



UK Health
Security
Agency

Tuberculosis in the East Midlands

Annual review (2020 data)

Data from 2000 to 2020

Contents

Executive summary.....	3
1. TB notifications and incidence	8
2. Demographic characteristics.....	15
3. Clinical characteristics.....	23
4. Laboratory confirmation of TB.....	25
5. Delay from onset of symptoms to start of treatment.....	26
6. TB outcomes in drug sensitive cohort	27
7. Drug-resistant TB (including outcomes in the drug-resistant cohort)	30
8. TB in under-served populations	33
9. HIV testing of TB patients	37
References.....	38
Appendix A. Notes on the report.....	39
Appendix B. Description of data sources and definitions	40
Appendix C. TB among East Midlands residents	44
Appendix D. All TB patients notified by East Midlands clinics	47
Appendix E. Local authority TB epidemiological summaries.....	47
Acknowledgements	48

The data presented in this report uses the final data download for 2020.

Executive summary

National and regional

In 2020, there were 310 tuberculosis (TB) case reports to the Public Health England (PHE) Enhanced Tuberculosis Surveillance system (ETS)¹ for individuals resident in the East Midlands. The East Midlands has lower rates of TB than England as a whole. In 2020, the 310 cases equated to a rate of 6.4 cases per 100,000 population (95% confidence interval [CI] 5.7-7.1), compared to 7.3 per 100,000 (95% CI 7.1-7.5) in England overall (1). In the East Midlands, both the number of cases and rate of TB decreased in 2020 compared to 2019 – it is thought this is likely to be due to the coronavirus (COVID-19) pandemic resulting in under diagnosis due to re-prioritisation of clinical services during the pandemic.

In England the rate of TB also decreased from 8.4 cases per 100,000 in 2019 to 7.3 cases per 100,000 in 2020, which supports the general downwards trend in national TB rates observed since 2011.

Local

Case numbers decreased in 6 out of 9 local authorities², with the largest reduction in numbers observed in West Northamptonshire (24 cases versus 41 in 2019), Leicester (131 cases versus 146 in 2019) and Nottingham (36 cases versus 48 in 2019). Leicester has a much higher case rate than the other local authorities in the East Midlands, with 37.0 cases per 100,000; followed by Nottingham (10.7 per 100,000) and Derby (10.5 per 100,000). Increases in cases were observed between 2019 and 2020 in Derbyshire (+50%, 15 cases versus 10 in 2019) and Lincolnshire (+20%, 24 cases versus 20 in 2019). Although at the level of the local authority some natural fluctuation of numbers is expected, this data highlights the importance of having sufficiently resilient resourced services in place to deal with higher than expected numbers of cases.

Age and sex

The highest age and sex specific rates of TB in the East Midlands were recorded among men aged 30 to 39 years (16.7 per 100,000) and women aged 30 to 39 years (10.2 per 100,000). Since 2019, TB rates have declined in all age groups, with the largest decrease in the 15 to 44 age group (9.6 per 100,000 in 2020 versus 11.1 per 100,000 in 2019).

¹ At time of writing UKHSA National TB Surveillance system (NTBS).

² Rutland and Leicestershire have been combined for the purposes of this report.

Ethnic groups and origin

Individuals with a country of birth outside of the UK accounted for 73% of people with TB in the East Midlands in 2020 (222 out of 303) and experienced a rate of TB 19 times higher than the rate among UK born individuals. This largely reflects the higher incidence of TB in the cases' respective countries of birth. The rate of TB in the East Midlands among UK born individuals has remained relatively stable since 2015. A decrease in rate was observed in non-UK born individuals between 2019 and 2020 (46.4 versus 36.6 per 100,000 in 2019).

India continues to be the most common country of birth outside of the UK for people with TB (50%, of non-UK cases, 111 out of 222), followed by Pakistan, Romania, Eritrea and Poland (all <10% of non-UK cases). The proportions of patients among these 5 most common countries of birth for TB patients born outside the UK retain very similar values to 2019, with a slightly larger fluctuational increase in patients from Poland and Eritrea.

Collectively, patients with a south-Asian ethnicity made up half (51%, 159 out of 309) of cases, of whom the majority were of Indian ethnicity (82%, 130 out of 159). People of White ethnicity made up 31% of cases (97 out of 309), of whom the large majority (63%, 61 out of 97) were UK-born. People of Black ethnicity made up 13% (40 out of 309) of cases, of whom 80% (32 out of 40) were Black-African. Similar to previous years, 35% (76 out of 216) of TB cases among people born outside the UK occurred in those that entered the UK 11 or more years prior to their TB diagnosis.

Occupation

In 2020 31% of people with TB aged 18 to 65 years were not in employment or education (78 out of 252). 4% of people with TB were in the education sector as either staff or students (10 out of 252), and 9% were health care workers, health care laboratory staff or prison staff (23 out of 252).

Clinical characteristics

59% of TB cases diagnosed in 2020 were pulmonary (184 out of 310). Of those, 71% were confirmed by culture (130 out of 184), which is below the national target of 80% (2). 23% of patients diagnosed were hospital inpatients at the time of diagnosis (68 out of 292), and 7% had previously been diagnosed with TB (19 out of 291).

Treatment outcomes

Among people with pulmonary TB in 2020, 31% (52 out of 170) started TB treatment within 2 months of symptom onset, whilst 37% (62 out of 170) started treatment more than 4 months after symptom onset (which is consistent with a prolonged period of infectiousness). Extra-

pulmonary cases of TB took, on average, 39 days longer to be diagnosed than pulmonary cases.

Treatment was completed within 12 months by 76% (242 out of 320) of people with rifampicin sensitive TB diagnosed in 2019 whose expected treatment duration was less than 12 months,³ which is lower than completion rates in the previous 2 years in the East Midlands. Of the 78 patients that did not complete treatment, 16 died (21%).

Drug resistance

TB antibiotic sensitivity was known for 59% of cases in 2020 (183 out of 310), of which 10% were resistant to at least one first line drug (19 out of 183). This is similar to proportions seen since 2016. 5% of the 2020 cases (9 out of 183) were resistant to isoniazid but not rifampicin (INH-R), and 3% (6 out of 183) had multi-drug resistant or rifampicin-resistant TB (MDR out of RR-TB).

Cases of extensively drug-resistant TB (XDR-TB) are rare in England and the East Midlands. There were a total of 5 cases notified between 2016 to 2020 in the East Midlands (this was 0.5% of all people with culture confirmed TB with a result (drug sensitivities or WGS) for at least isoniazid and rifampicin).⁴

Under-served populations

People with one or more recorded social risk factors for TB, including drug and alcohol misuse, homelessness and prison, accounted for 16%, (38 out of 239) of cases. This is slightly above the national average of 13% (1). Between 2009 and 2020, individuals with risk factors were more likely to be male, UK born, white, have pulmonary TB, be sputum smear positive and have a previous diagnosis of TB, compared to patients without risk factors. Between 2009 and 2019 treatment was completed by 76% (249 out of 328) of patients with social risk factors at their last recorded outcome, compared to 89% (2,410 out of 2,697) of patients with no risk factors. In 2020 39% (120 out of 310) of people with TB were resident in the most deprived areas of the West Midlands,⁵ compared to 9% in the least deprived areas.

³ Excludes cases with rifampicin resistance, and central nervous system, spinal, miliary or cryptic disseminated disease.

⁴ First line drugs: isoniazid, rifampicin, pyrazinamide and ethambutol. MDR-TB: cases initially resistant to at least isoniazid and rifampicin. XDR-TB: cases initially MDR and resistant to at least one injectable agent (amikacin, capreomycin or kanamycin) and at least one fluoroquinolone (moxifloxacin, ofloxacin or ciprofloxacin).

⁵ Most deprived quintile of lower super output areas based on Index of Multiple Deprivation (IMD 2019) rank.

HIV co-infection

HIV tests were not offered to 5% of eligible people with TB in 2020 (13 out of 277).⁶ Overall, in the West Midlands, 94% of all those offered an HIV test were tested. In 4 out of 9 upper tier local authority areas, 100% of cases were offered HIV testing and received the test.

Conclusion

In conclusion, although the overall number of TB notifications has declined in the East Midlands, if we are to achieve the World Health Organisation's (WHO) End TB Strategy target of a 90% reduction in new notifications by 2035, TB needs to remain a health priority. Due to the much higher rates of TB abroad than the UK, rates of TB in the East Midlands are very subject to migration flows from countries with high rates of TB. Importantly, this report demonstrates how the burden of TB falls on more socio-economically challenged groups, and the high number of individuals with TB and social risk factors represents a significant challenge in the East Midlands in ensuring that this health inequality is addressed.

An increasing proportion of people with TB should have access to high-quality diagnostics, including culture confirmation and WGS technology, and continued effort and investment is needed to early diagnose TB and deliver effective packages of TB care in those with social risk factors in order to maximise treatment completion and minimise transmission. Contact tracing is another key element in the action plan (2) for reaching the 2035 'End TB Strategy' target, and for COVID recovery.

Recommendations

TB remains a significant threat to health in the UK, especially to some of our more vulnerable community members, who are already living with a range of inequalities. Whilst the news on the rates of TB in UK population is encouraging there are some warnings on the most recent data as a result of the extraordinary conditions in which people and the key services which identify TB have been operating over the COVID-19 pandemic period. In order to continue to drive reductions in TB as the country and services recover from the pandemic there are some important themes for us to focus on, which we would summarise in the following recommendations arising from this report:

1. All TB stakeholder organisations should maintain the integrity of critical TB control and treatment services across: our complex system of clinical networks, including community TB services, our new health protection landscape and response to surveillance including whole genome sequencing-based cluster identification and management.

⁶ Excludes TB cases diagnosed post-mortem and patients whose HIV status was already known.

