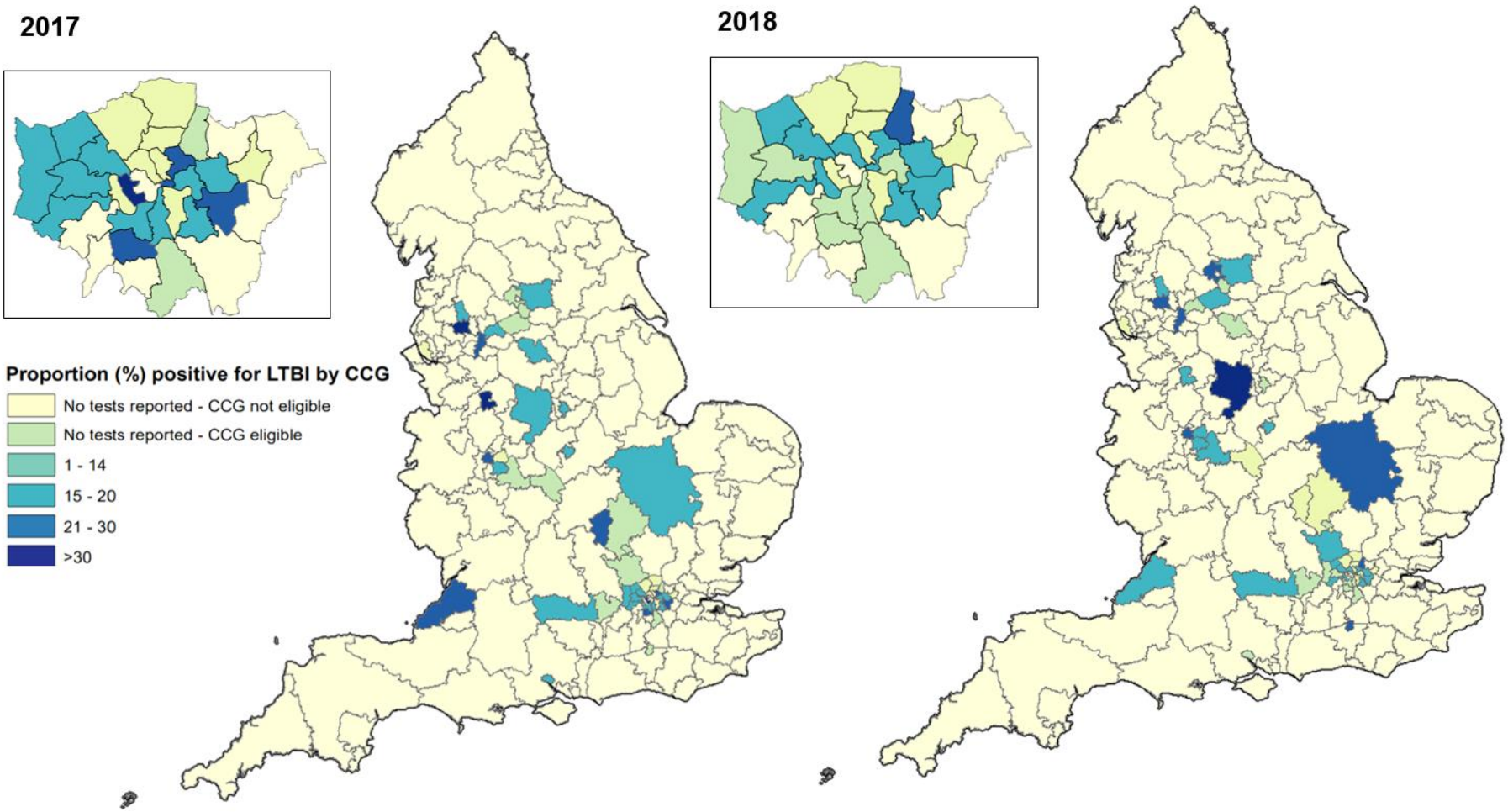


Figure 10.6: Proportion of people that tested positive for LTBI by CCG and year, 2017 to 2018 (box shows enlarged map of London area)



LTBI Indicator 3: Proportion of eligible new entrants who tested positive for LTBI

Treatment for LTBI

Treatment uptake and completion

Of the 50 CCGs that lab data was available for, treatment data was reported by 25 CCGs in 2018. According to the received treatment data, the proportion of people that accessed treatment has seen an annual decline from 78.3% (632/807) in 2016, to 65.7% (912/1409) in 2017 to 58.3% (671/1151) in 2018. Treatment uptake varied by CCG in 2018, from 0% (0/3) to 93.6% (44/47). Overall treatment completion increased annually across the 25 CCGs, from 65.1% (358/550) in 2016, to 65.3% (503/770) in 2017 to 76.5% (349/456) in 2018. The percentages that completed treatment also varied by CCG in 2018, from 36% (9/25) to 100% (1/1) (Figure 10.2). These figures have been calculated to take into consideration that treatment uptake and completion can be subject to pathway delays, which may lower the observed figures (as eligible patients may still be on the pathway at the time of reporting). The method used is further explained in the methods section.

Table 10.2: Treatment acceptance and completion by for individuals tested positive for LTBI by CCG, 2016 to 2018

Clinical commissioning group (CCG)	Positives who should be referred for treatment			Cohort that accessed treatment (% of those who should have been referred)						Cohort who should have completed treatment			Cohort that completed treatment (% of those who should have completed)					
	2016	2017	2018	2016		2017		2018		2016	2017	2018	2016		2017		2018	
NHS Birmingham and Solihull CCG	180	176	140	146	(81.1%)	114	(64.8%)	15	(10.7%)	144	112	8	65	(45.1%)	41	(36.6%)	5	(62.5%)
NHS Blackburn with Darwen CCG	82	52	47	47	(57.3%)	43	(82.7%)	44	(93.6%)	43	36	41	34	(79.1%)	28	(77.8%)	32	(78%)
NHS Bolton CCG	0	54	54	5	-	21	(38.9%)	39	(72.2%)	5	21	19	3	(60%)	12	(57.1%)	30	NR
NHS Bradford City CCG	107	106	157	90	(84.1%)	105	(99.1%)	128	(81.5%)	84	101	124	32	(38.1%)	30	(29.7%)	46	(37.1%)
NHS Camden CCG	0	0	5	0	-	1	-	19	NR	0	1	11	0	-	1	(100%)	12	NR
NHS Coventry and Rugby CCG	0	8	0	6	-	5	(62.5%)	0	-	-	-	-	2	-	1	-	0	-
NHS Crawley CCG	11	11	2	9	(81.8%)	11	(100%)	3	NR	7	9	0	7	(100%)	10	NR	0	-
NHS Croydon CCG	0	3	0	1	-	0	(0%)	0	-	-	-	-	0	-	0	-	0	-
NHS Ealing CCG	28	99	97	11	(39.3%)	47	(47.5%)	33	(34%)	11	43	25	2	(18.2%)	16	(37.2%)	9	(36%)
NHS Greater Huddersfield CCG	55	54	79	46	(83.6%)	18	(33.3%)	23	(29.1%)	46	18	13	37	(80.4%)	3	(16.7%)	18	NR
NHS Greenwich CCG	10	167	121	16	NR	137	(82%)	27	(22.3%)	16	133	26	15	(93.8%)	124	(93.2%)	12	(46.2%)
NHS Hillingdon CCG	12	11	13	14	NR	13	NR	0	(0%)	12	2	0	13	NR	11	NR	0	-
NHS Leeds CCG	8	89	100	10	NR	27	(30.3%)	56	(56%)	10	26	20	10	(100%)	22	(84.6%)	14	(70%)
NHS Manchester CCG	39	123	48	31	(79.5%)	75	(61%)	35	(72.9%)	16	66	4	11	(68.8%)	30	(45.5%)	8	NR
NHS North Kirklees CCG	13	20	31	13	(100%)	13	(65%)	13	(41.9%)	13	9	4	9	(69.2%)	6	(66.7%)	11	NR
NHS Nottingham City CCG	22	34	14	13	(59.1%)	34	(100%)	92	NR	13	29	91	13	(100%)	28	(96.6%)	81	(89%)
NHS Sandwell and West Birmingham CCG	96	131	0	34	(35.4%)	7	(5.3%)	1	-	28	3	1	22	(78.6%)	0	(0%)	1	(100%)
NHS Sheffield CCG	53	69	17	35	(66%)	48	(69.6%)	4	(23.5%)	31	12	0	27	(87.1%)	22	NR	1	-
NHS Slough CCG	8	67	74	8	(100%)	53	(79.1%)	46	(62.2%)	7	45	32	3	(42.9%)	22	(48.9%)	20	(62.5%)

Clinical commissioning group (CCG)	Positives who should be referred for treatment			Cohort that accessed treatment (% of those who should have been referred)						Cohort who should have completed treatment			Cohort that completed treatment (% of those who should have completed)					
	2016	2017	2018	2016		2017		2018		2016	2017	2018	2016		2017		2018	
NHS South Reading CCG	16	47	33	20	NR	46	(97.9%)	29	(87.9%)	14	23	5	7	(50%)	20	(87%)	18	NR
NHS Southampton CCG	35	85	72	33	(94.3%)	83	(97.6%)	52	(72.2%)	32	79	24	32	(100%)	71	(89.9%)	25	NR
NHS Stoke On Trent CCG	-	-	-	19	-	9	-	0	-	18	2	0	14	(77.8%)	5	NR	0	-
NHS Tower Hamlets CCG	0	0	47	1	-	2	-	12	(25.5%)	0	0	8	0	-	0	-	6	(75%)
NHS Wolverhampton CCG	32	3	0	24	(75%)	0	(0%)	0	-	-	-	-	0	-	0	-	0	-
Total	**807**	**1409**	**1151**	**632**	**(78.3%)**	**912**	**(64.7%)**	**671**	**(58.3%)**	**550**	**770**	**456**	**358**	**(65.1%)**	**503**	**(65.3%)**	**349**	**(76.5%)**

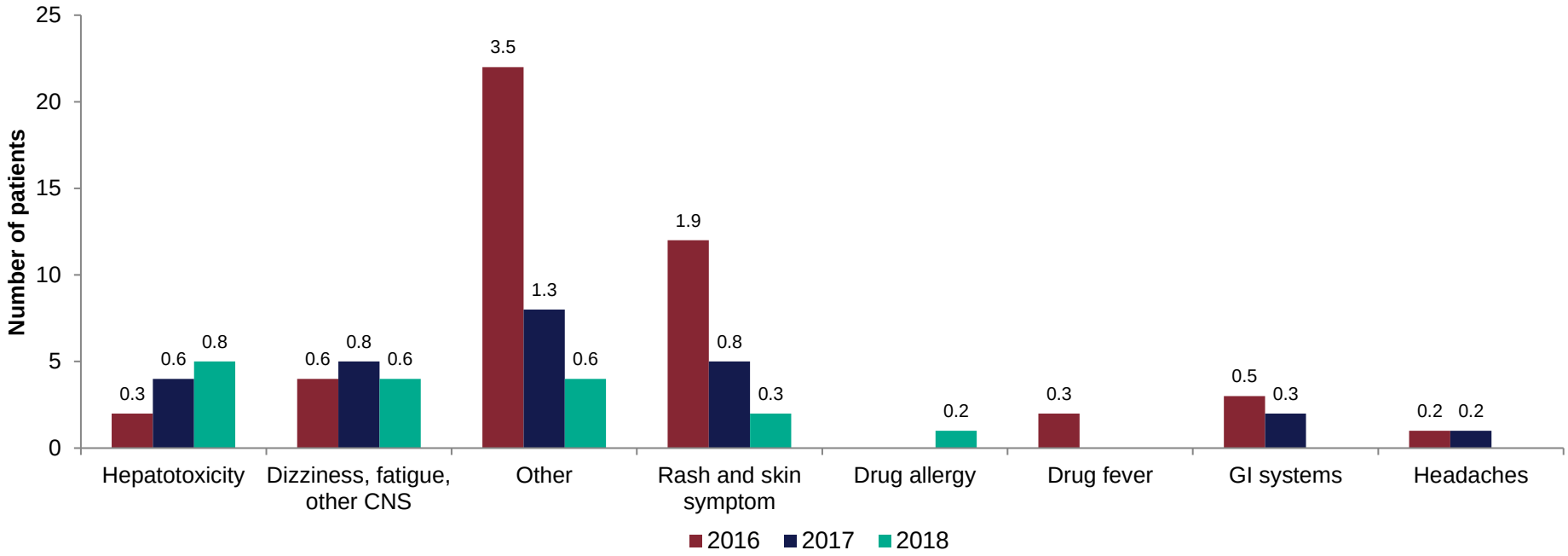
[a] See methods for the protocol on determining the number of people that should be referred to treatment and should have completed treatment
NR: Not reported due to cohort accessing or completing treatment being larger than the cohort that should have been referred for or completed treatment
Note: NHS Birmingham cross city and Birmingham South Central CCGs, NHS Bradford City and Districts CCGs and NHS Blackburn with Darwen and East Lancashire submitted joint treatment datasets. Newham data is not presented due to the majority of treatment data coming from pharmacies.

LTBI Indicator 4: The proportion of patients who take up treatment amongst those who have been offered it (England)
LTBI Indicator 5: The proportion of patients who complete LTBI treatment amongst those who start treatment (England)

Adverse events

In 2018, 2.4% (16/672) of people who started LTBI treatment experienced adverse effects, a decrease from 2.7% (25/915) in 2017 and 7.1% (46/646) in 2016. Among the adverse events reported in 2018, hepatoxicity, dizziness and fatigue, rash and 'other' were the most common events. The percentage of patients reporting hepatoxicity has seen a slight annual increase from 0.3% (2/646) in 2016 to 0.7% (5/672) in 2018. Figure 10.7 summarises all recorded adverse reactions.

Figure 10.7: Percentage and number of people reporting adverse treatment events following LTBI treatment, 2016 to 2018



[a] Numbers besides bars represent the number of patients reporting adverse effects

LTBI Indicator 6: The proportion of patients who experience significant drug events amongst those who initiated treatment (England).

11. United Kingdom tuberculosis pre-entry screening programme

Important messages

All long-term visa applicants (>6 months) from countries with an estimated incidence of 40 per 100,000 or above are required to undergo screening for active pulmonary TB prior to entry to the UK.

Just over 2 million screening episodes were recorded to have taken place between October 2005 and December 2018.

304,234 screening episodes took place in 2018, detecting 318 people with TB.

As more people with TB were detected overseas, the number of prevalent people with pulmonary TB in the UK (within 1 year of entry to the UK) from countries within the pre-entry scheme decreased from 366 in 2006 to 69 (so far) in 2018.

After a successful pilot in 15 high TB incidence countries between 2005 and 2012, the UK replaced port based on-entry screening with pre-entry screening overseas. The global roll out of pre-entry screening to 101 high incidence countries took place between September 2012 and March 2014, when on-entry screening ceased. Chest X-ray based active pulmonary TB screening is a requirement for all migrants from countries with a TB incidence of 40 per 100,000 and above who apply for a UK visa for more than 6 months, being carried out by appointed panel clinics usually in the country of origin [11].

The number of applicants screened and the number of people with TB detected has increased as more countries have joined the TB pre-entry scheme. In total, 2,016,795 screening episodes have taken place since October 2005, of which 304,234 were performed in 2018. In 2018, most applicants were female (57.3%, 142,440/248,520) (where sex was known) and 78.4% were young adults aged 15 to 34 years (195,223/248,857) (where age was known).

The largest number of screening episodes took place in China (32.7%, 99,569/304,234), India (23.6%, 71,931/304,234), Pakistan (6.9%, 21,103/304,234) and Nigeria (4.3%, 13,038/304,234). The number of applicants substantially increased in every region between 2016 and 2018 except Europe and the CIS (where it decreased slightly by 5.4%). The number of applicants from South and Central America more than doubled between 2016 and 2018, and increased by 82.7% from the Middle East, although numbers remained low for both (402 to 1,285 and 1,612 to 2,945 respectively

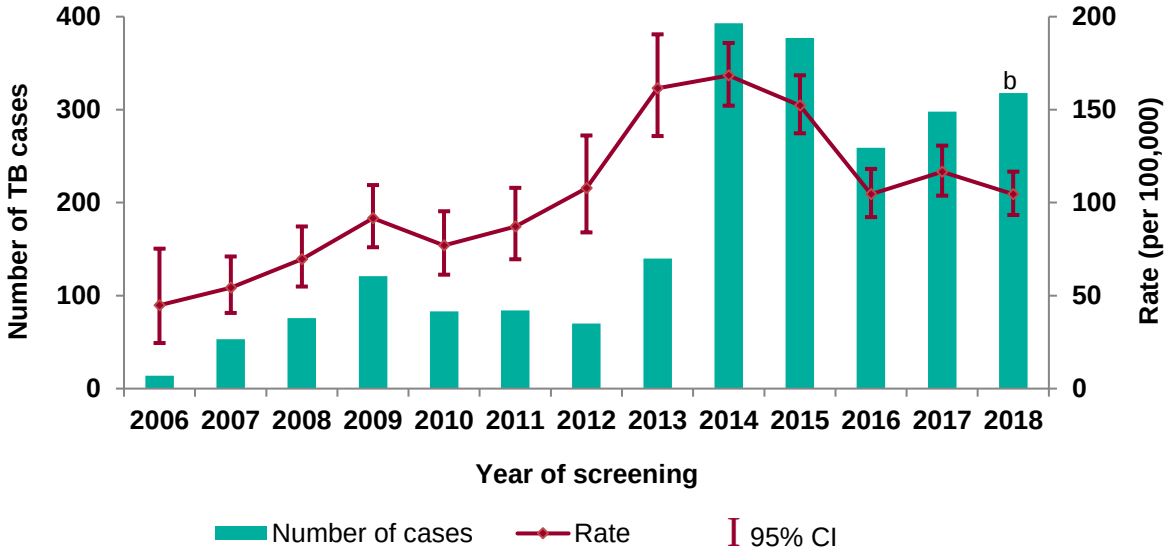
between 2016 and 2018). Applicants from the Indian subcontinent increased by 24.4%, Africa by 22.9% and South East Asia (which includes China) by 22.4%. These increases may in part due to improved data returns. Regional distribution of TB screening largely reflects overall migration trends to the UK.

In total, 318 people with TB were detected in 2018, giving an overall TB detection yield of 104.5 per 100,000 applications. The number of females with TB was higher than the number of males (118 versus 105), however, the rate of TB detection was higher in males (99.0 per 100,000) than females (83.8 per 100,000). The number and rate of people diagnosed with TB through the pre-entry screening programme increased from 14 (45 per 100,000) in 2006 to 393 (168.4 per 100,000) in 2014, then decreased to 259 (104.6 per 100,000) in 2016. Since then, the number of people diagnosed with TB has increased again (318 in 2018) but the rate has remained relatively stable (104.5 in 2018) (Figure 11.1, Table A11.1). There was an initial increase in case numbers and detection rates up until 2014 which was likely due to improved procedures and introduction of mandatory sputum collection in 2007. Since 2014, the TB detection rates have seen a general decline despite a consistently high culture to smear ratio. More detailed analysis of these factors is planned.

In 2018, most people found to have TB were aged 15 to 34 years old (75.6%, 186/246) (where age was available). Older age groups had lower numbers of people with TB (55 years and over: 7.7%, 19/246) but higher TB rates – 95.3 per 100,000 in 15 to 34 year olds versus 562.8 per 100,000 in 55 years and over.

Between 2006 and 2018, notifications of pulmonary TB in the UK within 1 year of entry into the UK from the 101 countries covered by the programme has decreased from 368 in 2006, to 69 (so far) in 2018 (Figure 11.2, Table A11.2).

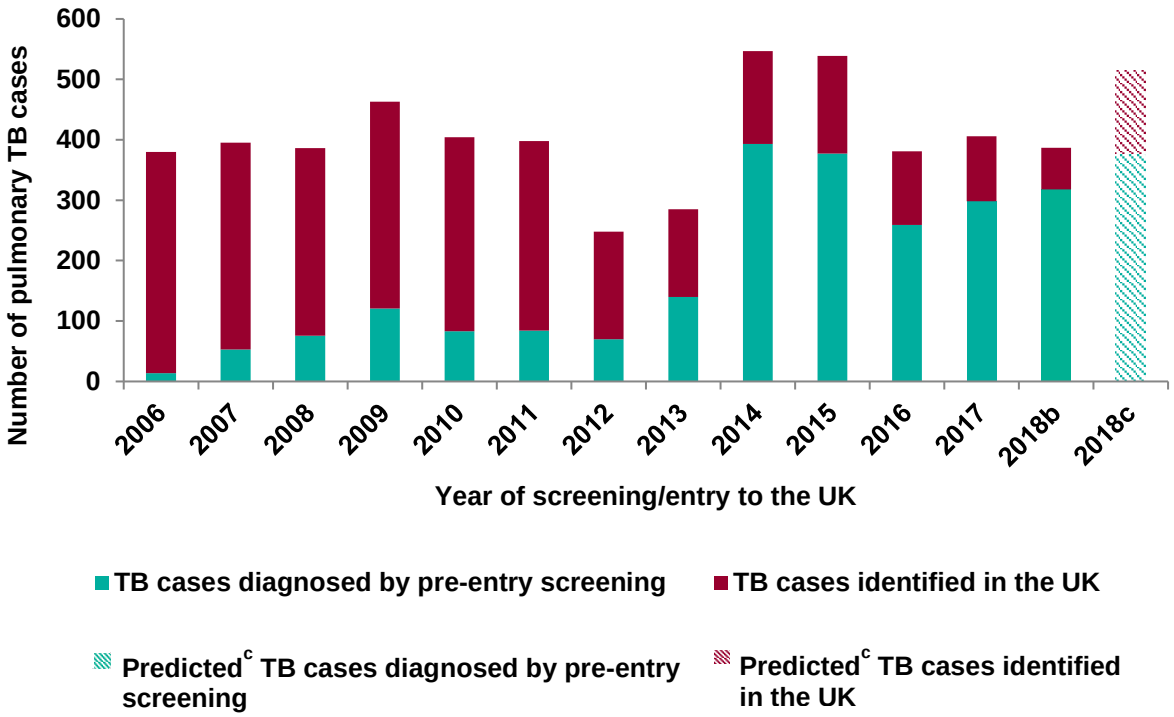
Figure 11.1: Number of people and rate of TB detected in high incidence countries through the UK pre-entry screening programme, 2006 to 2018[a]



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

[b] As of 19 April 2019, 747 sputum culture results were pending and the rate may increase when final results are available

Figure 11.2: Number of people with TB diagnosed by pre-entry screening in the 101 programme countries and those identified within 1 year of UK entry[a], 2006 to 2018[b]



[a] The number of people with pulmonary TB identified within 1 year of entry into the UK was from all 101 high incidence countries but the number of people diagnosed by pre-entry screening were from an increasing number of countries as screening was rolled out; 5 pilot countries (2006), 15 pilot countries (2007 and 2012), 101 countries (by 2014)
[b] As of 19 April 2019, 747 sputum samples are pending and the rate may increase when final results are available
[c] Predicted TB cases assume that of the pending sputum cultures, 10% will be positive; and for TB cases identified in the UK, 50% more cases will be detected for 2018 during 2019 as the proxy entry date is set at 2 July each year

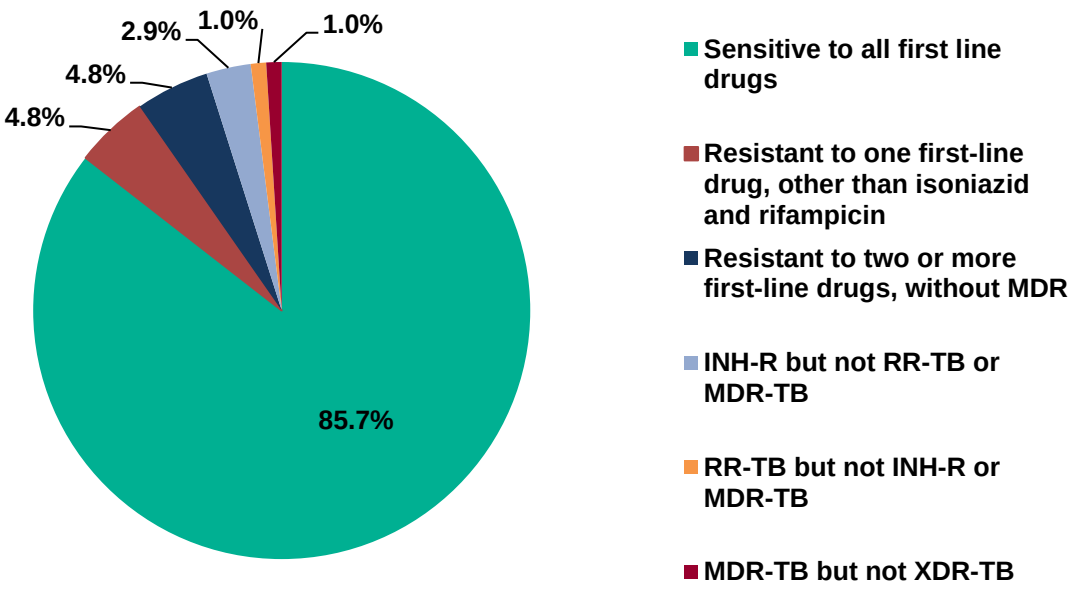
Drug susceptibility testing of positive TB cultures

Of the 140 people with culture positive TB screened in 2018, 105 had valid drug sensitivity testing (DST) results. Whilst culture confirmation has increased significantly over the years to almost 100% in International Organisation of Migration (IOM) clinics, much lower rates are achieved amongst the non-IOM clinics. In addition, culture update returns were poor, therefore a culture confirmation audit was carried out in 2018 which identified a further 20 people with culture confirmed TB. There was no clear temporal trend in the proportion of cultures with DST between 2007 and 2018 (range 33.3% to 93.2%).

Figure 11.3 summarises the overall DST results for culture confirmed TB in 2018. Most TB cultures were sensitive to all first-line drugs (85.7%, 90/105). Where DST results were available, 14.3% of people with TB had drug resistance of some description. Of these, 3 had isoniazid monoresistance, 1 had rifampicin monoresistance, 5 were resistant to a

first-line drug other than isoniazid or rifampicin (ethambutol or pyrazinamide) and 5 were classified as poly-drug resistant (resistant to 2 or more first-line drugs, but not MDR). One person with multi-drug resistant TB (MDR) was seen in 2018, and nobody with extensively-drug resistant (XDR) TB was detected.

Figure 11.3: Summary of drug susceptibility patterns for the 105 positive TB cultures, 2018



XDR=Extensively drug resistant, MDR=Multidrug resistant, INH-R=Isoniazid resistant & RR=Rifampicin resistant

12. Conclusions

In 2018, there were 4,655 people notified with TB, a fall of 8.2% from 2017 in the number of notifications. This is the lowest number of people ever notified with TB in England and represents a fall of 44% since the peak seen in 2011.

Similarly, the rate of TB in England is now 8.3 per 100,000, the lowest ever recorded rate of TB. The rate of TB in children born in the UK, a proxy for recent transmission in England has reduced by 65%, from the peak of 3.4 per 100,000 in 2008 to just 1.2 per 100,000 in 2018.

In England, nearly 60% of local authorities have now achieved a 3-year average TB incidence of less than 5 per 100,000 and 18 of these have reached the WHO End TB Strategy's pre-elimination target rate of less than 1 per 100,000.

People born outside the UK accounted for the majority (72%) of TB notifications in 2018 and had a rate of TB 14 times higher than that of people born in the UK. Between 2017 and 2018, the decline in number of notifications and rate was smaller for people born outside the UK than for people born in the UK who experienced the largest decline in both number of notifications (9%) and rate (9.7%) since 2015.

People with social risk factors (SRF) continue to be disproportionally affected by TB. 2018 again saw the highest proportion of people notified with TB who had a SRF (13.3%) since data collection began in 2010. People with a SRF are more likely to have infectious pulmonary TB, have poorer outcomes and are almost 2-times more likely to have MDR/RR-TB. The most deprived 10% of the population experience TB rates more than 7 times higher than the least deprived 10%. The number of people with a SRF has not fallen in recent years and they are likely to comprise an ever-larger proportion of cases in the coming years.

Delay between date of reported symptom onset and treatment in people with pulmonary TB fell slightly to a median of 75 days but still nearly one-third (31%) of people with pulmonary TB experienced a delay of more than 4 months.

Whole genome sequencing (WGS) data is now available for the whole of England for a complete year and will be used to develop more robust indicators of TB transmission in England.

The proportion of people with drug sensitive TB completing treatment by 12 months fell slightly to 84.7% in 2018, a change that is likely to reflect the increased proportion of people with a SRF who have worse treatment completion rates. If the proportion of people with a SRF continues to increase, we will probably continue to see a detrimental impact on outcome measures such as treatment completion. Most deaths continue to occur in those aged 65 years and older, a population who often have other comorbidities associated with poor outcomes.

In England, the number of people in the drug resistant cohort (confirmed or treated as MDR/RR-TB) has fallen to 47 in 2018, a proportion of 1.6%, similar to previous years. Four of these people had confirmed initial XDR-TB, the same number as in 2017. Resistance to pyrazinamide increased fivefold between 2016 and 2018, most of these cases (81.6%) being monoresistant, although the reasons for this are, as yet, unclear.

The pre-entry screening programme continues to be effective in detecting prevalent people with pulmonary TB; in 2018, picking up 318 people with active TB from over 304,000 people screened prior to entry, a rate of 104 per 100,000.

The new migrant LTBI testing and treatment programme performed nearly 16,000 tests in 2018. Although the proportion of people with a positive test who accessed treatment declined, the proportion completing treatment rose to 76% in 2018.

Further declines in the number and rate of people notified with TB over the last 6 years continue to be encouraging as we move towards the WHO End TB Strategy pre-elimination goal of 1 case per 100,000 population by 2035. However, the rising proportion of people with a SRF may make these gains harder to sustain and require the ongoing commitment to TB control beyond the end of the current ‘Collaborative TB Strategy for England’ in 2020 if we are to achieve elimination of TB as a public health problem in the longer term.

13. Recommendations

It is very encouraging that TB notifications and rates in England have declined for the seventh consecutive year. Since 2014, the last year before the launch of the Collaborative TB Strategy, England has seen almost a one-third reduction in TB incidence, has the lowest number of people with TB and TB rates ever recorded, and is now classified as a low incidence country by the WHO. However, further work is needed to improve the outcomes for those most at risk of TB, reduce in-country TB transmission and maintain the decline in TB incidence and numbers.

To achieve ongoing reductions in TB incidence, further work is required to move England towards the WHO's End TB Strategy pre-elimination goal by 2035 and deliver the Collaborative TB Strategy for England's 10 areas for action (AfA) [1]. Based on the findings in this report, a number of recommendations are outlined below. Wider recommendations on improving TB control in England are available in the Collaborative TB Strategy for England 2015 to 2020.

To improve access to services and ensure early diagnosis (AfA1)

The delay between symptom onset and treatment start for people notified with pulmonary TB remains little changed since 2017 and unacceptably long, with nearly one-third of people with pulmonary TB experiencing a delay of more than 4 months.

Recommendations to reduce diagnostic delay:

1. TB clinical teams are encouraged to raise awareness of TB among local communities affected by TB, other service providers and primary care (as per the national TB clinical policy) and by utilising the resources available from TB Alert http://www.thetruthabouttb.org/professionals/professional-education/ [12]
2. TB Control Boards (TBCBs), Clinical Commissioning Groups (CCGs) and primary care to raise awareness of TB in primary care by encouraging use of the RCGP TB e-learning module http://elearning.rcgp.org.uk/course/info.php?id=107 [13]
3. National TB Office to raise TB awareness in groups-at-risk of TB through a selective awareness raising campaign

To provide universal access to high quality diagnostics (AfA2)

In 2018, there was a small decrease in the proportion of people notified with TB who were culture confirmed (2018: 61% versus 2017: 63%). A significant proportion of people with TB (31%) remain unconfirmed by any laboratory method. It is increasingly

important to use all diagnostic modalities and to ensure high culture confirmation rates to maximise the benefits of whole genome sequencing.

Recommendations to improve TB diagnostics:

1. TB clinical teams to prioritise obtaining diagnostic samples wherever possible.
2. TBCBs and lead TB microbiologists to work with local laboratories to find solutions to gaps identified by the laboratory audit and encourage use of the TB diagnostics standard of best practice.

To improve treatment and care services (AfA3)

The proportion of people with drug sensitive TB completing treatment by 12 months fell very slightly to 84.7% in 2018. TBCBs, CCGs, primary care and TB services are encouraged to work collaboratively to ensure a continuing decline in TB notifications and recent transmissions and to further improve treatment and care for TB patients.

Recommendations to improve TB treatment and care:

1. TB clinical teams to continue their supportive case management of complex TB patients, offer DOT where indicated and consider the use of innovative approaches such as VOT to improve treatment completion.
2. TB clinical teams to continue cohort review and use as a tool to improve local TB control and to monitor treatment outcomes and contact tracing activity.
3. CCGs to use the updated 2018 National TB Service Specification and Clinical Policy to commission and monitor local TB services.
4. TBCBs encouraged to review local services against the updated 2018 National TB Service Specification and Clinical Policy to identify gaps and take appropriate action with important partners.
5. National TB Office to review case complexity to inform workforce needs into the future.

To reduce drug-resistant TB (AfA6)

In 2018, the number of people in the drug resistant cohort (confirmed or treated as MDR/RR-TB) decreased overall. People with drug resistant TB have more complex treatment and work is needed to ensure treatment completion in this group continues to improve.

Recommendations to reduce drug resistant TB:

1. TB clinical teams are encouraged to continue referring all MDR cases to the British Thoracic Society MDR-TB Clinical Advice Service to support MDR-TB case management.
2. TB clinical teams to continue supporting patients complete treatment, using DOT or VOT where indicated, and to minimise patient loss to follow-up through careful case management.

To tackle TB in under-served populations (USPs) (AfA7)

People with social risk factors (SRF) continue to be disproportionally affected by TB. 2018 saw the highest proportion of people with TB who had a SRF (13.3%) since data collection began in 2010. Patients with SRFs have more complex needs and worse TB outcomes; an enhanced focus on preventing TB in USPs and improving the support available to these patients is required. This should, in turn, help reduce health inequalities in association with TB, one of the *Collaborative TB Strategy*'s primary aims.

Recommendations to improve TB control among USPs:

1. TBCBs and their partners are encouraged to use the 2019 updated resource 'Tackling TB in Under-Served Populations' [14] to take appropriate local action and better meet the needs of USPs.
2. TBCBs and partners to work to provide more integrated services for USPs.
3. TB commissioners, in CCGs and local authorities, to ensure appropriate access to services, treatment and support to enable patients to complete treatment.
4. Local Authorities are encouraged to use 'Tackling TB - local government's public health role' [15], a joint publication from PHE and the Local Government Association to help support USPs with TB.
5. National TB Strategy team to work with NHS England and other stakeholders to ensure more integrated services for USPs.

To implement new entrant latent TB screening (AfA8)

The rate of TB among people born outside the UK remains considerably higher than among those born in the UK and accounted for the majority (72%) of TB notifications in 2018. Those born abroad had a rate of TB 14 times higher than those born in the UK. Sustaining the new migrant LTBI testing and treatment programme is therefore vital to the delivery of better TB control in England. The number of LTBI tests processed by this programme has increased year-on-year with a 4% increase observed between 2017 and 2018.

Recommendations to sustain the roll-out of new migrant LTBI programmes:

1. TBCBs should continue to work with CCGs and TB services in high TB burden areas to embed local new migrant LTBI testing and treatment programmes, facilitate data returns and encourage use of the LTBI toolkit to support this work http://www.tbalert.org/health-professionals/ltbi-toolkit/ [16].
2. In high TB burden areas, CCGs, primary and secondary care staff are encouraged to invite people for LTBI testing, encourage those with LTBI to consider treatment; and utilise the *TB Alert* resources generated by the programme of work to increase uptake in communities at risk.

Three final overarching recommendations that relate to the broader aspects of TB control include:

1. TBCBs are encouraged to continue their work providing support to local TB control and overseeing local implementation of the strategy's 10 areas for action.
2. CCGs and local authorities are encouraged to use the PHE TB Fingertips tool to assess their local TB burden to support JSNA development and TB commissioning and monitoring.
3. TB Services are encouraged to submit high quality data to strengthen surveillance to support appropriate public health decision making and commissioning.

This year's annual TB report shows how the dedication and hard work of all those involved in TB patient care continues to have an impact. The number of people with TB in England is the lowest it has ever been; the 44% decline in TB since the peak of 2011 is impressive as is the near one-third decline in TB since the launch of the Collaborative TB Strategy for England in 2015. However, action is still needed to sustain these declines and it is crucial that work continues to implement the current Collaborative TB Strategy to strengthen TB control, achieve the Strategy's goals of a year-on-year decrease in incidence, reduce health inequalities and, ultimately, eliminate TB as a public health problem in England.

Now that we are in the final year of the Collaborative TB Strategy, we are starting to prepare a new 5-year TB Action Plan (2020 to 2025) to move England ever closer to TB elimination. This TB Action Plan will build on the gains of the current Strategy, refocus our work to deliver any outstanding areas-for-action (for example to better tackle TB in under-served populations, reduce diagnostic delay and in-country transmission) and in addition take into account new ideas, technologies and research. The existing TB Strategy has created a co-ordinated, multi-stakeholder national TB programme which delivers collaboratively improved TB control across England. We must now work collectively to maintain and extend this to sustain the downward trend in TB incidence and move England toward TB elimination by 2035.

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Appendix I. Supplementary tables

Table Ai.A: Number of TB notifications, rates and annual percentage change, England, 1960 to 2018[a]

Year	Number of people	Rate per 100,000 (95% CI)	Annual change in numbers (%)	Annual change in rate (%)
1960	22,328	-	-	-
1961	20,433	-	-8.5	-
1962	19,344	-	-5.3	-
1963	17,860	-	-7.7	-
1964	16,527	-	-7.5	-
1965	15,161	-	-8.3	-
1966	13,773	-	-9.2	-
1967	12,477	-	-9.4	-
1968	12,328	-	-1.2	-
1969	11,559	-	-6.2	-
1970	11,280	-	-2.4	-
1971	11,128	24.0 (23.5 - 24.4)	-1.3	-
1972	10,566	22.7 (22.3 - 23.1)	-5.1	-5.4
1973	10,572	22.6 (22.2 - 23.1)	0.1	-0.4
1974	10,119	21.7 (21.3 - 22.1)	-4.3	-4.0
1975	10,276	22.0 (21.6 - 22.4)	1.6	1.4
1976	9,650	20.7 (20.3 - 21.1)	-6.1	-5.9
1977	9,071	19.4 (19.1 - 19.9)	-6.0	-6.3
1978	9,231	19.8 (19.4 - 20.2)	1.8	2.1
1979	8,854	19.0 (18.6 - 19.4)	-4.1	-4.0
1980	8,752	18.7 (18.3 - 19.1)	-1.2	-1.6
1981	7,803	16.7 (16.3 - 17.0)	-10.8	-10.7
1982	7,083	15.1 (14.8 - 15.5)	-9.2	-9.6
1983	6,501	13.9 (13.6 - 14.2)	-8.2	-7.9
1984	5,833	12.4 (12.1 - 12.8)	-10.3	-10.8
1985	5,583	11.9 (11.6 - 12.2)	-4.3	-4.0
1986	5,743	12.2 (11.9 - 12.5)	2.9	2.5
1987	4,854	10.3 (10.0 - 10.6)	-15.5	-15.6
1988	4,962	10.5 (10.2 - 10.8)	2.2	1.9
1989	5,223	11.0 (10.7 - 11.3)	5.3	4.8
1990	5,010	10.5 (10.2 - 10.8)	-4.1	-4.5
1991	5,270	11.0 (10.7 - 11.3)	5.2	4.8
1992	5,598	11.7 (11.4 - 12.0)	6.2	6.4
1993	5,722	11.9 (11.6 - 12.2)	2.2	1.7
1994	5,410	11.2 (10.9 - 11.5)	-5.5	-5.9

Year	Number of people	Rate per 100,000 (95% CI)	Annual change in numbers (%)	Annual change in rate (%)
1995	5,428	11.2 (10.9 - 11.5)	0.3	0.0
1996	5,493	11.3 (11.0 - 11.6)	1.2	0.9
1997	5,664	11.6 (11.3 - 11.9)	3.1	2.7
1998	5,915	12.1 (11.8 - 12.4)	4.4	4.3
1999	5,939	12.1 (11.8 - 12.4)	0.4	0.0
2000	6,044	12.3 (12.0 - 12.6)	1.8	1.7
2001	6,169	12.5 (12.2-12.8)	2.1	1.6
2002	6,675	13.4 (13.1-13.8)	8.2	7.2
2003	6,631	13.3 (13.0-13.6)	-0.7	-0.7
2004	6,930	13.8 (13.5-14.1)	4.5	3.8
2005	7,658	15.1 (14.8-15.5)	10.5	9.4
2006	7,682	15.1 (14.7-15.4)	0.3	0.0
2007	7,577	14.7 (14.4-15.1)	-1.4	-2.6
2008	7,809	15.1 (14.7-15.4)	3.1	2.7
2009	8,112	15.5 (15.2-15.9)	3.9	2.6
2010	7,676	14.6 (14.3-14.9)	-5.4	-5.8
2011	8,280	15.6 (15.3-15.9)	7.9	6.8
2012	8,084	15.1 (14.8-15.4)	-2.4	-3.2
2013	7,266	13.5 (13.2-13.8)	-10.1	-10.6
2014	6,473	11.9 (11.6-12.2)	-10.9	-11.9
2015	5,736	10.5 (10.2-10.7)	-11.4	-11.8
2016	5,618	10.2 (9.9-10.4)	-2.1	-2.9
2017	5,070	9.1 (8.9-9.4)	-9.8	-10.8
2018	4,655	8.3 (8.1-8.6)	-8.2	-8.8

CI: confidence interval

[a] Data between 2000 to 2018 is the same as that presented in Table Ai.1.1 and reflects data collected after enhanced surveillance was introduced. Data from 1960-1999 is from NOIDs Public Health England (2012) Notifiable diseases: annual totals from 1912 to 1981.

Table Ai.1.1: Number of TB notifications, rates and annual percentage change, England, 2000 to 2018

Year	Total		Annual change in numbers (%)	Annual change in rate (%)
	Number of people	Rate per 100,000 (95% CI)		
2000	6,044	12.3 (12.0 - 12.6)	-	-
2001	6,169	12.5 (12.2-12.8)	2.1	1.6
2002	6,675	13.4 (13.1-13.8)	8.2	7.2
2003	6,631	13.3 (13.0-13.6)	-0.7	-0.7
2004	6,930	13.8 (13.5-14.1)	4.5	3.8
2005	7,658	15.1 (14.8-15.5)	10.5	9.4
2006	7,682	15.1 (14.7-15.4)	0.3	0.0
2007	7,577	14.7 (14.4-15.1)	-1.4	-2.6
2008	7,809	15.1 (14.7-15.4)	3.1	2.7
2009	8,112	15.5 (15.2-15.9)	3.9	2.6
2010	7,676	14.6 (14.3-14.9)	-5.4	-5.8
2011	8,280	15.6 (15.3-15.9)	7.9	6.8
2012	8,084	15.1 (14.8-15.4)	-2.4	-3.2
2013	7,266	13.5 (13.2-13.8)	-10.1	-10.6
2014	6,473	11.9 (11.6-12.2)	-10.9	-11.9
2015	5,736	10.5 (10.2-10.7)	-11.4	-11.8
2016	5,618	10.2 (9.9-10.4)	-2.1	-2.9
2017	5,070	9.1 (8.9-9.4)	-9.8	-10.8
2018	4,655	8.3 (8.1-8.6)	-8.2	-8.8

CI: confidence intervals

Table Ai.1.2: Number of TB notifications and rates by PHE Centre, England, 2000 to 2018

Year	London		West Midlands		South East		North West		East of England	
	Number of people	Rate per 100,000 (95% CI)	Number of people	Rate per 100,000 (95% CI)	Number of people	Rate per 100,000 (95% CI)	Number of people	Rate per 100,000 (95% CI)	Number of people	Rate per 100,000 (95% CI)
2000	2,632	36.4 (35.0-37.8)	699	13.3 (12.3-14.3)	442	5.7 (5.2-6.2)	624	9.2 (8.5-10.0)	299	5.4 (4.8-6.0)
2001	2,574	35.2 (33.8-36.5)	702	13.3 (12.3-14.3)	430	5.5 (5.0-6.1)	638	9.4 (8.7-10.2)	338	6.0 (5.4-6.7)
2002	3,055	41.4 (40.0-42.9)	794	15.0 (14.0-16.1)	481	6.1 (5.6-6.7)	638	9.4 (8.7-10.2)	355	6.3 (5.6-7.0)
2003	3,063	41.4 (40.0-42.9)	783	14.7 (13.7-15.8)	542	6.9 (6.3-7.5)	574	8.4 (7.7-9.1)	323	5.7 (5.1-6.3)
2004	3,111	41.9 (40.4-43.4)	920	17.2 (16.1-18.4)	557	7.0 (6.5-7.6)	570	8.3 (7.7-9.0)	405	7.1 (6.4-7.8)
2005	3,448	45.9 (44.3-47.4)	920	17.1 (16.0-18.2)	583	7.3 (6.7-7.9)	743	10.8 (10.1-11.6)	470	8.1 (7.4-8.9)
2006	3,328	43.8 (42.3-45.3)	927	17.1 (16.0-18.3)	607	7.5 (7.0-8.2)	694	10.1 (9.3-10.8)	479	8.2 (7.5-9.0)
2007	3,234	42.0 (40.6-43.5)	928	17.0 (15.9-18.2)	627	7.7 (7.1-8.4)	733	10.6 (9.8-11.4)	421	7.2 (6.5-7.9)
2008	3,362	43.0 (41.6-44.5)	1,008	18.3 (17.2-19.5)	629	7.7 (7.1-8.3)	730	10.5 (9.7-11.3)	506	8.5 (7.8-9.3)
2009	3,402	42.8 (41.4-44.3)	1,006	18.2 (17.1-19.4)	712	8.6 (8.0-9.3)	799	11.4 (10.7-12.3)	512	8.5 (7.8-9.3)
2010	3,241	40.2 (38.8-41.6)	872	15.7 (14.6-16.7)	711	8.5 (7.9-9.2)	809	11.5 (10.7-12.3)	506	8.4 (7.6-9.1)
2011	3,491	42.6 (41.2-44.0)	1,004	17.9 (16.8-19.0)	813	9.7 (9.0-10.4)	818	11.6 (10.8-12.4)	560	9.2 (8.4-10.0)
2012	3,401	40.9 (39.6-42.3)	1,076	19.1 (17.9-20.2)	778	9.2 (8.5-9.9)	775	10.9 (10.2-11.7)	497	8.1 (7.4-8.8)
2013	2,975	35.3 (34.1-36.6)	979	17.3 (16.2-18.4)	685	8.0 (7.4-8.6)	716	10.1 (9.4-10.8)	451	7.3 (6.6-8.0)
2014	2,555	29.9 (28.8-31.1)	776	13.6 (12.6-14.6)	664	7.7 (7.1-8.3)	642	9.0 (8.3-9.7)	436	6.9 (6.3-7.6)
2015	2,279	26.3 (25.2-27.4)	699	12.1 (11.3-13.1)	593	6.8 (6.3-7.4)	568	7.9 (7.3-8.6)	389	6.1 (5.5-6.8)
2016	2,198	25.1 (24.0-26.1)	717	12.3 (11.5-13.3)	561	6.4 (5.9-7.0)	589	8.2 (7.5-8.8)	432	6.8 (6.1-7.4)
2017	1,907	21.6 (20.6-22.6)	661	11.3 (10.4-12.2)	534	6.1 (5.6-6.6)	529	7.3 (6.7-7.9)	407	6.3 (5.7-7.0)
2018	1,691	19.0 (18.1-19.9)	613	10.4 (9.6-11.2)	508	5.7 (5.2-6.3)	479	6.6 (6.0-7.2)	361	5.6 (5.0-6.2)

CI: confidence intervals

Table Ai.1.2: Number of TB notifications and rates by PHE Centre, England, 2000 to 2018 continued

Year	Yorkshire and the Humber		East Midlands		South West		North East	
	Number of people	Rate per 100,000 (95% CI)	Number of people	Rate per 100,000 (95% CI)	Number of people	Rate per 100,000 (95% CI)	Number of people	Rate per 100,000 (95% CI)
2000	544	11.0 (10.1-11.9)	414	9.9 (9.0-10.9)	230	4.7 (4.1-5.3)	157	6.2 (5.2-7.2)
2001	551	11.1 (10.2-12.0)	544	13.0 (11.9-14.1)	211	4.3 (3.7-4.9)	177	7.0 (6.0-8.1)
2002	505	10.1 (9.2-11.0)	471	11.2 (10.2-12.2)	220	4.4 (3.9-5.0)	149	5.9 (5.0-6.9)
2003	544	10.8 (9.9-11.8)	458	10.8 (9.8-11.8)	201	4.0 (3.5-4.6)	141	5.6 (4.7-6.5)
2004	535	10.6 (9.7-11.5)	418	9.7 (8.8-10.7)	263	5.2 (4.6-5.9)	143	5.6 (4.7-6.6)
2005	556	10.9 (10.0-11.8)	533	12.3 (11.3-13.4)	266	5.2 (4.6-5.9)	132	5.2 (4.3-6.1)
2006	661	12.9 (11.9-13.9)	566	13.0 (11.9-14.1)	278	5.4 (4.8-6.1)	141	5.5 (4.6-6.5)
2007	632	12.2 (11.3-13.2)	534	12.1 (11.1-13.2)	269	5.2 (4.6-5.9)	196	7.7 (6.6-8.8)
2008	635	12.2 (11.3-13.2)	483	10.9 (9.9-11.9)	279	5.4 (4.7-6.0)	177	6.9 (5.9-8.0)
2009	688	13.2 (12.2-14.2)	524	11.7 (10.7-12.8)	303	5.8 (5.2-6.5)	166	6.4 (5.5-7.5)
2010	628	12.0 (11.0-12.9)	494	11.0 (10.0-12.0)	265	5.0 (4.4-5.7)	150	5.8 (4.9-6.8)
2011	664	12.6 (11.6-13.5)	492	10.8 (9.9-11.8)	307	5.8 (5.2-6.5)	131	5.0 (4.2-6.0)
2012	593	11.2 (10.3-12.1)	497	10.9 (9.9-11.9)	300	5.6 (5.0-6.3)	167	6.4 (5.5-7.5)
2013	583	10.9 (10.1-11.8)	413	9.0 (8.1-9.9)	326	6.1 (5.4-6.8)	138	5.3 (4.4-6.2)
2014	516	9.6 (8.8-10.5)	400	8.6 (7.8-9.5)	316	5.8 (5.2-6.5)	168	6.4 (5.5-7.5)
2015	437	8.1 (7.4-8.9)	357	7.6 (6.9-8.5)	286	5.2 (4.6-5.9)	128	4.9 (4.1-5.8)
2016	421	7.8 (7.0-8.5)	341	7.2 (6.5-8.0)	238	4.3 (3.8-4.9)	121	4.6 (3.8-5.5)
2017	345	6.3 (5.7-7.0)	349	7.3 (6.6-8.1)	228	4.1 (3.6-4.7)	110	4.2 (3.4-5.0)
2018	352	6.4 (5.8-7.1)	338	7.0 (6.3-7.8)	195	3.5 (3.0-4.0)	118	4.4 (3.7-5.3)

CI: confidence intervals

Table Ai.1.3 Number of TB notifications and rates by age group and place of birth, England, 2018

Age group (years)	Place of Birth				Total[a]	
	UK born		Non-UK born			
	Number of people	Rate per 100,000 (95% CI)	Number of people	Rate per 100,000 (95% CI)	Number of people	Rate per 100,000 (95% CI)
0-4	64	2.0 (1.5-2.5)	6	5.5 (2.0-11.9)	71	2.1 (1.6-2.7)
5-9	18	0.5 (0.3-0.9)	9	3.8 (1.7-7.2)	27	0.8 (0.5-1.1)
10-14	28	0.9 (0.6-1.4)	24	8.3 (5.3-12.3)	53	1.6 (1.2-2.1)
15-19	75	2.8 (2.2-3.6)	145	40.9 (34.5-48.1)	221	7.4 (6.4-8.4)
20-24	136	4.7 (3.9-5.5)	228	42.8 (37.4-48.8)	370	10.7 (9.7-11.9)
25-29	94	3.1 (2.5-3.8)	355	48.2 (43.3-53.5)	454	12.0 (10.9-13.1)
30-34	83	3.0 (2.4-3.7)	467	46.3 (42.2-50.7)	558	14.8 (13.6-16.1)
35-39	80	3.0 (2.4-3.8)	428	40.3 (36.6-44.3)	515	14.0 (12.8-15.2)
40-44	84	3.4 (2.7-4.2)	341	37.4 (33.5-41.6)	428	12.7 (11.5-14.0)
45-49	95	3.1 (2.5-3.8)	297	39.2 (34.9-43.9)	399	10.6 (9.5-11.6)
50-54	95	2.9 (2.3-3.5)	209	36.8 (32.0-42.1)	314	8.1 (7.2-9.0)
55-59	78	2.6 (2.0-3.2)	194	39.5 (34.2-45.5)	277	7.8 (6.9-8.8)
60-64	73	2.8 (2.2-3.5)	160	40.5 (34.5-47.3)	238	7.9 (6.9-8.9)
65-69	90	3.6 (2.9-4.4)	129	44.9 (37.5-53.4)	221	7.9 (6.9-9.0)
70-74	63	2.5 (2.0-3.3)	94	44.2 (35.7-54.1)	162	6.0 (5.1-7.0)
75-79	55	3.3 (2.5-4.3)	76	42.9 (33.8-53.7)	134	7.3 (6.2-8.7)
80+	86	3.9 (3.1-4.8)	121	42.6 (35.4-50.9)	213	8.5 (7.4-9.8)

[a] Total number of people including those with an unknown place of birth

CI: confidence intervals

Table Ai.1.4: Proportion of people with TB by age, sex and place of birth, England, 2018

Age group (years)	UK born				Non-UK born			
	Female		Male		Female		Male	
	n	%	n	%	n	%	n	%
0-4	26	2.0	38	2.9	2	0.1	4	0.1
5-14	24	1.9	22	1.7	17	0.5	16	0.5
15-24	100	7.7	111	8.6	149	4.5	224	6.8
25-34	70	5.4	107	8.2	352	10.7	470	14.3
35-44	67	5.2	97	7.5	306	9.3	463	14.1
45-54	63	4.9	127	9.8	210	6.4	296	9.0
55-64	50	3.9	101	7.8	152	4.6	202	6.2
65+	131	10.1	163	12.6	184	5.6	236	7.2

Table Ai.1.5: Number of TB notifications, rates and annual percentage change by place of birth, England, 2000 to 2018

Year	Place of birth							
	UK born				Non-UK born			
	Number of people	Rate per 100,000 (95% CI)	Annual change in numbers (%)	Annual change in rate (%)	Number of people	Rate per 100,000 (95% CI)	Annual change in numbers (%)	Annual change in rate (%)
2000	1,830	4.1 (3.9 -4.3)	-	-	3,329	79.6 (76.9 -82.4)	-	-
2001	1,889	4.3 (4.1 -4.4)	3.2%	4.9%	3,431	79.1 (76.5 -81.8)	3.1%	-0.6%
2002	1,852	4.2 (4.0 -4.4)	-2%	-2.3%	4,111	90.5 (87.7 -93.3)	19.8%	14.4%
2003	1,703	3.8 (3.6 -4.0)	-8%	-9.5%	4,326	90.8 (88.1 -93.5)	5.2%	0.3%
2004	1,791	4.0 (3.8 -4.2)	5.2%	5.3%	4,571	95.2 (92.4 -98.0)	5.7%	4.8%
2005	1,804	4.0 (3.8 -4.2)	0.7%	0%	5,186	100.7 (98.0 -103.5)	13.5%	5.8%
2006	1,729	3.9 (3.7 -4.1)	-4.2%	-2.5%	5,175	92.9 (90.4 -95.5)	-0.2%	-7.7%
2007	1,799	4.0 (3.8 -4.2)	4%	2.6%	5,135	85.5 (83.2 -87.9)	-0.8%	-8%
2008	1,867	4.2 (4.0 -4.4)	3.8%	5%	5,417	86.0 (83.7 -88.3)	5.5%	0.6%
2009	1,907	4.2 (4.1 -4.4)	2.1%	0%	5,662	86.8 (84.6 -89.1)	4.5%	0.9%
2010	1,814	4.0 (3.8 -4.2)	-4.9%	-4.8%	5,515	83.1 (80.9 -85.3)	-2.6%	-4.3%
2011	1,958	4.3 (4.1 -4.5)	7.9%	7.5%	6,021	85.9 (83.7 -88.1)	9.2%	3.4%
2012	2,004	4.4 (4.2 -4.6)	2.3%	2.3%	5,840	81.4 (79.4 -83.6)	-3%	-5.2%
2013	1,842	4.0 (3.8 -4.2)	-8.1%	-9.1%	5,260	70.6 (68.7 -72.6)	-9.9%	-13.3%
2014	1,757	3.8 (3.6 -4.0)	-4.6%	-5%	4,611	60.2 (58.5 -62.0)	-12.3%	-14.7%
2015	1,532	3.3 (3.2 -3.5)	-12.8%	-13.2%	4,100	51.3 (49.8 -52.9)	-11.1%	-14.8%
2016	1,456	3.2 (3.0 -3.3)	-5%	-3%	4,093	49.4 (47.9 -50.9)	-0.2%	-3.7%
2017	1,426	3.1 (2.9 -3.2)	-2.1%	-3.1%	3,571	41.2 (39.9 -42.6)	-12.8%	-16.6%
2018	1,297	2.8 (2.6 -2.9)	-9%	-9.7%	3,283	39.0 (37.7 -40.4)	-8.1%	-5.3%

CI: confidence intervals

Table Ai.1.6: Number of TB notifications and rates by place of birth and PHE Centre, England, 2000 to 2018

Year	London				West Midlands				South East			
	UK born		Non-UK born		UK born		Non-UK born		UK born		Non-UK born	
	Number of people	Rate per 100,000 (95% CI)	Number of people	Rate per 100,000 (95% CI)	Number of people	Rate per 100,000 (95% CI)	Number of people	Rate per 100,000 (95% CI)	Number of people	Rate per 100,000 (95% CI)	Number of people	Rate per 100,000 (95% CI)
2000	446	8.5 (7.7-9.3)	1,775	92.4 (88.1-96.8)	293	6.0 (5.4-6.8)	380	105.4 (95.1-116.6)	172	2.4 (2.0-2.7)	210	37.1 (32.2-42.5)
2001	422	8.0 (7.2-8.8)	1,862	95.0 (90.8-99.4)	325	6.7 (6.0-7.5)	359	94.7 (85.2-105.1)	152	2.1 (1.8-2.4)	228	38.9 (34.0-44.3)
2002	540	10.3 (9.5-11.2)	2,264	110.0 (105.5-114.6)	300	6.2 (5.5-6.9)	448	119.7 (108.8-131.3)	145	2.0 (1.7-2.3)	290	48.0 (42.7-53.9)
2003	480	9.3 (8.5-10.1)	2,326	108.1 (103.8-112.6)	302	6.2 (5.5-6.9)	438	110.0 (99.9-120.8)	118	1.6 (1.3-1.9)	364	55.1 (49.6-61.1)
2004	535	10.3 (9.5-11.2)	2,299	105.6 (101.3-110.0)	322	6.6 (5.9-7.4)	551	137.2 (126.0-149.1)	163	2.2 (1.9-2.6)	344	52.7 (47.3-58.6)
2005	578	11.3 (10.4-12.2)	2,579	112.0 (107.7-116.4)	270	5.4 (4.8-6.1)	602	168.6 (155.4-182.6)	129	1.7 (1.5-2.1)	416	61.5 (55.7-67.7)
2006	546	10.6 (9.7-11.5)	2,564	108.3 (104.1-112.6)	282	5.8 (5.1-6.5)	580	125.0 (115.0-135.6)	135	1.8 (1.5-2.2)	415	53.5 (48.5-58.9)
2007	519	10.2 (9.4-11.1)	2,577	101.5 (97.6-105.5)	278	5.7 (5.0-6.4)	535	114.9 (105.4-125.1)	164	2.2 (1.9-2.6)	415	52.2 (47.3-57.4)
2008	553	10.8 (9.9-11.7)	2,669	102.4 (98.5-106.3)	350	7.2 (6.4-8.0)	599	110.1 (101.4-119.2)	138	1.9 (1.6-2.2)	442	51.4 (46.7-56.4)
2009	511	10.0 (9.1-10.9)	2,754	100.9 (97.2-104.8)	317	6.5 (5.8-7.3)	638	106.0 (97.9-114.6)	180	2.4 (2.1-2.8)	474	53.9 (49.2-59.0)
2010	503	9.6 (8.8-10.5)	2,696	98.0 (94.3-101.7)	283	5.7 (5.1-6.5)	559	97.4 (89.5-105.8)	150	2.0 (1.7-2.4)	499	52.6 (48.1-57.4)
2011	504	9.7 (8.9-10.6)	2,931	100.1 (96.5-103.8)	316	6.4 (5.7-7.1)	664	113.9 (105.4-122.9)	204	2.7 (2.4-3.1)	577	59.0 (54.2-64.0)
2012	561	10.6 (9.8-11.5)	2,797	94.7 (91.2-98.3)	335	6.7 (6.0-7.5)	704	117.3 (108.8-126.3)	230	3.0 (2.6-3.4)	530	54.7 (50.2-59.6)
2013	485	9.2 (8.4-10.1)	2,466	80.6 (77.4-83.8)	313	6.3 (5.6-7.0)	643	100.1 (92.5-108.2)	172	2.3 (1.9-2.6)	507	48.3 (44.2-52.7)
2014	477	9.0 (8.2-9.8)	2,075	66.2 (63.4-69.1)	268	5.4 (4.7-6.1)	501	77.0 (70.4-84.0)	160	2.1 (1.8-2.4)	493	46.6 (42.6-50.9)
2015	420	7.8 (7.0-8.6)	1,844	57.9 (55.2-60.6)	253	5.1 (4.5-5.7)	440	63.2 (57.4-69.4)	168	2.2 (1.9-2.5)	405	37.3 (33.7-41.1)
2016	398	7.4 (6.7-8.2)	1,780	52.5 (50.1-55.0)	228	4.6 (4.0-5.2)	485	68.3 (62.4-74.7)	132	1.7 (1.4-2.0)	420	35.8 (32.5-39.4)
2017	371	6.8 (6.1-7.5)	1,513	44.2 (42.0-46.5)	244	4.9 (4.3-5.5)	411	55.6 (50.3-61.2)	150	1.9 (1.6-2.3)	375	31.2 (28.1-34.5)
2018	306	5.4 (4.8-6.1)	1,357	41.8 (39.6-44.1)	225	4.5 (3.9-5.1)	386	48.1 (43.4-53.1)	164	2.1 (1.8-2.5)	334	27.2 (24.4-30.3)

CI: confidence intervals

Denominator data used to calculate rates among people born in the UK and those born outside the UK are based on survey data, which have known limitations when broken down into smaller geographical areas, therefore rates and annual changes in rates should be interpreted with caution. For further information, see Appendix III: Methods.

Table Ai.1.6: Number of TB notifications and rates by place of birth and PHE Centre, England, 2000 to 2018 continued

Year	North West				East of England				Yorkshire and the Humber			
	UK born		Non-UK born		UK born		Non-UK born		UK born		Non-UK born	
	Number of people	Rate per 100,000 (95% CI)	Number of people	Rate per 100,000 (95% CI)	Number of people	Rate per 100,000 (95% CI)	Number of people	Rate per 100,000 (95% CI)	Number of people	Rate per 100,000 (95% CI)	Number of people	Rate per 100,000 (95% CI)
2000	261	4.1 (3.6-4.6)	348	126.4 (113.4-140.4)	97	1.9 (1.6-2.4)	150	46.8 (39.6-54.9)	212	4.5 (4.0-5.2)	259	114.0 (100.5-128.7)
2001	299	4.7 (4.2-5.2)	327	116.1 (103.9-129.4)	111	2.2 (1.8-2.7)	164	45.4 (38.7-52.9)	245	5.2 (4.6-5.9)	270	111.1 (98.3-125.2)
2002	258	4.0 (3.6-4.6)	352	118.5 (106.5-131.6)	105	2.1 (1.7-2.5)	209	60.7 (52.8-69.5)	188	4.0 (3.5-4.6)	284	108.2 (96.0-121.6)
2003	235	3.7 (3.2-4.2)	330	109.5 (98.0-122.0)	97	1.9 (1.6-2.4)	198	53.4 (46.2-61.3)	201	4.3 (3.7-4.9)	334	116.1 (104.0-129.3)
2004	198	3.1 (2.7-3.5)	358	110.4 (99.3-122.5)	101	2.0 (1.6-2.4)	270	71.5 (63.2-80.5)	194	4.1 (3.6-4.7)	330	115.6 (103.5-128.8)
2005	244	3.8 (3.3-4.3)	468	126.1 (114.9-138.1)	129	2.6 (2.1-3.0)	304	69.0 (61.4-77.2)	180	3.8 (3.3-4.4)	341	97.7 (87.6-108.7)
2006	229	3.6 (3.1-4.1)	426	104.9 (95.2-115.4)	98	1.9 (1.6-2.4)	324	66.0 (59.0-73.6)	172	3.6 (3.1-4.2)	415	126.7 (114.8-139.5)
2007	253	4.0 (3.5-4.5)	458	96.8 (88.1-106.1)	111	2.2 (1.8-2.7)	275	51.1 (45.3-57.5)	179	3.8 (3.3-4.4)	356	95.0 (85.4-105.4)
2008	231	3.6 (3.2-4.1)	474	95.4 (87.0-104.4)	148	2.9 (2.5-3.4)	309	58.0 (51.8-64.9)	174	3.7 (3.2-4.3)	415	102.9 (93.2-113.3)
2009	255	4.0 (3.5-4.5)	494	93.8 (85.8-102.5)	132	2.6 (2.2-3.1)	339	60.9 (54.6-67.7)	212	4.4 (3.9-5.1)	406	105.7 (95.7-116.5)
2010	270	4.2 (3.7-4.8)	491	90.5 (82.7-98.9)	135	2.6 (2.2-3.1)	347	61.7 (55.4-68.6)	190	3.9 (3.4-4.6)	366	96.9 (87.2-107.4)
2011	259	4.0 (3.6-4.6)	521	93.3 (85.4-101.7)	147	2.8 (2.4-3.3)	387	65.1 (58.8-71.9)	220	4.6 (4.0-5.2)	389	94.6 (85.5-104.5)
2012	262	4.1 (3.6-4.6)	494	89.5 (81.7-97.7)	128	2.5 (2.1-2.9)	345	52.9 (47.4-58.7)	189	3.9 (3.4-4.5)	354	78.3 (70.3-86.9)
2013	255	4.0 (3.5-4.5)	447	76.7 (69.8-84.2)	120	2.3 (1.9-2.7)	314	48.4 (43.2-54.1)	182	3.8 (3.2-4.4)	360	79.8 (71.8-88.5)
2014	226	3.5 (3.1-4.0)	405	66.1 (59.8-72.9)	110	2.1 (1.7-2.5)	313	46.3 (41.3-51.8)	171	3.5 (3.0-4.1)	320	67.9 (60.7-75.8)
2015	185	2.9 (2.5-3.3)	368	52.1 (46.9-57.7)	102	1.9 (1.6-2.4)	279	37.4 (33.1-42.0)	127	2.6 (2.2-3.1)	292	59.8 (53.1-67.1)
2016	209	3.2 (2.8-3.7)	368	55.4 (49.9-61.4)	119	2.2 (1.9-2.7)	302	42.0 (37.4-47.0)	132	2.7 (2.3-3.2)	287	55.0 (48.8-61.7)
2017	175	2.7 (2.3-3.2)	340	49.3 (44.2-54.8)	121	2.3 (1.9-2.7)	282	37.1 (32.9-41.7)	101	2.1 (1.7-2.5)	244	46.3 (40.6-52.4)
2018	164	2.5 (2.1-2.9)	301	46.4 (41.3-51.9)	94	1.7 (1.4-2.1)	261	36.8 (32.4-41.5)	118	2.4 (2.0-2.9)	228	42.7 (37.3-48.6)

CI: confidence intervals

Denominator data used to calculate rates among people born in the UK born and those born outside the UK are based on survey data, which have known limitations when broken down into smaller geographical areas, therefore rates and annual changes in rates should be interpreted with caution. For further information, see Appendix III: Methods.