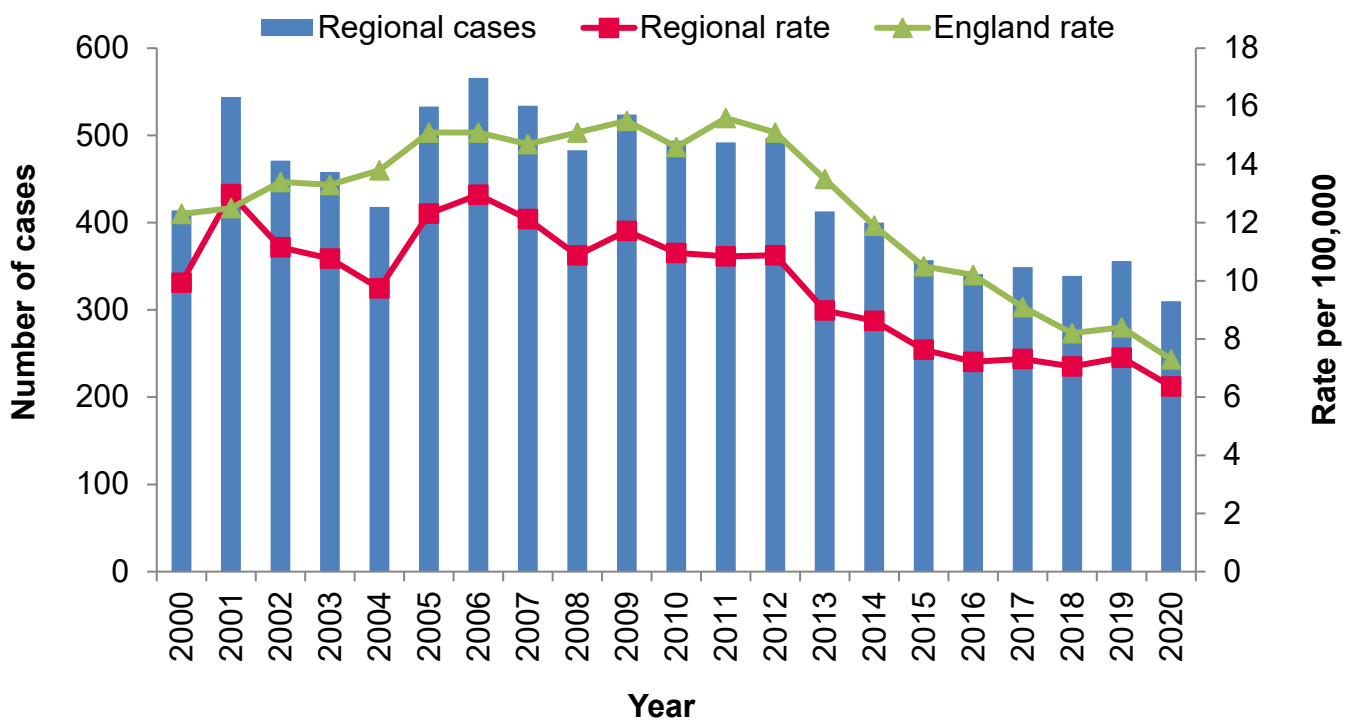
2. All TB stakeholder organisations should take steps to understand and manage the upward pressure on TB risk and rates from, for example, migration from countries with higher incidence of TB alongside the likely effects of deteriorations in latent TB and other screening and proactive work necessitated by the pandemic response.
3. In line with the national plan programme reviews of systems' services and approaches to TB control and identify areas for development and improvement system by system and across the region where this is an appropriate approach.
4. UKHSA to work with national TB leads and Prevention Programme leads from regional and local tiers to develop partnership infrastructure which can take forward support and assurance of the delivery of review and improvement activities.

1. TB notifications and incidence

Overall numbers, rates and geographical distribution

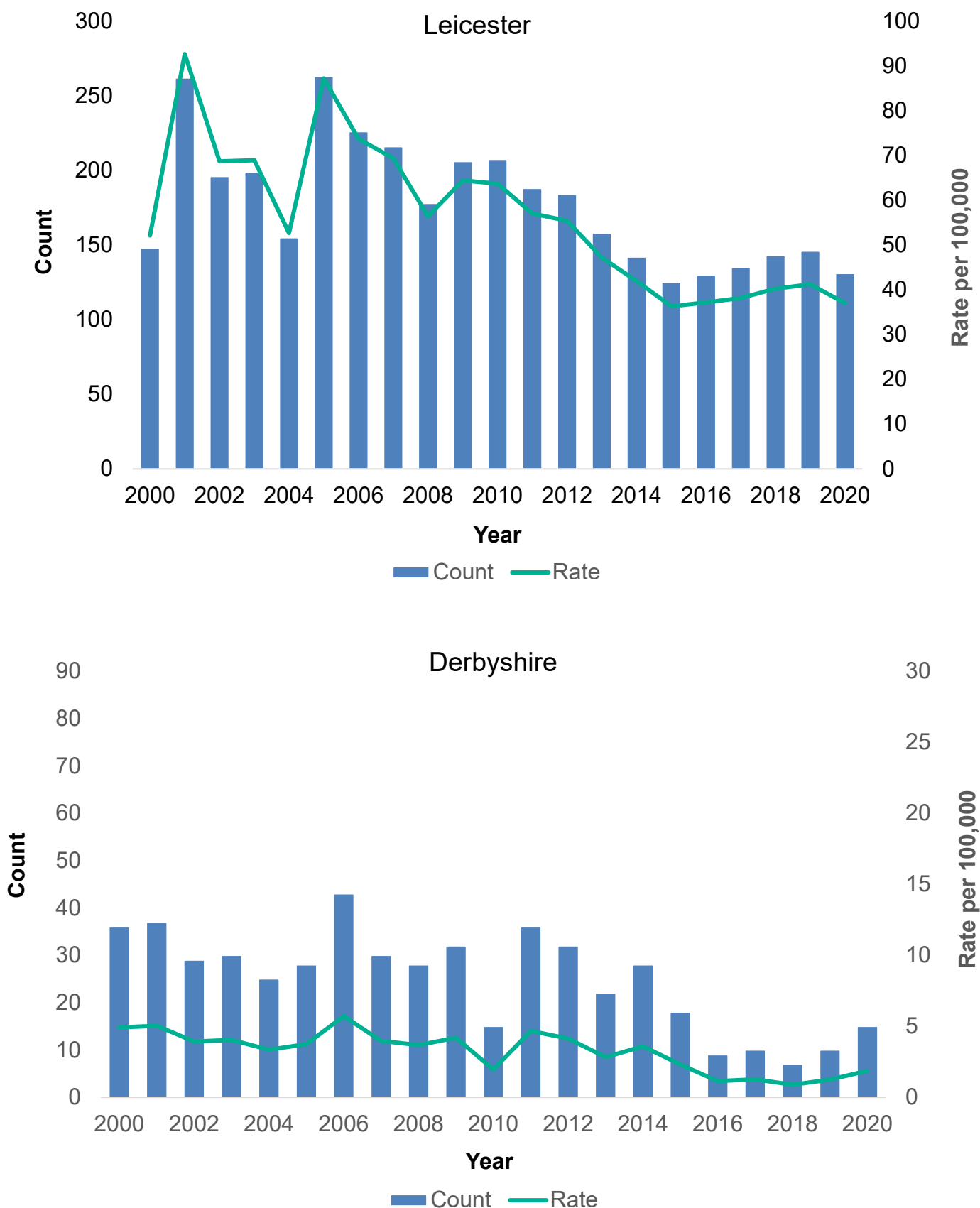
In 2020, 310 cases of tuberculosis (TB) were reported among residents in the East Midlands, a crude rate of 6.4 cases per 100,000 population (95% confidence interval [CI] 5.7-7.1) (Figure 1). This represents a decrease of 46 cases from 2019. The rate of TB in the East Midlands remains lower than the overall rate for England (7.3 per 100,000) ([1](#)). Case numbers have been gradually declining in the East Midlands since the early to mid-2000s, mirroring the national trend.

Figure 1. TB case reports and rates, East Midlands, 2000 to 2020

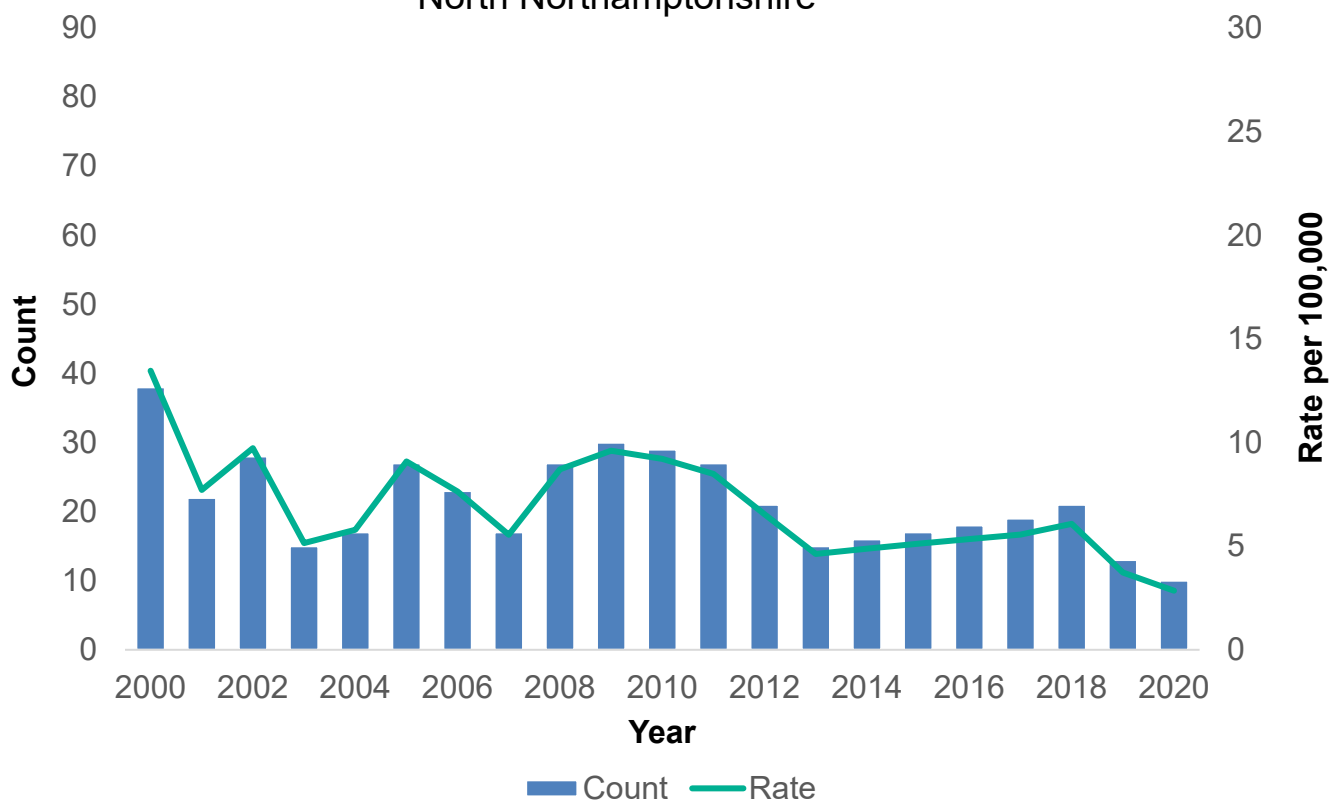


TB case rates for upper tier local authorities (UTLAs) are presented in Figure 2. Case numbers decreased in 6 out of 9 local authorities, with the largest reduction in numbers (-41%) observed in West Northamptonshire (24 cases versus 41 in 2019). Other large reductions in cases were observed in Nottingham (-25%, 36 cases versus 48 in 2019) and North Northamptonshire (-23%, 10 cases versus 13 in 2019). An increase in cases were observed between 2019 and 2020 in Derbyshire (+50%, 15 cases versus 10 in 2019), Lincolnshire (+20%, 24 cases versus 20 in 2019) and Nottinghamshire (+8%, 13 cases versus 12 in 2019).