Table Ai.1.6: Number of TB notifications and rates by place of birth and PHE Centre, England, 2000 to 2018 continued

Year	East Midlands				South West				North East			
	UK born		Non-UK born		UK born		Non-UK born		UK born		Non-UK born	
	Number of people	Rate per 100,000 (95% CI)	Number of people	Rate per 100,000 (95% CI)	Number of people	Rate per 100,000 (95% CI)	Number of people	Rate per 100,000 (95% CI)	Number of people	Rate per 100,000 (95% CI)	Number of people	Rate per 100,000 (95% CI)
2000	120	3.1 (2.6-3.7)	101	46.4 (37.8-56.4)	139	3.0 (2.5-3.6)	70	29.6 (23.1-37.5)	90	3.7 (2.9-4.5)	35	63.4 (44.2-88.2)
2001	120	3.1 (2.5-3.7)	100	44.7 (36.4-54.4)	123	2.7 (2.2-3.2)	61	25.8 (19.7-33.1)	92	3.8 (3.0-4.6)	59	88.5 (67.4-114.2)
2002	127	3.2 (2.7-3.9)	119	47.2 (39.1-56.5)	98	2.1 (1.7-2.6)	89	32.3 (25.9-39.7)	90	3.7 (3.0-4.6)	55	72.3 (54.5-94.1)
2003	116	2.9 (2.4-3.5)	182	72.9 (62.7-84.3)	87	1.9 (1.5-2.3)	93	33.0 (26.6-40.4)	67	2.7 (2.1-3.5)	60	91.0 (69.5-117.2)
2004	111	2.8 (2.3-3.4)	225	90.4 (78.9-103.0)	98	2.1 (1.7-2.5)	134	53.5 (44.8-63.3)	68	2.8 (2.2-3.6)	59	69.3 (52.8-89.4)
2005	95	2.4 (1.9-2.9)	291	99.4 (88.3-111.5)	123	2.6 (2.2-3.1)	124	46.0 (38.3-54.9)	55	2.3 (1.7-3.0)	60	66.3 (50.6-85.4)
2006	114	2.9 (2.4-3.5)	233	68.3 (59.8-77.6)	87	1.8 (1.5-2.3)	160	52.8 (44.9-61.7)	66	2.7 (2.1-3.5)	57	60.0 (45.4-77.7)
2007	118	3.0 (2.5-3.6)	278	75.7 (67.1-85.2)	97	2.1 (1.7-2.5)	151	42.1 (35.6-49.3)	79	3.2 (2.6-4.0)	90	95.1 (76.5-116.9)
2008	119	3.0 (2.5-3.6)	296	76.5 (68.0-85.7)	91	1.9 (1.5-2.3)	141	40.7 (34.2-47.9)	63	2.6 (2.0-3.3)	72	59.4 (46.5-74.8)
2009	146	3.6 (3.1-4.3)	340	89.8 (80.5-99.8)	99	2.1 (1.7-2.5)	147	45.2 (38.2-53.2)	55	2.3 (1.7-3.0)	70	48.9 (38.1-61.7)
2010	122	3.0 (2.5-3.6)	351	85.3 (76.6-94.8)	108	2.2 (1.8-2.7)	125	35.8 (29.8-42.6)	53	2.2 (1.6-2.9)	81	66.4 (52.7-82.5)
2011	142	3.5 (3.0-4.1)	331	76.1 (68.1-84.8)	127	2.6 (2.2-3.2)	150	36.7 (31.0-43.0)	39	1.6 (1.1-2.2)	71	62.2 (48.6-78.5)
2012	127	3.1 (2.6-3.7)	354	80.3 (72.1-89.1)	114	2.4 (2.0-2.8)	167	39.6 (33.8-46.0)	58	2.4 (1.8-3.1)	95	73.4 (59.4-89.7)
2013	116	2.8 (2.4-3.4)	292	63.3 (56.2-71.0)	151	3.1 (2.6-3.6)	156	39.4 (33.4-46.0)	48	2.0 (1.5-2.6)	75	48.6 (38.2-60.9)
2014	132	3.2 (2.7-3.8)	258	55.8 (49.2-63.0)	133	2.7 (2.3-3.2)	171	38.2 (32.7-44.3)	80	3.3 (2.6-4.1)	75	51.4 (40.4-64.4)
2015	99	2.4 (2.0-2.9)	251	50.9 (44.8-57.6)	123	2.5 (2.1-3.0)	149	32.5 (27.5-38.2)	55	2.2 (1.7-2.9)	72	57.6 (45.1-72.5)
2016	94	2.3 (1.8-2.8)	242	48.2 (42.3-54.7)	94	1.9 (1.5-2.3)	138	31.1 (26.1-36.8)	50	2.1 (1.5-2.7)	71	42.2 (33.0-53.2)
2017	112	2.8 (2.3-3.3)	225	37.5 (32.7-42.7)	106	2.2 (1.8-2.6)	117	21.6 (17.9-25.9)	46	1.9 (1.4-2.5)	64	36.3 (28.0-46.4)
2018	75	1.8 (1.4-2.3)	259	44.3 (39.1-50.0)	98	2.0 (1.6-2.4)	93	18.7 (15.1-22.9)	53	2.2 (1.6-2.8)	64	38.5 (29.7-49.2)

CI: confidence intervals

Denominator data used to calculate rates among people born in the UK born and those born outside the UK are based on survey data, which have known limitations when broken down into smaller geographical areas, therefore rates and annual changes in rates should be interpreted with caution. For further information, see Appendix III: Methods.

Table Ai.1.7: Number and proportion of people with TB by most frequent country of birth for those born outside the UK, England, 2000 to 2018

Year	Country of birth[a]																		
	India		Pakistan		Romania		Bangladesh		Somalia		Eritrea		Philippines		Nigeria		Poland		Total[b]
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n
2000	722	23.2	676	21.7	5	0.2	102	3.3	362	11.6	26	0.8	28	0.9	47	1.5	10	0.3	3,115
2001	668	20.6	715	22.1	5	0.2	109	3.4	360	11.1	18	0.6	35	1.1	47	1.5	9	0.3	3,236
2002	780	19.9	774	19.8	8	0.2	159	4.1	428	10.9	26	0.7	51	1.3	89	2.3	10	0.3	3,913
2003	789	19.3	729	17.9	11	0.3	182	4.5	473	11.6	43	1.1	52	1.3	116	2.8	15	0.4	4,083
2004	904	20.8	700	16.1	8	0.2	183	4.2	532	12.3	33	0.8	74	1.7	136	3.1	13	0.3	4,339
2005	1,099	22.4	832	16.9	11	0.2	191	3.9	581	11.8	43	0.9	69	1.4	153	3.1	12	0.2	4,917
2006	1,112	22.6	837	17.0	6	0.1	182	3.7	641	13.0	64	1.3	86	1.7	154	3.1	30	0.6	4,930
2007	1,187	24.3	796	16.3	15	0.3	243	5.0	551	11.3	66	1.4	92	1.9	150	3.1	36	0.7	4,886
2008	1,328	25.6	882	17.0	19	0.4	239	4.6	531	10.3	86	1.7	111	2.1	165	3.2	53	1.0	5,178
2009	1,531	28.2	921	16.9	25	0.5	235	4.3	535	9.8	93	1.7	114	2.1	174	3.2	43	0.8	5,436
2010	1,553	29.2	881	16.5	44	0.8	259	4.9	439	8.2	81	1.5	131	2.5	169	3.2	48	0.9	5,326
2011	1,787	30.4	1,061	18.0	54	0.9	285	4.8	415	7.1	98	1.7	101	1.7	190	3.2	61	1.0	5,884
2012	1,764	30.6	1,047	18.1	77	1.3	276	4.8	377	6.5	78	1.4	126	2.2	174	3.0	60	1.0	5,770
2013	1,550	29.8	1,045	20.1	69	1.3	237	4.6	290	5.6	58	1.1	123	2.4	156	3.0	63	1.2	5,206
2014	1,291	28.3	798	17.5	89	1.9	207	4.5	233	5.1	85	1.9	113	2.5	117	2.6	71	1.6	4,567
2015	1,068	26.1	640	15.7	120	2.9	209	5.1	178	4.4	90	2.2	106	2.6	120	2.9	72	1.8	4,085
2016	999	24.5	635	15.6	175	4.3	174	4.3	209	5.1	102	2.5	106	2.6	99	2.4	70	1.7	4,073
2017	889	25.1	513	14.5	205	5.8	139	3.9	130	3.7	99	2.8	78	2.2	98	2.8	74	2.1	3,547
2018	788	24.2	454	13.9	192	5.9	134	4.1	134	4.1	97	3.0	91	2.8	90	2.8	82	2.5	3,262
Total	**21,809**	**25.4**	**14,936**	**17.4**	**1,138**	**1.3**	**3,745**	**4.4**	**7,399**	**8.6**	**1,286**	**1.5**	**1,687**	**2.0**	**2,444**	**2.9**	**832**	**1.0**	**85,753**

[a] Countries ordered by decreasing total number of TB notifications in 2018
[b] Total number of people notified with TB born outside the UK where country of birth was known

Table Ai.1.7: Number and proportion of people with TB by most frequent country of birth for those born outside the UK, England, 2000 to 2018 continued

Year	Country of birth[a]																
	Nepal		Sudan		Zimbabwe		Kenya		Lithuania		Afghanistan		Ethiopia		Other		Total*
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n
2000	19	0.6	7	0.2	78	2.5	92	3.0	1	0.0	43	1.4	29	0.9	868	27.9	3,115
2001	28	0.9	10	0.3	110	3.4	109	3.4	3	0.1	66	2.0	37	1.1	907	28.0	3,236
2002	33	0.8	10	0.3	240	6.1	110	2.8	3	0.1	100	2.6	52	1.3	1,040	26.6	3,913
2003	34	0.8	17	0.4	275	6.7	109	2.7	5	0.1	65	1.6	48	1.2	1,120	27.4	4,083
2004	37	0.9	20	0.5	270	6.2	130	3.0	2	0.0	78	1.8	55	1.3	1,164	26.8	4,339
2005	36	0.7	23	0.5	269	5.5	134	2.7	6	0.1	83	1.7	44	0.9	1,331	27.1	4,917
2006	67	1.4	27	0.5	242	4.9	106	2.2	12	0.2	73	1.5	45	0.9	1,246	25.3	4,930
2007	69	1.4	37	0.8	203	4.2	126	2.6	13	0.3	83	1.7	64	1.3	1,155	23.6	4,886
2008	90	1.7	34	0.7	201	3.9	124	2.4	11	0.2	92	1.8	52	1.0	1,160	22.4	5,178
2009	114	2.1	20	0.4	158	2.9	110	2.0	18	0.3	97	1.8	54	1.0	1,194	22.0	5,436
2010	175	3.3	27	0.5	189	3.5	96	1.8	27	0.5	95	1.8	48	0.9	1,064	20.0	5,326
2011	214	3.6	24	0.4	152	2.6	116	2.0	27	0.5	104	1.8	58	1.0	1,137	19.3	5,884
2012	209	3.6	21	0.4	129	2.2	95	1.6	31	0.5	76	1.3	54	0.9	1,176	20.4	5,770
2013	163	3.1	33	0.6	105	2.0	85	1.6	36	0.7	66	1.3	33	0.6	1,094	21.0	5,206
2014	167	3.7	21	0.5	107	2.3	80	1.8	55	1.2	95	2.1	37	0.8	1,001	21.9	4,567
2015	127	3.1	32	0.8	102	2.5	61	1.5	49	1.2	69	1.7	37	0.9	1,005	24.6	4,085
2016	109	2.7	51	1.3	83	2.0	59	1.4	45	1.1	54	1.3	40	1.0	1,063	26.1	4,073
2017	94	2.7	64	1.8	71	2.0	55	1.6	50	1.4	68	1.9	52	1.5	868	24.5	3,547
2018	72	2.2	57	1.7	54	1.7	51	1.6	51	1.6	49	1.5	48	1.5	818	25.1	3,262
Total	**1,857**	**2.2**	**535**	**0.6**	**3,038**	**3.5**	**1,848**	**2.2**	**445**	**0.5**	**1,456**	**1.7**	**887**	**1.0**	**20411**	**23.8**	**85,753**

[a] Countries ordered by decreasing total number of TB notifications in 2018
[b] Total number of people notified with TB born outside the UK where country of birth was known

Table Ai.1.8: Time between entry to the UK and TB notification for people with TB born outside the UK by year, England, 2009 to 2018

Year	Time (years) between entry to the UK and TB notification								
	<2		2-5		6-10		11+		Total[a]
	n	%	n	%	n	%	n	%	n
2009	967	20.5	1,398	29.7	971	20.6	1,371	29.1	4,707
2010	1,071	22.5	1,368	28.7	938	19.7	1,382	29.0	4,759
2011	1,185	22.4	1,408	26.6	1,087	20.5	1,612	30.5	5,292
2012	1,021	19.4	1,460	27.8	1,047	19.9	1,726	32.9	5,254
2013	688	14.2	1,419	29.3	1,014	20.9	1,728	35.6	4,849
2014	604	14.1	1,101	25.8	898	21.0	1,668	39.1	4,271
2015	597	15.3	880	22.5	786	20.1	1,646	42.1	3,909
2016	652	16.8	779	20.0	732	18.8	1,727	44.4	3,890
2017	536	15.9	692	20.6	606	18.0	1,527	45.4	3,361
2018	509	16.8	604	19.9	545	18.0	1,376	45.4	3,034

[a] Total number of people notified with TB in the population born outside the UK where year of entry to the UK is known

Table Ai.1.9: Number of TB notifications and rates by ethnic group and place of birth, England, 2018

Ethnic group	Place of birth			
	UK born		Non-UK born	
	Number of people	Rate per 100,000 (95% CI)	Number of people	Rate per 100,000 (95% CI)
White	809	1.9 (1.8-2.0)	442	11.0 (10.0-12.0)
Black-Caribbean	67	17.9 (13.9-22.8)	38	13.2 (9.3-18.1)
Black-African	76	16.7 (13.2-20.9)	699	89.5 (83.0-96.4)
Black-Other	12	15.7 (8.1-27.5)	35	65.8 (45.8-91.5)
Indian	117	16.6 (13.8-19.9)	866	98.0 (91.6-104.8)
Pakistani	124	15.6 (13.0-18.6)	460	95.1 (86.6-104.2)
Bangladeshi	22	7.8 (4.9-11.8)	137	59.7 (50.1-70.5)
Chinese	3	3.8 (0.8-11.2)	49	23.0 (17.0-30.4)
Mixed / Other	60	4.1 (3.1-5.3)	528	37.0 (33.9-40.3)

CI: confidence intervals

Table Ai.1.10: Number of people with TB born in the UK over time by ethnic group, England, 2000 to 2018

Year	White	Black[a]	South Asian[b]	Mixed/other[c]
	n	n	n	n
2000	1,262	173	346	35
2001	1,309	151	367	48
2002	1,229	178	391	38
2003	1,191	127	335	36
2004	1,164	204	345	59
2005	1,117	197	399	69
2006	1,094	189	373	62
2007	1,051	240	425	70
2008	1,049	235	483	81
2009	1,115	232	432	86
2010	1,054	225	436	70
2011	1,138	233	462	85
2012	1,183	242	474	83
2013	1,093	218	419	90
2014	1,074	224	363	89
2015	918	205	329	78
2016	884	190	299	77
2017	900	185	273	65
2018	809	155	263	63

[a] People from Black-Caribbean, Black-African and Black-Other ethnic groups were grouped as ‘Black’
[b] People from Indian, Pakistani and Bangladeshi ethnic groups were grouped as ‘South Asian’
[c] People from Mixed/Other and Chinese ethnic groups were grouped as ‘Mixed/other’

Table Ai.1.11: Number and proportion of people with TB by site of disease and place of birth, England, 2009 to 2018

Year	All people with TB[a]					UK born					Non-UK born				
	Pulmonary[b]		Extra-pulmonary only[c]		Total	Pulmonary[b]		Extra-pulmonary only[c]		Total	Pulmonary[b]		Extra-pulmonary only[c]		Total
	n	%	n	%	n	n	%	n	%	n	n	%	n	%	n
2009	4,441	55.1	3,619	44.9	8,060	1,353	71.5	539	28.5	1,892	2,766	49.0	2,878	51.0	5,644
2010	4,106	53.7	3,539	46.3	7,645	1,249	69.2	557	30.8	1,806	2,623	47.7	2,875	52.3	5,498
2011	4,359	52.9	3,883	47.1	8,242	1,386	71.7	548	28.3	1,934	2,801	46.6	3,208	53.4	6,009
2012	4,265	53.1	3,773	46.9	8,038	1,378	69.2	612	30.8	1,990	2,751	47.2	3,074	52.8	5,825
2013	3,779	52.3	3,449	47.7	7,228	1,254	68.7	572	31.3	1,826	2,437	46.5	2,807	53.5	5,244
2014	3,444	53.3	3,015	46.7	6,459	1,195	68.2	558	31.8	1,753	2,181	47.4	2,420	52.6	4,601
2015	3,088	53.9	2,639	46.1	5,727	1,081	70.7	448	29.3	1,529	1,946	47.5	2,149	52.5	4,095
2016	3,084	55.0	2,527	45.0	5,611	997	68.7	455	31.3	1,452	2,044	50.0	2,047	50.0	4,091
2017	2,815	55.6	2,247	44.4	5,062	999	70.3	423	29.7	1,422	1,775	49.7	1,794	50.3	3,569
2018	2,664	57.3	1,987	42.7	4,651	934	72.2	360	27.8	1,294	1,691	51.5	1,591	48.5	3,282

[a] Total number of people with TB including those with an unknown place of birth
[b] With or without extra-pulmonary disease
[c] Extra-pulmonary disease only

Table Ai.1.12: Number of people with TB receiving directly observed therapy (DOT) by age group, England, 2009 to 2018

Year	Age group (years)								Total[a]
	0-14		15-44		45-64		65+		
	n	%	n	%	n	%	n	%	
2009	58	22.8	293	9.0	116	10.8	54	8.4	5,224
2010	67	24.7	281	7.4	117	9.4	71	9.3	6,095
2011	72	20.3	364	7.6	145	9.2	100	10.8	7,654
2012	100	28.0	372	8.0	166	10.9	109	11.7	7,445
2013	65	24.3	349	8.4	183	12.1	113	13.0	6,818
2014	79	31.9	387	10.9	193	13.6	110	12.8	6,077
2015	57	28.5	380	11.8	196	15.3	132	17.6	5,454
2016	61	30.8	361	12.0	227	16.8	115	14.8	5,339
2017	52	31.0	311	11.5	187	15.2	105	14.2	4,840
2018	53	37.3	282	11.5	161	14.0	107	16.0	4,407

[a] Total number of people with TB where information on whether they received DOT was known

Table Ai.2.1: Number and proportion of all people with TB who were culture confirmed by PHE Centre, England, 2009 to 2018

PHE Centre[a]	2009		2010		2011		2012		2013		2014		2015		2016		2017		2018	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
London	1,908	56.1	1,955	60.3	2,099	60.1	2,096	61.6	1,777	59.7	1,541	60.3	1,365	59.9	1,383	62.9	1,179	61.8	1,036	61.3
West Midlands	578	57.5	525	60.2	612	61.0	581	54.0	551	56.3	424	54.6	401	57.4	417	58.2	413	62.5	354	57.7
South East	422	59.3	440	61.9	493	60.6	492	63.2	440	64.2	430	64.8	368	62.1	379	67.6	343	64.2	303	59.6
North West	484	60.6	493	60.9	508	62.1	470	60.6	446	62.3	393	61.2	362	63.7	379	64.3	324	61.2	311	64.9
East of England	297	58.0	310	61.3	352	62.9	311	62.6	283	62.7	286	65.6	243	62.5	277	64.1	262	64.4	208	57.6
Yorkshire and the Humber	398	57.8	362	57.6	382	57.5	348	58.7	365	62.6	328	63.6	267	61.1	305	72.4	215	62.3	231	65.6
East Midlands	278	53.1	298	60.3	298	60.6	297	59.8	243	58.8	239	59.8	243	68.1	211	61.9	213	61.0	199	58.9
South West	195	64.4	141	53.2	201	65.5	190	63.3	186	57.1	177	56.0	173	60.5	151	63.4	144	63.2	119	61.0
North East	110	66.3	97	64.7	104	79.4	115	68.9	105	76.1	115	68.5	85	66.4	86	71.1	78	70.9	89	75.4
England[b]	**4,670**	**57.6**	**4,621**	**60.2**	**5,049**	**61.0**	**4,900**	**60.6**	**4,396**	**60.5**	**3,933**	**60.8**	**3,507**	**61.1**	**3,588**	**63.9**	**3,171**	**62.5**	**2,850**	**61.2**

[a] Ordered by decreasing total number of TB notifications in 2018
[b] Total number including those with an unknown PHE Centre of residence

Table Ai.2.2: Species identification for people with culture confirmed TB, England, 2009 to 2018

Year	*M. tuberculosis*		*M. bovis*		*M. africanum*		*M. microti*		MTBC		Total
	n	%	n	%	n	%	n	%	n	%	n
2009	4,612	98.8	17	0.4	31	0.7	0	0.0	10	0.2	4,670
2010	4,364	94.4	32	0.7	17	0.4	1	0.0	207	4.5	4,621
2011	4,897	97.0	30	0.6	34	0.7	0	0.0	88	1.7	5,049
2012	4,765	97.2	30	0.6	42	0.9	2	0.0	61	1.2	4,900
2013	4,283	97.4	24	0.5	52	1.2	1	0.0	36	0.8	4,396
2014	3,838	97.6	32	0.8	42	1.1	1	0.0	20	0.5	3,933
2015	3,405	97.1	26	0.7	59	1.7	0	0.0	17	0.5	3,507
2016	3,483	97.1	33	0.9	53	1.5	3	0.1	16	0.4	3,588
2017	3,080	97.1	35	1.1	47	1.5	4	0.1	5	0.2	3,171
2018	2,791	97.9	23	0.8	33	1.2	2	0.1	1	0.0	2,850

Table Ai.2.3: Number and proportion of people with pulmonary TB who were culture confirmed by PHE Centre, England, 2009 to 2018

PHE Centre[a]	2009		2010		2011		2012		2013		2014		2015		2016		2017		2018	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
London	1,181	66.5	1,165	71.7	1,214	73.0	1,207	73.1	1,072	75.2	950	74.6	827	75.5	856	78.1	758	77.9	685	75.4
West Midlands	382	67.6	337	70.6	413	71.6	366	63.9	353	66.2	275	65.0	280	69.7	286	70.4	288	74.4	258	72.9
South East	278	69.8	267	68.5	326	72.0	319	73.0	276	79.5	285	81.2	246	77.6	247	80.5	227	74.7	213	75.0
North West	318	72.9	317	74.4	303	72.5	293	73.8	270	75.2	261	73.1	245	78.8	253	73.8	190	75.1	203	77.2
East of England	203	68.4	207	68.8	221	72.0	185	69.3	180	75.9	182	77.4	156	70.9	191	75.5	205	78.8	152	66.1
Yorkshire and the Humber	264	66.5	254	66.8	251	65.9	228	67.9	232	68.8	224	75.4	185	71.2	217	85.4	153	70.8	166	77.2
East Midlands	192	68.6	195	78.3	206	73.0	189	65.4	174	71.6	166	72.2	174	80.2	155	79.1	153	73.6	145	74.0
South West	134	69.4	98	56.0	145	70.7	150	70.8	134	64.4	115	59.0	128	65.3	110	69.6	109	70.8	90	66.2
North East	71	71.7	62	73.8	60	81.1	75	73.5	79	87.8	63	75.9	55	78.6	59	83.1	46	76.7	60	77.9
England[b]	**3,023**	**68.1**	**2,902**	**70.7**	**3,139**	**72.0**	**3,012**	**70.6**	**2,770**	**73.3**	**2,521**	**73.2**	**2,296**	**74.4**	**2,374**	**77.0**	**2,129**	**75.6**	**1,972**	**74.0**

[a] Ordered by decreasing total number of TB notifications in 2018
[b] Total number including those with an unknown PHE Centre of residence

TB Monitoring Indicator 8: Proportion of pulmonary TB cases that were culture confirmed (England, PHEC, UTLA, NHS sub-region and CCG data shown on Fingertips)

Table Ai.3.1: Overall numbers and rate of TB in children (<15 years) born in the UK, England, 2000 to 2018

Year	Number of people	Rate per 100,000 (95% CI)
2000	209	2.3 (2.0-2.6)
2001	229	2.5 (2.2-2.9)
2002	228	2.6 (2.2-2.9)
2003	179	2.0 (1.7-2.3)
2004	264	3.0 (2.6-3.4)
2005	247	2.8 (2.5-3.2)
2006	209	2.4 (2.1-2.8)
2007	290	3.4 (3.0-3.8)
2008	294	3.4 (3.0-3.8)
2009	257	2.9 (2.6-3.3)
2010	238	2.7 (2.4-3.1)
2011	234	2.6 (2.3-3.0)
2012	254	2.9 (2.5-3.2)
2013	195	2.2 (1.9-2.5)
2014	187	2.1 (1.8-2.4)
2015	157	1.7 (1.5-2.0)
2016	163	1.8 (1.5-2.1)
2017	127	1.4 (1.2-1.6)
2018	110	1.2 (1.0-1.4)

CI: confidence interval

Table Ai.3.2: The rate of TB in children (<15 years) born in the UK by PHE Centre, England, 2000 to 2018

Year	Rate per 100,000 (95% CI)									
	Overall	East Midlands	East of England	London	North East	North West	South East	South West	West Midlands	Yorkshire and the Humber
2000	2.3 (2.0-2.6)	1.7 (0.9-2.9)	0.7 (0.3-1.5)	5.7 (4.4-7.1)	2.3 (1.2-4.2)	1.5 (0.9-2.3)	0.6 (0.3-1.2)	0.6 (0.2-1.4)	4.2 (3.1-5.7)	3.2 (2.1-4.5)
2001	2.5 (2.2-2.9)	1.8 (1.0-3.0)	1.2 (0.6-2.1)	5.6 (4.4-7.1)	2.0 (0.9-3.7)	1.6 (1.0-2.4)	0.7 (0.3-1.3)	0.4 (0.1-1.0)	4.4 (3.2-5.9)	5.0 (3.6-6.6)
2002	2.6 (2.2-2.9)	1.6 (0.8-2.8)	1.0 (0.5-1.9)	6.2 (4.9-7.8)	1.3 (0.5-2.9)	1.5 (0.9-2.3)	1.3 (0.7-2.0)	0.4 (0.1-1.0)	4.4 (3.2-6.0)	4.1 (2.9-5.7)
2003	2.0 (1.7-2.3)	1.6 (0.8-2.8)	0.8 (0.4-1.6)	4.9 (3.8-6.3)	0.9 (0.2-2.3)	1.4 (0.9-2.3)	0.7 (0.3-1.3)	0.0 (0.0-0.4)	4.3 (3.1-5.8)	2.5 (1.6-3.8)
2004	3.0 (2.6-3.4)	1.3 (0.6-2.4)	1.1 (0.6-2.0)	8.7 (7.2-10.5)	0.9 (0.2-2.3)	1.2 (0.7-2.0)	1.4 (0.9-2.2)	0.8 (0.3-1.7)	6.0 (4.6-7.7)	2.9 (1.9-4.2)
2005	2.8 (2.5-3.2)	1.7 (0.9-3.0)	1.9 (1.1-2.9)	8.9 (7.4-10.8)	0.5 (0.1-1.7)	1.8 (1.1-2.7)	0.6 (0.2-1.1)	0.4 (0.1-1.0)	3.4 (2.3-4.7)	4.0 (2.8-5.6)
2006	2.4 (2.1-2.8)	1.4 (0.6-2.5)	1.0 (0.5-1.9)	7.6 (6.2-9.3)	2.3 (1.1-4.3)	1.9 (1.2-2.9)	0.3 (0.1-0.7)	0.5 (0.1-1.2)	3.1 (2.1-4.5)	2.3 (1.4-3.6)
2007	3.4 (3.0-3.8)	1.6 (0.8-2.9)	3.1 (2.1-4.4)	8.9 (7.4-10.8)	1.4 (0.5-3.1)	2.5 (1.7-3.6)	1.3 (0.8-2.0)	0.7 (0.3-1.6)	5.4 (4.0-7.0)	2.6 (1.6-3.9)
2008	3.4 (3.0-3.8)	2.1 (1.2-3.5)	2.4 (1.5-3.6)	9.2 (7.6-11.0)	0.5 (0.1-1.7)	2.8 (1.9-3.9)	0.9 (0.5-1.6)	0.5 (0.1-1.2)	5.3 (3.9-6.9)	3.6 (2.5-5.1)
2009	2.9 (2.6-3.3)	1.8 (0.9-3.0)	1.5 (0.9-2.5)	6.7 (5.4-8.3)	1.0 (0.3-2.5)	2.9 (2.0-4.0)	1.1 (0.6-1.8)	1.0 (0.4-1.9)	5.1 (3.8-6.7)	3.3 (2.2-4.7)
2010	2.7 (2.4-3.1)	1.3 (0.6-2.5)	2.0 (1.2-3.2)	7.2 (5.9-8.8)	0.7 (0.2-2.1)	3.6 (2.6-4.8)	1.0 (0.5-1.6)	0.2 (0.0-0.9)	2.5 (1.6-3.7)	2.7 (1.7-4.0)
2011	2.6 (2.3-3.0)	0.7 (0.2-1.6)	1.5 (0.9-2.5)	5.8 (4.6-7.2)	0.2 (0.0-1.3)	3.3 (2.4-4.5)	1.4 (0.9-2.2)	0.7 (0.3-1.6)	3.3 (2.3-4.7)	4.1 (2.9-5.7)
2012	2.9 (2.5-3.2)	1.2 (0.5-2.3)	1.1 (0.6-2.0)	7.7 (6.3-9.3)	1.4 (0.5-3.1)	2.2 (1.4-3.2)	1.6 (1.1-2.4)	1.1 (0.5-2.0)	3.7 (2.6-5.2)	2.8 (1.8-4.1)
2013	2.2 (1.9-2.5)	1.3 (0.6-2.4)	1.2 (0.6-2.1)	5.4 (4.3-6.8)	0.7 (0.1-2.1)	1.6 (1.0-2.5)	1.1 (0.6-1.8)	1.0 (0.4-1.9)	2.5 (1.6-3.7)	2.7 (1.7-4.0)
2014	2.1 (1.8-2.4)	1.6 (0.8-2.8)	0.9 (0.4-1.7)	5.7 (4.5-7.1)	2.4 (1.1-4.3)	1.7 (1.1-2.7)	0.9 (0.5-1.6)	0.4 (0.1-1.0)	2.2 (1.4-3.4)	1.4 (0.8-2.5)
2015	1.7 (1.5-2.0)	1.1 (0.5-2.1)	1.3 (0.7-2.2)	4.1 (3.1-5.3)	1.2 (0.4-2.7)	1.3 (0.7-2.1)	0.3 (0.1-0.8)	0.7 (0.3-1.5)	2.2 (1.4-3.4)	2.3 (1.4-3.5)
2016	1.8 (1.5-2.1)	2.4 (1.5-3.8)	0.6 (0.2-1.3)	4.3 (3.3-5.4)	0.9 (0.3-2.4)	2.0 (1.3-3.0)	0.9 (0.5-1.6)	0.1 (0.0-0.6)	1.9 (1.1-3.0)	1.2 (0.6-2.2)
2017	1.4 (1.2-1.6)	1.4 (0.7-2.5)	0.4 (0.1-1.0)	2.3 (1.6-3.2)	0.9 (0.3-2.4)	1.7 (1.1-2.6)	0.7 (0.4-1.3)	0.9 (0.4-1.8)	2.1 (1.3-3.2)	1.2 (0.6-2.1)
2018	1.2 (1.0-1.4)	0.9 (0.4-1.9)	0.5 (0.2-1.1)	2.0 (1.4-2.9)	0.7 (0.1-2.0)	1.1 (0.6-1.9)	0.8 (0.4-1.4)	1.0 (0.5-1.9)	1.7 (1.0-2.7)	1.2 (0.6-2.1)

CI – confidence interval

Table Ai.4.1: Number and proportion of people with pulmonary TB by time from symptom onset to treatment start and place of birth, England, 2014 to 2018

Place of birth	Year	Time from symptom onset to treatment start						
		0-2 months		2-4 months		>4 months		Total[a]
		n	%	n	%	n	%	n
UK born	2014	404	39.4	285	27.8	337	32.8	1,026
	2015	378	38.5	284	28.9	320	32.6	982
	2016	328	36.4	259	28.8	313	34.8	900
	2017	330	35.9	248	27.0	342	37.2	920
	2018	329	39.9	228	27.7	267	32.4	824
Non-UK born	2014	757	39.6	601	31.4	554	29.0	1,912
	2015	807	44.1	556	30.3	469	25.6	1,832
	2016	753	39.0	601	31.1	577	29.9	1,931
	2017	651	39.1	533	32.0	481	28.9	1,665
	2018	625	40.9	482	31.5	421	27.6	1,528

[a] Number of people with pulmonary TB for whom time from symptom onset to treatment start was known

Table Ai.4.2: Number and proportion of people with pulmonary TB by time from symptom onset to treatment start and PHE Centre[a], England, 2014 to 2018

Year	London							West Midlands							South East						
	Time from symptom onset to treatment start							Time from symptom onset to treatment start							Time from symptom onset to treatment start						
	0-2 months		2-4 months		>4 months		Total[b]	0-2 months		2-4 months		>4 months		Total[b]	0-2 months		2-4 months		>4 months		Total[b]
	n	%	n	%	n	%	n	n	%	n	%	n	%	n	n	%	n	%	n	%	n
2014	446	42.4	315	30.0	290	27.6	**1,051**	156	41.7	98	26.2	120	32.1	**374**	103	31.9	104	32.2	116	35.9	**323**
2015	464	45.7	309	30.4	242	23.8	**1,015**	148	39.6	103	27.5	123	32.9	**374**	104	35.0	82	27.6	111	37.4	**297**
2016	410	40.6	320	31.7	280	27.7	**1,010**	134	35.6	118	31.4	124	33.0	**376**	107	35.8	87	29.1	105	35.1	**299**
2017	364	40.3	296	32.7	244	27.0	**904**	148	40.0	115	31.1	107	28.9	**370**	113	39.1	79	27.3	97	33.6	**289**
2018	337	41.3	272	33.3	207	25.4	**816**	157	47.3	92	27.7	83	25.0	**332**	98	37.7	79	30.4	83	31.9	**260**