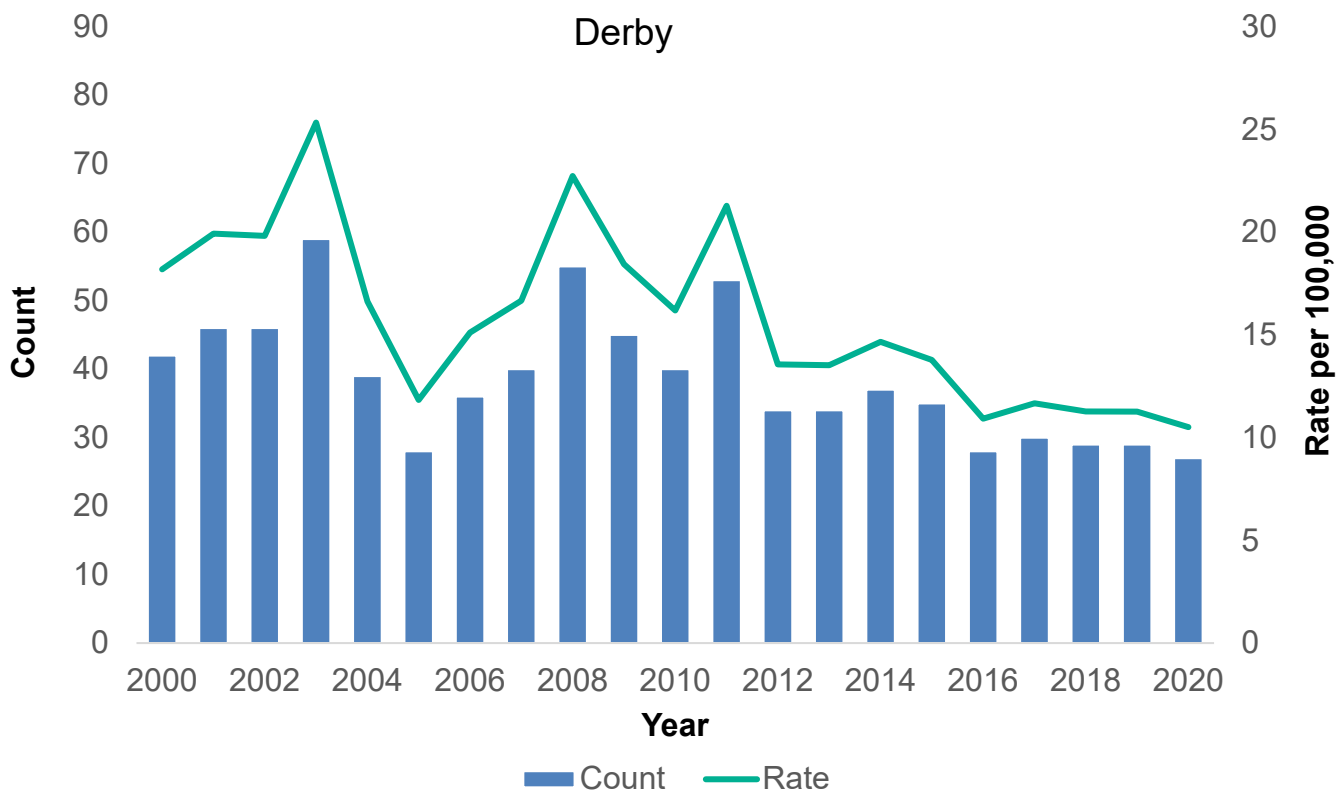
Figure 2. TB case rates, by upper tier local authority of residence, East Midlands, 2000 to 2020

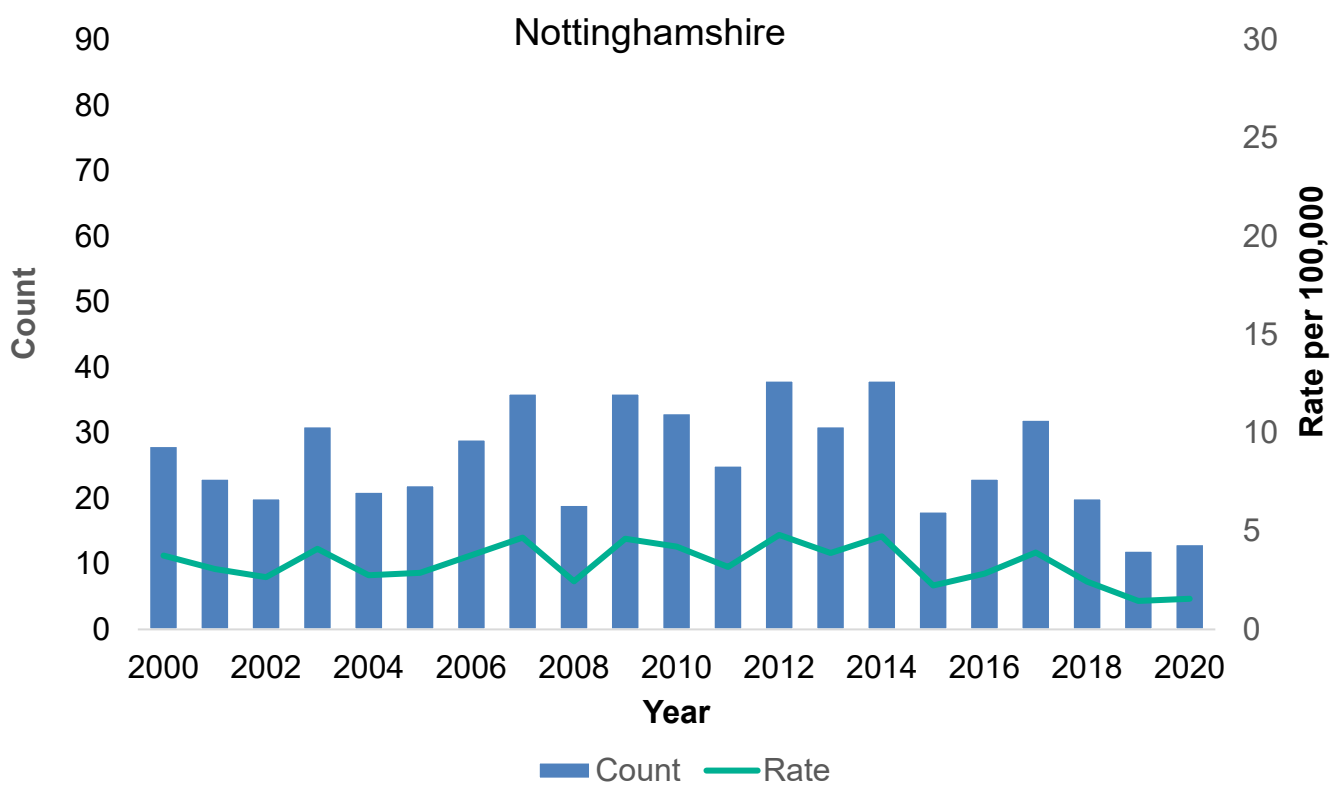
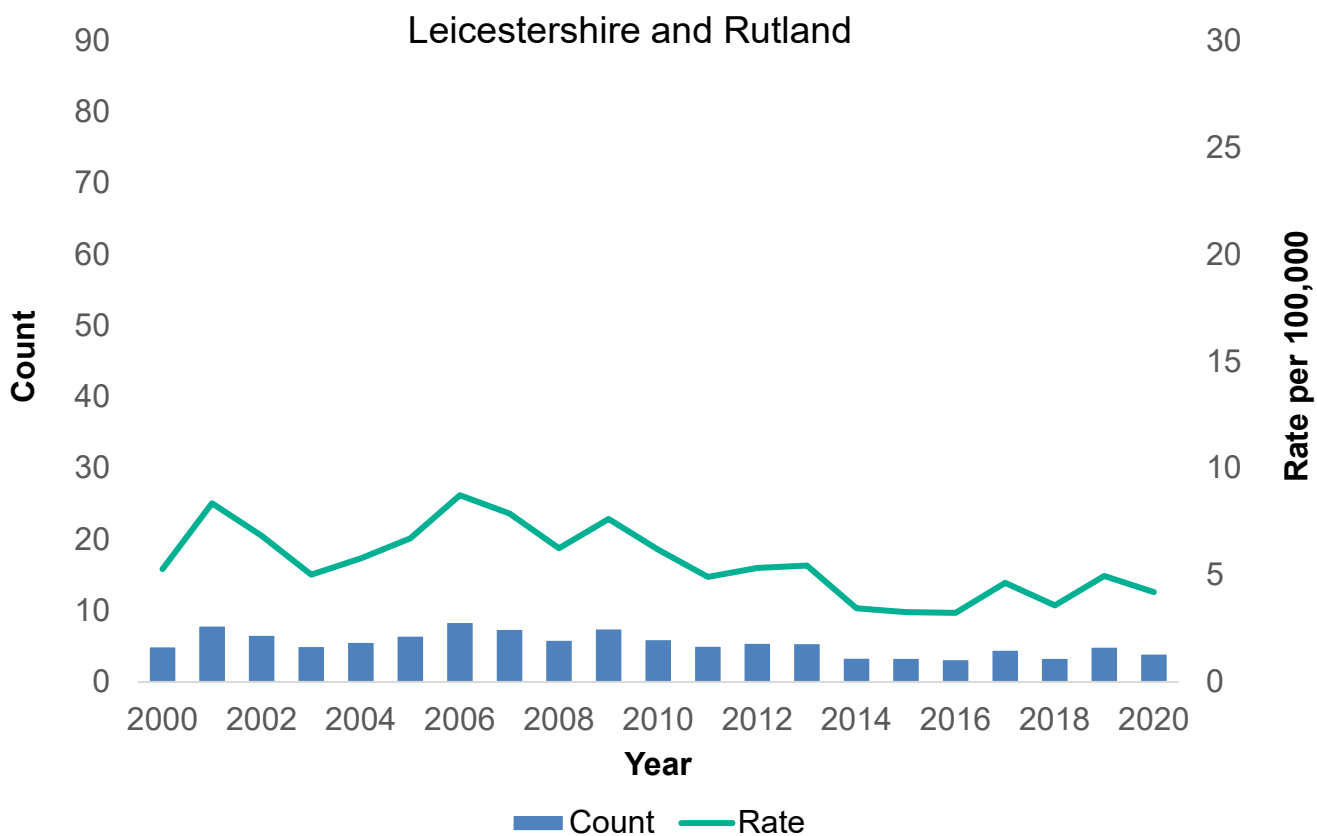