Year	North West							East of England							Yorkshire and the Humber						
	Time from symptom onset to treatment start							Time from symptom onset to treatment start							Time from symptom onset to treatment start						
	0-2 months		2-4 months		>4 months		Total[b]	0-2 months		2-4 months		>4 months		Total[b]	0-2 months		2-4 months		>4 months		Total[b]
	n	%	n	%	n	%	n	n	%	n	%	n	%	n	n	%	n	%	n	%	n
2014	121	38.9	100	32.2	90	28.9	**311**	73	36.0	65	32.0	65	32.0	**203**	100	39.5	76	30.0	77	30.4	**253**
2015	111	40.4	84	30.5	80	29.1	**275**	81	40.7	62	31.2	56	28.1	**199**	104	44.3	71	30.2	60	25.5	**235**
2016	120	40.3	84	28.2	94	31.5	**298**	80	33.8	63	26.6	94	39.7	**237**	96	40.7	72	30.5	68	28.8	**236**
2017	75	35.9	57	27.3	77	36.8	**209**	73	31.1	73	31.1	89	37.9	**235**	83	40.5	58	28.3	64	31.2	**205**
2018	86	40.2	54	25.2	74	34.6	**214**	68	35.2	55	28.5	70	36.3	**193**	75	40.3	55	29.6	56	30.1	**186**

[a] Ordered by decreasing total number of TB notifications in 2018

[b] The number of people with pulmonary TB for whom time from symptom onset to treatment start was known

Table Ai.4.2: Number and proportion of people with pulmonary TB by time from symptom onset to treatment start and PHE Centre[a], England, 2014 to 2018 continued

Year	East Midlands							South West							North East						
	Time from symptom onset to treatment start							Time from symptom onset to treatment start							Time from symptom onset to treatment start						
	0-2 months		2-4 months		>4 months		Total[b]	0-2 months		2-4 months		>4 months		Total[b]	0-2 months		2-4 months		>4 months		Total[b]
	n	%	n	%	n	%	n	n	%	n	%	n	%	n	n	%	n	%	n	%	n
2014	76	35.8	59	27.8	77	36.3	**212**	65	37.1	60	34.3	50	28.6	**175**	34	46.6	20	27.4	19	26.0	**73**
2015	81	39.9	66	32.5	56	27.6	**203**	67	36.0	62	33.3	57	30.6	**186**	39	62.9	12	19.4	11	17.7	**62**
2016	73	39.7	58	31.5	53	28.8	**184**	49	32.2	43	28.3	60	39.5	**152**	24	38.1	22	34.9	17	27.0	**63**
2017	65	33.2	60	30.6	71	36.2	**196**	47	32.6	30	20.8	67	46.5	**144**	24	44.4	17	31.5	13	24.1	**54**
2018	78	42.4	51	27.7	55	29.9	**184**	36	30.5	37	31.4	45	38.1	**118**	28	40.0	23	32.9	19	27.1	**70**

[a] Ordered by decreasing total number of TB notifications in 2018
[b] The number of people with pulmonary TB for whom time from symptom onset to treatment start was known

Table Ai.5.1: TB outcome at 12 months for people with drug sensitive TB with an expected treatment duration <12months[a], England, 2008 to 2017

Year	Completed		Died		Lost to follow-up		Still on treatment		Stopped		Not evaluated[b]		Total
	n	%	n	%	n	%	n	%	n	%	n	%	n
2008	5,602	80.3	351	5.0	318	4.6	407	5.8	68	1.0	234	3.4	6,980
2009	5,918	81.9	332	4.6	308	4.3	430	6.0	77	1.1	157	2.2	7,222
2010	5,650	82.9	312	4.6	290	4.3	380	5.6	60	0.9	122	1.8	6,814
2011	6,024	82.1	313	4.3	371	5.1	455	6.2	64	0.9	107	1.5	7,334
2012	6,016	83.8	308	4.3	296	4.1	400	5.6	67	0.9	94	1.3	7,181
2013	5,504	85.7	265	4.1	252	3.9	312	4.9	54	0.8	39	0.6	6,426
2014	4,848	84.9	276	4.8	226	4.0	267	4.7	60	1.1	31	0.5	5,708
2015	4,199	83.9	265	5.3	206	4.1	264	5.3	46	0.9	27	0.5	5,007
2016	4,223	85.0	249	5.0	198	4.0	216	4.3	47	0.9	34	0.7	4,967
2017	3,796	84.7	204	4.6	183	4.1	209	4.7	55	1.2	35	0.8	4,482
Total	**51,780**	**83.4**	**2,875**	**4.6**	**2,648**	**4.3**	**3,340**	**5.4**	**598**	**1.0**	**880**	**1.4**	**62,121**

[a] Excludes people in the drug resistant cohort and those with CNS, spinal, miliary or cryptic disseminated TB
[b] Not evaluated includes unknown and transferred out

TB Monitoring Indicator 10: Proportion of drug sensitive TB cases who had completed a full course of treatment by 12 months (England, PHEC, UTLA, NHS sub-region and CCG data shown on Fingertips)

Table Ai.5.2: Last recorded TB outcome for people with drug sensitive TB with an expected treatment duration <12months[a], England, 2008 to 2017

Year	Completed		Died		Lost to follow-up		Still on treatment		Stopped		Not evaluated[b]		Total
	n	%	n	%	n	%	n	%	n	%	n	%	n
2008	5,888	84.4	355	5.1	325	4.7	107	1.5	71	1.0	234	3.4	6,980
2009	6,235	86.3	341	4.7	309	4.3	101	1.4	79	1.1	157	2.2	7,222
2010	5,922	86.9	317	4.7	295	4.3	96	1.4	62	0.9	122	1.8	6,814
2011	6,466	88.2	316	4.3	373	5.1	5	0.1	67	0.9	107	1.5	7,334
2012	6,384	88.9	316	4.4	309	4.3	7	0.1	71	1.0	94	1.3	7,181
2013	5,801	90.3	268	4.2	254	4.0	2	0.0	62	1.0	39	0.6	6,426
2014	5,105	89.4	281	4.9	229	4.0	1	0.0	61	1.1	31	0.5	5,708
2015	4,446	88.8	269	5.4	213	4.3	4	0.1	48	1.0	27	0.5	5,007
2016	4,417	88.9	251	5.1	200	4.0	17	0.3	48	1.0	34	0.7	4,967
2017[c]	3,931	87.7	205	4.6	185	4.1	71	1.6	55	1.2	35	0.8	4,482
Total	**54,595**	**87.9**	**2,919**	**4.7**	**2,692**	**4.3**	**411**	**0.7**	**624**	**1.0**	**880**	**1.4**	**62,121**

[a] Excludes people in the drug resistant cohort and those with CNS, spinal, miliary or cryptic disseminated TB
[b] Not evaluated includes unknown and transferred out
[c] Reduced follow-up period for this group, therefore proportion completed expected to increase and proportion still on treatment expected to decrease in future reporting

Table Ai.5.3: Time to treatment completion for people with drug sensitive TB with an expected treatment duration <12months[a], England, 2008 to 2017

Year	<6 months to complete[b]		6-8 months to complete[b]		8-10 months to complete		10-12 months to complete		>12 months to complete		Completion time known		Treatment completed[c]
	n	%	n	%	n	%	n	%	n	%	n	%	n
2008	273	5.6	3,521	72.7	513	10.6	272	5.6	263	5.4	4,842	82.2	5,888
2009	372	6.7	3,980	71.5	562	10.1	360	6.5	292	5.2	5,566	89.3	6,235
2010	321	5.9	3,998	72.9	583	10.6	332	6.1	249	4.5	5,483	92.6	5,922
2011	326	5.4	4,355	71.7	664	10.9	316	5.2	415	6.8	6,076	94.0	6,466
2012	303	5.0	4,422	73.0	613	10.1	367	6.1	350	5.8	6,055	94.8	6,384
2013	303	5.5	4,034	72.6	569	10.2	375	6.8	274	4.9	5,555	95.8	5,801
2014	266	5.3	3,578	71.3	538	10.7	387	7.7	248	4.9	5,017	98.3	5,105
2015	224	5.1	3,161	72.4	473	10.8	268	6.1	244	5.6	4,370	98.3	4,446
2016	241	5.5	3,130	71.6	552	12.6	261	6.0	187	4.3	4,371	98.9	4,417
2017	230	5.9	2,743	71.0	494	12.8	264	6.8	135	3.5	3,866	98.3	3,931
Total	**2,859**	**5.6**	**36,922**	**72.1**	**5,561**	**10.9**	**3,202**	**6.3**	**2,657**	**5.2**	**51,198**	**93.8**	**54,595**

[a] Excludes people in the drug resistant cohort and those with CNS, spinal, miliary or cryptic disseminated TB
[b] People with completion between 168 and 180 days are included in the 6-8 months category
[c] Treatment completed at last recorded outcome

Table Ai.5.4: Treatment completion at 12 months by age group for people with drug sensitive TB with an expected treatment duration <12months[a], England, 2008 to 2017

Year	Age group (years)							
	0-14		15-44		45-64		65+	
	n	%	n	%	n	%	n	%
2008	380	90.5	3,600	82.7	1,073	81.2	547	62.0
2009	346	92.5	3,731	84.8	1,185	80.9	656	66.7
2010	301	91.8	3,566	85.7	1,151	82.4	632	68.0
2011	301	85.5	3,804	84.8	1,285	82.9	634	67.2
2012	336	91.6	3,780	86.4	1,252	84.2	648	68.0
2013	249	91.9	3,359	87.8	1,251	86.6	645	72.8
2014	232	94.3	2,912	88.2	1,110	84.5	594	70.0
2015	186	95.4	2,556	87.6	1,007	84.7	450	63.7
2016	180	96.3	2,452	88.5	1,064	85.0	527	69.6
2017	144	93.5	2,239	88.4	922	84.0	491	70.4
Total	**2,655**	**91.7**	**31,999**	**86.2**	**11,300**	**83.6**	**5,824**	**67.8**

[a] Excludes people in the drug resistant cohort and those with CNS, spinal, miliary or cryptic disseminated TB

Table Ai.5.5: TB outcome at 12 months for people with drug sensitive TB with an expected treatment duration <12 months[a], by age and sex, England, 2017

Age group (years)	Sex	Completed		Died		Lost to follow-up		Still on treatment		Stopped		Not evaluated[b]		Total
		n	%	n	%	n	%	n	%	n	%	n	%	n
0-14	Female	78	95.1	0	0.0	0	0.0	3	3.7	1	1.2	0	0.0	82
	Male	66	91.7	1	1.4	2	2.8	2	2.8	0	0.0	1	1.4	72
15-44	Female	945	89.1	7	0.7	41	3.9	52	4.9	9	0.8	7	0.7	1,061
	Male	1,294	87.8	11	0.7	99	6.7	51	3.5	7	0.5	11	0.7	1,473
45-64	Female	373	87.4	16	3.7	10	2.3	19	4.4	6	1.4	3	0.7	427
	Male	549	81.9	41	6.1	13	1.9	47	7.0	12	1.8	8	1.2	670
65+	Female	220	75.3	34	11.6	5	1.7	17	5.8	16	5.5	0	0.0	292
	Male	271	66.9	94	23.2	13	3.2	18	4.4	4	1.0	5	1.2	405
Total		**3,796**	**84.7**	**204**	**4.6**	**183**	**4.1**	**209**	**4.7**	**55**	**1.2**	**35**	**0.8**	**4,482**

[a] Excludes people in the drug resistant cohort and those with CNS, spinal, miliary or cryptic disseminated TB
[b] Not evaluated includes unknown and transferred out

Table Ai.5.6: Last recorded TB outcome for the entire drug sensitive cohort[a] by site of disease, 2017

Site of disease[b]	Completed		Died		Lost to follow-up		Still on treatment		Stopped		Not evaluated[c]		Total
	n	%	n	%	n	%	n	%	n	%	n	%	n
Pulmonary	2,317	83.6	206	7.4	147	5.3	51	1.8	23	0.8	26	0.9	2,770
Pulmonary only	1,666	84.1	140	7.1	108	5.5	35	1.8	16	0.8	15	0.8	1,980
Miliary	94	67.6	30	21.6	5	3.6	4	2.9	2	1.4	4	2.9	139
Laryngeal	14	87.5	1	6.3	0	0.0	1	6.3	0	0.0	0	0.0	16
Extrapulmonary	2,652	87.8	124	4.1	102	3.4	67	2.2	44	1.5	31	1.0	3,020
Extrapulmonary only	2,001	89.7	58	2.6	63	2.8	51	2.3	37	1.7	20	0.9	2,230
Extra-thoracic lymph nodes	998	92.2	15	1.4	31	2.9	11	1.0	21	1.9	6	0.6	1,082
Intra-thoracic lymph nodes	582	90.1	18	2.8	24	3.7	11	1.7	7	1.1	4	0.6	646
Unknown extra-pulmonary	659	87.4	24	3.2	24	3.2	28	3.7	7	0.9	12	1.6	754
Pleural	401	89.3	20	4.5	18	4.0	6	1.3	1	0.2	3	0.7	449
Other extra-pulmonary	357	88.6	8	2.0	9	2.2	15	3.7	8	2.0	6	1.5	403
Gastrointestinal	225	87.2	14	5.4	9	3.5	6	2.3	4	1.6	0	0.0	258
Bone – spine	159	81.1	9	4.6	7	3.6	15	7.7	1	0.5	5	2.6	196
Bone – other	96	82.8	5	4.3	6	5.2	6	5.2	3	2.6	0	0.0	116
CNS – meningitis	82	69.5	13	11.0	11	9.3	10	8.5	1	0.8	1	0.8	118
Genitourinary	68	81.0	8	9.5	3	3.6	1	1.2	3	3.6	1	1.2	84
CNS – other	82	72.6	12	10.6	5	4.4	7	6.2	3	2.7	4	3.5	113
Cryptic	26	66.7	7	17.9	2	5.1	3	7.7	1	2.6	0	0.0	39

[a] Excludes people in the drug resistant cohort
[b] With or without disease at another site
[c] Not evaluated includes unknown and transferred out

Table Ai.5.7: TB outcome at 12 months for people with drug sensitive TB with expected treatment duration <12 months by PHE Centre[a], England, 2017

PHE Centre[b]	Completed		Died		Lost to follow-up		Still on treatment		Stopped		Not evaluated[c]		Total
	n	%	n	%	n	%	n	%	n	%	n	%	n
London	1,439	85.9	50	3.0	81	4.8	80	4.8	15	0.9	10	0.6	1,675
West Midlands	505	85.4	35	5.9	11	1.9	31	5.2	8	1.4	1	0.2	591
South East	406	86.2	24	5.1	17	3.6	13	2.8	8	1.7	3	0.6	471
North West	397	83.1	25	5.2	19	4.0	30	6.3	4	0.8	3	0.6	478
East of England	306	83.8	15	4.1	17	4.7	18	4.9	8	2.2	1	0.3	365
Yorkshire and the Humber	271	88.6	13	4.2	6	2.0	9	2.9	2	0.7	5	1.6	306
East Midlands	233	80.3	20	6.9	18	6.2	12	4.1	5	1.7	2	0.7	290
South West	165	79.7	17	8.2	7	3.4	10	4.8	3	1.4	5	2.4	207
North East	74	74.7	5	5.1	7	7.1	6	6.1	2	2.0	5	5.1	99
England[d]	**3,796**	**84.7**	**204**	**4.6**	**183**	**4.1**	**209**	**4.7**	**55**	**1.2**	**35**	**0.8**	**4,482**

[a] Excludes people in the drug resistant cohort and those with CNS, spinal, miliary or cryptic disseminated TB
[b] Ordered by decreasing total number of TB notifications in 2018
[c] Not evaluated includes unknown and transferred out
[d] Total number of people with TB including those with an unknown PHE Centre of residence

Table Ai.5.8: Treatment completion at 12 months for people with drug sensitive TB with an expected treatment duration <12months[a] by PHE Centre, England, 2008 to 2017

PHE Centre[b]	2008		2009		2010		2011		2012		2013		2014		2015		2016		2017	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
London	2,539	85.4	2,580	86.5	2,435	86.0	2,618	85.5	2,573	86.1	2,251	86.7	1,951	87.6	1,711	86.9	1,663	87.0	1,439	85.9
West Midlands	761	83.0	743	81.8	633	80.0	724	81.3	824	85.7	736	85.9	575	83.1	516	83.1	546	84.4	505	85.4
South East	414	74.6	507	80.0	516	80.8	606	83.7	583	82.9	536	88.0	525	87.4	436	83.2	430	85.7	406	86.2
North West	514	77.9	589	80.9	602	84.8	594	81.1	579	84.3	544	84.1	469	83.9	415	84.0	451	85.1	397	83.1
East of England	325	71.9	353	78.1	372	80.7	405	82.2	350	79.2	339	84.3	316	81.0	274	78.7	319	83.7	306	83.8
Yorkshire and Humber	435	76.2	468	77.2	428	75.8	431	72.9	442	82.5	458	86.6	401	85.0	324	84.8	320	86.0	271	88.9
East Midlands	333	77.6	392	81.2	371	85.3	362	82.5	353	80.8	317	88.1	278	82.0	233	76.9	230	75.4	233	80.3
South West	160	62.3	173	63.4	179	74.0	194	68.8	193	70.4	224	73.9	221	75.9	198	79.8	174	82.9	165	79.7
North East	121	73.3	113	73.4	114	81.4	90	74.4	119	78.3	99	81.1	112	82.4	92	78.6	90	84.1	74	74.7
England[c]	**5,602**	**80.3**	**5,918**	**81.9**	**5,650**	**82.9**	**6,024**	**82.1**	**6,016**	**83.8**	**5,504**	**85.7**	**4,848**	**84.9**	**4,199**	**83.9**	**4,223**	**85.0**	**3,796**	**84.7**

[a] Excludes people in the drug resistant cohort and those with CNS, spinal, miliary or cryptic disseminated TB
[b] Ordered by decreasing total number of TB notifications in 2018
[c] Total number of people with TB including those with an unknown PHE Centre of residence

Table Ai.5.9: Last recorded TB outcome by end of follow-up period for people with drug sensitive CNS, spinal, miliary or cryptic disseminated TB[a], England, 2008 to 2017

Year	Completed		Died		Lost to follow-up		Still on treatment		Stopped		Not evaluated[b]		Total
	n	%	n	%	n	%	n	%	n	%	n	%	n
2008	532	70.8	81	10.8	43	5.7	49	6.5	7	0.9	36	4.8	751
2009	603	74.2	78	9.6	45	5.5	53	6.5	8	1.0	26	3.2	813
2010	584	74.6	65	8.3	47	6.0	60	7.7	10	1.3	17	2.2	783
2011	704	82.7	66	7.8	52	6.1	0	0.0	10	1.2	19	2.2	851
2012	658	81.3	74	9.1	56	6.9	4	0.5	7	0.9	10	1.2	809
2013	629	83.3	68	9.0	44	5.8	2	0.3	6	0.8	6	0.8	755
2014	560	80.8	73	10.5	45	6.5	0	0.0	12	1.7	3	0.4	693
2015	538	81.3	77	11.6	38	5.7	1	0.2	3	0.5	5	0.8	662
2016	480	82.5	54	9.3	28	4.8	8	1.4	6	1.0	6	1.0	582
2017[c]	392	74.5	59	11.2	26	4.9	31	5.9	6	1.1	12	2.3	526
Total	**5,680**	**78.6**	**695**	**9.6**	**424**	**5.9**	**208**	**2.9**	**75**	**1.0**	**143**	**2.0**	**7,225**

[a] Excludes people in the drug resistant cohort
[b] Not evaluated includes unknown and transferred out
[c] Reduced follow-up period for this group, therefore the proportion completed is expected to increase and the proportion still on treatment is expected to decrease in future reporting

Table Ai.5.10: Last recorded TB outcome by end of follow-up period for the entire drug sensitive cohort[a], England, 2008 to 2017

Year	Completed		Died		Lost to follow-up		Still on treatment		Stopped		Not evaluated[b]		Total
	n	%	n	%	n	%	n	%	n	%	n	%	n
2008	6,420	83.0	436	5.6	368	4.8	156	2.0	78	1.0	273	3.5	7,731
2009	6,838	85.1	419	5.2	354	4.4	154	1.9	87	1.1	183	2.3	8,035
2010	6,506	85.6	382	5.0	342	4.5	156	2.1	72	0.9	139	1.8	7,597
2011	7,170	87.6	382	4.7	425	5.2	5	0.1	77	0.9	126	1.5	8,185
2012	7,042	88.1	390	4.9	365	4.6	11	0.1	78	1.0	104	1.3	7,990
2013	6,430	89.5	336	4.7	298	4.1	4	0.1	68	0.9	45	0.6	7,181
2014	5,665	88.5	354	5.5	274	4.3	1	0.0	73	1.1	34	0.5	6,401
2015	4,984	87.9	346	6.1	251	4.4	5	0.1	51	0.9	32	0.6	5,669
2016	4,897	88.3	305	5.5	228	4.1	25	0.5	54	1.0	40	0.7	5,549
2017[c]	4,323	86.3	264	5.3	211	4.2	102	2.0	61	1.2	47	0.9	5,008
Total	**60,275**	**86.9**	**3,614**	**5.2**	**3,116**	**4.5**	**619**	**0.9**	**699**	**1.0**	**1,023**	**1.5**	**69,346**

[a] Excludes people in the drug resistant cohort
[b] Not evaluated includes unknown and transferred out
[c] Reduced follow-up period for this group, therefore proportion completed expected to increase and proportion still on treatment expected to decrease in future reporting

TB Monitoring Indicator 11: Proportion of drug sensitive TB cases who were lost to follow-up at last recorded outcome (England, PHEC, NHS sub-region, UTLA, NHS sub-region and CCG data shown on Fingertips)

TB Monitoring Indicator 12: Proportion of drug sensitive TB cases who had died at last recorded outcome (England, PHEC, NHS sub-region, UTLA, NHS sub-region and CCG data shown on Fingertips)

Table Ai.5.11: Relationship with TB for people in the entire drug sensitive cohort[a] who died at last recorded outcome, England, 2008 to 2017

Year	TB caused or contributed to death		TB incidental to death		Unknown		Total deaths		Total
	n	%	n	%	n	%	n	%	n
2008	145	33.3	97	22.2	194	44.5	436	5.6	7,731
2009	149	35.6	88	21.0	182	43.4	419	5.2	8,035
2010	103	27.0	100	26.2	179	46.9	382	5.0	7,597
2011	105	27.5	88	23.0	189	49.5	382	4.7	8,185
2012	115	29.5	87	22.3	188	48.2	390	4.9	7,990
2013	109	32.4	70	20.9	157	46.7	336	4.7	7,181
2014	112	31.6	72	20.3	170	48.0	354	5.5	6,401
2015	123	35.5	99	28.6	124	35.8	346	6.1	5,669
2016	107	35.1	74	24.3	124	40.7	305	5.5	5,549
2017[b]	112	42.4	60	22.7	92	34.8	264	5.3	5,008
Total	**1,180**	**32.7**	**835**	**23.1**	**1,598**	**44.2**	**3,614**	**5.2**	**69,346**

[a] Excludes people in the drug resistant cohort
[b] Reduced follow-up period for this group, therefore proportion expected to increase in future reporting

Table Ai.5.12: Last recorded TB outcome for the entire drug sensitive cohort[a] by PHE Centre, England, 2017

PHE Centre[b]	Completed		Died		Lost to follow-up		Still on treatment		Stopped		Not evaluated[c]		Total
	n	%	n	%	n	%	n	%	n	%	n	%	n
London	1,654	87.5	74	3.9	97	5.1	33	1.7	18	1.0	14	0.7	1,890
West Midlands	568	87.0	44	6.7	13	2.0	16	2.5	9	1.4	3	0.5	653
South East	460	86.8	32	6.0	20	3.8	6	1.1	8	1.5	4	0.8	530
North West	449	85.2	32	6.1	21	4.0	16	3.0	6	1.1	3	0.6	527
East of England	340	85.4	16	4.0	20	5.0	12	3.0	8	2.0	2	0.5	398
Yorkshire and the Humber	308	90.3	16	4.7	6	1.8	2	0.6	2	0.6	7	2.1	341
East Midlands	276	81.7	25	7.4	20	5.9	9	2.7	5	1.5	3	0.9	338
South West	181	80.8	20	8.9	7	3.1	7	3.1	3	1.3	6	2.7	224
North East	87	81.3	5	4.7	7	6.5	1	0.9	2	1.9	5	4.7	107
England	**4,323**	**86.3**	**264**	**5.3**	**211**	**4.2**	**102**	**2.0**	**61**	**1.2**	**47**	**0.9**	**5,008**

[a] Excludes people in the drug resistant cohort
[b] Ordered by decreasing total number of TB notifications in 2018
[c] Not evaluated includes unknown and transferred out

Table Ai.6.1: Number and proportion of people with TB with first line drug results, England, 2000 to 2018

Year	Results for isoniazid and rifampicin[a]		Results for all first line drugs[b]		People with culture confirmed TB	
	n	%	n	%	n	%
2000	2,797	100.0	2,779	99.4	2,797	46.3
2001	3,160	99.8	3,141	99.2	3,167	51.3
2002	3,813	99.4	3,784	98.6	3,836	57.5
2003	3,826	99.9	3,801	99.2	3,831	57.8
2004	4,031	99.0	4,014	98.6	4,072	58.8
2005	4,549	99.3	4,532	98.9	4,581	59.8
2006	4,635	99.2	4,611	98.7	4,671	60.8
2007	4,386	99.0	4,355	98.3	4,432	58.5
2008	4,480	98.8	4,431	97.7	4,536	58.1
2009	4,597	98.4	4,520	96.8	4,670	57.6
2010	4,538	98.2	4,495	97.3	4,621	60.2
2011	4,963	98.3	4,890	96.9	5,049	61.0
2012	4,851	99.0	4,784	97.6	4,900	60.6
2013	4,298	97.8	4,247	96.6	4,396	60.5
2014	3,905	99.3	3,834	97.5	3,933	60.8
2015	3,488	99.5	3,440	98.1	3,507	61.1
2016	3,545	98.8	3,442	95.9	3,588	63.9
2017	3,137	98.9	3,070	96.8	3,171	62.5
2018	2,821	99.0	2,773	97.3	2,850	61.2

[a] People with culture confirmed TB with a result (DST or WGS) for at least isoniazid and rifampicin
[b] People with culture confirmed TB with a result (DST or WGS) for at least isoniazid, rifampicin, ethambutol and pyrazinamide

TB Monitoring Indicator 9: Proportion of microbiologically confirmed cases with drug susceptibility testing reported for the 4 first-line agents (England, PHEC, NHS sub-region, UTLA, NHS sub-region and CCG data shown on Fingertips)

Table Ai.6.2: Number and proportion of people with TB with first line drug resistance[a], England, 2000 to 2018

Year	Isoniazid resistant		Rifampicin resistant		Ethambutol resistant		Pyrazinamide resistant[b]		Resistant to any first line drug	
	n	%	n	%	n	%	n	%	n	%
2000	178	6.4	41	1.5	10	0.4	14	0.5	193	6.9
2001	210	6.6	33	1.0	11	0.3	16	0.5	228	7.2
2002	272	7.1	45	1.2	19	0.5	29	0.8	296	7.8
2003	281	7.3	68	1.8	17	0.4	19	0.5	307	8.0
2004	294	7.3	61	1.5	17	0.4	26	0.6	324	8.0
2005	322	7.1	56	1.2	18	0.4	14	0.3	346	7.6
2006	338	7.3	74	1.6	25	0.5	22	0.5	371	8.0
2007	303	6.9	63	1.4	26	0.6	26	0.6	331	7.5
2008	267	6.0	68	1.5	34	0.8	36	0.8	306	6.8
2009	327	7.1	70	1.5	27	0.6	49	1.1	369	8.0
2010	293	6.5	75	1.7	35	0.8	40	0.9	322	7.1
2011	376	7.6	89	1.8	55	1.1	46	0.9	413	8.3
2012	331	6.8	86	1.8	47	1.0	43	0.9	360	7.4
2013	299	7.0	77	1.8	39	0.9	37	0.9	326	7.6
2014	267	6.8	57	1.5	42	1.1	31	0.8	286	7.3
2015	237	6.8	54	1.5	27	0.8	23	0.7	255	7.3
2016	244	6.9	60	1.7	48	1.4	20	0.6	263	7.4
2017	224	7.1	54	1.7	53	1.7	60	2.0	269	8.6
2018	219	7.8	44	1.6	41	1.5	103	3.7	321	11.4

[a] People with culture confirmed TB with a result (DST or WGS) for at least isoniazid and rifampicin. A person may have resistance to more than 1 of the first line drugs

[b] Excludes people with *M. bovis*, which is inherently resistant to pyrazinamide

TB Monitoring Indicator 18: Number and proportion of culture confirmed TB cases with any first line drug resistance (England, PHEC, NHS sub-region, UTLA, NHS sub-region and CCG data shown on Fingertips)

Table Ai.6.3: Number and proportion of people with TB[a] with initial drug resistance, England, 2000 to 2018

Year	Isoniazid resistance without MDR-TB		Rifampicin resistance without MDR-TB		MDR-TB (including XDR-TB)		MDR/RR-TB (including XDR-TB)		XDR-TB	
	n	%	n	%	n	%	n	%	n	%
2000	150	5.4	13	0.5	28	1.0	41	1.5	1	0.04
2001	187	5.9	10	0.3	23	0.7	33	1.0	0	0.00
2002	238	6.2	11	0.3	34	0.9	45	1.2	0	0.00
2003	232	6.1	19	0.5	49	1.3	68	1.8	1	0.03
2004	249	6.2	16	0.4	45	1.1	61	1.5	0	0.00
2005	281	6.2	15	0.3	41	0.9	56	1.2	0	0.00
2006	284	6.1	20	0.4	54	1.2	74	1.6	0	0.00
2007	254	5.8	14	0.3	49	1.1	63	1.4	0	0.00
2008	217	4.8	18	0.4	50	1.1	68	1.5	2	0.04
2009	268	5.8	11	0.2	59	1.3	70	1.5	2	0.04
2010	228	5.0	10	0.2	65	1.4	75	1.7	2	0.04
2011	295	5.9	8	0.2	81	1.6	89	1.8	6	0.12
2012	255	5.3	10	0.2	76	1.6	86	1.8	2	0.04
2013	232	5.4	10	0.2	67	1.6	77	1.8	3	0.07
2014	214	5.5	4	0.1	53	1.4	57	1.5	3	0.08
2015	192	5.5	9	0.3	45	1.3	54	1.5	10	0.29
2016	191	5.4	7	0.2	53	1.5	60	1.7	7	0.20
2017	180	5.7	10	0.3	44	1.4	54	1.7	4	0.13
2018	185	6.6	10	0.4	34	1.2	44	1.6	4	0.14

[a] People with culture confirmed TB with a result (DST or WGS) for at least isoniazid and rifampicin

TB Monitoring Indicator 19: Number and proportion of culture confirmed TB cases with multi-drug resistance TB (England)

Table Ai.6.4: Number and proportion of people with TB with drug resistance by PHE Centre, England, 2014 to 2018

PHE Centre[a]	Isoniazid resistance without MDR-TB		MDR-TB		MDR/RR-TB		XDR-TB		Total[b]
	n	%	n	%	n	%	n	%	n
London	423	6.6	78	1.2	90	1.4	7	0.1	6,450
West Midlands	81	4.1	23	1.2	32	1.6	1	0.1	1,980
South East	96	5.3	23	1.3	24	1.3	3	0.2	1,799
North West	92	5.2	18	1.0	22	1.2	4	0.2	1,761
East of England	81	6.4	25	2.0	30	2.4	2	0.2	1,267
Yorkshire and the Humber	73	5.5	25	1.9	30	2.2	5	0.4	1,336
East Midlands	54	4.9	22	2.0	26	2.4	4	0.4	1,094
South West	47	6.2	10	1.3	11	1.4	2	0.3	759
North East	15	3.3	5	1.1	5	1.1	0	0.0	450
England	**962**	**5.7**	**229**	**1.4**	**270**	**1.6**	**28**	**0.2**	**16,896**

[a] Ordered by decreasing total number of TB notifications in 2018 which is not the same as the order based on the total column in this table
[b] People with culture confirmed TB with a result (DST or WGS) for at least isoniazid and rifampicin

Table Ai.6.5: Number and proportion of people with MDR/RR-TB with resistance to an injectable agent or a fluoroquinolone, England, 2000 to 2018

Year	MDR/RR-TB	Tested for at least 1 injectable agent		Resistant to an injectable agent		Tested for at least 1 fluoroquinolone		Resistant to a fluoroquinolone	
	n	n	%	n	%	n	%	n	%
2000	41	1	2.4	1	100.0	1	2.4	1	100.0
2001	33	8	24.2	0	0.0	8	24.2	0	0.0
2002	45	33	73.3	1	3.0	36	80.0	0	0.0
2003	68	50	73.5	2	4.0	62	91.2	4	6.5
2004	61	48	78.7	1	2.1	45	73.8	3	6.7
2005	56	42	75.0	0	0.0	48	85.7	2	4.2
2006	74	58	78.4	3	5.2	73	98.6	0	0.0
2007	63	52	82.5	2	3.8	62	98.4	4	6.5
2008	68	61	89.7	3	4.9	66	97.1	11	16.7
2009	70	62	88.6	5	8.1	68	97.1	7	10.3
2010	75	70	93.3	11	15.7	71	94.7	9	12.7
2011	89	88	98.9	14	15.9	89	100.0	21	23.6
2012	86	85	98.8	13	15.3	86	100.0	4	4.7
2013	77	74	96.1	12	16.2	77	100.0	12	15.6
2014	57	56	98.2	7	12.5	56	98.2	14	25.0
2015	54	54	100.0	13	24.1	54	100.0	15	27.8
2016	60	58	96.7	13	22.4	60	100.0	14	23.3
2017	54	52	96.3	8	15.4	53	98.1	18	34.0
2018	44	44	100.0	8	18.2	44	100.0	8	18.2

Table Ai.6.6: The number and proportion of people with MDR/RR-TB resistant to at least 1 injectable agent or at least 1 fluoroquinolone by most frequent country of birth, England, 2014 to 2018