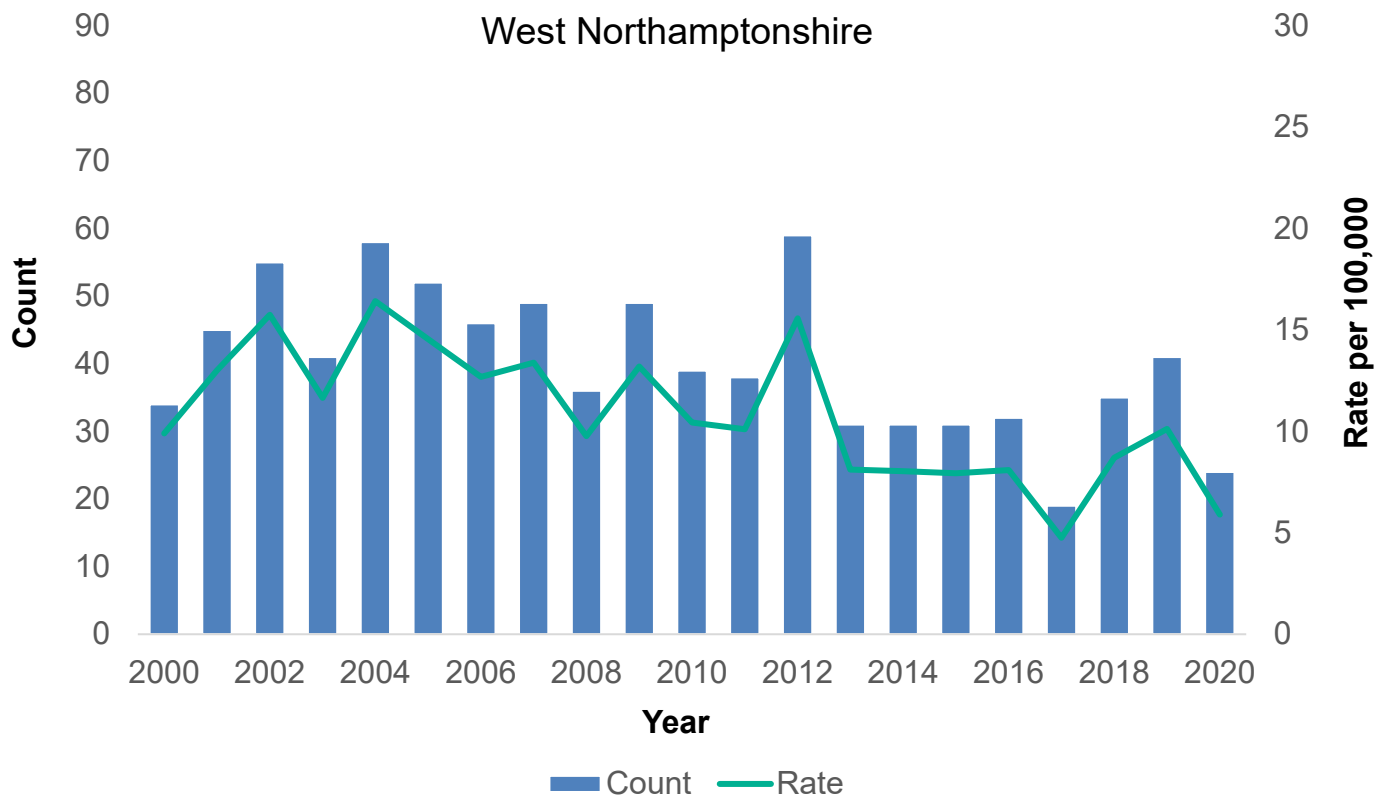
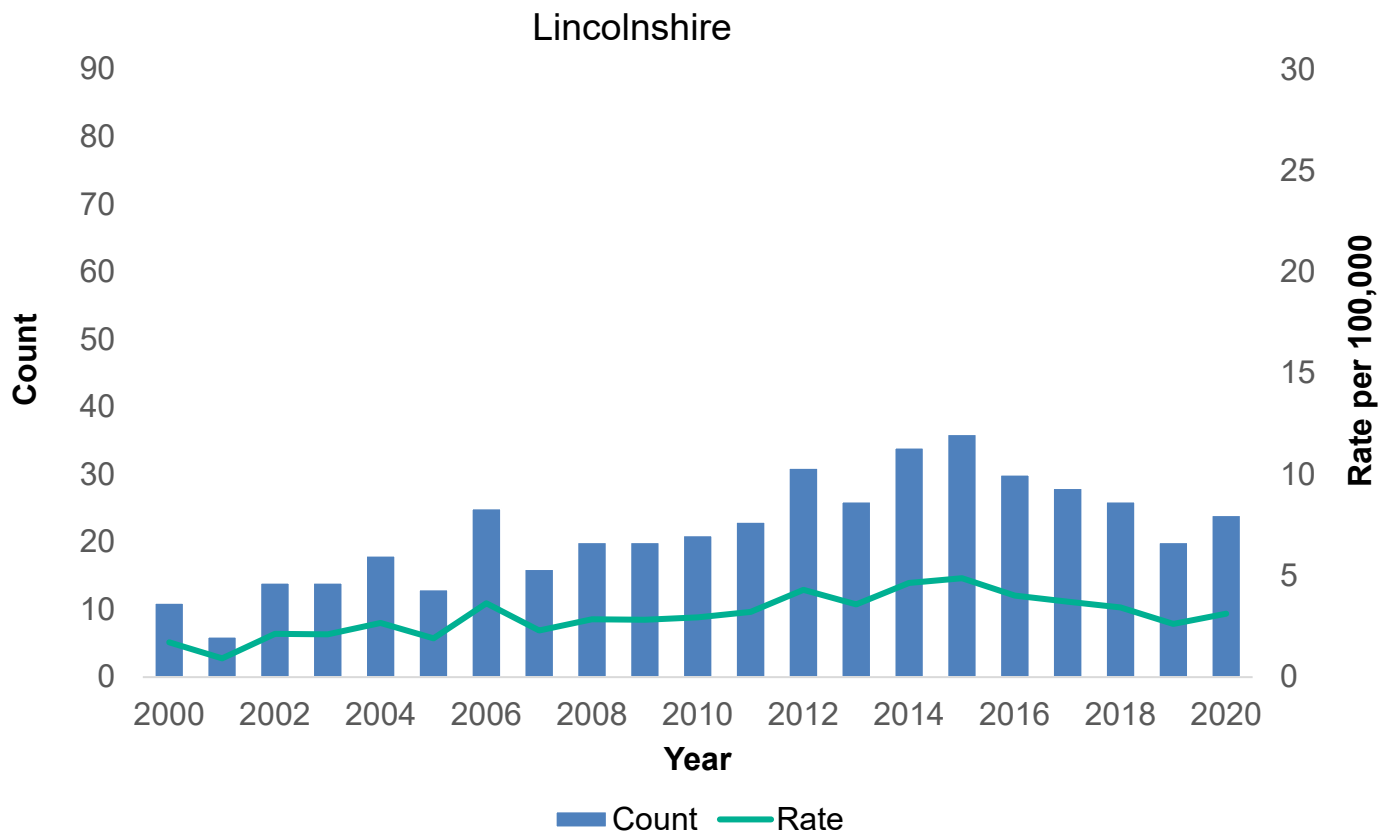
North Northamptonshire

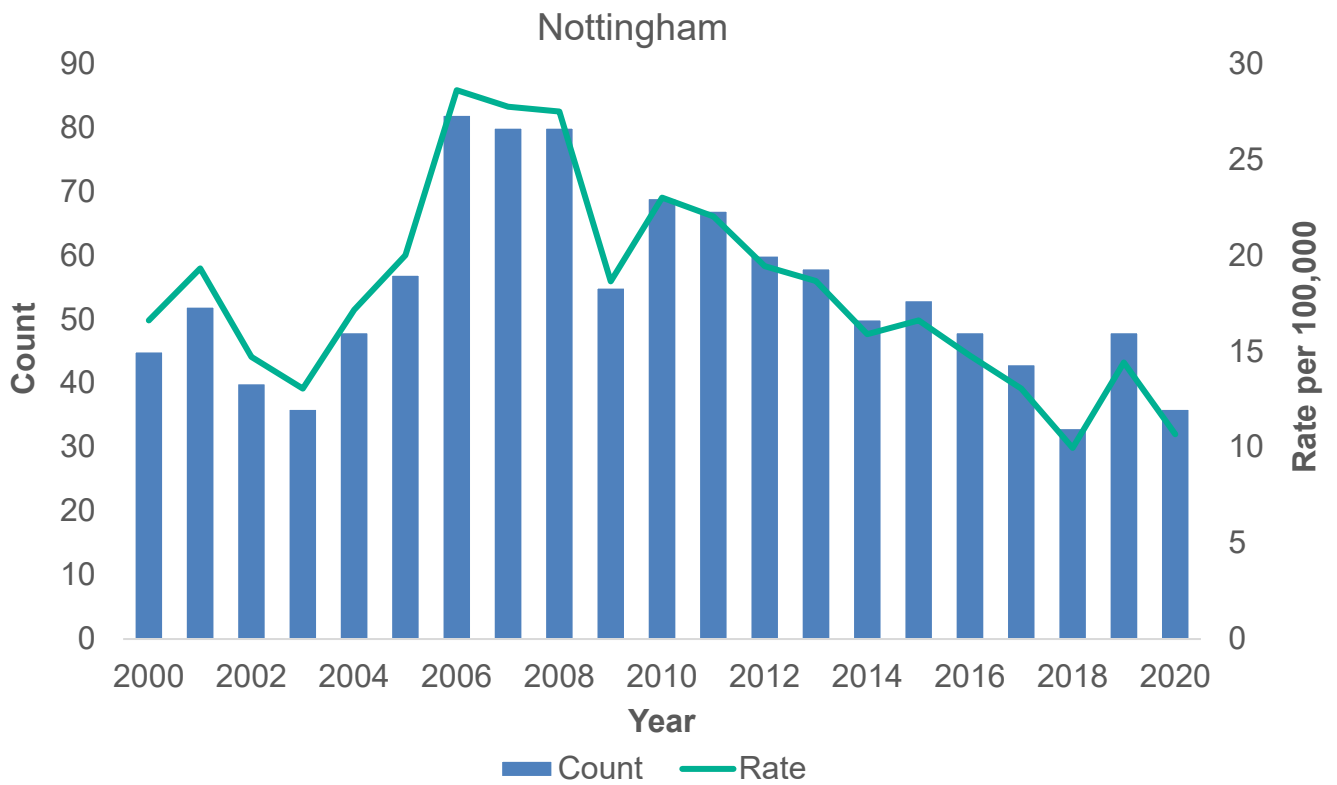


Derby



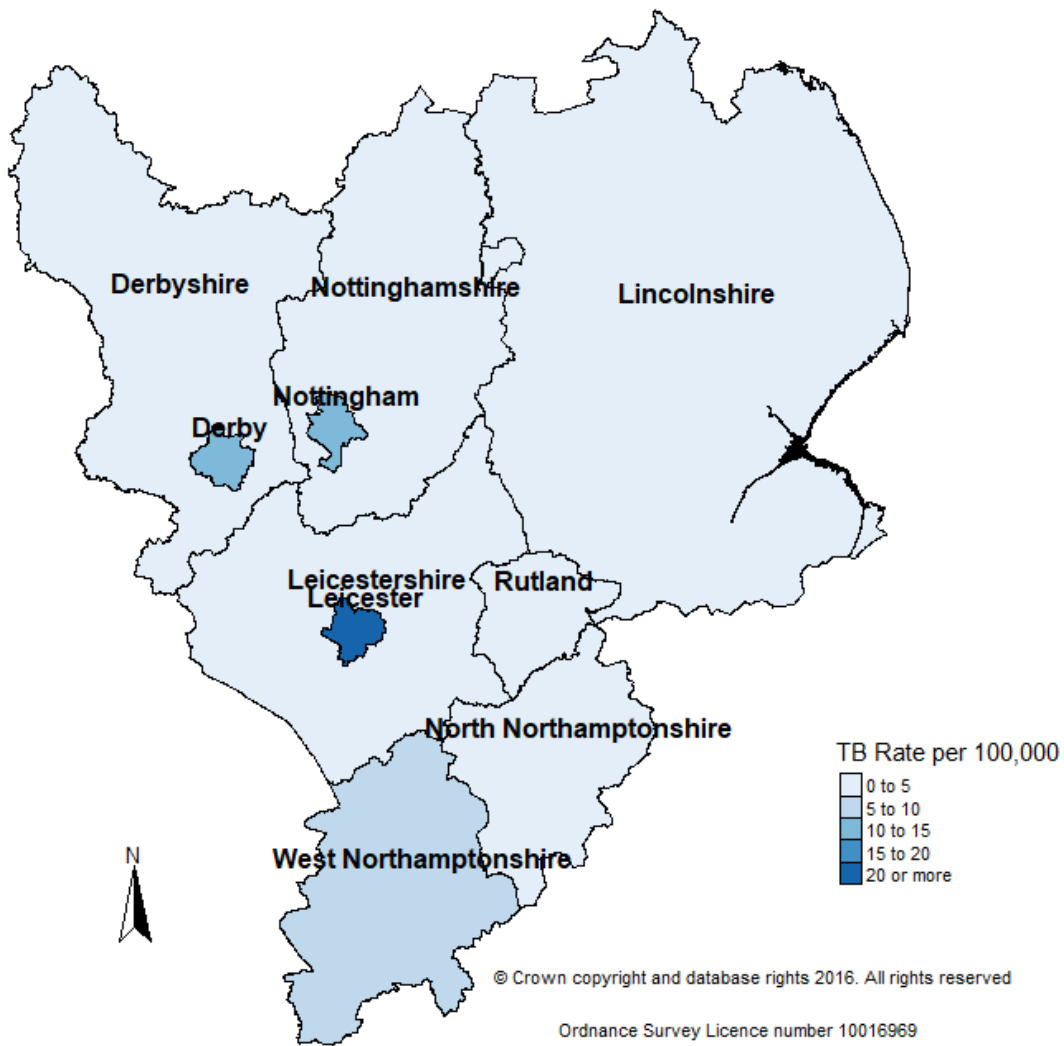






The highest rates of TB in the East Midlands were seen in Leicester (37.0 per 100,000), Nottingham (10.7 per 100,000) and Derby (10.5 per 100,000) UTLAs (Figures 2 and 3).

Figure 3. TB case rate by upper tier local authority of residence, East Midlands, 2020

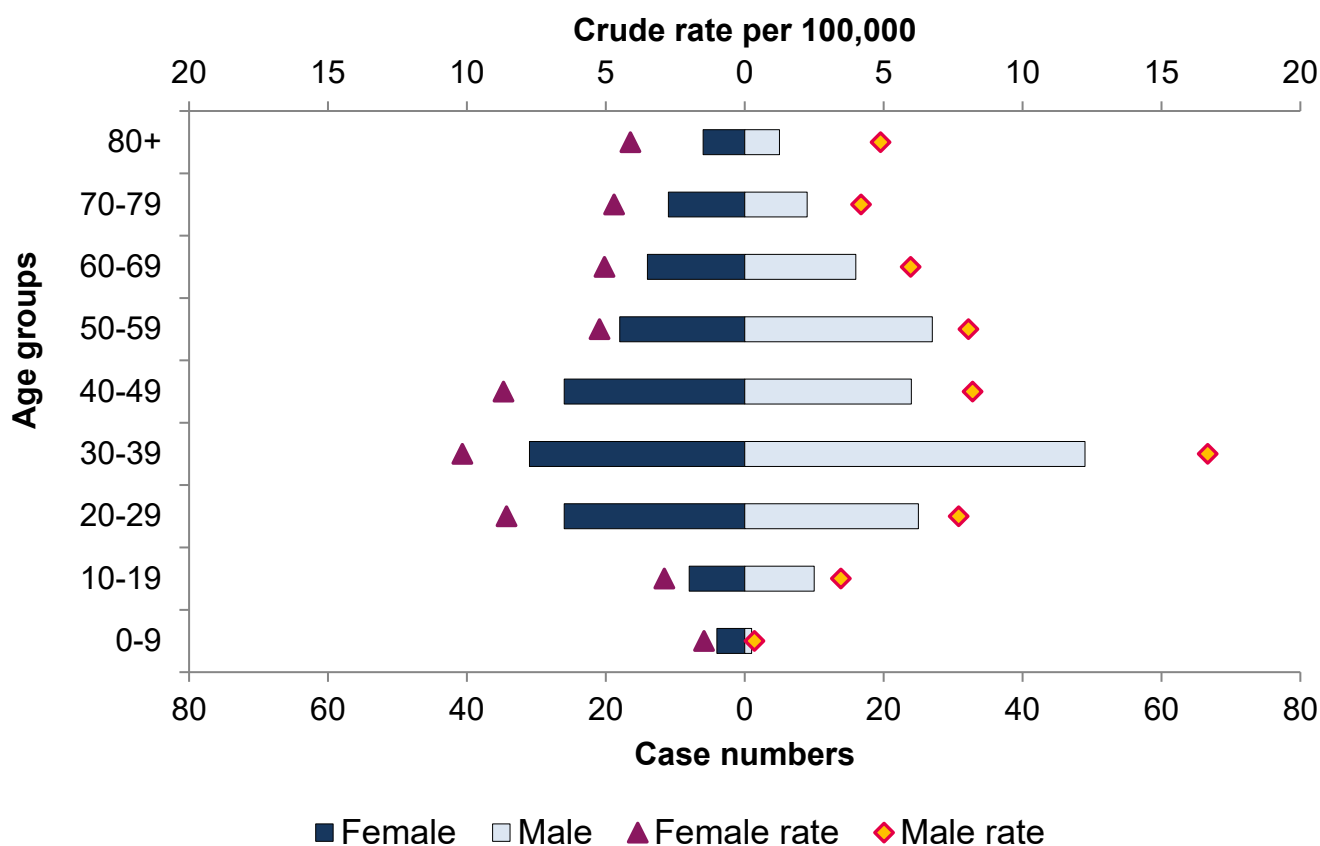


2. Demographic characteristics

Age and sex

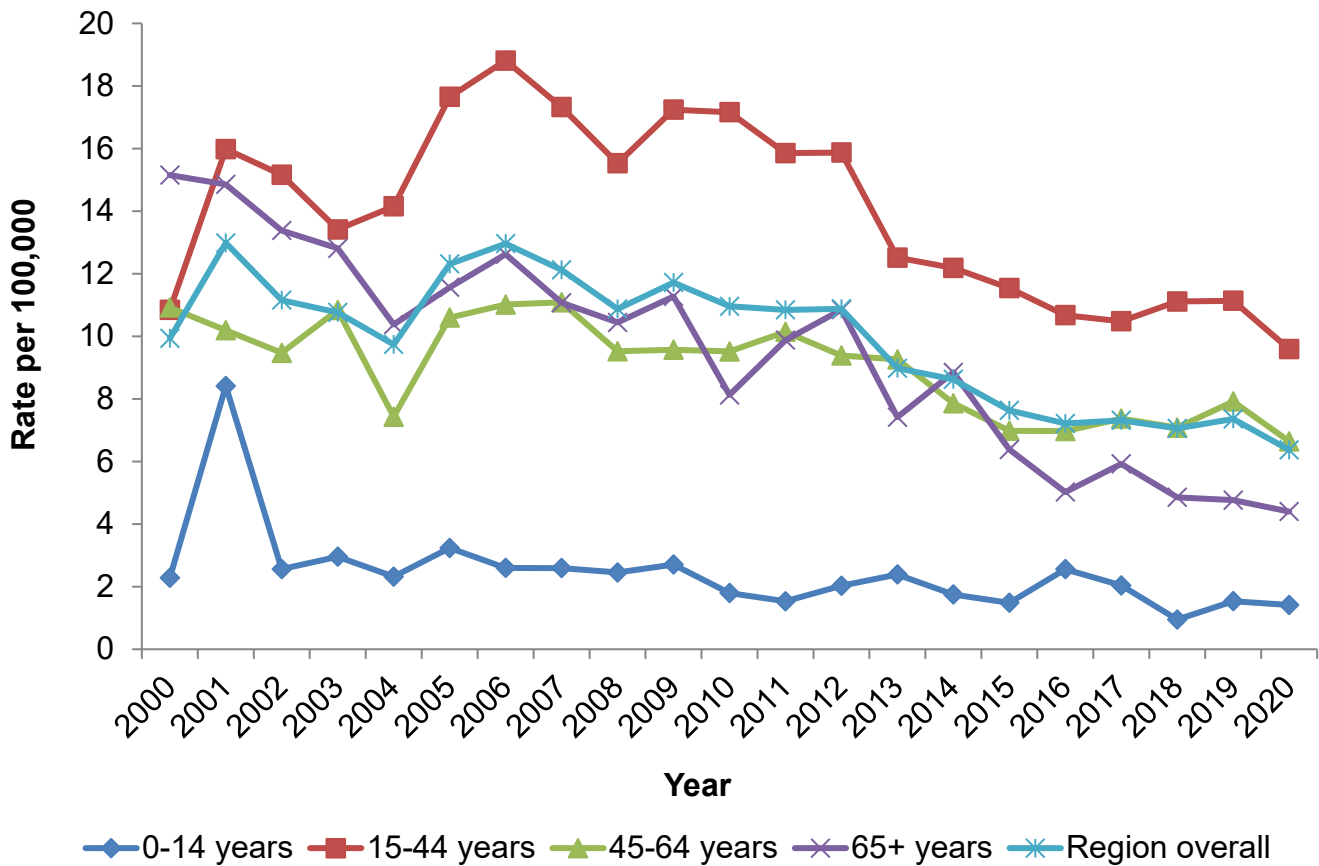
The age sex pyramid for people with TB in 2020 was similar to previous years, with more males (54%) than females (Figure 4). Using 10-year age groups, crude rates of TB among were highest for those aged 30 to 39 years for both males (16.7 per 100,000) and females (10.2 per 100,000).