Country of birth[a]	MDR/RR-TB	Pre-XDR				XDR-TB	
		Resistant to an injectable agent		Resistant to a fluoroquinolone			
	n	n	%[b]	n	%[b]	n	%[b]
India	48	4	8.7	18	37.5	3	6.3
United Kingdom	40	10	25.0	12	30.0	6	15.0
Lithuania	39	15	38.5	15	38.5	10	25.6
Pakistan	16	2	13.3	4	26.7	1	6.7
Romania	12	3	25.0	2	16.7	2	16.7
Philippines	11	0	0.0	1	9.1	0	0.0

[a] The table shows the top 6 countries of birth for people with MDR/RR-TB who are resistant to at least 1 injectable agent or at least 1 fluoroquinolone with 9 or more people with MDR/RR-TB from that country in 2014 to 2018. For these countries, the total number and proportion of people with resistant TB are shown

[b] Proportion of people with MDR/RR-TB who are resistant to an injectable agent or a fluoroquinolone (of those tested), born in the respective country

Table Ai.6.7: TB outcome at 24 months after treatment start for the drug resistant cohort[a], England, 2007 to 2016

Year	Completed		Died		Lost to follow-up		Still on treatment		Stopped		Not evaluated[b]		Total
	n	%	n	%	n	%	n	%	n	%	n	%	n
2007	30	42.3	10	14.1	6	8.5	20	28.2	5	7.0	0	0.0	71
2008	45	57.7	6	7.7	10	12.8	10	12.8	4	5.1	3	3.8	78
2009	40	51.9	4	5.2	11	14.3	19	24.7	1	1.3	2	2.6	77
2010	38	48.1	0	0.0	9	11.4	25	31.6	4	5.1	3	3.8	79
2011	48	50.5	4	4.2	17	17.9	23	24.2	3	3.2	0	0.0	95
2012	58	61.7	3	3.2	9	9.6	16	17.0	5	5.3	3	3.2	94
2013	51	60.0	4	4.7	13	15.3	15	17.6	2	2.4	0	0.0	85
2014	38	52.8	2	2.8	14	19.4	13	18.1	4	5.6	1	1.4	72
2015	41	61.2	5	7.5	5	7.5	9	13.4	2	3.0	5	7.5	67
2016	45	65.2	6	8.7	7	10.1	10	14.5	1	1.4	0	0.0	69
Total	**434**	**55.1**	**44**	**5.6**	**101**	**12.8**	**160**	**20.3**	**31**	**3.9**	**17**	**2.2**	**787**

[a] Includes people with initial and acquired MDR/RR-TB and people treated with a second line regimen
[b] Not evaluated includes unknown and transferred out

TB Monitoring Indicator 13: Proportion of TB cases with rifampicin resistance or MDR-TB who had completed treatment at 24 months (England)

Table Ai.6.8: Last recorded TB outcome for the drug resistant cohort[a], England, 2007 to 2016

Year	Completed		Died		Lost to follow-up		Still on treatment		Stopped		Not evaluated[b]		Total
	n	%	n	%	n	%	n	%	n	%	n	%	n
2007	46	64.8	10	14.1	6	8.5	4	5.6	5	7.0	0	0.0	71
2008	53	67.9	7	9.0	10	12.8	4	5.1	4	5.1	0	0.0	78
2009	59	76.6	4	5.2	11	14.3	1	1.3	1	1.3	1	1.3	77
2010	60	75.9	1	1.3	9	11.4	4	5.1	5	6.3	0	0.0	79
2011	64	67.4	6	6.3	18	18.9	4	4.2	3	3.2	0	0.0	95
2012	72	76.6	4	4.3	10	10.6	3	3.2	5	5.3	0	0.0	94
2013	65	76.5	4	4.7	14	16.5	0	0.0	2	2.4	0	0.0	85
2014	47	65.3	2	2.8	14	19.4	3	4.2	5	6.9	1	1.4	72
2015	50	74.6	5	7.5	5	7.5	4	6.0	2	3.0	1	1.5	67
2016[c]	47	68.1	6	8.7	7	10.1	7	10.1	2	2.9	0	0.0	69
Total	**563**	**71.5**	**49**	**6.2**	**104**	**13.2**	**34**	**4.3**	**34**	**4.3**	**3**	**0.4**	**787**

[a] Includes people with initial and acquired MDR/RR-TB and people treated with a second line regimen
[b] Not evaluated includes unknown and transferred out
[c] Reduced follow-up period for this group, therefore proportion completed expected to increase and proportion still on treatment expected to decrease in future reporting

TB Monitoring Indicator 14: Proportion of TB cases with rifampicin resistance or MDR-TB who are lost to follow-up at reported outcome (England)

TB Monitoring Indicator 15: Proportion of TB cases with rifampicin resistance or MDR-TB who had died at last reported outcome (England)

Table Ai.6.9: Time to TB treatment completion[a] for the drug resistant cohort[b], England, 2007 to 2016

Year	<12 months to complete[c]		12-18 months to complete[c]		18-20 months to complete		20-24 months to complete		>24 months to complete		Completion time known		Treatment completed[c]
	n	%	n	%	n	%	n	%	n	%	n	%	n
2007	2	5.7	5	14.3	6	17.1	8	22.9	14	40.0	35	76.1	46
2008	1	3.0	6	18.2	8	24.2	11	33.3	7	21.2	33	62.3	53
2009	1	2.2	2	4.3	11	23.9	17	37.0	15	32.6	46	78.0	59
2010	1	2.0	4	8.2	14	28.6	12	24.5	18	36.7	49	81.7	60
2011	1	1.7	8	13.6	11	18.6	23	39.0	16	27.1	59	92.2	64
2012	3	5.1	5	8.5	17	28.8	20	33.9	14	23.7	59	81.9	72
2013	4	6.3	8	12.5	15	23.4	24	37.5	13	20.3	64	98.5	65
2014	3	7.3	4	9.8	8	19.5	18	43.9	8	19.5	41	87.2	47
2015	4	8.3	12	25.0	9	18.8	14	29.2	9	18.8	48	96.0	50
2016	2	4.5	10	22.7	10	22.7	20	45.5	2	4.5	44	93.6	47
Total	**22**	**3.9**	**64**	**11.4**	**109**	**19.4**	**167**	**29.7**	**116**	**20.6**	**478**	**84.9**	**563**

[a] Time to completion is from MDR/RR-TB treatment start date until completion date
[b] Includes people with initial and acquired MDR/RR-TB and people treated with a second line regimen
[c] Treatment completed at last recorded outcome

Table Ai.7.1: Number and proportion of people with TB (≥15 years) with a social risk factor (SRF) by place of birth, England, 2010 to 2018

	Year	Drug use		Alcohol use		Homelessness		Prison		≥ 1 SRF		≥ 2 SRF	
		n	%	n	%	n	%	n	%	n	%	n	%
All people with TB	2010	188	2.9	257	4.0	201	3.0	177	2.8	584	9.9	164	2.8
	2011	204	2.8	236	3.3	196	2.7	212	3.0	592	8.9	188	2.8
	2012	220	3.1	220	3.1	185	2.6	224	3.2	593	8.9	184	2.8
	2013	217	3.3	239	3.7	216	3.3	193	3.0	587	9.4	195	3.1
	2014	203	3.5	197	3.4	210	3.6	188	3.3	540	9.8	176	3.2
	2015	219	4.2	207	4.0	234	4.5	203	4.0	583	11.8	202	4.1
	2016	229	4.5	187	3.6	211	4.1	204	4.1	538	11.0	199	4.1
	2017	233	5.0	186	4.0	226	4.9	196	4.4	545	12.4	210	4.8
	2018	220	5.2	204	4.8	200	4.7	177	4.3	539	13.3	182	4.5
UK born	2010	114	8.1	113	8.2	71	5.0	83	6.2	235	18.4	100	7.8
	2011	134	8.6	121	7.8	62	3.9	126	8.4	271	18.6	125	8.6
	2012	129	8.0	99	6.2	54	3.3	106	6.8	254	16.7	94	6.2
	2013	133	8.6	130	8.5	70	4.5	100	6.7	259	17.5	115	7.8
	2014	124	8.5	98	6.8	74	5.1	94	6.7	236	17.0	101	7.3
	2015	146	11.4	112	8.7	76	5.9	114	9.1	271	21.8	117	9.4
	2016	141	11.7	97	8.1	59	4.9	99	8.5	235	20.3	104	9.0
	2017	155	12.7	85	6.9	75	6.1	105	8.8	250	20.9	118	9.9
	2018	137	12.3	91	8.2	56	5.1	96	8.9	222	20.7	105	9.8
Non-UK born	2010	68	1.4	134	2.8	123	2.5	83	1.7	328	7.4	58	1.3
	2011	63	1.1	106	2.0	128	2.3	78	1.5	301	6.0	58	1.2
	2012	86	1.6	111	2.1	124	2.3	111	2.1	315	6.2	86	1.7
	2013	81	1.6	104	2.1	144	2.9	92	1.9	320	6.8	77	1.6
	2014	76	1.8	96	2.2	132	3.1	92	2.2	295	7.2	72	1.8
	2015	68	1.8	91	2.3	156	4.1	88	2.3	304	8.3	81	2.2
	2016	84	2.2	87	2.2	150	3.9	105	2.8	298	8.1	92	2.5
	2017	75	2.2	98	2.9	149	4.4	90	2.8	290	9.1	90	2.8
	2018	83	2.7	110	3.5	144	4.7	81	2.7	314	10.6	77	2.6

Table Ai.7.2: Number and proportion of people with TB (≥15 years) with a social risk factor (SRF), by ethnicity and country of birth, England, 2014 to 2018

Demographic characteristic	Drug use		Alcohol use		Homelessness		Prison		≥ 1 SRF		≥ 2 SRF	
	n	%	n	%	n	%	n	%	n	%	n	%
Ethnicity (UK born)[a]												
White	490	12.0	398	9.8	272	6.7	345	8.9	877	22.6	411	10.6
Black-Caribbean	82	23.6	29	8.4	32	9.4	55	15.9	123	35.8	49	14.2
Black-African	18	6.3	5	1.7	8	2.7	19	6.4	32	11.2	11	3.8
South Asian	75	5.9	36	2.8	11	0.9	56	4.4	118	9.7	43	3.5
Other	37	12.3	14	4.7	17	5.6	33	11.0	63	20.9	30	9.9
Country of birth (Non-UK born)[b]												
India	23	0.5	88	1.8	49	1.0	30	0.6	151	3.3	34	0.7
Eritrea	4	0.9	6	1.4	91	21.3	45	10.7	118	28.5	19	4.6
Poland	29	8.7	59	17.3	57	17.1	46	14.6	107	33.0	57	17.6
Romania	32	4.5	23	3.2	56	7.9	28	4.1	105	15.5	26	3.8
Somalia	29	3.5	27	3.2	46	5.5	36	4.4	101	12.7	27	3.4
Pakistan	20	0.7	23	0.8	31	1.1	26	0.9	75	2.8	19	0.7
Lithuania	19	8.6	34	15.3	37	16.9	23	10.9	67	31.3	35	16.4
Sudan	3	1.4	1	0.5	51	24.4	17	8.8	64	32.3	8	4.0
Ethiopia	5	2.5	4	2.0	39	19.5	17	8.7	52	27.1	10	5.2
Afghanistan	6	1.9	9	2.8	23	7.4	9	3.0	38	12.8	7	2.4

[a] People from Indian, Pakistani and Bangladeshi ethnic groups were grouped as ‘South Asian’
[b] The top 10 countries of birth by the number of people with TB with ≥1 SRF were included

Table Ai.7.3: Number and proportion of people with TB (≥15 years) with social risk factors (SRF) by PHE Centre, England, 2018

PHE Centre[a]	Drug use		Alcohol use		Homelessness		Prison		≥ 1 SRF		≥ 2 SRF	
	n	%	n	%	n	%	n	%	n	%	n	%
London	81	5.1	90	5.6	84	5.3	61	3.8	214	13.5	70	4.4
West Midlands	50	8.9	28	5.0	21	3.8	41	7.5	78	14.3	40	7.3
South East	17	3.7	21	4.5	20	4.3	15	3.4	50	11.4	16	3.6
North West	22	5.3	14	3.4	18	4.4	17	4.6	48	12.9	16	4.3
East of England	14	4.4	17	5.3	19	6.0	11	3.5	43	13.8	12	3.8
Yorkshire and the Humber	8	2.7	11	3.5	8	2.6	9	3.2	29	10.7	6	2.2
East Midlands	10	3.2	14	4.5	22	7.3	14	4.9	44	15.3	12	4.2
South West	7	4.2	5	3.0	5	3.1	3	1.9	16	10.6	4	2.6
North East	11	10.3	4	3.8	3	2.9	6	5.8	17	16.8	6	5.9

[a] Ordered by decreasing total number of TB notifications in 2018

Table Ai.7.4: Number and proportion of people with TB (≥15 years) with a social risk factor by PHE Centre, England, 2010 to 2018

PHE Centre[a]	2010		2011		2012		2013		2014		2015		2016		2017		2018	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
London	313	11.8	268	9.0	259	8.8	263	9.8	230	9.9	228	10.8	209	10.1	209	11.6	214	13.5
West Midlands	61	8.9	61	7.4	75	8.4	87	10.5	62	9.3	78	12.6	62	9.7	80	13.7	78	14.3
South East	34	6.7	63	9.4	61	9.0	46	7.4	45	7.6	59	11.3	49	10.3	48	10.4	50	11.4
North West	54	10.6	54	10.5	56	10.3	52	9.4	52	10.7	63	14.4	51	12.1	39	10.5	48	12.9
East of England	23	6.1	35	7.6	32	7.3	26	6.7	34	9.1	39	12.7	57	15.4	43	11.5	43	13.8
Yorkshire and the Humber	41	8.9	44	8.5	39	8.6	36	8.0	47	11.2	40	11.7	35	10.2	36	12.7	29	10.7
East Midlands	25	6.5	29	8.0	24	6.6	29	9.5	34	12.4	30	11.0	30	11.3	50	19.5	44	15.3
South West	21	12.4	23	11.3	32	14.1	36	13.8	23	9.0	32	13.7	28	14.7	24	13.8	16	10.6
North East	12	9.5	15	13.4	15	11.0	12	10.1	13	9.4	14	13.0	17	16.2	16	16.5	17	16.8
England	584	9.9	592	8.9	593	8.9	587	9.4	540	9.8	583	11.8	538	11.0	545	12.4	539	13.3

[a] Ordered by decreasing total number of TB notifications in 2018

Table Ai.7.5: Number and proportion of people with TB (≥15 years) with specific clinical and disease characteristics, according to the presence of social risk factors (SRF), England, 2018

Social risk factor status	Clinical characteristics						Time from symptom onset until treatment start[b]						Initial drug resistance			
	Previous TB diagnosis		Pulmonary[a]		On DOT		0-2 months treatment delay		2-4 months treatment delay		>4 months treatment delay		INH-R without MDR		MDR/RR-TB	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Drug misuse	27	12.6	187	85.0	98	48.5	71	41.3	49	28.5	52	30.2	13	7.6	3	1.8
Alcohol misuse	16	8.4	167	81.9	117	61.9	66	45.8	37	25.7	41	28.5	14	8.9	2	1.3
Homeless	16	8.4	154	77.0	97	53.3	56	41.5	33	24.4	46	34.1	9	6.0	0	0.0
Prison	16	9.4	138	78.0	86	50.6	47	36.7	41	32.0	40	31.3	11	8.6	1	0.8
≥ 1 SRF	51	9.8	417	77.4	228	45.9	157	42.1	105	28.2	111	29.8	30	7.5	5	1.2
≥ 2 SRF	19	11.0	157	86.3	111	66.1	58	41.7	37	26.6	44	31.7	10	6.9	1	0.7
No SRF	201	5.8	1,871	53.1	289	8.5	664	38.8	537	31.3	512	29.9	138	6.6	35	1.7

[a] With or without extrapulmonary disease
[b] For pulmonary cases excluding those diagnosed post-mortem and those who did not start treatment

Table Ai.7.6: TB notifications and rates by deprivation decile, England, 2018

Deprivation decile	Number of people	Rate per 100,000 (95% CI)
1 (10% most deprived)	931	16.6 (15.6 - 17.7)
2	844	14.7 (13.8 - 15.8)
3	803	13.9 (13.0 - 14.9)
4	557	9.8 (9.0 - 10.6)
5	378	6.8 (6.1 - 7.5)
6	325	5.8 (5.2 - 6.5)
7	254	4.6 (4.1 - 5.2)
8	228	4.2 (3.6 - 4.8)
9	175	3.2 (2.8 - 3.7)
10 (10% least deprived)	160	3.0 (2.6 - 3.5)

CI: confidence interval

Table Ai.8.1: Number and proportion of people (notified and un-notified) with TB-HIV co-infection[a], England, 2001 to 2018

Year	TB notifications	TB notifications matched to HIV notifications		Un-notified people with TB with an isolate matched an HIV notification	Total people with TB matched to HIV notifications[b]	
	n	n	%	n	n	%
2001	5,761	281	4.9	70	351	6.0
2002	6,289	450	7.2	34	484	7.7
2003	6,308	517	8.2	39	556	8.8
2004	6,528	546	8.4	21	567	8.7
2005	7,243	566	7.8	29	595	8.2
2006	7,320	533	7.3	19	552	7.5
2007	7,121	454	6.4	10	464	6.5
2008	7,358	459	6.2	26	485	6.6
2009	7,720	397	5.1	10	407	5.3
2010	7,321	366	5.0	7	373	5.1
2011	7,904	322	4.1	4	326	4.1
2012	7,688	292	3.8	4	296	3.8
2013	6,975	239	3.4	2	241	3.5
2014	6,210	212	3.4	2	214	3.4
2015	5,521	220	4.0	2	222	4.0
2016	5,411	172	3.2	0	172	3.2
2017	4,894	148	3.0	1	149	3.0
2018	4,504	119	2.6	1	120	2.7
Total	**118,076**	**6,293**	**5.3**	**281**	**6,574**	**5.6**

[a] Includes people with TB-HIV co-infection aged 15 years and older.
[b] Proportion is calculated using the number of TB notifications with HIV co-infection plus the number who are un-notified with an MTBC isolate which matched to a person with HIV as the numerator, and the number of all TB notifications (with or without HIV co-infection) plus the number of un-notified TB isolates which matched to a person with HIV as the denominator.

Table Ai.8.2: Number and proportion of people (notified and un-notified) with TB-HIV co-infection[a] by PHE Centre, England, 2001 to 2018

Year	PHE Centre[b]																	
	London		West Midlands		South East		North West		East of England		Yorkshire and the Humber		East Midlands		South West		North East	
	n	%[c]	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
2001	230	9.3	4	0.6	29	6.9	19	3.1	22	6.8	14	2.9	14	2.9	4	1.9	8	4.9
2002	264	9.1	30	4.1	56	12.1	25	4.1	50	14.4	16	3.5	23	5.1	10	4.7	9	6.3
2003	286	9.8	39	5.4	69	12.9	27	4.8	50	15.8	37	7.2	22	5.1	16	8.0	7	5.1
2004	275	9.4	51	6.0	46	8.7	37	6.8	64	16.4	34	6.8	34	8.5	18	7.1	8	5.8
2005	289	8.9	48	5.4	62	10.9	45	6.3	48	10.7	37	7.2	44	8.6	13	5.0	5	4.0
2006	246	7.8	41	4.6	52	8.7	46	6.9	52	11.2	42	6.7	41	7.5	22	8.1	8	6.3
2007	192	6.3	36	4.2	53	8.9	43	6.3	40	10.5	35	5.9	35	6.8	14	5.4	16	8.5
2008	214	6.8	36	3.8	48	7.8	39	5.7	46	9.7	41	6.9	37	7.9	14	5.1	6	3.4
2009	173	5.3	37	3.9	48	7.0	38	5.1	39	7.9	27	4.2	21	4.2	16	5.6	7	4.5
2010	155	5.0	27	3.2	39	5.7	42	5.6	35	7.3	27	4.6	31	6.5	12	4.7	5	3.4
2011	137	4.1	36	3.8	32	4.1	21	2.8	32	5.9	29	4.8	23	4.8	14	4.7	2	1.5
2012	135	4.2	28	2.8	32	4.3	25	3.4	22	4.5	17	3.1	27	5.6	8	2.8	1	0.6
2013	109	3.8	36	3.8	20	3.0	19	2.8	24	5.5	14	2.6	7	1.8	9	2.9	3	2.3
2014	74	3.0	25	3.3	27	4.2	23	3.8	22	5.2	18	3.6	10	2.6	9	3.0	6	3.8
2015	91	4.1	20	3.0	19	3.3	25	4.6	16	4.3	20	4.9	13	3.8	13	4.7	5	4.1
2016	73	3.4	16	2.3	16	2.9	18	3.3	12	2.8	10	2.5	17	5.3	6	2.5	4	3.5
2017	56	3.0	17	2.7	23	4.4	15	3.0	15	3.7	6	1.8	9	2.7	6	2.8	2	1.9
2018	48	2.9	11	1.9	12	2.4	15	3.3	10	2.8	8	2.4	10	3.0	4	2.2	2	1.8
Total	**3,047**	**6.0**	**538**	**3.5**	**683**	**6.2**	**522**	**4.4**	**599**	**7.7**	**432**	**4.6**	**418**	**5.2**	**208**	**4.4**	**104**	**4.0**

[a] Includes people with TB and HIV co-infection aged 15 years and older
[b] Ordered by decreasing total number of TB notifications in 2018
[c] Proportion is calculated using the number of TB notifications with HIV co-infection plus the number who are un-notified with an MTBC isolate which matched to a person with HIV as the numerator, and the number of all TB notifications (with or without HIV co-infection) plus the number of un-notified TB isolates which matched to a person with HIV as the denominator.

Table Ai 8.3: Number and proportion[a] of people notified with TB who had HIV co-infection by age group, England, 2001 to 2018

Year	Age group (years)											
	15-24		25-34		35-44		45-54		55-64		65+	
	n	%	n	%	n	%	n	%	n	%	n	%
2001	24	8.6	119	42.5	99	35.4	24	8.6	11	3.9	3	1.1
2002	28	6.2	211	46.9	154	34.2	45	10.0	11	2.4	1	0.2
2003	35	6.8	221	42.7	192	37.1	48	9.3	15	2.9	6	1.2
2004	45	8.2	218	39.9	194	35.5	73	13.4	13	2.4	3	0.5
2005	41	7.2	208	36.7	227	40.1	68	12.0	16	2.8	6	1.1
2006	27	5.1	186	34.9	227	42.6	67	12.6	17	3.2	9	1.7
2007	18	4.0	152	33.5	207	45.6	59	13.0	14	3.1	4	0.9
2008	15	3.3	152	33.1	190	41.4	78	17.0	20	4.4	4	0.9
2009	27	6.8	122	30.7	152	38.3	70	17.6	21	5.3	5	1.3
2010	22	6.0	92	25.1	150	41.0	76	20.8	19	5.2	7	1.9
2011	19	5.9	74	23.0	119	37.0	65	20.2	32	9.9	13	4.0
2012	11	3.8	69	23.6	131	44.9	52	17.8	23	7.9	6	2.1
2013	12	5.0	44	18.4	92	38.5	71	29.7	14	5.9	6	2.5
2014	12	5.7	38	17.9	82	38.7	58	27.4	18	8.5	4	1.9
2015	8	3.6	42	19.1	86	39.1	58	26.4	18	8.2	8	3.6
2016	8	4.7	32	18.6	62	36.0	52	30.2	14	8.1	4	2.3
2017	5	3.4	24	16.2	50	33.8	51	34.5	15	10.1	3	2.0
2018	5	4.2	14	11.8	37	31.1	45	37.8	13	10.9	5	4.2
Total	**362**	**5.8**	**2,018**	**32.1**	**2,451**	**39.0**	**1,060**	**16.8**	**304**	**4.8**	**97**	**1.5**

[a] Proportion of all people with TB-HIV co-infection that were in each age group

Table Ai.8.4: HIV testing in people notified with TB by PHE Centre, England, 2018

PHE Centre[b]	HIV testing[a]								
	Not offered		Offered and received		Offered but not received		Offered but declined		Total[a]
	n	%	n	%	n	%	n	%	n
London	24	1.5	1,558	96.8	26	1.6	1	0.1	1,609
West Midlands	19	3.7	486	93.6	11	2.1	3	0.6	519
South East	22	4.7	422	90.8	15	3.2	6	1.3	465
North West	19	4.5	395	94.5	3	0.7	1	0.2	418
East of England	11	3.4	309	94.2	4	1.2	4	1.2	328
Yorkshire and the Humber	17	5.4	290	92.9	2	0.6	3	1.0	312
East Midlands	14	4.5	292	94.8	2	0.6	0	0.0	308
South West	3	1.8	164	98.2	0	0.0	0	0.0	167
North East	8	7.8	92	90.2	2	2.0	0	0.0	102
England	**137**	**3.2**	**4,008**	**94.8**	**65**	**1.5**	**18**	**0.4**	**4,228**

[a] Total with previously unknown HIV status where HIV testing is known and excluding those diagnosed post-mortem
[b] Ordered by decreasing total number of TB notifications in 2018

Table Ai.10.1: Availability of data by source and CCG for latent TB testing

Clinical Commissioning Group (CCG)	Testing	Treatment	Laboratory
NHS Barking & Dagenham CCG			
NHS Barnet CCG			
NHS Bedfordshire CCG			
NHS Birmingham Crosscity CCG			
NHS Birmingham South and Central CCG			
NHS Blackburn with Darwen and East Lancashire CCG			
NHS Bolton CCG			
NHS Bradford City CCG			
NHS Bradford Districts CCG			
NHS Brent CCG			
NHS Bristol CCG			
NHS Cambridge & Peterborough CCG			
NHS Camden CCG			
NHS Central London (Westminster) CCG			
NHS City and Hackney CCG			
NHS Coventry and Rugby CCG			
NHS Crawley CCG			
NHS Croydon CCG			
NHS Ealing CCG			
NHS Enfield CCG			
Find and Treat			
NHS Greater Huddersfield CCG			
NHS Greenwich CCG			
NHS Hammersmith and Fulham CCG			
NHS Haringey CCG			
NHS Harrow CCG			
NHS Herts Valleys CCG			
NHS Hillingdon CCG			
NHS Hounslow CCG			
NHS Islington CCG			
NHS Lambeth CCG			
NHS Leeds South and East CCG			
NHS Leicester City CCG			
NHS Lewisham CCG			
NHS Liverpool CCG			
NHS Luton CCG			
NHS Merton CCG			
NHS Milton Keynes CCG			
NHS Nene CCG			

Clinical Commissioning Group (CCG)	Testing	Treatment	Laboratory
NHS Newham CCG			
NHS North and central Manchester CCG			
NHS North Kirklees CCG			
NHS Nottingham City CCG			
NHS Oldham CCG			
NHS Redbridge CCG			
NHS Sandwell and West Birmingham CCG			
NHS Sheffield CCG			
NHS Slough CCG			
NHS South Reading CCG			
NHS Southampton CCG			
NHS Southern Derbyshire CCG			
NHS Southwark CCG			
NHS Stoke on Trent CCG			
NHS Tower Hamlets CCG			
NHS Walsall CCG			
NHS Waltham Forest CCG			
NHS Wandsworth CCG			
NHS West London CCG			
NHS Wolverhampton CCG			

No data submitted

Some data submitted but not for all reporting periods/ have stopped reporting

Data submitted for all years 2016, 2017 and 2018

No data expected

Table Ai.10.2: Number of LTBI tests by CCG and year, 2016 to 2018

Clinical Commissioning Group (CCG)	2016	2017	2018
Find and Treat	0	220	0
NHS Barking And Dagenham CCG	-	-	6
NHS Barnet CCG	-	-	3
NHS Bedfordshire CCG	5	110	-
NHS Birmingham Crosscity CCG	352	435	432
NHS Birmingham South and Central CCG	890	852	381
NHS Blackburn With Darwen CCG	380	286	220
NHS Bolton CCG	4	154	182
NHS Bradford Districts CCG	569	823	760
NHS Brent CCG	583	1,170	1,470
NHS Bristol CCG	104	146	167
NHS Cambridgeshire And Peterborough CCG	297	146	113
NHS Camden CCG	-	-	21
NHS Central London (Westminster) CCG	-	1	18
NHS Central Manchester CCG	36	5	-
NHS City And Hackney CCG	-	14	56
NHS Coventry And Rugby CCG	-	48	-
NHS Crawley CCG	68	82	8
NHS Croydon CCG	12	58	184
NHS Ealing CCG	155	621	684
NHS Enfield CCG	-	-	2
NHS Greater Huddersfield CCG	312	415	510
NHS Greenwich CCG	64	777	627
NHS Hammersmith & Fulham CCG	-	7	7
NHS Haringey CCG	-	-	1
NHS Harrow CCG	121	240	149
NHS Herts Valleys CCG	6	177	307
NHS Hillingdon CCG	100	81	508
NHS Hounslow CCG	63	475	676
NHS Islington CCG	-	1	1
NHS Lambeth CCG	-	29	64
NHS Leeds South And East CCG	25	378	545
NHS Leicester City CCG	426	1,671	970
NHS Lewisham CCG	7	27	72
NHS Liverpool CCG	-	-	2
NHS Luton CCG	121	108	41
NHS Manchester CCG	185	521	150
NHS Merton CCG	6	58	118

Clinical Commissioning Group (CCG)	2016	2017	2018
NHS Milton Keynes CCG	45	16	-
NHS Newham CCG	2,131	2,308	2,789
NHS North Kirklees CCG	156	152	248
NHS Nottingham City CCG	218	204	139
NHS Oldham CCG	-	5	115
NHS Sandwell And West Birmingham CCG	440	566	506
NHS Sheffield CCG	364	466	631
NHS Slough CCG	84	496	539
NHS South Reading CCG	108	239	213
NHS Southampton CCG	227	534	434
NHS Southern Derbyshire CCG	33	13	72
NHS Southwark CCG	-	3	8
NHS Stoke On Trent CCG	-	11	10
NHS Tower Hamlets CCG	-	11	295
NHS Walsall CCG	-	2	103
NHS Waltham Forest CCG	-	34	14
NHS Wandsworth CCG	37	98	279
NHS West London CCG	2	5	8
NHS Wolverhampton CCG	101	44	25
Total	**8,837**	**15,343**	**15,883**

[a] NHS Bradford City and Districts CCGs submit a joint dataset
[b] Find and treat is not a CCG but funded as part of the LTBI programme

Table Ai.10.3: Number and proportion of people tested for LTBI by country of birth, 2016 to 2018

Country of birth	2016		2017		2018	
	n	%	n	%	n	%
India	1,277	(29.3)	2,447	(32.5)	2,173	(33.5)
Pakistan	1,421	(32.6)	1,944	(25.8)	1,587	(24.5)
Bangladesh	417	(9.6)	570	(7.6)	739	(11.4)
Afghanistan	175	(4.0)	368	(4.9)	228	(3.5)
Nigeria	147	(3.4)	273	(3.6)	202	(3.1)
Eritrea	94	(2.2)	232	(3.1)	162	(2.5)
Sudan	108	(2.5)	199	(2.6)	148	(2.3)
Ghana	100	(2.3)	197	(2.6)	132	(2.0)
Moldova	38	(0.9)	89	(1.2)	102	(1.6)
Nepal	43	(1.0)	169	(2.2)	86	(1.3)
Philippines	15	(0.3)	69	(0.9)	61	(0.9)
Vietnam	23	(0.5)	73	(1.0)	61	(0.9)
Ethiopia	34	(0.8)	81	(1.1)	55	(0.8)
South Africa	20	(0.5)	39	(0.5)	48	(0.7)
Zimbabwe	21	(0.5)	40	(0.5)	34	(0.5)
Gambia, The	14	(0.3)	17	(0.2)	27	(0.4)
Kenya	22	(0.5)	59	(0.8)	27	(0.4)
Thailand	18	(0.4)	27	(0.4)	27	(0.4)
Mali	21	(0.5)	21	(0.3)	26	(0.4)
Africa	6	(0.1)	21	(0.3)	21	(0.3)
Congo	4	(0.1)	27	(0.4)	21	(0.3)
Guinea-Bissau	10	(0.2)	20	(0.3)	21	(0.3)
Uganda	16	(0.4)	25	(0.3)	17	(0.3)
Cameroon	9	(0.2)	30	(0.4)	16	(0.2)
Senegal	4	(0.1)	8	(0.1)	15	(0.2)
Sierra Leone	8	(0.2)	14	(0.2)	10	(0.2)
Burma	11	(0.3)	13	(0.2)	9	(0.1)
Mauritius	13	(0.3)	15	(0.2)	9	(0.1)
Guinea	4	(0.1)	10	(0.1)	8	(0.1)
Angola	10	(0.2)	17	(0.2)	7	(0.1)
Gambia	5	(0.1)	5	(0.1)	6	(0.1)
Sao Tome And Principe	0	(0.0)	4	(0.1)	6	(0.1)
Tanzania	11	(0.3)	13	(0.2)	5	(0.1)
East Timor	37	(0.8)	10	(0.1)	4	(0.1)
Mongolia	3	(0.1)	4	(0.1)	4	(0.1)
Namibia	0	(0.0)	3	(0.0)	4	(0.1)

Country of birth	2016		2017		2018	
	n	%	n	%	n	%
Botswana	2	(0.0)	2	(0.0)	3	(0.0)
Ivory Coast	3	(0.1)	6	(0.1)	3	(0.0)
Malawi	2	(0.0)	1	(0.0)	3	(0.0)
Benin	0	(0.0)	1	(0.0)	2	(0.0)
Burkina Faso	0	(0.0)	1	(0.0)	2	(0.0)
Cambodia	3	(0.1)	2	(0.0)	2	(0.0)
Cape Verde	1	(0.0)	5	(0.1)	2	(0.0)
Mozambique	2	(0.0)	5	(0.1)	2	(0.0)
Swaziland	0	(0.0)	2	(0.0)	2	(0.0)
Togo	1	(0.0)	0	(0.0)	2	(0.0)
Burundi	4	(0.1)	1	(0.0)	1	(0.0)
Djibouti	1	(0.0)	0	(0.0)	1	(0.0)
Lesotho	0	(0.0)	0	(0.0)	1	(0.0)
Rwanda	1	(0.0)	2	(0.0)	1	(0.0)
Zambia	4	(0.1)	4	(0.1)	1	(0.0)
Bhutan	2	(0.0)	0	(0.0)	0	(0.0)
Chad	0	(0.0)	2	(0.0)	0	(0.0)
Equatorial Guinea	0	(0.0)	1	(0.0)	0	(0.0)
Indonesia	0	(0.0)	1	(0.0)	0	(0.0)
Laos	0	(0.0)	1	(0.0)	0	(0.0)
Liberia	1	(0.0)	0	(0.0)	0	(0.0)
Madagascar	1	(0.0)	0	(0.0)	0	(0.0)
Mauritania	1	(0.0)	5	(0.1)	0	(0.0)
Niger	0	(0.0)	1	(0.0)	0	(0.0)
Somalia	0	(0.0)	4	(0.1)	0	(0.0)
Other	174	(4.0)	331	(4.4)	354	(5.5)
Total	**4,362**	**(100.0)**	**7,531**	**(100.0)**	**6,490**	**(100.0)**