Figure 4. TB case reports and rate by age and sex, East Midlands, 2020



Using the demographic age groups in Figure 5, the rate of TB declined for all age groups compared to 2019. The greatest percentage decrease in rates per 100,000 was in the 15 to 44 age group (-14%, 9.6 per 100,000 in 2020 versus 11.1 per 100,000 in 2019).

Figure 5. TB case rates by age group, East Midlands, 2000 to 2020



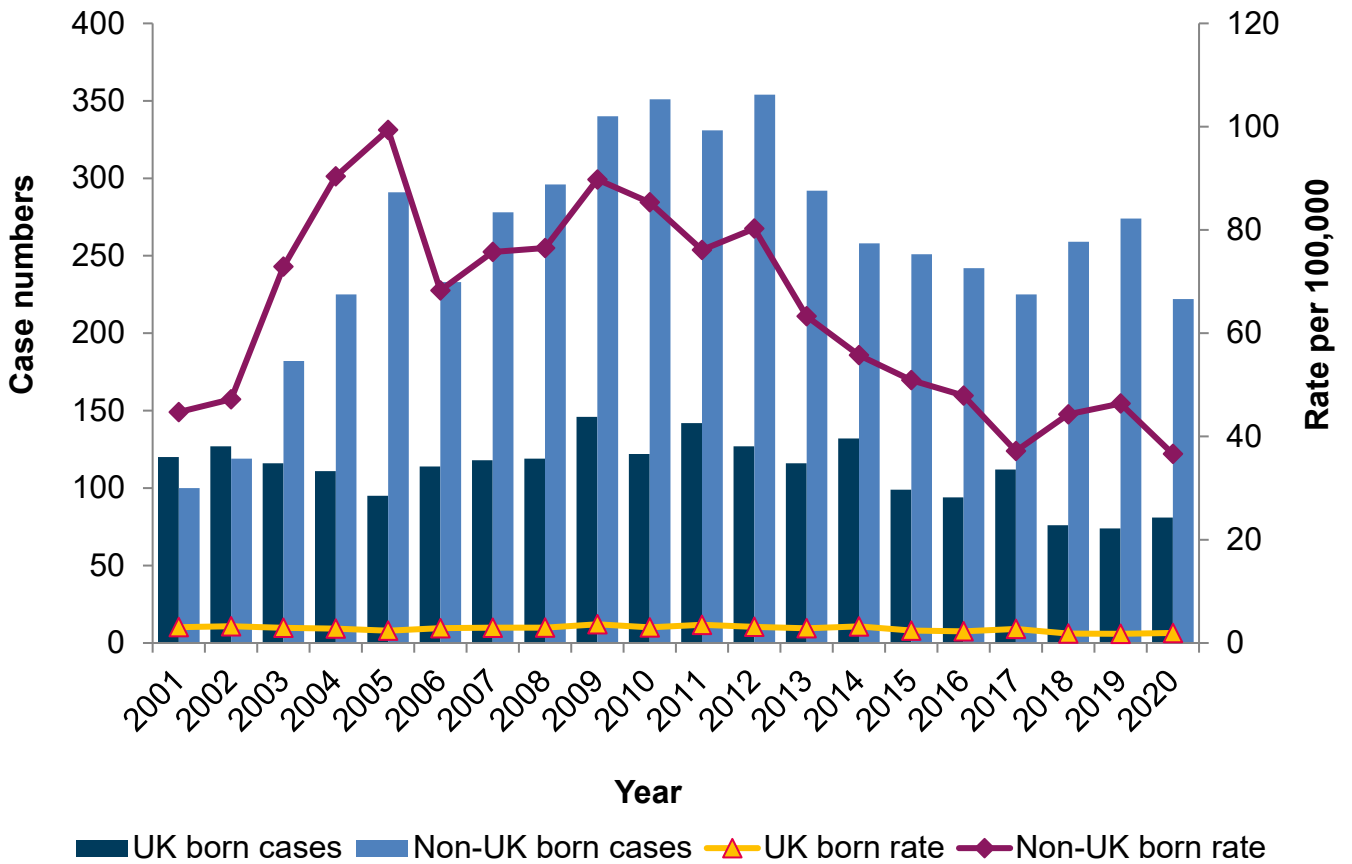
Place of birth and time since entry

The rates of TB among people born outside the UK should be interpreted in the context of changes to the pre-UK entry screening policies. In 2005 the UK piloted the pre-entry screening of long-term migrants to the UK for active pulmonary TB in 15 high TB incidence countries. In 2012 this pre-entry screening was extended to all countries with a high incidence of TB (>40 cases per 100,000 population) (3).

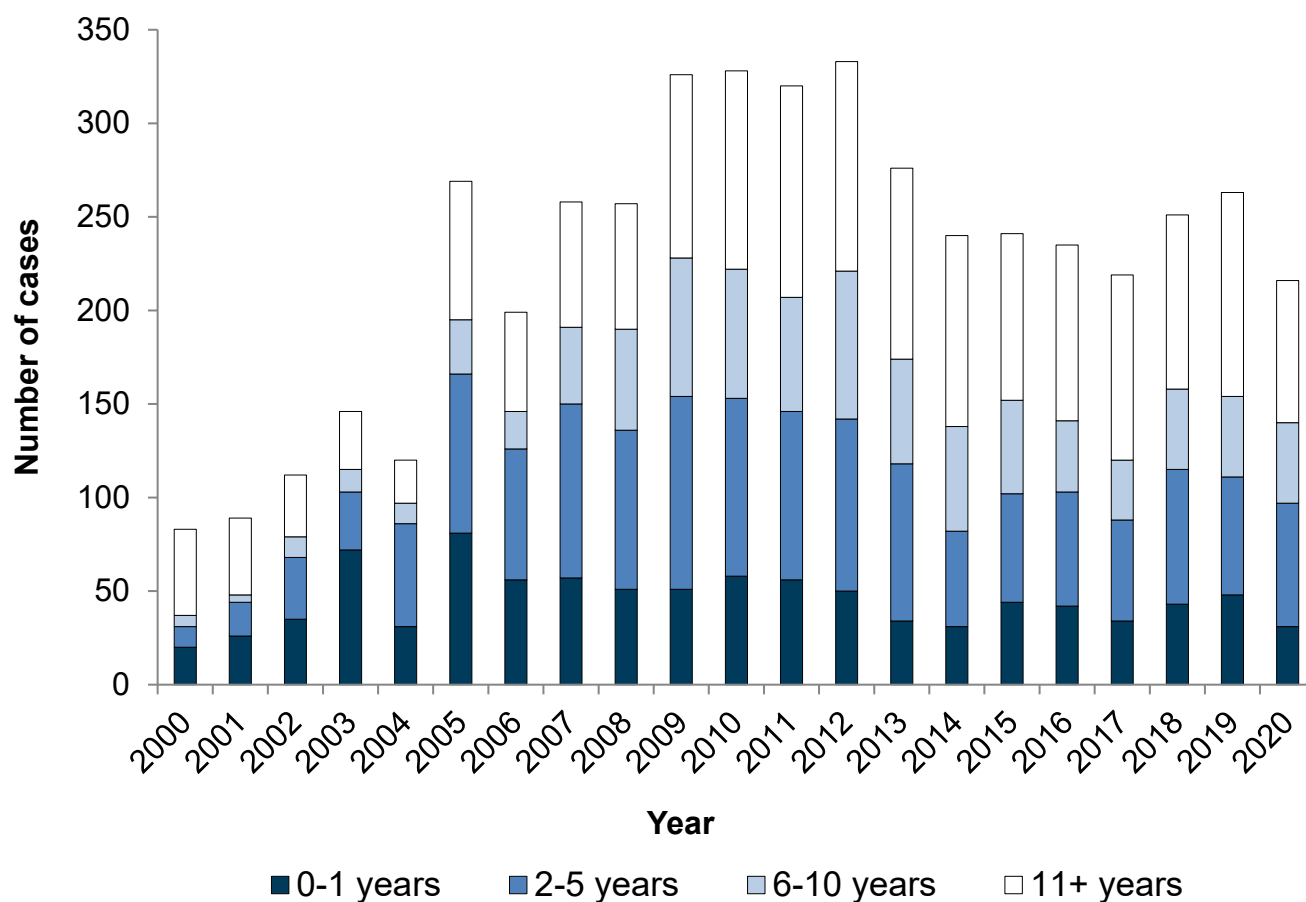
In 2020, 98% of TB cases had a recorded country of birth (303 out of 310), and of these, over two-thirds (73%, 222 out of 303) were born outside the UK, (Figure 6). The rate of TB was over 18 times higher among people born outside the UK (36.6 per 100,000) compared to those UK born (1.9 per 100,000).⁷ Rates in 2020 increased for UK born cases (+9.4%, 1.9 versus 1.8 per 100,000 in 2019), but decreased for non-UK born cases (-21.1%, 36.6 versus 46.4 per 100,000 in 2019).

⁷ These rates should be interpreted with caution, as population estimates used as denominators for UK born and non-UK born groups were calculated using The Labour Force Survey (LFS) populations estimates, which are liable to sampling error for small population groups as they are based on a random sample of surveyed individuals weighted to represent others in the region.

Figure 6. TB case reports and rate by place of birth, East Midlands, 2001 to 2020



In cases notified in 2020, the year of entry to the UK was reported by 97% (216 out of 222) of TB patients born outside the UK. Of those, the largest proportion (35.2%, 76 out of 216) had arrived in the UK 11 or more years prior to their TB diagnosis, which is a similar pattern to previous years ([Figure 7](#)) and suggests reactivation of latent disease, although some could be new acquisitions.