Table Ai.10.4: Number and proportion of people that tested positive for LTBI by CCG and year, 2016 to 2018

Clinical Commissioning Group (CCG)	2016			2017			2018		
	Tests with result	LTBI positive		Tests with result	LTBI positive		Tests with result	LTBI positive	
		n	%		n	%		n	%
Find and Treat	0	0	0.0	219	61	27.9	0	0	0.0
NHS Barking & Dagenham CCG	0	0	0.0	0	0	0.0	5	0	0.0
NHS Barnet CCG	0	0	0.0	0	0	0.0	3	0	0.0
NHS Bedfordshire CCG	0	0	0.0	110	11	10.0	0	0	0.0
NHS Birmingham Crosscity CCG	321	39	12.1	411	51	12.4	430	71	16.5
NHS Birmingham South & Central CCG	863	141	16.3	832	124	14.9	380	60	15.8
NHS Blackburn With Darwen CCG	380	81	21.3	286	50	17.5	220	36	16.4
NHS Bolton CCG	4	4	100.0	154	54	35.1	170	50	29.4
NHS Bradford Districts CCG	566	107	18.9	820	106	12.9	759	157	20.7
NHS Brent CCG	566	119	21.0	1,151	191	16.6	1,470	227	15.4
NHS Bristol CCG	104	14	13.5	145	30	20.7	162	24	14.8
NHS Cambridgeshire & Peterborough CCG	296	40	13.5	141	27	19.1	113	25	22.1
NHS Camden CCG	0	0	0.0	0	0	0.0	20	4	20.0
NHS City & Hackney CCG	0	0	0.0	14	3	21.4	55	10	18.2
NHS Coventry & Rugby CCG	0	0	0.0	48	6	12.5	0	0	0.0
NHS Crawley CCG	67	11	16.4	82	11	13.4	8	2	25.0
NHS Croydon CCG	12	2	16.7	53	3	5.7	184	22	12.0
NHS Ealing CCG	150	32	21.3	609	98	16.1	684	94	13.7
NHS Enfield CCG	0	0	0.0	0	0	0.0	2	0	0.0
NHS Greater Huddersfield CCG	309	55	17.8	414	54	13.0	509	78	15.3
NHS Greenwich CCG	63	10	15.9	767	164	21.4	627	104	16.6
NHS Hammersmith & Fulham CCG	0	0	0.0	5	0	0.0	7	1	14.3
NHS Haringey CCG	0	0	0.0	0	0	0.0	1	0	0.0
NHS Harrow CCG	113	29	25.7	230	46	20.0	149	25	16.8
NHS Herts Valleys CCG	6	1	16.7	169	16	9.5	307	49	16.0
NHS Hillingdon CCG	83	12	14.5	74	11	14.9	508	59	11.6
NHS Hounslow CCG	59	12	20.3	451	81	18.0	676	123	18.2
NHS Islington CCG	0	0	0.0	1	0	0.0	1	0	0.0
NHS Lambeth CCG	0	0	0.0	27	5	18.5	64	6	9.4
NHS Leeds South & East CCG	25	8	32.0	378	69	18.3	545	86	15.8
NHS Leicester City CCG	426	57	13.4	1,671	287	17.2	966	179	18.5
NHS Lewisham CCG	7	0	0.0	27	5	18.5	71	13	18.3
NHS Liverpool CCG	0	0	0.0	0	0	0.0	2	0	0.0
NHS Luton CCG	121	15	16.9	111	14	12.6	41	2	4.9

Clinical Commissioning Group (CCG)	2016			2017			2018		
	Tests with result	LTBI positive		Tests with result	LTBI positive		Tests with result	LTBI positive	
		n	%		n	%		n	%
NHS Manchester CCG	237	40	14.1	506	108	21.4	167	45	26.9
NHS Merton CCG	6	0	0.0	57	13	22.8	118	9	7.6
NHS Milton Keynes CCG	44	7	15.9	16	4	25.0	0	0	0.0
NHS Newham CCG	2,131	447	21.0	2,302	417	18.1	2,788	442	15.9
NHS North Kirklees CCG	156	20	12.8	152	20	13.2	248	31	12.5
NHS Nottingham City CCG	218	22	10.1	204	30	14.7	138	13	9.4
NHS Oldham CCG	0	0	0.0	5	1	20.0	115	11	9.6
NHS Sandwell & West Birmingham CCG	432	96	22.2	545	101	18.5	504	94	18.7
NHS Sheffield CCG	353	53	15.0	463	69	14.9	631	83	13.2
NHS Slough CCG	73	8	11.0	484	64	13.2	532	66	12.4
NHS South Reading CCG	107	16	15.0	238	47	19.7	211	30	14.2
NHS Southampton CCG	227	35	15.4	533	79	14.8	434	53	12.2
NHS Southern Derbyshire CCG	33	4	12.1	13	2	15.4	72	24	33.3
NHS Southwark CCG	0	0	0.0	2	0	0.0	8	0	0.0
NHS Stoke On Trent CCG	0	0	0.0	11	6	54.5	10	2	20.0
NHS Tower Hamlets CCG	0	0	0.0	10	2	20.0	291	40	13.7
NHS Walsall CCG	0	0	0.0	2	0	0.0	103	17	16.5
NHS Waltham Forest CCG	0	0	0.0	31	2	6.5	14	4	28.6
NHS Wandsworth CCG	34	3	8.8	92	14	15.2	279	32	11.5
NHS West London CCG	2	1	50.0	5	2	40.0	8	0	0.0
NHS Wolverhampton CCG	95	32	33.7	44	10	22.7	25	6	24.0
Total	**8,689**	**1,573**	**18.1**	**15,115**	**2,569**	**17.0**	**15,835**	**2,509**	**15.8**

[a] Find and treat is not a CCG but was funded as part of the LTBI programme
[b]NHS Bradford City and Districts CCGs submit a joint dataset

Table Ai.11.1: Number of people and rate of TB detected in high incidence countries through the UK pre-entry screening programme, 2006 to 2018

Year	Number of people with TB	Rate per 100,000 (95% CI)
2006	14	44.8 (24.5 - 75.3)
2007	53	54.3 (40.7 - 71.0)
2008	76	69.7 (54.9- 87.2)
2009	121	91.6 (76.0 - 109.45)
2010	83	76.9 (61.3 - 95.4)
2011	84	87.2 (69.6 - 108.0)
2012	70	107.7 (84.0 - 136.1)
2013	140	161.4 (135.8 - 190.5)
2014	393	168.4 (152.1 - 185.9)
2015	377	152.3 (137.3 - 168.5)
2016	259	104.6 (92.2 - 118.1)
2017	298	116.6 (103.8 - 130.7)
2018	318	104.5 (93.4 - 116.7)

Table Ai.11.2: Number of people with pulmonary TB diagnosed by pre-entry screening and identified within 1 year of UK entry[a], 2006 to 2018

Year of screening/ entry to the UK	Number of people detected with TB by pre-entry screening	Number of people identified with TB in the UK
2006	14	366
2007	53	342
2008	76	310
2009	121	342
2010	83	321
2011	84	314
2012	70	178
2013	140	145
2014	393	154
2015	377	162
2016	259	122
2017	298	51
2018[b]	318	69
2018[c]	377	138

[a] The number of people with pulmonary TB identified within 1 year of entry into the UK was from all 101 high incidence countries but the number of people with TB diagnosed by pre-entry screening were from an increasing number of countries as screening was rolled out; 5 pilot countries (2006), 15 pilot countries (2007 and 2012), 101 countries (by 2014).
[b] As of 19 April 2019, 747 sputum samples are pending and the rate may increase when final results are available.
[c] Predicted people with TB assume that of the pending sputum cultures, 10% will be positive; and for people with TB identified in the UK, 50% more cases will be detected for 2018 during 2019 as the proxy entry date is set at 2 July each year.

Table A11.3: Drug susceptibility testing of people with TB, 2018

Drug susceptibility category	Number of people with TB	% Total
Sensitive to all first line drugs	90	85.7
Resistant to 1 first-line drug, other than isoniazid and rifampicin	5	4.8
Resistant to 2 or more first-line drugs, without MDR	5	4.8
INH-R but not RR-TB or MDR-TB	3	2.9
RR-TB but not INH-TB or MDR-TB	1	1.0
MDR-TB but not XDR-TB	1	1.0
Total	**105**	**100.0**

MDR=Multidrug resistant, INH-R=Isoniazid resistant, RR=Rifampicin resistant & XDR=Extensively drug resistant.

Appendix II. Supplementary tables of local level data

Table Aii.1.1: Three-year average number of people with TB and rates by PHE Centre, upper tier local authority and local authority district, England, 2016 to 2018

PHE Centre[a]	Upper tier local authority and local authority district[b]	Average annual number of people[c]	Average annual rate per 100,000 (95% CI)
London		**1,932**	**21.9 (21.3-22.4)**
	Barking and Dagenham	58	27.4 (23.5-31.8)
	Barnet	64	16.6 (14.3-19.1)
	Bexley	29	11.8 (9.4-14.5)
	Brent	150	45.6 (41.5-50.0)
	Bromley	21	6.4 (4.9-8.2)
	Camden	39	15.4 (12.8-18.5)
	City of London	2	21.2 (6.9-49.4)
	Croydon	74	19.2 (16.8-22.0)
	Ealing	125	36.4 (32.8-40.3)
	Enfield	60	18.1 (15.6-21.0)
	Greenwich	66	23.3 (20.2-26.8)
	Hackney	62	22.3 (19.2-25.8)
	Hammersmith and Fulham	29	16.0 (12.8-19.7)
	Haringey	59	21.7 (18.7-25.2)
	Harrow	79	31.6 (27.7-35.9)
	Havering	27	10.4 (8.3-13.0)
	Hillingdon	76	25.0 (21.9-28.5)
	Hounslow	93	34.5 (30.6-38.8)
	Islington	38	16.0 (13.2-19.2)
	Kensington and Chelsea	24	15.1 (11.8-19.1)
	Kingston upon Thames	11	6.5 (4.5-9.1)
	Lambeth	52	16.1 (13.7-18.9)
	Lewisham	55	18.1 (15.5-21.1)
	Merton	36	17.3 (14.2-20.9)
	Newham	172	49.3 (45.1-53.8)
	Redbridge	107	35.4 (31.6-39.5)
	Richmond upon Thames	12	6.0 (4.1-8.3)
	Southwark	64	20.5 (17.7-23.6)
	Sutton	21	10.5 (8.1-13.4)
	Tower Hamlets	72	23.4 (20.4-26.8)
	Waltham Forest	71	25.7 (22.3-29.3)
	Wandsworth	49	15.0 (12.7-17.7)
	Westminster	37	14.8 (12.2-17.9)

PHE Centre[a]	Upper tier local authority and local authority district[b]	Average annual number of people[c]	Average annual rate per 100,000 (95% CI)
West Midlands		**664**	**11.3 (10.8-11.8)**
	Birmingham	248	21.9 (20.3-23.5)
	Coventry	80	22.3 (19.6-25.3)
	Dudley	23	7.3 (5.7-9.2)
	Herefordshire, County of	5	2.8 (1.6-4.5)
	Sandwell	73	22.5 (19.6-25.6)
	Shropshire	5	1.7 (1.0-2.7)
	Solihull	10	4.7 (3.2-6.7)
	Staffordshire	31	3.6 (2.9-4.4)
	Cannock Chase	4	3.7 (1.8-6.6)
	East Staffordshire	6	5.4 (3.2-8.4)
	Lichfield	1	1.0 (0.2-2.8)
	Newcastle-under-Lyme	8	6.2 (4.0-9.2)
	South Staffordshire	3	2.7 (1.2-5.1)
	Stafford	5	4.0 (2.3-6.4)
	Staffordshire Moorlands	1	1.4 (0.4-3.5)
	Tamworth	2	3.0 (1.2-6.3)
	Stoke-on-Trent	27	10.6 (8.4-13.2)
	Telford and Wrekin	7	4.0 (2.5-6.1)
	Walsall	46	16.4 (13.7-19.3)
	Warwickshire	31	5.5 (4.4-6.7)
	North Warwickshire	2	3.6 (1.5-7.5)
	Nuneaton and Bedworth	10	7.8 (5.3-11.1)
	Rugby	6	5.6 (3.3-8.9)
	Stratford-on-Avon	4	2.9 (1.5-5.2)
	Warwick	9	6.4 (4.2-9.3)
	Wolverhampton	56	21.5 (18.4-25.1)
	Worcestershire	20	3.4 (2.6-4.4)
	Bromsgrove	4	4.4 (2.4-7.6)
	Malvern Hills	2	2.2 (0.7-5.0)
	Redditch	4	5.1 (2.7-8.7)
	Worcester	4	3.9 (2.0-6.8)
	Wychavon	5	3.7 (2.0-6.2)
	Wyre Forest	1	1.0 (0.2-2.9)

PHE Centre[a]	Upper tier local authority and local authority district[b]	Average annual number of people[c]	Average annual rate per 100,000 (95% CI)
South East		**534**	**6.1 (5.8-6.4)**
	Bracknell Forest	5	4.1 (2.3-6.8)
	Brighton and Hove	18	6.1 (4.6-8.0)
	Buckinghamshire	48	9.0 (7.6-10.6)
	Aylesbury Vale	15	7.5 (5.4-10.0)
	Chiltern	7	7.0 (4.3-10.8)
	South Bucks	4	5.2 (2.6-9.4)
	Wycombe	23	13.3 (10.4-16.9)
	East Sussex	15	2.8 (2.0-3.7)
	Eastbourne	4	3.9 (2.0-6.8)
	Hastings	4	3.9 (2.0-7.1)
	Lewes	2	2.3 (0.9-4.7)
	Rother	1	1.4 (0.4-3.6)
	Wealden	4	2.5 (1.3-4.4)
	Hampshire	61	4.4 (3.8-5.1)
	Basingstoke and Deane	10	5.5 (3.7-7.9)
	East Hampshire	4	3.3 (1.7-5.8)
	Eastleigh	4	3.3 (1.8-5.7)
	Fareham	2	2.0 (0.8-4.1)
	Gosport	1	1.6 (0.4-4.0)
	Hart	2	2.1 (0.8-4.6)
	Havant	3	2.4 (1.1-4.6)
	New Forest	3	1.7 (0.8-3.2)
	Rushmoor	21	22.3 (17.2-28.5)
	Test Valley	6	4.8 (2.9-7.6)
	Winchester	4	3.0 (1.5-5.3)
	Isle of Wight	2	1.4 (0.5-3.1)
	Kent	95	6.1 (5.4-6.9)
	Ashford	10	8.1 (5.5-11.5)
	Canterbury	8	5.1 (3.3-7.5)
	Dartford	10	9.6 (6.5-13.7)
	Dover	6	5.2 (3.1-8.2)
	Folkestone and Hythe	7	6.0 (3.6-9.2)
	Gravesham	17	15.7 (11.6-20.7)
	Maidstone	16	9.5 (7.0-12.6)
	Sevenoaks	4	3.3 (1.7-5.8)
	Shepway	6	3.9 (2.3-6.2)
	Swale	6	4.2 (2.5-6.7)
	Thanet	2	1.6 (0.6-3.4)
	Tonbridge and Malling	3	2.5 (1.2-4.8)
	Tunbridge Wells	14	5.0 (3.6-6.8)
	Medway	**534**	**6.1 (5.8-6.4)**

PHE Centre[a]	Upper tier local authority and local authority district[b]	Average annual number of people[c]	Average annual rate per 100,000 (95% CI)
South East	**Oxfordshire**	40	5.9 (4.9-7.0)
continued	Cherwell	10	6.8 (4.6-9.7)
	Oxford	22	14.4 (11.2-18.3)
	South Oxfordshire	3	1.9 (0.8-3.8)
	Vale of White Horse	3	2.0 (0.9-4.0)
	West Oxfordshire	2	2.1 (0.9-4.4)
	Portsmouth	12	5.6 (3.9-7.7)
	Reading	29	17.8 (14.3-21.9)
	Slough	44	29.8 (25.0-35.4)
	Southampton	32	12.7 (10.3-15.5)
	Surrey	56	4.7 (4.0-5.5)
	Elmbridge	4	2.9 (1.5-5.1)
	Epsom and Ewell	6	7.1 (4.2-11.4)
	Guildford	4	2.9 (1.6-5.0)
	Mole Valley	3	3.1 (1.3-6.0)
	Reigate and Banstead	7	4.8 (3.0-7.3)
	Runnymede	4	4.6 (2.4-8.0)
	Spelthorne	6	6.1 (3.6-9.6)
	Surrey Heath	4	4.1 (2.1-7.4)
	Tandridge	3	3.4 (1.6-6.5)
	Waverley	5	4.0 (2.2-6.6)
	Woking	10	10.2 (6.9-14.5)
	West Berkshire	7	4.2 (2.6-6.5)
	West Sussex	35	4.1 (3.3-4.9)
	Adur	2	3.7 (1.5-7.5)
	Arun	4	2.5 (1.3-4.4)
	Chichester	2	1.7 (0.6-3.6)
	Crawley	16	14.0 (10.3-18.6)
	Horsham	3	2.1 (1.0-4.1)
	Mid Sussex	3	2.2 (1.1-4.1)
	Worthing	4	4.0 (2.1-6.8)
	Windsor and Maidenhead	12	8.0 (5.6-11.1)
	Wokingham	10	6.0 (4.1-8.6)

PHE Centre[a]	Upper tier local authority and local authority district[b]	Average annual number of people[c]	Average annual rate per 100,000 (95% CI)
North West		**532**	**7.3 (7.0-7.7)**
	Blackburn with Darwen	29	19.7 (15.8-24.3)
	Blackpool	10	7.4 (5.0-10.5)
	Bolton	43	15.0 (12.5-17.8)
	Bury	15	7.7 (5.6-10.4)
	Cheshire East	10	2.6 (1.8-3.8)
	Cheshire West and Chester	7	2.1 (1.3-3.2)
	Cumbria	9	1.7 (1.1-2.5)
	Allerdale	3	3.4 (1.6-6.3)
	Barrow-in-Furness	1	1.5 (0.3-4.3)
	Carlisle	1	1.2 (0.3-3.2)
	Copeland	1	1.5 (0.3-4.2)
	Eden	0	0.0 (0.0-0.0)
	South Lakeland	2	1.9 (0.7-4.2)
	Halton	1	1.0 (0.3-2.7)
	Knowsley	1	0.7 (0.1-2.0)
	Lancashire	73	6.1 (5.3-7.0)
	Burnley	9	10.2 (6.7-14.9)
	Chorley	3	2.6 (1.2-4.9)
	Fylde	1	1.3 (0.3-3.7)
	Hyndburn	7	8.3 (5.1-12.8)
	Lancaster	9	6.1 (4.0-8.9)
	Pendle	13	13.9 (9.9-19.1)
	Preston	21	14.6 (11.2-18.7)
	Ribble Valley	2	2.8 (0.9-6.5)
	Rossendale	2	3.3 (1.3-6.8)
	South Ribble	2	2.1 (0.9-4.4)
	West Lancashire	2	1.5 (0.5-3.4)
	Wyre	4	3.3 (1.7-5.9)
	Liverpool	34	7.0 (5.7-8.5)
	Manchester	115	21.2 (19.0-23.5)
	Oldham	37	15.7 (12.9-18.9)
	Rochdale	29	13.4 (10.8-16.6)
	Salford	23	9.2 (7.1-11.6)
	Sefton	6	2.3 (1.4-3.6)
	St. Helens	2	1.1 (0.4-2.4)
	Stockport	16	5.5 (4.1-7.3)
	Tameside	25	11.0 (8.6-13.8)
	Trafford	21	8.9 (6.9-11.4)
	Warrington	7	3.3 (2.1-5.1)
	Wigan	9	2.9 (1.9-4.2)
	Wirral	9	2.8 (1.8-4.1)

PHE Centre[a]	Upper tier local authority and local authority district[b]	Average annual number of people[c]	Average annual rate per 100,000 (95% CI)
East of England		**400**	**6.2 (5.9-6.6)**
	Bedford	15	8.6 (6.3-11.6)
	Cambridgeshire	40	6.2 (5.2-7.4)
	Cambridge	17	13.9 (10.3-18.2)
	East Cambridgeshire	3	3.4 (1.5-6.4)
	Fenland	4	4.3 (2.3-7.4)
	Huntingdonshire	7	4.0 (2.5-6.1)
	South Cambridgeshire	9	5.5 (3.6-8.1)
	Central Bedfordshire	6	2.0 (1.2-3.2)
	Essex	59	4.0 (3.4-4.6)
	Basildon	11	6.1 (4.2-8.6)
	Braintree	2	1.3 (0.5-2.9)
	Brentwood	3	3.9 (1.8-7.4)
	Castle Point	2	2.2 (0.8-4.8)
	Chelmsford	5	2.7 (1.5-4.5)
	Colchester	7	3.5 (2.1-5.4)
	Epping Forest	4	3.1 (1.6-5.4)
	Harlow	13	15.1 (10.7-20.6)
	Maldon	2	3.1 (1.1-6.8)
	Rochford	2	2.3 (0.9-5.0)
	Tendring	4	2.5 (1.3-4.5)
	Uttlesford	4	4.9 (2.6-8.4)
	Hertfordshire	81	6.8 (6.0-7.8)
	Broxbourne	7	7.6 (4.7-11.5)
	Dacorum	7	4.8 (3.0-7.2)
	East Hertfordshire	6	3.9 (2.2-6.2)
	Hertsmere	12	11.2 (7.8-15.6)
	North Hertfordshire	6	4.8 (2.9-7.4)
	St Albans	7	4.5 (2.8-7.0)
	Stevenage	8	8.8 (5.5-13.1)
	Three Rivers	6	6.8 (4.1-10.7)
	Watford	13	13.4 (9.6-18.4)
	Welwyn Hatfield	9	7.1 (4.6-10.4)
	Luton	54	25.0 (21.3-29.1)
	Milton Keynes	28	10.3 (8.2-12.8)

PHE Centre[a]	Upper tier local authority and local authority district[b]	Average annual number of people[c]	Average annual rate per 100,000 (95% CI)
East of England	**Norfolk**	34	3.8 (3.1-4.6)
continued	Breckland	4	2.9 (1.5-5.1)
	Broadland	0	0.3 (0.0-1.4)
	Great Yarmouth	13	12.8 (9.0-17.5)
	King's Lynn and West Norfolk	7	4.4 (2.7-6.8)
	North Norfolk	1	1.0 (0.2-2.8)
	Norwich	8	5.9 (3.8-8.8)
	South Norfolk	1	0.7 (0.2-2.2)
	Peterborough	40	19.9 (16.5-23.9)
	Southend-on-Sea	10	5.7 (3.9-8.1)
	Suffolk	23	3.1 (2.4-3.9)
	Babergh	2	1.8 (0.6-4.3)
	East Suffolk	6	2.6 (1.5-4.0)
	Ipswich	7	5.3 (3.3-8.0)
	Mid Suffolk	1	1.3 (0.4-3.4)
	West Suffolk	7	3.7 (2.3-5.8)
	Thurrock	11	6.6 (4.6-9.3)
Yorkshire and the Humber		**373**	**6.8 (6.4-7.2)**
	Barnsley	5	2.2 (1.3-3.6)
	Bradford	85	15.9 (14.0-18.0)
	Calderdale	13	6.2 (4.4-8.5)
	Doncaster	14	4.4 (3.2-6.0)
	East Riding of Yorkshire	8	2.3 (1.4-3.4)
	Kingston upon Hull, City of	16	6.0 (4.4-8.0)
	Kirklees	58	13.3 (11.4-15.4)
	Leeds	68	8.7 (7.5-9.9)
	North East Lincolnshire	4	2.7 (1.4-4.6)
	North Lincolnshire	6	3.5 (2.1-5.5)
	North Yorkshire	12	2.0 (1.4-2.8)
	Craven	1	1.8 (0.4-5.2)
	Hambleton	2	2.2 (0.8-4.8)
	Harrogate	2	1.2 (0.5-2.7)
	Richmondshire	3	6.2 (3.0-11.4)
	Ryedale	0	0.0 (0.0-0.0)
	Scarborough	3	2.5 (1.1-4.8)
	Selby	1	1.5 (0.4-3.9)
	Rotherham	13	4.9 (3.5-6.7)
	Sheffield	52	8.9 (7.6-10.5)
	Wakefield	16	4.6 (3.4-6.1)
	York	3	1.6 (0.8-2.9)

PHE Centre[a]	Upper tier local authority and local authority district[b]	Average annual number of people[c]	Average annual rate per 100,000 (95% CI)
East Midlands		**343**	**7.2 (6.8-7.6)**
	Derby	29	11.4 (9.2-14.1)
	Derbyshire	9	1.1 (0.7-1.6)
	Amber Valley	1	0.5 (0.1-1.9)
	Bolsover	0	0.4 (0.0-2.4)
	Chesterfield	2	2.2 (0.9-4.6)
	Derbyshire Dales	1	1.4 (0.3-4.1)
	Erewash	2	1.7 (0.6-3.8)
	High Peak	1	1.1 (0.2-3.2)
	North East Derbyshire	1	1.0 (0.2-2.9)
	South Derbyshire	0	0.3 (0.0-1.8)
	Leicester	136	38.6 (35.0-42.6)
	Leicestershire	26	3.8 (3.0-4.8)
	Blaby	3	3.4 (1.6-6.2)
	Charnwood	12	6.5 (4.5-9.0)
	Harborough	3	2.9 (1.3-5.7)
	Hinckley and Bosworth	2	2.1 (0.8-4.3)
	Melton	1	1.3 (0.2-4.7)
	North West Leicestershire	1	1.3 (0.4-3.4)
	Oadby and Wigston	4	7.6 (4.1-13.1)
	Lincolnshire	28	3.7 (3.0-4.6)
	Boston	10	14.6 (9.8-20.8)
	East Lindsey	3	2.4 (1.1-4.4)
	Lincoln	5	4.7 (2.6-8.0)
	North Kesteven	2	1.7 (0.6-3.8)
	South Holland	3	3.6 (1.7-6.6)
	South Kesteven	4	2.6 (1.3-4.6)
	West Lindsey	1	1.1 (0.2-3.1)
	Northamptonshire	48	6.5 (5.5-7.6)
	Corby	4	6.2 (3.3-10.7)
	Daventry	2	2.8 (1.1-5.8)
	East Northamptonshire	3	3.2 (1.5-6.1)
	Kettering	6	6.3 (3.8-9.9)
	Northampton	23	10.4 (8.1-13.1)
	South Northamptonshire	3	3.3 (1.5-6.2)
	Wellingborough	6	7.2 (4.2-11.5)

PHE Centre[a]	Upper tier local authority and local authority district[b]	Average annual number of people[c]	Average annual rate per 100,000 (95% CI)
East Midlands	Nottingham	41	12.5 (10.4-14.9)
continued	**Nottinghamshire**	24	3.0 (2.3-3.7)
	Ashfield	5	4.2 (2.4-6.9)
	Bassetlaw	1	0.9 (0.2-2.5)
	Broxtowe	3	2.4 (1.0-4.7)
	Gedling	4	3.7 (2.0-6.3)
	Mansfield	2	1.8 (0.7-4.0)
	Newark and Sherwood	4	3.3 (1.7-5.8)
	Rushcliffe	5	4.3 (2.4-7.1)
	Rutland	1	1.7 (0.2-6.1)
South West		**220**	**4.0 (3.7-4.3)**
	Bath and North East Somerset	4	2.3 (1.2-3.9)
	Bournemouth, Christchurch and Pool	17	4.4 (3.3-5.8)
	Bristol, City of	59	12.8 (10.9-14.8)
	Cornwall	13	2.4 (1.7-3.2)
	Devon	21	2.7 (2.1-3.5)
	East Devon	2	1.6 (0.7-3.4)
	Exeter	6	4.9 (3.0-7.7)
	Mid Devon	3	3.3 (1.4-6.5)
	North Devon	1	1.4 (0.4-3.6)
	South Hams	1	1.6 (0.4-4.0)
	Teignbridge	5	4.1 (2.3-6.6)
	Torridge	1	1.0 (0.1-3.6)
	West Devon	1	2.4 (0.7-6.2)
	Dorset	8	2.1 (1.4-3.2)
	Gloucestershire	19	3.0 (2.2-3.9)
	Cheltenham	3	2.8 (1.4-5.2)
	Cotswold	1	1.5 (0.4-3.9)
	Forest of Dean	2	1.9 (0.6-4.5)
	Gloucester	6	4.4 (2.6-7.0)
	Stroud	2	2.0 (0.8-4.1)
	Tewkesbury	4	4.8 (2.6-8.2)
	Isles of Scilly	0	0.0 (0.0-0.0)
	North Somerset	6	3.0 (1.8-4.6)
	Plymouth	16	6.2 (4.6-8.2)
	Somerset	7	1.3 (0.8-1.9)
	Mendip	2	1.8 (0.6-3.8)
	Sedgemoor	1	0.8 (0.2-2.4)
	Somerset West and Taunton	2	1.5 (0.6-3.2)
	South Somerset	2	1.0 (0.3-2.3)
	South Gloucestershire	13	4.5 (3.2-6.2)
	Swindon	23	10.4 (8.1-13.2)
	Torbay	5	3.5 (1.9-5.8)
	Wiltshire	9	1.7 (1.1-2.6)

PHE Centre[a]	Upper tier local authority and local authority district[b]	Average annual number of people[c]	Average annual rate per 100,000 (95% CI)
North East		**116**	**4.4 (3.9-4.9)**
	County Durham	10	2.0 (1.3-2.8)
	Darlington	5	4.4 (2.4-7.4)
	Gateshead	9	4.4 (2.9-6.5)
	Hartlepool	4	3.9 (2.0-7.1)
	Middlesbrough	15	10.9 (8.0-14.6)
	Newcastle upon Tyne	34	11.6 (9.4-14.0)
	North Tyneside	6	3.1 (1.9-4.8)
	Northumberland	5	1.7 (1.0-2.7)
	Redcar and Cleveland	3	2.4 (1.2-4.5)
	South Tyneside	3	2.2 (1.1-4.1)
	Stockton-on-Tees	10	5.1 (3.4-7.3)
	Sunderland	11	3.8 (2.6-5.4)

[a] Ordered by decreasing total number TB notifications in 2018
[b] Those highlighted in bold are upper tier local authority only, those indented are local authority district only, and those neither highlighted nor indented are both an upper tier local authority and a local authority district
[c] Average number of people with TB in a local authority may not be the same as the sum of the average number of people with TB in the corresponding upper tier local authority due to rounding

CI: confidence intervals

Table Aii.1.2: Three-year average number of people with TB and rates by Clinical Commissioning Group (CCG), England, 2016 to 2018

Clinical Commissioning Group	Average annual number of people	Average annual rate per 100,000 (95% CI)
NHS Airedale, Wharfedale and Craven CCG	9	5.6 (3.7-8.2)
NHS Ashford CCG	10	8.1 (5.5-11.6)
NHS Barking and Dagenham CCG	58	27.5 (23.5-31.9)
NHS Barnet CCG	64	16.6 (14.4-19.2)
NHS Barnsley CCG	5	2.2 (1.3-3.6)
NHS Basildon and Brentwood CCG	14	5.5 (4.0-7.4)
NHS Bassetlaw CCG	1	0.9 (0.2-2.5)
NHS Bath and North East Somerset CCG	4	2.3 (1.2-3.9)
NHS Bedfordshire CCG	20	4.5 (3.5-5.8)
NHS Berkshire West CCG	46	9.4 (7.9-11.1)
NHS Bexley CCG	29	11.8 (9.5-14.6)
NHS Birmingham and Solihull CCG	177	15.1 (13.9-16.5)
NHS Blackburn with Darwen CCG	29	19.7 (15.8-24.3)
NHS Blackpool CCG	10	7.4 (5.0-10.5)
NHS Bolton CCG	43	15.0 (12.5-17.8)
NHS Bradford City CCG	37	44.1 (36.3-53.0)
NHS Bradford Districts CCG	40	11.7 (9.7-14.0)
NHS Brent CCG	150	45.7 (41.6-50.1)
NHS Brighton and Hove CCG	18	6.1 (4.6-8.0)
NHS Bristol, North Somerset and South Gloucestershire CCG	78	8.2 (7.2-9.3)
NHS Bromley CCG	21	6.4 (4.9-8.2)
NHS Buckinghamshire CCG	48	9.0 (7.6-10.6)
NHS Bury CCG	15	7.7 (5.6-10.4)
NHS Calderdale CCG	13	6.2 (4.4-8.5)
NHS Cambridgeshire and Peterborough CCG	81	9.2 (8.1-10.4)
NHS Camden CCG	39	15.6 (12.9-18.7)
NHS Cannock Chase CCG	4	2.7 (1.3-4.8)
NHS Canterbury and Coastal CCG	8	3.9 (2.5-5.8)
NHS Castle Point and Rochford CCG	4	2.3 (1.2-4.0)
NHS Central London (Westminster) CCG	23	13.0 (10.1-16.5)
NHS Chorley and South Ribble CCG	4	2.5 (1.3-4.2)
NHS City and Hackney CCG	63	22.4 (19.3-25.8)
NHS Coastal West Sussex CCG	14	2.7 (1.9-3.7)
NHS Corby CCG	4	6.3 (3.3-10.7)
NHS Coventry and Rugby CCG	86	18.6 (16.4-21.0)
NHS Crawley CCG	16	14.0 (10.3-18.7)
NHS Croydon CCG	74	19.3 (16.8-22.0)