Figure 7. Time between entry to the UK and TB notification for non-UK born patients by year, East Midlands, 2000 to 2020

The 10 most common countries of birth for TB patients born outside the UK and notified in 2020 were India (50%), and Pakistan (8%) followed by Romania, Eritrea, Poland, Kenya, Zimbabwe, Bangladesh, Afghanistan and Lithuania (each <10%, Table 1). Suppressed

Table 1. Ten most common countries of birth of non-UK born TB patients, East Midlands, 2020

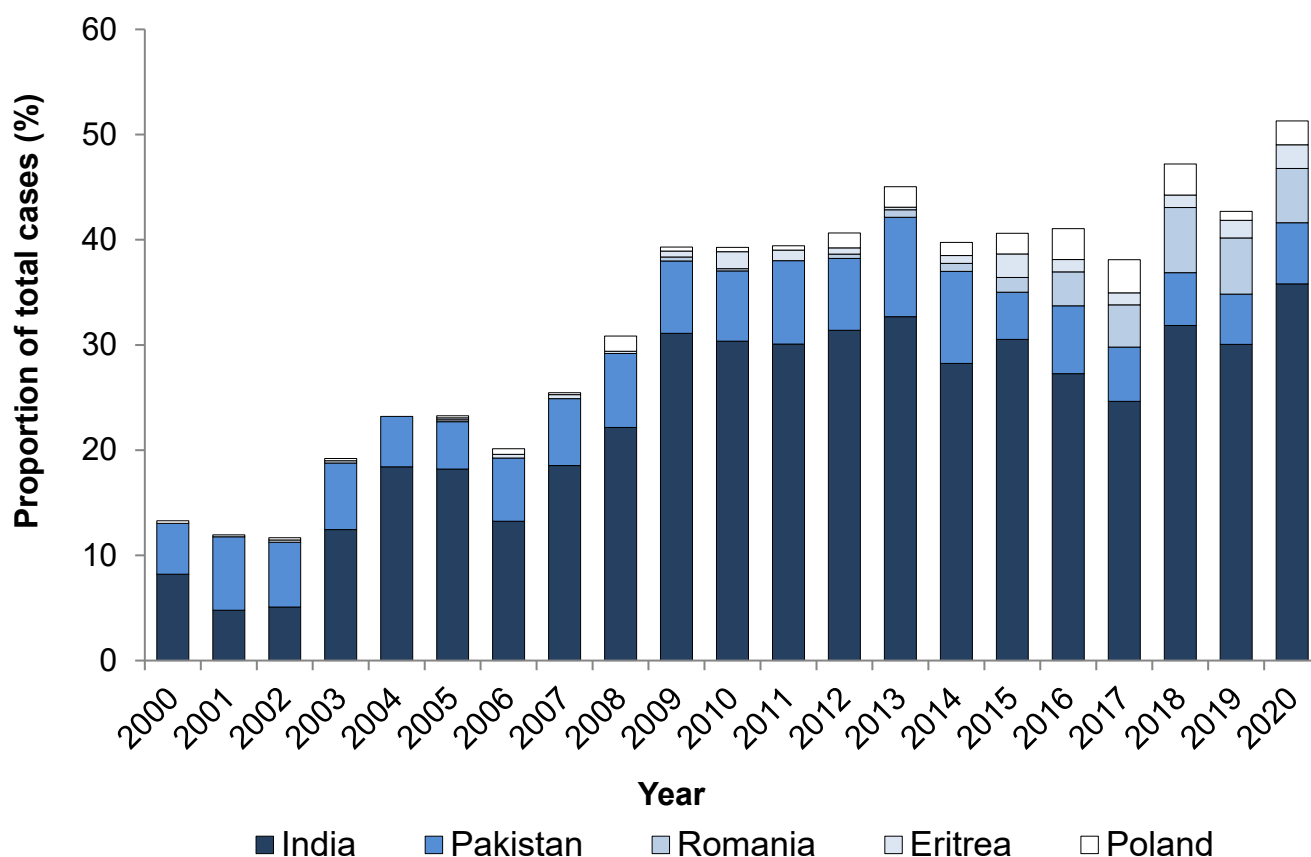
Country of origin	Number of patients	Proportion of non-UK born (%)	Time since entry (years)		
			Median	IQR*	
India	111	50	7	3	14
Pakistan	18	8	11	3	24
Romania	16	7	3	1	4
Eritrea	7	3	4	3	7
Poland	7	3	7	5	14
Kenya	5	2	10	4	46
Zimbabwe	5	2	18	17	18

Country of origin	Number of patients	Proportion of non-UK born (%)	Time since entry (years)		
			Median	IQR*	
Bangladesh	<5	Suppressed	4	0	4
Afghanistan	<5	Suppressed	10	0	11
Lithuania	<5	Suppressed	7	3	10
Total	179				

* IQR: Interquartile range.

India, Pakistan, Romania, Eritrea and Poland were the 5 most common countries of birth outside the UK for 2020, making up 51.3% (159 out of 310) of all cases. The proportions of patients retained very similar values to 2019, with a slightly larger increase in proportion of patients from India (Figure 8).

Figure 8. TB case reports by country of birth from the 5 most common countries of birth outside the UK, East Midlands, 2000 to 2020



The age distribution of TB cases varied between patients born within and outside the UK. Both groups had the highest proportion of cases in the 15 to 44 age group, accounting for 35% of UK born cases (28 out of 81) and 63% (139 out of 222) of non UK born cases. For the 0 to 14 and 45 to 64 age groups, the proportions were broadly similar between the UK born and non UK born (7% versus 3% for 0 to 14 and 30% versus 27% for 45 to 64 respectively). For the 65+ age

group the proportion of cases was much higher in the UK born cases (28% UK born versus 8% non UK born).

Ethnicity

In 2020, 99.7% (309 out of 310) of patients with TB had an ethnicity recorded, of which 4% were recorded as mixed out of other. Collectively, patients with a recorded south Asian ethnicity made up over half (51%) of cases, of which 9% were UK born. Patients of White ethnicity made up 31% of cases, of whom the majority (63%) were UK born. Patients of Black ethnicity made up 13% of cases, of whom 80% were Black African. Five percent of Black ethnicity were UK born (Table 2).

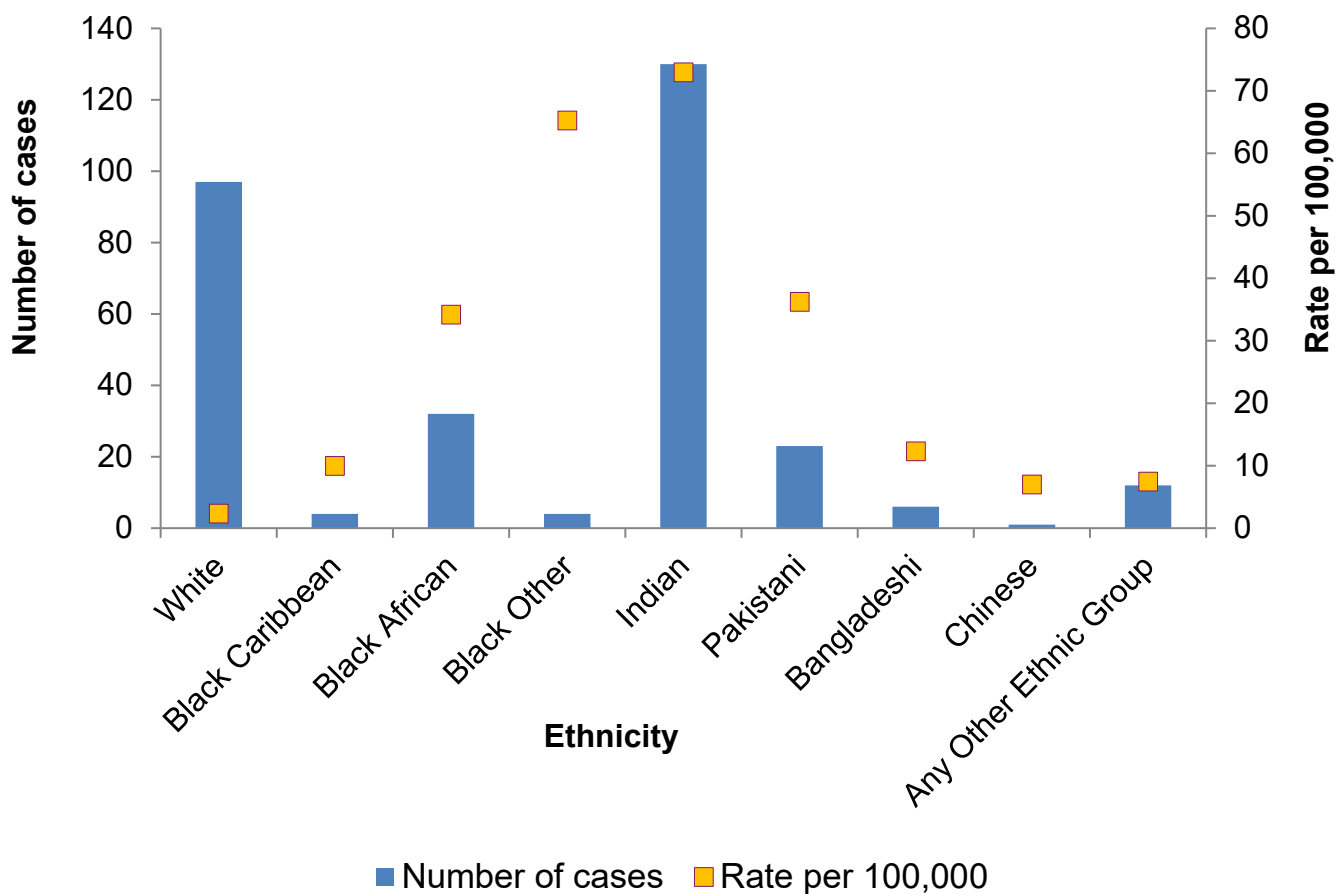
Table 2. Proportion of UK born TB patients by ethnic group, East Midlands, 2020

Ethnic group	Number of cases	Number UK born	Proportion (%)
White	97	61	63
Black Caribbean	<5	<5	25
Black African	32	<5	0
Black Other	<5	<5	25
Indian	130	9	7
Pakistani	23	<5	<20
Bangladeshi	<10	<5	17
Chinese	<5	<5	0
Mixed / Other	<15	<5	33

Patients of White ethnicity have the lowest TB rates compared to all other ethnicities (2.3 cases per 100,000), whilst people of Indian ethnicity were found to have TB rates 32 times higher (73.0 cases per 100,000)⁸ ([Figure 9](#)).