Clinical Commissioning Group	Average annual number of people	Average annual rate per 100,000 (95% CI)
NHS Darlington CCG	5	4.4 (2.4-7.4)
NHS Dartford, Gravesham and Swanley CCG	29	11.1 (8.9-13.7)
NHS Derby and Derbyshire CCG	38	3.7 (3.1-4.5)
NHS Devon CCG	42	3.6 (3.0-4.3)
NHS Doncaster CCG	14	4.4 (3.2-6.0)
NHS Dorset CCG	25	3.3 (2.6-4.1)
NHS Dudley CCG	23	7.3 (5.7-9.2)
NHS Durham Dales, Easington and Sedgefield CCG	5	1.8 (1.0-3.0)
NHS Ealing CCG	125	36.4 (32.8-40.3)
NHS East Berkshire CCG	61	14.2 (12.3-16.5)
NHS East Lancashire CCG	32	8.6 (7.0-10.5)
NHS East Leicestershire and Rutland CCG	12	3.7 (2.6-5.1)
NHS East Riding of Yorkshire CCG	8	2.4 (1.5-3.6)
NHS East Staffordshire CCG	7	5.2 (3.2-8.1)
NHS East Surrey CCG	8	4.3 (2.8-6.5)
NHS East and North Hertfordshire CCG	35	6.2 (5.1-7.5)
NHS Eastbourne, Hailsham and Seaford CCG	6	3.2 (1.9-5.0)
NHS Eastern Cheshire CCG	6	3.2 (1.9-5.0)
NHS Enfield CCG	60	18.1 (15.6-21.0)
NHS Fareham and Gosport CCG	4	1.8 (0.9-3.3)
NHS Fylde and Wyre CCG	5	2.5 (1.3-4.1)
NHS Gloucestershire CCG	19	3.0 (2.3-3.9)
NHS Great Yarmouth and Waveney CCG	18	8.3 (6.2-10.8)
NHS Greater Huddersfield CCG	30	12.1 (9.7-14.9)
NHS Greater Preston CCG	22	10.7 (8.3-13.7)
NHS Greenwich CCG	66	23.4 (20.3-26.9)
NHS Guildford and Waverley CCG	7	3.4 (2.1-5.1)
NHS Halton CCG	1	1.0 (0.3-2.7)
NHS Hambleton, Richmondshire and Whitby CCG	6	3.7 (2.2-5.9)
NHS Hammersmith and Fulham CCG	29	16.1 (12.9-19.8)
NHS Haringey CCG	59	21.7 (18.6-25.2)
NHS Harrogate and Rural District CCG	2	1.3 (0.5-2.7)
NHS Harrow CCG	79	31.6 (27.7-35.9)
NHS Hartlepool and Stockton-on-Tees CCG	14	4.7 (3.4-6.4)
NHS Hastings and Rother CCG	5	2.7 (1.5-4.4)
NHS Havering CCG	27	10.5 (8.3-13.0)
NHS Herefordshire CCG	5	2.8 (1.6-4.5)
NHS Herts Valleys CCG	45	7.6 (6.4-9.0)
NHS Heywood, Middleton and Rochdale CCG	29	13.5 (10.8-16.6)
NHS High Weald Lewes Havens CCG	4	2.5 (1.3-4.3)

Clinical Commissioning Group	Average annual number of people	Average annual rate per 100,000 (95% CI)
NHS Hillingdon CCG	76	25.1 (21.9-28.6)
NHS Horsham and Mid Sussex CCG	5	2.3 (1.3-3.7)
NHS Hounslow CCG	93	34.6 (30.7-38.9)
NHS Hull CCG	16	6.0 (4.4-8.0)
NHS Ipswich and East Suffolk CCG	10	2.5 (1.7-3.6)
NHS Isle of Wight CCG	2	1.4 (0.5-3.1)
NHS Islington CCG	38	16.1 (13.3-19.4)
NHS Kernow CCG	13	2.4 (1.7-3.2)
NHS Kingston CCG	11	6.5 (4.5-9.1)
NHS Knowsley CCG	1	0.7 (0.1-2.0)
NHS Lambeth CCG	52	16.2 (13.7-18.9)
NHS Leeds CCG	68	8.7 (7.5-10.0)
NHS Leicester City CCG	136	38.7 (35.0-42.6)
NHS Lewisham CCG	55	18.2 (15.5-21.2)
NHS Lincolnshire East CCG	14	6.0 (4.3-8.1)
NHS Lincolnshire West CCG	7	2.8 (1.7-4.3)
NHS Liverpool CCG	34	7.0 (5.7-8.5)
NHS Luton CCG	54	25.0 (21.2-29.1)
NHS Manchester CCG	115	21.2 (19.0-23.6)
NHS Mansfield and Ashfield CCG	5	2.7 (1.5-4.3)
NHS Medway CCG	14	5.0 (3.6-6.8)
NHS Merton CCG	36	17.3 (14.2-20.9)
NHS Mid Essex CCG	9	2.2 (1.4-3.2)
NHS Milton Keynes CCG	28	10.2 (8.2-12.7)
NHS Morecambe Bay CCG	12	3.6 (2.5-4.9)
NHS Nene CCG	43	6.6 (5.5-7.9)
NHS Newark and Sherwood CCG	4	3.3 (1.7-5.8)
NHS Newcastle Gateshead CCG	43	8.7 (7.3-10.3)
NHS Newham CCG	172	49.5 (45.3-54.0)
NHS North Cumbria CCG	6	1.8 (1.0-2.9)
NHS North Durham CCG	5	2.1 (1.2-3.5)
NHS North East Essex CCG	10	3.1 (2.1-4.4)
NHS North East Hampshire and Farnham CCG	25	12.0 (9.4-15.0)
NHS North East Lincolnshire CCG	4	2.7 (1.4-4.6)
NHS North Hampshire CCG	11	5.1 (3.5-7.1)
NHS North Kirklees CCG	28	14.8 (11.8-18.3)
NHS North Lincolnshire CCG	6	3.5 (2.1-5.5)
NHS North Norfolk CCG	1	0.6 (0.1-1.7)
NHS North Staffordshire CCG	9	4.1 (2.7-6.0)

Clinical Commissioning Group	Average annual number of people	Average annual rate per 100,000 (95% CI)
NHS North Tyneside CCG	6	3.1 (1.9-4.8)
NHS North West Surrey CCG	23	6.6 (5.1-8.4)
NHS Northumberland CCG	5	1.7 (1.0-2.7)
NHS Norwich CCG	9	4.0 (2.6-5.9)
NHS Nottingham City CCG	41	12.5 (10.4-14.9)
NHS Nottingham North and East CCG	6	4.2 (2.5-6.5)
NHS Nottingham West CCG	3	2.4 (1.0-4.7)
NHS Oldham CCG	37	15.7 (12.9-18.9)
NHS Oxfordshire CCG	40	6.0 (4.9-7.1)
NHS Portsmouth CCG	12	5.6 (3.9-7.8)
NHS Redbridge CCG	107	35.5 (31.7-39.6)
NHS Redditch and Bromsgrove CCG	9	4.7 (3.1-7.0)
NHS Richmond CCG	12	6.0 (4.2-8.3)
NHS Rotherham CCG	13	4.9 (3.5-6.8)
NHS Rushcliffe CCG	5	4.3 (2.4-7.1)
NHS Salford CCG	23	9.2 (7.2-11.6)
NHS Sandwell and West Birmingham CCG	154	30.8 (28.1-33.8)
NHS Scarborough and Ryedale CCG	2	1.8 (0.7-3.9)
NHS Sheffield CCG	52	9.0 (7.6-10.5)
NHS Shropshire CCG	5	1.7 (1.0-2.7)
NHS Somerset CCG	7	1.3 (0.8-1.9)
NHS South Cheshire CCG	4	2.0 (1.0-3.6)
NHS South East Staffordshire and Seisdon Peninsula CCG	6	2.5 (1.5-4.0)
NHS South Eastern Hampshire CCG	6	2.6 (1.5-4.2)
NHS South Kent Coast CCG	13	6.1 (4.3-8.3)
NHS South Lincolnshire CCG	4	2.7 (1.4-4.7)
NHS South Norfolk CCG	4	1.9 (1.0-3.2)
NHS South Sefton CCG	4	2.5 (1.3-4.4)
NHS South Tees CCG	19	6.8 (5.1-8.8)
NHS South Tyneside CCG	3	2.2 (1.1-4.1)
NHS South Warwickshire CCG	13	4.8 (3.4-6.6)
NHS South West Lincolnshire CCG	3	2.6 (1.3-4.9)
NHS South Worcestershire CCG	10	3.4 (2.3-4.8)
NHS Southampton CCG	32	12.7 (10.3-15.5)
NHS Southend CCG	10	5.7 (3.9-8.1)
NHS Southport and Formby CCG	2	2.0 (0.8-4.2)
NHS Southwark CCG	64	20.5 (17.7-23.6)

Clinical Commissioning Group	Average annual number of people	Average annual rate per 100,000 (95% CI)
NHS St Helens CCG	2	1.1 (0.4-2.4)
NHS Stafford and Surrounds CCG	6	3.7 (2.1-5.9)
NHS Stockport CCG	16	5.5 (4.1-7.3)
NHS Stoke on Trent CCG	27	10.4 (8.3-12.9)
NHS Sunderland CCG	11	3.8 (2.6-5.4)
NHS Surrey Downs CCG	12	4.0 (2.8-5.6)
NHS Surrey Heath CCG	4	3.8 (1.9-6.8)
NHS Sutton CCG	21	10.5 (8.1-13.4)
NHS Swale CCG	6	4.9 (2.9-7.8)
NHS Swindon CCG	23	10.2 (7.9-12.9)
NHS Tameside and Glossop CCG	25	9.6 (7.5-12.0)
NHS Telford and Wrekin CCG	7	4.0 (2.5-6.1)
NHS Thanet CCG	6	4.3 (2.5-6.7)
NHS Thurrock CCG	11	6.7 (4.6-9.3)
NHS Tower Hamlets CCG	72	23.7 (20.6-27.0)
NHS Trafford CCG	21	8.9 (6.9-11.4)
NHS Vale Royal CCG	2	1.9 (0.7-4.2)
NHS Vale of York CCG	5	1.4 (0.8-2.3)
NHS Wakefield CCG	16	4.6 (3.4-6.1)
NHS Walsall CCG	46	16.4 (13.8-19.4)
NHS Waltham Forest CCG	71	25.7 (22.3-29.4)
NHS Wandsworth CCG	49	15.1 (12.7-17.7)
NHS Warrington CCG	7	3.3 (2.1-5.1)
NHS Warwickshire North CCG	12	6.4 (4.5-8.8)
NHS West Cheshire CCG	5	2.1 (1.2-3.5)
NHS West Essex CCG	21	7.0 (5.4-9.0)
NHS West Hampshire CCG	17	3.0 (2.3-4.0)
NHS West Kent CCG	23	4.7 (3.7-6.0)
NHS West Lancashire CCG	2	1.5 (0.5-3.4)
NHS West Leicestershire CCG	15	3.7 (2.7-5.0)
NHS West London CCG	37	16.7 (13.8-20.1)
NHS West Norfolk CCG	7	4.2 (2.6-6.3)
NHS West Suffolk CCG	8	3.3 (2.1-5.0)
NHS Wigan Borough CCG	9	2.9 (1.9-4.2)
NHS Wiltshire CCG	9	1.8 (1.1-2.6)
NHS Wirral CCG	9	2.8 (1.8-4.1)
NHS Wolverhampton CCG	56	21.6 (18.5-25.1)
NHS Wyre Forest CCG	1	1.0 (0.2-2.9)

CI: confidence intervals

Appendix III. Methods

Data production

TB Notifications

People who are diagnosed with TB in England must be notified through the Enhanced Tuberculosis Surveillance system (ETS), other than in London where the London TB Register (LTBR) is used. Data from the LTBR is imported weekly into ETS. ETS is also used in Wales and Northern Ireland, but only people who are resident in England, or are treated in England and are homeless or visiting from abroad are included in this report.

Data for TB notifications between 2000 and 2018 was extracted from ETS at the beginning of March 2019, then cleaned and validated by end of May 2019.

Matching laboratory isolates to case notifications

Data from all TB isolates sent to National Mycobacterium Reference Service laboratories for culture between January 2017 and February 2019 was deduplicated and a summary record was generated from all the isolates from the same person within a 12-month period. In the instance that a patient received treatment for longer than 12 months, the summary record was generated from all the isolates that existed within the treatment period, even if this was outwith the 12-month period.

Isolates and notifications are matched in ETS; automatically where person identifiers are identical or manually by users where differences in person identifiers occur. For the production of the full dataset, these matches were included. For isolates that were not matched in ETS, these data were then matched to TB notifications from 2017 and 2018, through a probabilistic matching process based on person identifiers common to both the laboratory isolate and the notification [17]. Matches were also subject to manual review to identify any false positive or false negative matches. For notifications prior to 2017, results from matching conducted in prior years (using the same process described above) were retained and included in the final dataset.

Matching TB and HIV data

Data from TB notifications between 2001 and 2018 and data from unmatched laboratory TB isolates with specimen dates between 2001 and 2018 were matched to HIV data from the HIV & AIDS Reporting System (HARS) for the same time period as above, for those aged 15 years and older in England. Data was matched using a probabilistic matching process based on patient identifiers common to both the TB and HIV datasets,

followed by deterministic matching and manual review. The identified matches were all classified as people with TB-HIV co-infection.

Data cleaning to improve data quality

In addition to validation checks at data entry and routine cleaning queries that identify missing or inconsistent data within ETS, the following cleaning was subsequently carried out to produce the dataset used in reporting for TB notifications from 2000 to 2018.

The postcode field (used to map postcodes to geographic areas, including CCGs) was cleaned by identifying invalid postcodes based on matching to the latest available Office for National Statistics (ONS) Postcode Directory (February 2019). Where cleaning was necessary, the correct postcode was identified using the address fields. For people who were homeless or who had a residence outside the UK, but were notified in England, the postcode of the clinic/hospital at which they were treated was assigned to the notification. For people with no postcode or treatment clinic/hospital, the local authority and PHEC were updated using the local authority field recorded in ETS (based on the area that the notifying case manager was located in). Notifications were assigned to PHECs by matching the local authority of residence to the relevant PHEC.

People with BCGosis, on chemoprophylaxis for latent TB infection or with a non-tuberculous mycobacterial infection who were notified in error were identified using comments fields, and denotified. People with culture confirmation of TB who had been denotified were queried with clinics, and lab contaminations were removed or people were renotified if they were found to have been denotified in error.

The site of disease was reclassified to pulmonary if a positive sputum smear (microscopy) sample was recorded or if a positive culture was grown from a pulmonary laboratory specimen. People with laryngeal TB were included in pulmonary breakdowns, and people with miliary TB were included in both pulmonary and extra-pulmonary breakdowns. Site of disease for people with culture confirmation was reclassified based on the site in the body from which the specimen was taken. Site of disease classifications were also updated using the free text field for site of disease in ETS.

Occupation was re-categorised into the main occupational groups (agricultural/animal care worker, social service/prison, laboratory/pathology, healthcare worker and education) if the occupation documented in the free text field (which is available within ETS for occupational groups recorded as none or other) could be classified into 1 of these occupational groups.

The presence or absence of social risk factors (current or a history of drug misuse, alcohol misuse, homelessness and prison) was updated based on information recorded in free text comments fields within ETS. Drug misuse (current or past use) was updated

to “yes” if recorded as unknown but current or past drug misuse was mentioned in the comments fields. Alcohol misuse was updated if alcohol misuse was mentioned in the comments along with evidence that the person was non-compliant or on DOT, in line with the definition that alcohol misuse affects the ability to self-administer treatment. Homelessness was updated to “yes” if mentioned in the comments fields or if the address given was “no fixed abode” or a shelter/hostel for homeless people was named. Prison (current or in the past) was updated to “yes” if mentioned in the comments fields or if HMP or a prison name was recorded as the address.

Data on incident TB cases reported to the Public Health in Prisons (PHiP) log were used to validate people with TB reported with a current imprisonment on ETS and updates were made where required. People with TB who were remanded in an immigration removal centre were identified if the address given at notification, comments fields or occupation field showed the person to be an immigration detainee. People were identified as asylum seekers through the occupation field sub-category under those grouped as having occupation as ‘none’.

Data cleaning of TB outcomes

If a person was reported on ETS to have died without a date of death entered, ONS mortality data was used where available. If a person was reported on ETS to have died with a date of death entered, this was reviewed and validated against the ONS mortality data. In addition to deaths reported as diagnosed at post-mortem on ETS (where the person was not suspected/diagnosed with TB before death) additional deaths diagnosed post-mortem were identified through review of information in the comments fields, date of diagnosis and date of death. Deaths were re-classified as diagnosed at post-mortem if the date of death was earlier than the date of diagnosis, where date of diagnosis was available. Deaths were re-classified as not diagnosed at post-mortem if a person had a start date of treatment and the TB outcome entered stated that the person died before treatment or while on treatment (indicating that the person was suspected to have TB before death).

People who died and had a treatment start date available were reclassified as died at 12, 24 or 36 months based on the time between the date of starting treatment and the date of death. Where the date of treatment start was not available, the notification date was used. Similarly, for people who completed treatment and a treatment start date was available, reclassification as completed at 12, 24 or 36 months based on the time between the date of treatment start and the date of treatment completion was conducted. Where treatment start date was not available the notification date was used if appropriate.

For people with MDR/RR-TB, the start date of MDR/RR-TB treatment was used to reclassify TB outcome at 12, 24 or 36 months. People with MDR-TB/RR who died were

reclassified based on the time between date of starting MDR/RR-TB treatment and the date of death. Similarly, for people with MDR/RR-TB who had completed treatment, reclassification using the date of starting MDR/RR-TB treatment and date of treatment completion was conducted. Where the MDR/RR-TB treatment start date was not known, people with MDR/RR-TB were not reclassified and the original TB outcome recorded on ETS was used.

Comments fields were also used to identify additional outcomes (completed treatment, died, lost to follow-up, treatment stopped) that were not recorded on ETS. For people who were transferred to another clinic but a duplicate notification was entered in error, the TB outcome was used from the record where it was recorded and the duplicate was removed.

LTBI data

Data production

To obtain a more consistent and robust dataset, data from all 3 sources have been merged using the NHS number, forename and surname. Where no NHS number was provided, the forename, surname and date of birth were used to obtain 1 from the NHS so that the datasets could be matched.

LTBI data limitations

The recording of some important variables (e.g. ‘test invitation or offer’ and ‘IGRA test result’) has not always been consistent and these fields contain missing data (Table Ai.10.1). Data from laboratory services is now routinely collected by PHE with well completed variables although there may be underreporting for some CCGs. Laboratory data was used to determine the number of LTBI tests and calculate the positivity for each CCG except where denoted otherwise. CCGs were requested to submit the number of people offered or invited to be tested obtained from their systems and acceptance was only calculated for CCGs that provided these figures. Laboratory data only provides data on 2 demographic characteristics (age and sex). Other demographic characteristics such as country of birth and ethnicity were only available for people WHO’se record from laboratory data could be matched to their GP data or treatment data.

LTBI overall number of tests

Lab data was used for number of tests and positives except for NHS Blackburn with Darwen and East Lancashire CCGs, NHS Bolton CCG, NHS Central and North Manchester CCG, NHS Slough CCG, NHS South Reading CCH and Find and treat. LTBI test results that were reported as ‘unprocessed’ or ‘rejected’ were

excluded from the dataset. Test results that had not yet been obtained at the time of reporting were reported as unknown results.

LTBI cohort of positives who should be referred

The minimum (first) and maximum (last) treatment start date reported for each CCG were extracted from the treatment data. Three months (90 days) were subtracted from the minimum date to create a cohort start date. All positive tests between the cohort start date and maximum date were included in the cohort of positives that should be referred for treatment.

LTBI number of people started/accessed treatment

This was defined as the number of people that had a treatment start date, a chemo prescription, refused treatment or had a treatment completion date LTBI cohort who should have completed treatment (column M) The maximum (last) IGRA date reported for each CCG was extracted. Four months (120 days) were subtracted from the maximum IGRA date to create a 4-month window to enable treatment completion. Only patients that started treatment prior to this 4-month window were included. People who had their treatment discontinued for reasons such as pregnancy were excluded from this cohort.

LTBI number completed treatment

This was defined as the number of people who reported a date of treatment completion LTBI testing acceptance LTBI testing acceptance was calculated using the number of people invited for testing as the denominator and the number of tests carried out as the numerator. CCGs were requested to provide the number of people invited per year.

LTBI testing acceptance

LTBI testing acceptance was calculated using the number of people invited for testing s the denominator and the number of tests carried out as the numerator. CCGs were requested to provide the number of people invited per year.

UK TB pre-entry screening data

Data collection

Pre-entry screening data was 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 PHE. Data from non-IOM providers was collected by the clinics, collated via the

overseas UK visa application centres and securely transferred to PHE. Full details of data collection, cleaning and analysis are presented in the UK pre-entry TB screening report available at: https://www.gov.uk/government/publications/tuberculosis-pre-entry-screening-in-the-uk.

Reporting methodology

Time periods

TB rates are presented from the year 2000, the first year of enhanced surveillance for TB. TB-HIV co-infection trends are presented from 2001 onwards, the first year both TB and HIV data were available. All other trends are presented displaying the 10 most recent years of data, with the following exceptions; *Mycobacterium* speciation, treatment delay, social risk factors and HIV testing. Social risk factors and HIV testing are presented from the first year data were collected. *Mycobacterium* speciation is presented from 2009 onwards as MTBC was reclassified as *Mycobacterium tuberculosis* prior to 2009 and treatment delay is presented from 2011 onwards when data completeness for symptom onset and treatment start dates were both above 66%. For social risk factors, data was presented from 2010 when this data was available. Where presenting a single year of data would have resulted in the display of small numbers, 5 years have been combined.

Tuberculosis rates

Rates are presented from 2000 to 2018 with overall TB rates per 100,000 population, as well as those by area of reporting, calculated using the mid-year population estimates provided by ONS. Average annual rates per 100,000 for a 3-year period were calculated by dividing the numerator (the number of TB notifications in the 3-year period) by the denominator (the sum of the mid-year population estimates for the same 3-year period) and multiplying by 100,000.

Rates by age, sex, place of birth and ethnic group were calculated using population estimates from the Labour Force Survey (http://www.esds.ac.uk/findingData/qlfs.asp). The LFS is based on a population sample, so estimates are liable to sampling errors, particularly for small population sub-groups, and should be interpreted with caution. CCGs were placed into priority groups for LTBI testing based on the average CCG TB rate per 100,000 between 2011 and 2014, and the TB burden (the proportion of notifications the CCG contributes to the overall number of notifications for England). High incidence CCGs are defined as those with an incidence of 20.0 per 100,000 or above. High burden CCGs are defined as those with a number of notifications equal to or over 0.5% of the total number of notifications in England.

TB rates detected during pre-entry TB screening were calculated by taking the notifications detected as the numerator and the number of applicants screened in the same year as the denominator.

Social risk factors and health inequalities

People with TB were reported as having at least 1 social risk factor (yes) if any of the 4 social risk factors (current alcohol misuse, current or a history of homelessness, drug misuse, and imprisonment) had “yes” recorded. People were only reported to have no social risk factor where all of the 4 risk factors were recorded as “no”. Information on individual social risk factors was also reported separately, regardless of whether information was known for all 4 risk factors. Because of this, the denominator for reporting of at least 1 social risk factor and individual social risk factors may differ.

TB notifications were assigned an Index of Multiple Deprivation (IMD) 2015 rank based on Lower Super Output Area (LSOA) of residence (2011 census). To assign LSOAs to deprivation categories, the LSOAs were first sorted from most to least deprived using the IMD 2015 rank, before being divided into deciles. The LSOA mid-year population estimates were also assigned to these deciles and the rate per decile was calculated by dividing the TB notifications per decile by the population per decile and multiplying by 100,000.

DOT interpretation

The variables for collecting information on DOT are different in ETS and LTBR. In ETS, the relevant variable is “Is the patient to begin a course of treatment under direct observation?”. In LTBR, the relevant variable is “Patient was taking Directly Observed Therapy at any time during the episode of care”. For the purposes of this report, a report of “yes” for either variable was taken as an indication that the person had received DOT.

Reporting of *Mycobacterium* species

Species was reclassified based on WGS lineage; those reported as MTBC with a WGS lineage of EAI, Beijing, CAS, or Euro-american were reclassified as *M. tuberculosis*. Those reported as *M. tuberculosis* or MTBC with a WGS lineage of *M. bovis* or *M. africanum* were reclassified as *M. bovis* or *M. africanum*, respectively.

Reporting drug resistance

Initial resistance was classed as resistance identified within 1 month of the first specimen date. People who had a change from a sensitive to resistant result following treatment were reclassified as having acquired resistance, even if this was within the 1-

month period. If no drug susceptibility results (DST or WGS) were available for isolates cultured in the first month, any subsequent susceptibility results were not used, unless MDR-TB was identified. To ensure that all people with MDR-TB were counted, where the first available drug susceptibility result was after the 1 month cut-off and positive for MDR-TB (with no evidence of acquired resistance), this MDR-TB result was classified as initial resistance.

People with no resistance confirmation (DST or WGS) who were treated with an MDR/RR-TB regimen were identified by recording on ETS that MDR treatment was given (new field in ETS introduced in 2016) or using key word searches on the comments fields.

Whole genome sequencing

The rate of change in DNA sequences of TB has been estimated to be 0.5 single nucleotide polymorphisms (SNPs) per genome per year [18]. Epidemiologically linked cases involved in transmission are unlikely to be identified at SNP distances greater than 12, hence a distance of 12 SNPs is used to define clusters for public health purposes.

Clusters

People that are part of a cluster identified by WGS are referred to as clustered cases.

TB outcome cohorts

TB outcomes are reported for all people notified with TB, including those who started treatment and those who did not (for example those diagnosed post-mortem, died without starting treatment or lost to follow-up without starting treatment). For the purposes of TB outcome reporting, the drug sensitive cohort is defined as all people with TB, excluding those with rifampicin resistant TB or MDR-TB (initial or acquired), or treated with an MDR/RR-TB regimen [5]. In this report, TB outcomes for people with drug sensitive TB were reported separately for the following groups:

1. for people with an expected duration of treatment of less than 12 months, TB outcomes at 12 months are reported. This group excludes people with CNS disease, who have an expected duration of treatment of 12 months. In addition, those with spinal, cryptic disseminated or miliary disease are excluded from this group, as CNS involvement cannot be reliably ruled out for the purposes of reporting.
2. for people with CNS, spinal, cryptic disseminated or miliary disease, the last recorded TB outcome is reported.

The drug resistant cohort included any people with MDR/RR-TB (initial or acquired) as well as those without phenotypic DST or WGS confirmation treated with an MDR/RR-TB regimen.

A TB outcome is assigned to each person within these cohorts; those that have an unknown TB outcome, or recorded as transferred to another clinic, are assigned the outcome “not evaluated”.

As well as reporting outcomes at defined time periods (at 12 and 24 months for drug sensitive and drug resistant cohorts, respectively), a last recorded outcome based on the last known outcome was derived and presented for those still on treatment beyond the 12 and 24 month time periods.

Specifically, for this report the following groups have been presented:

- the drug sensitive cohort with an expected course of treatment of less than 12 months have TB outcomes reported at 12 months, with analysis of treatment completion at 12 months
- the drug sensitive cohort with CNS, spinal, miliary or cryptic disseminated TB have outcomes reported for the last recorded outcome
- analysis of deaths in the entire drug sensitive cohort (including CNS, spinal, miliary or cryptic disseminated TB) are presented for the last recorded outcome
- analysis of those lost to follow-up in the entire drug sensitive cohort was presented for the last recorded outcome
- the drug resistant cohort have TB outcomes reported at 24 months, with analysis of treatment completion at 24 months
- deaths and those lost to follow-up in the drug resistant cohort are reported at the last recorded outcome

Confidence intervals

95% confidence intervals for incidence rates were calculated using a Poisson distribution. For proportions a binomial distribution was used.

Software packages

All statistical analysis was carried out using Stata 15. ArcGIS 10.5 was used to produce all maps shown in the report.

Appendix IV. Surveillance data quality

Data completeness overview

Results presented in the completeness tables are based on data entered into the Enhanced TB Surveillance system (ETS) before additional cleaning had been undertaken for presentation in the rest of the report. Tables Aiv.1- Aiv.7 shows the level of completeness for important variables collected in ETS. The fields “forename”, “surname”, “postcode”, “date of birth”, “NHS number” and “sex”, are mandatory fields in ETS, thus completeness is not reported. Since May 2015, it has been mandatory to enter a valid NHS number or select “no NHS number” for all TB notifications (with the exception of those notified to LTBR).

Demographic variables completeness (Table Aiv.1 and Aiv.2)

NHS Number

This variable is used for matching TB notifications to TB isolates records to ensure information on, for example, culture confirmation and drug resistance, is available for each notification. In addition, this data helps identify duplicate notifications. High completion is therefore extremely important.

In 2018, NHS number completeness was 96% overall, and lowest at 94% in the London PHEC

NHS number completeness on TB isolates received from Mycobacterium Reference Laboratories was 82%, a 6% increase compared to 2017; the largest increases were seen in the South West (+23%), North East (+20%) and North West (+17%) PHECs

Clinical variables completeness (Table Aiv.1 and Aiv.2)

Previous TB treatment

For people with a known previous TB diagnosis, information on previous treatment is also collected. This is important for understanding the role of previous treatment in drug resistance. However, until completion of the previous treatment variable improves, previous diagnosis has to be used as a proxy measure when reporting nationally and internationally:

- in 2018, completeness of previous TB treatment was low (78%); in the North East PHEC it was only 57%

Diagnosis and Treatment variables completeness (Table Aiv.3 and Aiv.4)

Sputum smear status

Sputum smear status among people with pulmonary TB enables quantification of the number and proportion of people that are likely to be most infectious. Results of sputum smear status are collected through manual data entry onto ETS. While onerous, entry of this data is important as currently there are no automated systems available for data collection:

- in 2018, only 65% of people with pulmonary TB had a sputum smear status reported
- completeness was lowest in the South West and North East PHECs, being under 50% for both, while highest in London (77%)
- a large increase in completeness of this variable was seen in the East of England (+10%) and South East (+6%) PHECs

Symptom onset date completeness

This variable is used in the TB Strategy Monitoring indicators 6 and 7, and is vital to assess diagnostic and treatment delays:

- in 2018 completeness of symptom onset date was 92% and was lowest in the North West (85%) and highest in the East Midlands PHEC (98%)

Date first presented completeness[28]

The definition of this variable is the date a person first presented to a healthcare service in relation to their TB symptoms, and is not when first presented to TB services (unless this was the first contact with healthcare). It is important to collect this to assess patient delays in diagnosis compared with healthcare delays, to monitor and improve access to healthcare and early diagnosis:

- in 2018, completeness of date first presented was 88% – the lowest of the 4 important dates used in delay monitoring (symptom onset date, date first presented, date of diagnosis and date of treatment start)
- there was a 2% decrease in completeness between 2017 and 2018

Death variables completeness

Completion of the date of death variable is important to assess the timing of the death in relation to treatment start. Information on the relationship between TB and death is also important to be able to assess the proportion of people with TB who die where TB is the cause of death:

- in 2018, completeness of date of death was 78% overall, a decrease of 3% compared to 2017
- there was large variation in completeness of this variables across PHECs, with 100% completeness in the East of England PHEC, while London had the lowest percentage completeness at 46%
- completeness of the relationship between TB and death (TB caused death/TB contributed to death/TB incidental to death) was only 75%, however this increased by 6% between 2017 and 2018
- the largest increase in completeness of this variable was seen in the West Midlands PHEC (+19%), while the largest decrease was seen in the South East (-11%)

[28] Completion of this field does not include London cases, as this data field is not available in LTBR

Co-morbidities (Table Aiv.5 and Aiv.6)

The co-morbidity variables (diabetes, hepatitis B, hepatitis C, chronic liver disease, chronic renal disease, immunosuppression) and smoking status were introduced to ETS in mid-2015 and to LTBR in mid-2016. Data on these co-morbidities is essential to report and understand case complexity:

- in 2018, overall completeness for reporting (yes/no/unknown) was high for all co-morbidity variables (range 97-98%)
- overall completeness on known status (yes/no) of each co-morbidity varied; diabetes had the highest completeness (95%), whereas hepatitis B and hepatitis C had the lowest completeness (both 88%)
- between 2017 and 2018, completeness of these variables stayed fairly constant

Travel and visitor risk factor variables (Table Aiv.7)[29]

The travel and visitor history risk factor variables were introduced to ETS in May 2015:

- in 2018, completeness for reporting (yes/no/unknown) on travel history and visitor history was 94% and 95%, respectively
- in 2018, travel history was known (yes/no) for 82% of people with TB and visitor history was known (yes/no) for 74%

[29] Completion of this field does not include London notifications, as this data field is not available in LTBR

Table Aiv.1: Percentage completeness of key data fields in ETS by PHE Centre, England, 2018

	Demographic				Clinical				Social risk factor							
	NHS Number[b]		Ethnic group	UK/non-UK born	HIV Testing[c]	Previous TB diagnosis		Previous TB treatment[e]	Drug misuse		Alcohol misuse		Homelessness		Prison	
PHE Centre[a]	ETS	Lab	Known	Known	Known	Known	Reported[d]	Known	Known	Reported	Known	Reported	Known	Reported	Known	Reported
London	94	73	99	98	99	98	100	85	97	99	97	99	97	99	96	99
West Midlands	98	91	100	100	88	96	100	74	95	99	95	99	94	99	92	98
South East	95	89	98	98	97	95	99	79	93	98	94	98	95	98	91	97
North West	98	88	98	97	93	93	98	69	90	97	90	97	89	97	82	97
East of England	95	89	97	98	96	94	97	81	90	96	91	95	90	95	88	96
Yorkshire and the Humber	99	91	98	98	94	96	99	74	90	99	93	98	91	98	85	98
East Midlands	97	89	99	99	94	96	99	71	94	100	93	98	91	98	87	98
South West	99	50	98	98	91	94	97	78	92	96	92	96	89	95	88	95
North East	100	85	100	99	92	97	99	57	93	97	92	97	91	95	92	94
England	**96**	**82**	**99**	**98**	**95**	**96**	**99**	**78**	**94**	**98**	**94**	**98**	**94**	**98**	**91**	**98**

Table Aiv.2: Percentage difference in completeness of key fields in ETS between 2017 and 2018 by PHE Centre, England

	Demographic				Clinical				Social risk factor							
	NHS Number[b]		Ethnic group	UK/non-UK born	HIV Testing[c]	Previous TB diagnosis		Previous TB treatment[e]	Drug misuse		Alcohol misuse		Homelessness		Prison	
PHE Centre[a]	ETS	Lab	Known	Known	Known	Known	Reported[d]	Known	Known	Reported	Known	Reported	Known	Reported	Known	Reported
London	+2	-2	0	-1	0	0	-	+4	-1	-1	0	0	-1	0	-2	0
West Midlands	+1	+10	-	+1	-8	-2	-	-3	-2	0	-1	+1	-1	+1	-3	0
South East	-2	+2	0	0	-3	-1	0	-2	-1	0	0	-1	+1	-1	0	-1
North West	0	+17	0	0	-3	+2	+1	-10	+1	0	+2	0	+3	0	+5	+2
East of England	-1	+9	-2	-1	-4	-2	-2	+1	-5	-3	-4	-4	-4	-3	-5	-2
Yorkshire and the Humber	0	+12	-2	-2	-5	-1	0	+1	-2	+1	-1	0	-1	+1	-2	+1
East Midlands	0	+10	+1	+2	-1	+3	+2	+1	+2	+2	+2	+1	+2	0	+7	+1
South West	+2	+23	0	0	-4	0	-1	-9	+2	-1	+3	-1	+1	-1	+2	-1
North East	+3	+20	-	-1	-3	0	+1	-14	-5	-2	-6	-2	-8	-5	-3	-2
England	**+1**	**+6**	**0**	**-1**	**-3**	**0**	**0**	**-1**	**-1**	**-1**	**-1**	**0**	**0**	**-1**	**0**	**0**

Some of the fields included here are mandatory data entry fields within ETS therefore it is not necessary to show "reported" and "known" for all fields

[a] Ordered by decreasing total number TB notifications in 2018

[b] Data are reported and have a known value

[c] Excludes people diagnosed post-mortem

[d] Data are reported but may be reported as unknown

[e] Includes people with previous TB diagnosis only

Table Aiv.1 key: 99-100% complete | 95-98% complete | <95% complete

Table Aiv.2 key: % increase | No change | % decrease | 100% reached

Table Aiv.3: Percentage completeness of data fields for diagnosis, death and treatment in ETS by PHE Centre, England, 2018

PHE Centre[a]	Diagnosis					Death		Treatment					
	Sputum smear status[b]	Site of disease	Symptom onset date[d]	Date first presented	Date diagnosed[d]	Date of death[e]	Relationship between TB and Death[e]	Start of treatment date[d]	Date treatment completed[f]	Treatment Outcome reported at 12 months[g]		Treatment Outcome reported at 24 months[i]	
	Known[c]	Known	Known	Known	Known	Known	Known	Known	Known	Known	Reported[h]	Known	Reported
London	77	100	91	N/A	89	46	80	97	99	99	100	100	100
West Midlands	56	100	95	92	97	95	75	98	99	100	100	100	100
South East	65	100	95	86	98	76	62	98	99	99	100	90	90
North West	56	100	85	85	95	94	75	97	99	99	100	100	100
East of England	63	100	89	77	94	100	80	97	100	100	100	97	97
Yorkshire and the Humber	69	100	93	89	98	94	81	93	97	97	99	72	72
East Midlands	58	100	98	95	99	96	55	98	99	98	99	95	98
South West	49	100	92	92	97	86	83	97	99	97	98	95	95
North East	44	100	97	97	99	80	75	97	100	94	96	100	100
England	**65**	**100**	**92**	**88**	**94**	**78**	**75**	**97**	**99**	**99**	**100**	**97**	**97**

Table Aiv.4: Percentage difference in completeness of data fields for diagnosis, death and treatment in ETS between 2017 and 2018 by PHE Centre, England

PHE Centre[a]	Diagnosis					Death		Treatment					
	Sputum smear status[b]	Site of disease	Symptom onset date[d]	Date first presented	Date diagnosed[d]	Date of death[e]	Relationship between TB and Death[e]	Start of treatment date[d]	Date treatment completed[f]	Treatment Outcome reported at 12 months[g]		Treatment Outcome reported at 24 months[i]	
	Known[c]	Known	Known	Known	Known	Known	Known	Known	Known	Known	Reported[h]	Known	Reported
London	-3	-	-3	N/A	-2	-7	+1	-1	0	-1	-	-	-
West Midlands	-3	-	-2	-4	-3	+1	+19	-1	0	+1	-	-	-
South East	+6	-	-3	-4	0	-15	-11	-1	0	0	+1	-10	-10
North West	+1	-	-3	+1	-1	-1	+9	-1	+1	-1	-	-	-
East of England	+10	-	-3	-4	-3	+11	+13	-2	-	-	-	-3	-3
Yorkshire and the Humber	-3	-	-5	-5	-1	+12	+12	-4	0	-1	0	-12	-15
East Midlands	+1	-	0	+4	+3	+3	+7	+1	0	+1	0	-5	-2
South West	-2	-	-2	-1	-1	-14	+10	-2	+1	0	-2	-5	-5
North East	+2	+1	+2	-1	0	-20	-8	-1	-	-5	-3	-	-
England	**0**	**0**	**-3**	**-2**	**-1**	-3	+6	-1	0	0	0	-2	-2

For treatment outcome variables - recording of 'not completed', or 'transferred out' are counted as unknown and not reported. Date first presented completeness does not include London cases, as this data field is not available in LTBR

[a] Ordered by decreasing total number of TB notifications in 2018
[b] People with pulmonary TB only
[c] Data are reported and have a known value
[d] Excludes people diagnosed post-mortem
[e] People notified in the previous year that have treatment outcome died only
[f] People notified in the previous year that have completed treatment only
[g] For people notified in the previous year
[h] Data are reported but may be reported as unknown
[i] For people notified 2 years prior to the reporting year and still on treatment at 12 months

Table Aiv.3 key: 99-100% complete | 95-98% complete | <95% complete

Table Aiv.4 key: % increase | No change | % decrease | 100% reached

Table Aiv.5: Percentage completeness of data fields for co-morbidities in ETS by PHE Centre, England, 2018

PHE Centre[a]	Co-morbidities													
	Diabetes		Hepatitis B		Hepatitis C		Chronic liver disease		Chronic renal disease		Immunosuppression		Smoker	
	Known[b]	Reported[c]	Known	Reported	Known	Reported	Known	Reported	Known	Reported	Known	Reported	Known	Reported
London	97	99	94	98	94	98	97	98	97	98	97	98	93	97
West Midlands	92	98	85	97	85	97	90	98	91	97	91	99	83	98
South East	96	98	82	98	82	98	94	98	94	97	93	98	92	99
North West	91	97	84	97	83	96	89	97	91	97	91	97	87	97
East of England	92	95	84	93	82	92	88	92	90	94	89	94	88	96
Yorkshire and the Humber	95	99	87	99	87	99	92	99	93	99	91	99	89	99
East Midlands	97	99	89	99	89	99	94	98	96	99	94	99	88	100
South West	94	96	82	95	82	95	92	96	93	96	93	96	89	95
North East	95	97	94	97	91	95	95	96	96	97	97	97	92	97
England	**95**	**98**	**88**	**97**	**88**	**97**	**93**	**97**	**94**	**97**	**94**	**98**	**90**	**97**

Table Aiv.6: Percentage difference in completeness of data fields for co-morbidities in ETS between 2017 and 2018 by PHE centre, England

PHE Centre[a]	Co-morbidities													
	Diabetes		Hepatitis B		Hepatitis C		Chronic liver disease		Chronic renal disease		Immunosuppression		Smoker	
	Known[b]	Reported[c]	Known	Reported	Known	Reported	Known	Reported	Known	Reported	Known	Reported	Known	Reported
London	-1	0	-1	0	-1	0	0	-1	-1	-1	0	-1	-2	-1
West Midlands	-2	-1	-1	0	-2	-1	-2	0	-1	-1	0	+1	-4	0
South East	+1	-1	-5	0	-5	0	+1	0	0	-1	+1	0	0	0
North West	0	0	+6	+1	+6	0	0	+1	+1	+1	+4	+1	+2	0
East of England	-3	-2	-5	-3	-8	-4	-2	-2	-2	-2	-4	-2	-2	-1
Yorkshire and the Humber	+1	+1	+4	+2	+3	+2	+1	+2	+1	+2	0	+2	0	+2
East Midlands	+4	+2	+10	+2	+11	+3	+3	+3	+4	+4	+2	+3	+4	+5
South West	-2	-2	-1	-2	-1	-1	-2	-1	0	0	0	-1	0	-2
North East	-4	-3	-1	-3	-3	-4	-5	-4	-2	-3	-3	-3	-6	-3
England	**0**	**0**	**0**	**0**	**0**	**-1**	**-1**	**0**	**0**	**-1**	**+1**	**0**	**-1**	**0**

[a] Ordered by decreasing total number of TB notifications in 2018
[b] Data are reported and have a known value
[c] Data reported but may be reported as unknown

Table Aiv.5 key: 99-100% complete | 95-98% complete | <95% complete

Table Aiv.6 key: % increase | No change | % decrease | 100% reached

Table Aiv.7: Percentage completeness and difference to previous year of data fields for travel and visitor history in ETS by PHE centre, England[a], 2018

PHE Centre[b]	Risk factor							
	Travel history outside the UK[c]				Visitors received from outside the UK[c]			
	Known[d]		Reported[e]		Known[c]		Reported[e]	
	Completed %	Difference %[f]	Completed %	Difference %[f]	Completed %	Difference %[f]	Completed %	Difference %[f]
West Midlands	91	-1	98	0	88	-3	99	+1
South East	79	-3	88	-4	73	-1	89	-4
North West	78	+7	97	+2	71	+7	97	+1
East of England	79	-1	84	-4	72	-2	84	-5
Yorkshire and the Humber	81	0	98	+1	65	+3	99	+1
East Midlands	83	+9	99	+6	64	+3	99	+4
South West	78	+2	95	-2	65	+1	95	-2
North East	90	-7	95	-4	90	-8	97	-3
England	**82**	+1	**94**	-1	**74**	+1	**95**	0

[a] Excludes London notifications (as these data fields are not available in LTBR)
[b] Ordered by decreasing total number of TB notifications in 2018
[c] Excluding countries within Western Europe, US, Canada, New Zealand and Australia
[d] Data are reported and have a known value
[e] Data reported but may be reported as unknown
[f] Between 2017 and 2018

Table Aiv.7 key:

Completed%:	99-100% complete	95-98% complete	<95% complete	
Difference%:	% increase	No change	% decrease	100% reached

Appendix V. National level data for TB strategy monitoring indicators, England, 2000 to 2018

Year	Indicator 1			Indicator 2						Indicator 5		
	Overall TB incidence per 100,000 population			TB incidence in UK born and non-UK born populations						Incidence of TB in UK born children aged under 15 years		
				UK born			Non- UK born					
	Number of cases	Rate	95% CI	Number of cases	Rate	95% CI	Number of cases	Rate	95% CI	Number of cases	Rate	95% CI
2000	6,044	12.3	12.0-12.6	1,830	4.1	3.9-4.3	3,329	79.6	76.9-82.4	209	2.3	2.0-2.6
2001	6,169	12.5	12.2-12.8	1,889	4.3	4.1-4.4	3,431	79.1	76.5-81.8	229	2.5	2.2-2.9
2002	6,675	13.4	13.1-13.8	1,852	4.2	4.0-4.4	4,111	90.5	87.7-93.3	228	2.6	2.2-2.9
2003	6,631	13.3	13.0-13.6	1,703	3.8	3.6-4.0	4,326	90.8	88.1-93.5	179	2.0	1.7-2.3
2004	6,930	13.8	13.5-14.1	1,791	4.0	3.8-4.2	4,571	95.2	92.4-98.0	264	3.0	2.6-3.4
2005	7,658	15.1	14.8-15.5	1,804	4.0	3.8-4.2	5,186	100.7	98.0-103.5	247	2.8	2.5-3.2
2006	7,682	15.1	14.7-15.4	1,729	3.9	3.7-4.1	5,175	92.9	90.4-95.5	209	2.4	2.1-2.8
2007	7,577	14.7	14.4-15.1	1,799	4.0	3.8-4.2	5,135	85.5	83.2-87.9	290	3.4	3.0-3.8
2008	7,809	15.1	14.7-15.4	1,867	4.2	4.0-4.4	5,417	86.0	83.7-88.3	294	3.4	3.0-3.8
2009	8,112	15.5	15.2-15.9	1,907	4.2	4.1-4.4	5,662	86.8	84.6-89.1	257	2.9	2.6-3.3
2010	7,676	14.6	14.3-14.9	1,814	4.0	3.8-4.2	5,515	83.1	80.9-85.3	238	2.7	2.4-3.1
2011	8,280	15.6	15.3-15.9	1,958	4.3	4.1-4.5	6,021	85.9	83.7-88.1	234	2.6	2.3-3.0
2012	8,084	15.1	14.8-15.4	2,004	4.4	4.2-4.6	5,840	81.4	79.4-83.6	254	2.9	2.5-3.2
2013	7,266	13.5	13.2-13.8	1,842	4.0	3.8-4.2	5,260	70.6	68.7-72.6	195	2.2	1.9-2.5
2014	6,473	11.9	11.6-12.2	1,757	3.8	3.6-4.0	4,611	60.2	58.5-62.0	187	2.1	1.8-2.4
2015	5,736	10.5	10.2-10.7	1,532	3.3	3.2-3.5	4,100	51.3	49.8-52.9	157	1.7	1.5-2.0
2016	5,618	10.2	9.9-10.4	1,456	3.2	3.0-3.3	4,093	49.4	47.9-50.9	163	1.8	1.5-2.1
2017	5,070	9.1	8.9-9.4	1,426	3.1	2.9-3.2	3,571	41.2	39.9-42.6	127	1.4	1.1-1.6
2018	4,655	8.3	8.1-8.6	1,297	2.8	2.6-2.9	3,283	39.0	37.7-40.4	110	1.2	1.0-1.4

Year	Indicator 6			Indicator 7			Indicator 8			Indicator 9		
	Number and proportion of pulmonary TB cases starting treatment within 2 months of symptom onset			Number and proportion of pulmonary TB cases starting treatment within 4 months of symptom onset			Number and proportion of pulmonary TB cases that were culture confirmed			Number and proportion of microbiologically confirmed cases with drug susceptibility testing reported for the 4 first line agents		
	Number of cases	Proportion	95% CI	Number of cases	Proportion	95% CI	Number of cases	Proportion	95% CI	Number of cases	Proportion	95% CI
2000	-	-	-	-	-	-	1,920	52.7	51.1-54.3	2,779	99.4	99.0-99.6
2001	-	-	-	-	-	-	2,100	57.2	55.6-58.8	3,141	99.2	98.8-99.4
2002	-	-	-	-	-	-	2,631	64.7	63.2-66.2	3,784	98.6	98.2-99.0
2003	-	-	-	-	-	-	2,614	66.2	64.7-67.7	3,801	99.2	98.9-99.5
2004	-	-	-	-	-	-	2,753	68.3	66.9-69.7	4,014	98.6	98.2-98.9
2005	-	-	-	-	-	-	3,012	69.2	67.8-70.6	4,532	98.9	98.6-99.2
2006	-	-	-	-	-	-	3,009	69.5	68.1-70.8	4,611	98.7	98.4-99.0
2007	-	-	-	-	-	-	2,848	68.4	66.9-69.8	4,355	98.3	97.8-98.6
2008	-	-	-	-	-	-	2,921	67.7	66.3-69.1	4,431	97.7	97.2-98.1
2009	-	-	-	-	-	-	3,023	68.1	66.7-69.4	4,520	96.8	96.2-97.3
2010	-	-	-	-	-	-	2,902	70.7	69.3-72.0	4,495	97.3	96.8-97.7
2011	1,339	44.9	43.1-46.7	2,210	74.1	72.5-75.7	3,139	72.0	70.7-73.3	4,890	96.9	96.3-97.3
2012	1,390	43.9	42.2-45.7	2,334	73.7	72.2-75.2	3,012	70.6	69.2-72.0	4,784	97.6	97.2-98.0
2013	1,240	41.2	39.4-42.9	2,156	71.6	69.9-73.2	2,770	73.3	71.9-74.7	4,247	96.6	96.0-97.1
2014	1,174	39.5	37.7-41.2	2,071	69.6	67.9-71.2	2,521	73.2	71.7-74.7	3,834	97.5	96.9-97.9
2015	1,199	42.1	40.3-44.0	2,050	72.0	70.4-73.6	2,296	74.4	72.8-75.9	3,440	98.1	97.6-98.5
2016	1,093	38.3	36.5-40.1	1,960	68.7	66.9-70.3	2,374	77.0	75.5-78.4	3,442	95.9	95.2-96.5
2017	993	38.1	36.2-40.0	1,778	68.2	66.4-69.9	2,129	75.6	74.0-77.2	3,070	96.8	96.1-97.4
2018	963	40.6	38.6-42.6	1,681	70.8	69.0-72.6	1,972	74.0	72.3-75.7	2,773	97.3	96.6-97.8

Year	Indicator 10			Indicator 11			Indicator 12		
	Number and proportion of drug sensitive TB cases who had completed a full course of treatment by 12 months			Number and proportion of drug sensitive TB cases who were lost to follow-up at last reported outcome			Number and proportion of drug sensitive TB cases who had died at last reported outcome		
	Number of cases	Proportion	95% CI	Number of cases	Proportion	95% CI	Number of cases	Proportion	95% CI
2000	-	-	-	-	-	-	-	-	-
2001	3,628	63.7	62.5-65.0	237	3.9	3.4-4.4	377	6.1	5.6-6.8
2002	4,113	67.4	66.2-68.5	296	4.5	4.0-5.0	436	6.6	6.0-7.2
2003	4,191	69.6	68.4-70.7	291	4.4	4.0-5.0	407	6.2	5.6-6.8
2004	4,426	70.1	69.0-71.2	333	4.9	4.4-5.4	402	5.9	5.3-6.4
2005	4,878	70.3	69.3-71.4	381	5.0	4.5-5.5	448	5.9	5.4-6.4
2006	5,211	75.5	74.5-76.5	413	5.4	4.9-6.0	430	5.7	5.2-6.2
2007	5,289	78.2	77.2-79.2	345	4.6	4.1-5.1	432	5.8	5.3-6.3
2008	5,602	80.3	79.3-81.2	368	4.8	4.3-5.3	436	5.6	5.1-6.2
2009	5,918	81.9	81.0-82.8	354	4.4	4.0-4.9	419	5.2	4.7-5.7
2010	5,650	82.9	82.0-83.8	342	4.5	4.1-5.0	382	5.0	4.6-5.5
2011	6,024	82.1	81.2-83.0	425	5.2	4.7-5.7	382	4.7	4.2-5.1
2012	6,016	83.8	82.9-84.6	365	4.6	4.1-5.0	390	4.9	4.4-5.4
2013	5,504	85.7	84.8-86.5	298	4.1	3.7-4.6	335	4.7	4.2-5.2
2014	4,848	84.9	84.0-85.8	274	4.3	3.8-4.8	354	5.5	5.0-6.1
2015	4,199	83.9	82.8-84.9	251	4.4	3.9-5.0	346	6.1	5.5-6.8
2016	4,223	85.0	84.0-86.0	227	4.1	3.6-4.6	305	5.5	4.9-6.1
2017	3,796	84.7	83.6-85.7	210	4.2	3.7-4.8	264	5.3	4.7-5.9
2018	-	-	-	-	-	-	-	-	-

Year	Indicator 13			Indicator 14			Indicator 15		
	Number and proportion of TB cases with rifampicin resistance or MDR-TB who had completed treatment at 24 months			Number and proportion of TB cases with rifampicin resistance or MDR-TB who were lost to follow-up at last reported outcome			Number and proportion of TB cases with rifampicin resistance or MDR-TB who had died at last reported outcome		
	Number of cases	Proportion	95% CI	Number of cases	Proportion	95% CI	Number of cases	Proportion	95% CI
2000	-	-	-	-	-	-	-	-	-
2001	-	-	-	-	-	-	-	-	-
2002	-	-	-	-	-	-	-	-	-
2003	-	-	-	-	-	-	-	-	-
2004	37	52.1	40.7-63.3	9	12.7	6.8-22.4	4	5.6	2.2-13.6
2005	38	64.4	51.7-75.4	8	13.6	7.0-24.5	3	5.1	1.7-13.9
2006	40	50.0	39.3-60.7	8	10.0	5.2-18.5	3	3.8	1.3-10.5
2007	30	42.3	31.5-53.8	6	8.5	3.9-17.2	10	14.1	7.8-24.0
2008	45	57.7	46.6-68.0	10	12.8	7.1-22.0	7	9.0	4.4-17.4
2009	40	51.9	41.0-62.7	11	14.3	8.2-23.8	4	5.2	2.0-12.6
2010	38	48.1	37.4-58.9	9	11.4	6.1-20.3	1	1.3	0.2-6.8
2011	48	50.5	40.6-60.4	18	18.9	12.3-28.0	6	6.3	2.9-13.1
2012	58	61.7	51.6-70.9	10	10.6	5.9-18.5	4	4.3	1.7-10.4
2013	51	60.0	49.4-69.8	14	16.5	10.1-25.8	4	4.7	1.8-11.5
2014	38	52.8	41.4-63.9	14	19.4	12.0-30.0	2	2.8	0.8-9.6
2015	41	61.2	49.2-72.0	5	7.5	3.2-16.3	5	7.5	3.2-16.3
2016	45	65.2	53.4-75.4	7	10.1	5.0-19.5	6	8.7	4.0-17.7
2017	-	-	-	-	-	-	-	-	-
2018	-	-	-	-	-	-	-	-	-

Year	Indicator 16			Indicator 17			Indicator 18			Indicator 19		
	Number and proportion of TB cases offered an HIV test			Number and proportion of drug sensitive TB cases with at least 1 social risk factor who completed treatment within 12 months			Number and proportion of culture confirmed TB cases with any first line drug resistance			Number and proportion of culture confirmed TB cases with multi-drug resistance TB		
	Number of cases	Proportion	95% CI	Number of cases	Proportion	95% CI	Number of cases	Proportion	95% CI	Number of cases	Proportion	95% CI
2000	-	-	-	-	-	-	193	6.9	6.0-7.9	28	1.0	0.7-1.4
2001	-	-	-	-	-	-	228	7.2	6.4-8.2	23	0.7	0.5-1.1
2002	-	-	-	-	-	-	296	7.8	7.0-8.7	34	0.9	0.6-1.2
2003	-	-	-	-	-	-	308	8.0	7.2-9.0	49	1.3	1.0-1.7
2004	-	-	-	-	-	-	324	8.0	7.2-8.9	45	1.1	0.8-1.5
2005	-	-	-	-	-	-	346	7.6	6.9-8.4	41	0.9	0.7-1.2
2006	-	-	-	-	-	-	371	8.0	7.3-8.8	54	1.2	0.9-1.5
2007	-	-	-	-	-	-	331	7.5	6.8-8.4	49	1.1	0.8-1.5
2008	-	-	-	-	-	-	307	6.9	6.1-7.6	50	1.1	0.8-1.5
2009	-	-	-	-	-	-	371	8.1	7.3-8.9	59	1.3	1.0-1.7
2010	-	-	-	373	73.6	69.6-77.2	323	7.1	6.4-7.9	65	1.4	1.1-1.8
2011	-	-	-	371	71.5	67.5-75.2	413	8.3	7.6-9.1	81	1.6	1.3-2.0
2012	5,205	93.2	92.5-93.8	394	74.9	71.0-78.4	360	7.4	6.7-8.2	76	1.6	1.3-2.0
2013	5,788	93.6	92.9-94.2	402	77.2	73.4-80.6	327	7.6	6.9-8.4	67	1.6	1.2-2.0
2014	5,402	95.4	94.8-95.9	361	74.9	70.8-78.6	286	7.3	6.5-8.2	53	1.4	1.0-1.8
2015	4,951	96.3	95.7-96.8	392	75.5	71.7-79.0	255	7.3	6.5-8.2	45	1.3	1.0-1.7
2016	5,024	97.0	96.5-97.4	368	76.5	72.5-80.1	265	7.5	6.7-8.4	53	1.5	1.1-2.0
2017	4,554	96.5	95.9-97.0	358	74.7	70.7-78.4	269	8.6	7.6-9.6	44	1.4	1.0-1.9
2018	4,091	96.8	96.2-97.3	-	-	-	322	11.4	10.3-12.6	34	1.2	0.9-1.7

Metadata for TB Strategy Monitoring Indicators, England

Rates presented are crude rates per 100,000 population. 95% confidence intervals (CI) for rates were calculated assuming a Poisson distribution. The remaining indicators are all presented as proportions, with 95% binomial CIs.

Indicator 1: TB incidence per 100,000 population:

Numerator: Annual TB case notifications, England.

Denominator: Office for National Statistics mid-year population estimate, England.

Indicator 2: TB incidence per 100,000 population by place of birth:

Numerator: Annual TB notifications, England, by place of birth.

Denominator: Labour Force Survey annual population estimates by place of birth, England.

Indicator 5: TB incidence per 100,000 population in UK born children aged under 15 years:

Numerator: Annual TB case notifications in UK born children aged under 15 years, England.

Denominator: Labour Force Survey annual population estimate of UK born children aged under 15 years, England.

Indicator 6: Number and proportion of pulmonary TB cases starting treatment within 2 months of symptom onset:

Numerator: Annual number of pulmonary TB cases starting treatment within 61 days of symptom onset.

Denominator: Annual number of pulmonary TB cases notified.
Exclusions: TB cases with no date of symptom onset or no date of treatment start.

Indicator 7: Number and proportion of pulmonary TB cases starting treatment within 4 months of symptom onset:

Numerator: Annual number of pulmonary TB cases starting treatment within 121 days of symptom onset.

Denominator: Annual number of pulmonary TB cases notified.

Exclusions: TB cases with no date of symptom onset or no date of treatment start.

Indicator 8: Number and proportion of pulmonary TB cases that were culture confirmed:

Numerator: Annual number of pulmonary TB cases with a positive culture for *Mycobacterium tuberculosis* complex.

Denominator: Annual number of notified pulmonary TB cases.

Indicator 9: Number and proportion of culture confirmed TB cases with drug susceptibility testing reported for the 4 first line agents:

Numerator: Annual number of culture confirmed notified TB cases with DST or WGS resistance predictions reported for all of the following drugs: isoniazid, rifampicin, ethambutol and pyrazinamide.

Denominator: Annual number of culture confirmed notified TB cases.

Indicator 10: Number and proportion of drug sensitive TB cases who had completed a full course of treatment by 12 months:

Numerator: Number of drug sensitive TB cases notified in a given year who had completed a full course of treatment within 12 months of treatment start date.

Denominator: Number of drug sensitive TB cases notified with TB that year.

Exclusions: cases with rifampicin resistance or multi-drug resistant TB (MDR-TB), and cases with CNS, spinal, miliary or disseminated TB who may require longer than the standard 6 month treatment course.

Indicator 11: Number and proportion of drug sensitive TB cases that were lost to follow-up at last reported outcome:

Numerator: Number of drug sensitive TB cases notified in a given year who were lost to follow-up at last reported outcome.

Denominator: Number of drug sensitive TB cases notified in that year.

Exclusions: cases with rifampicin resistance or MDR-TB.

Indicator 12: Number and proportion of drug sensitive TB cases that had died at last reported outcome:

Numerator: Number of drug sensitive TB cases notified in a given year who had died at last reported outcome.

Denominator: Number of drug sensitive TB cases notified in that year.

Exclusions: as for indicator 11.

Indicator 13: Number and proportion of drug resistant TB cases who had completed treatment at 24 months:

Numerator: Annual number of notified TB cases with rifampicin resistance or MDR-TB who had completed treatment within 24 months of start of treatment.

Denominator: Annual number of notified TB cases with rifampicin resistance or MDR-TB.

Indicator 14: Number and proportion of drug resistant TB cases who were lost to follow-up at last reported outcome:

Numerator: Annual number of notified TB cases with rifampicin resistance or MDR-TB who were lost to follow-up at last reported outcome.

Denominator: Annual number of notified TB cases with rifampicin resistance or MDR-TB.

Indicator 15: Number and proportion of drug resistant TB cases who had died at last reported outcome:

Numerator: Annual number of notified TB cases with rifampicin resistance or MDR-TB who had died at last reported outcome.

Denominator: Annual number of notified TB cases with rifampicin resistance or MDR-TB.

Indicator 16: Number and proportion of TB cases offered an HIV test:

Numerator: Annual number of notified TB cases reported to have been offered an HIV test.

Denominator: Annual number of notified TB cases.

Exclusions: cases where HIV status already known, and cases diagnosed post mortem.

Indicator 17: Number and proportion of drug sensitive TB cases with at least 1 social risk factor who completed treatment within 12 months:

Numerator: Annual number of drug sensitive TB cases with at least 1 social risk factor (current or past history of drug or alcohol misuse, homelessness or imprisonment) who have completed treatment within 12 months of treatment start date.

Denominator: Number of drug sensitive TB cases with at least 1 social risk factor notified with TB that year. Exclusions: as for indicator 10.

Indicator 18: Number and proportion of culture confirmed TB cases with any first line drug resistance:

Numerator: Annual number of culture confirmed TB cases with resistance to isoniazid, rifampicin, ethambutol or pyrazinamide.

Denominator: Annual number of culture confirmed TB cases.

Exclusions: Mycobacterium bovis cases.

Indicator 19: Annual number and proportion of culture confirmed TB cases with MDR-TB:

Numerator: Number of culture confirmed cases with resistance to at least isoniazid and rifampicin.

Denominator: Annual number of notified culture confirmed TB cases.

List of acronyms

BCG	Bacillus Calmette-Guérin vaccination
BTS	British Thoracic Society
CCG	Clinical commissioning group
CHIS	Child Health Information systems
CI	Confidence Intervals
COVER	Cover of Vaccination Evaluated Rapidly
CNS	Central nervous system
DOT	Directly Observed Therapy
DST	Drug susceptibility testing
ETS	Enhanced TB Surveillance system
GP	General Practice
HANDD	HIV & AIDS New Diagnosis Database
HIV	Human immunodeficiency virus
HMP	Her Majesty's Prison service
IRC	Immigration removal centre
IGRA	Interferon gamma release assay
INH-R	Isoniazid resistance
IMD	Index of Multiple Deprivation
IOM	International Organisation of Migration
IQR	Inter-quartile range
JSNA	Joint Strategic Needs Assessment
LA	Local authority
LFS	Labour Force Survey
LSOA	Lower Super Output Area
LTBI	Latent TB infection
LTBR	London TB Register
MDR-TB	Multi-drug resistant TB
MDR/RR-TB	Multi-drug resistant/rifampicin resistant TB
MDT	Multidisciplinary team
MIRU-VNTR	Mycobacterial Interspersed Repetitive Uni-Variable Number Tandem Repeats
MTBC	Mycobacterium tuberculosis complex
NHS	National Health Service
ONS	Office for National Statistics
PCR	Polymerase chain reaction
PDS	Personal Demographic Service
PHE	Public Health England
PHEC	Public Health England Centre
PHiP	Public Health in Prisons
RCGP	Royal College of General Practitioners
SNP	Single Nucleotide Polymorphism
SRF	Social risk factor
SCCI	Standardisation Committee for Care Information
SOPHID	Survey of Prevalent HIV Infections Diagnosed
TB	Tuberculosis
TBCBs	TB Control Boards
VOT	Virtually Observed Treatment
USPs	Under-served populations
WGS	Whole genome sequencing
XDR-TB	Extensively drug resistant TB

Glossary

Acquired resistance
Acquired resistance is classed as resistance identified on repeat culture 1 or more months after the first specimen date. In addition, people with a change from a sensitive to resistant result following treatment start are reclassified as having acquired resistance, even if this is within the 1-month period.

Drug resistant cohort
The drug resistant cohort includes any people with rifampicin resistant TB (initial or acquired), including MDR-TB (initial or acquired), as well as people treated with a second line regimen without confirmation through phenotypic DST or WGS resistance predictions.

Drug sensitive cohort
The drug sensitive cohort excludes all people with rifampicin resistant TB (initial or acquired) including MDR-TB (initial, acquired or treated).

Extensively-drug resistant TB (XDR-TB)
XDR-TB is defined as resistance to isoniazid and rifampicin (MDR-TB), at least 1 injectable agent (capreomycin, kanamycin or amikacin) and at least 1 fluoroquinolone (moxifloxacin, ofloxacin, ciprofloxacin).

First-line drug resistance
First-line drug resistance is defined as resistance to at least 1 of the first line drugs (isoniazid, rifampicin, ethambutol or pyrazinamide).

Initial resistance
Initial resistance is classed as resistance identified within 3 months of the first specimen date.

Latent TB infection (LTBI)
LTBI is defined as a state of persistent immune response to stimulation by Mycobacterium tuberculosis antigens without evidence of active TB disease.

Last recorded outcome
Last known outcome, irrespective of when it occurred compared to treatment start.

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

Multi-drug resistant/Rifampicin resistant TB (MDR/RR-TB)

MDR/RR-TB is defined as resistance to rifampicin including people with MDR-TB.

Post-mortem diagnosis

A person diagnosed at post-mortem is defined as having TB which was not suspected before death, but a TB diagnosis was made at post-mortem, with pathological and/or microbiological findings consistent with active TB that would have warranted anti-TB treatment if discovered before death.

Pulmonary tuberculosis

A person with pulmonary TB is defined as having TB involving the lungs and/or tracheo-bronchial tree, with or without extra-pulmonary TB diagnosis. In this report, in line with the WHO's recommendation and international reporting definitions, miliary TB is classified as pulmonary TB due to the presence of lesions in the lungs, and laryngeal TB is also classified as pulmonary TB.

Social risk factor

Social risk factors for TB include current alcohol misuse, current or history of homelessness, current or history of imprisonment and current or history of drug misuse.

Under-served populations

Under-served populations refer to people with TB who have a social risk factor (current alcohol misuse, current or history of homelessness, imprisonment and drug misuse), as well as those who were remanded in an immigration removal centre, identified as asylum seekers or unemployed.

WGS cluster

Clusters in this document refer to molecular clusters only. These are defined as 2 or more people who are infected with a strain of Mycobacterium tuberculosis complex who are within 12 single nucleotide polymorphisms (SNPs).