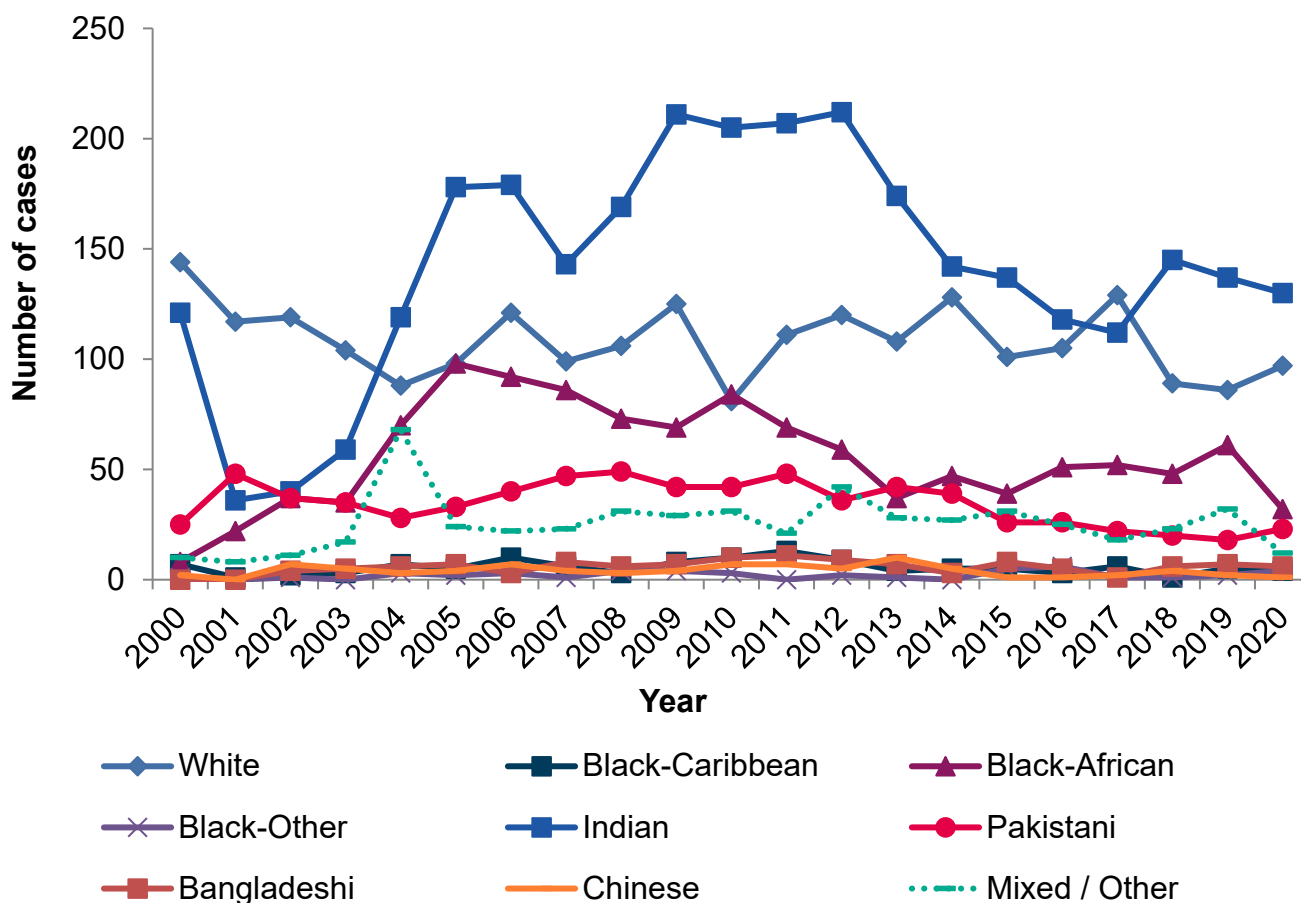
⁸ These rates should be interpreted with caution, as population estimates, used as the denominators for the different ethnic groups were calculated using the Labour Force Survey, which is liable to sampling error for small population groups. Small populations are often under-represented in the LFS sample, which may inflate TB rates for ethnic groups such as black individuals.

Figure 9. TB case number and rate by ethnic group, East Midlands, 2020



The majority of the ethnic groups saw decreases in the number of cases between 2019 and 2020. The ethnic groups seeing an increase, and with more than 15 cases, were White (+12.8%) and Pakistani (+27.8%). The greatest decreases, where there were more than 15 cases in one of the years, were in the Mixed/Other (-62.5%) and Black-African ethnic groups (-47.5%) ([Figure 10](#)).

Figure 10. TB case number by ethnic group, East Midlands, 2000 to 2020



Occupation

In 2020 31% of people with TB aged 18-65 years were recorded as not in employment or education (this includes housewives out of husbands, retired, unemployed, asylum seekers and prisoners (78 out of 252)). A total of 4% (10 out of 252) of people with TB were in the education sector as either staff or students, and 9% were health care workers, health care laboratory staff or prison staff (23 out of 252) (Table 3).

Table 3. Occupational category of TB patients aged 18 to 64 years, East Midlands, 2020

Occupation	Number of patients	Proportion (%)
None*	78	31.0
Other	134	53.2
Education	10	4.0
Health care worker†	23	9.1
Unknown occupation	7	2.8
Total	252	

* Includes housewives or husbands, retired, unemployed, asylum seekers and prisoners.

† Also includes laboratory or pathology workers and social service or prison staff.

3. Clinical characteristics

Site of disease

In 2020, site of disease was recorded for all but one case (309 out of 310). The majority (59%, 184 out of 310) of patients had pulmonary TB disease (with or without extra-pulmonary sites). Lymph nodes were the next most common site of disease (41%, 128 out of 310), of which 39% (50 out of 128) were intra-thoracic and 61% were extra-thoracic (78 out of 128). Other extra-pulmonary sites of unknown origin also make up a large proportion of cases (14%) (Table 4).

Table 4. Site of disease of TB patients, East Midlands, 2020

Site of disease	Number of cases	Proportion %†
Pulmonary*	184	41.6
Miliary	20	6.5
Laryngeal	0	0.0
Extra-pulmonary	255	82.3
Lymph nodes (extra-thoracic)	78	25.2
EP Unknown	44	14.2
Pulmonary +EP sites	55	17.7
IT lymph nodes	50	16.1
Other (extra-pulmonary)	25	8.1
Pleural	18	5.8
Gastrointestinal	16	5.2
Bone or joint (spine)	8	2.6
Bone or joint (other)	6	1.9
Central nervous system (meningitis)	<5	Suppressed
Genitourinary	6	1.9
CNS (other)	7	2.3
Cryptic	7	2.3
Unknown	<5	Suppressed

† Patients may have disease at more than one site, so the total proportion will not equal 100%.

* With or without disease at another site.

In 2020, UK born patients were more likely to have pulmonary disease (78%, 63 out of 81) compared to non-UK born patients (54%, 119 out of 222). Patients reporting at least one social

risk factor⁹ were more often pulmonary cases (84%, 32 out of 38) compared to patients reporting no social risk factors who were less often pulmonary cases (58%, 122 out of 212). People with pulmonary TB have the potential to be infectious to others.

Previous history of tuberculosis

In 2020, among the 94% of patients who reported their clinical history, 6.5% of cases (19 out of 291) had a previous diagnosis of TB at least 12 months prior to their most recent notification, which is a decrease of 33% since 2019 in the East Midlands. These patients had a median of 12.5 years since their previous diagnosis (IQR 4-18 years). This is slightly higher than the proportion of cases reporting a previous diagnosis of TB in England overall (6.2%) ([1](#)).

Hospital inpatient and directly observed therapy

Of the 94% of cases with hospital inpatient status recorded, 23% (68 out of 292) were inpatients around the time of diagnosis with TB. Cases diagnosed as hospital inpatients were more likely to have pulmonary disease (28%, 48 out of 169) compared to non pulmonary, 16%, 20 out of 123), and over twice as likely to have at least one recorded social risk factor (39%, 14 out of 36 compared to 19%, 39 out of 207 with no social risk factors).

⁹ Social risk factors for TB indicates one or more of prison, homelessness, alcohol or substance misuse.

4. Laboratory confirmation of TB

Laboratory tests data collection

Laboratory data on culture confirmed TB isolates from the National Mycobacterium Reference Service was matched to TB case notifications, and the results were used to report culture confirmation. Results for microscopy, polymerase chain reaction (PCR) and histology are also collected in the PHE Enhanced Tuberculosis Surveillance system (ETS).¹⁰

Culture confirmation and speciation

In 2020, 60% of all cases (187 out of 310) were confirmed by culture of a TB isolate. Among pulmonary cases, 71% of cases (130 out of 184) were culture confirmed. These proportions are consistent with the previous year, where 58% (330 out of 574) of all cases, and 73% (239 out of 328) of pulmonary cases, were culture confirmed.

Of the 187 culture confirmed cases in 2020, almost all were *M. tuberculosis* (98.4%, 184 out of 187). The small number remaining were either *M. africanum* or *M. bovis*.

Sputum smear

As described in the last chapter, 59% of TB cases reported in 2020 had pulmonary disease. Among these individuals, 67% (124 out of 184) had a sputum smear test, of which 48% were smear positive (59 out of 124). The rate of sputum smear testing for pulmonary cases in the East Midlands was slightly above the England overall proportion (65.9%), and the smear positivity rate for those tested was slightly higher compared to England overall (46.3%) ([2](#)).

¹⁰ ETS was replaced in September 2021 by the National Tuberculosis Surveillance System (NTBS).

5. Delay from onset of symptoms to start of treatment

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

Overall, 300 patients started on TB treatment in 2020. Among patients with pulmonary TB who reported both date of symptom onset and date of treatment start, 31% (52 out of 170) started treatment within 2 months of symptom onset (Table 6), which is a lower percentage compared to the previous year (44%, 81 out of 186 in 2019). In 2020, of patients with pulmonary TB, 36% (62 out of 170) started treatment more than 4 months (120 days) after symptom onset, indicating a prolonged period of infectiousness.

47% of patients with extra-pulmonary TB started treatment more than 4 months after symptom onset (57 out of 121), which is higher than the previous year (42%, 62 out of 149 in 2019). The longer treatment delays in extra-pulmonary cases are often thought to relate to delays in presenting to healthcare and in diagnosing extra-pulmonary disease, which is supported by the longer median time from symptom onset to diagnosis for extra-pulmonary cases (109 days) compared to pulmonary cases (82 days).

Table 6. Time between symptom onset and treatment start*, East Midlands, 2020

Time delay	Pulmonary		Extra-pulmonary only		Overall	
	n	%	n	%	n	%
<2 months	52	30.6	25	20.7	77	26.5
2 to 4 months	56	32.9	39	32.2	95	32.6
Over 4 months	62	36.5	57	47.1	119	40.9
Total	170		121		291	

* Excluding asymptomatic patients, and those with missing onset dates.

Characteristics of pulmonary TB patients with a delay from onset of symptoms to treatment of more than 4 months

In 2020, 60% (37 out of 62) of pulmonary TB patients who experienced a treatment delay exceeding 4 months were male and 50% (31 out of 62) were aged 15 to 44 years. A slightly larger proportion were non UK born (61%, 38 out of 62), among whom just over a third (37% 14 out of 62) had entered the UK over 11 years prior to their TB diagnosis. 31% of these late diagnosed pulmonary cases were sputum smear positive (19 out of 62). Nearly one quarter had at least one social risk factor (24%, 14 out of 62).

6. TB outcomes in drug sensitive cohort

For the purposes of TB outcome reporting, drug sensitive cases are defined as sensitive to rifampicin. Under this definition, cases with resistance to isoniazid, ethambutol and/or pyrazinamide but sensitive to rifampicin are included in the drug sensitive cohort. Drug-resistant strains are defined as those with resistance to rifampicin and cases with suspected rifampicin resistance (initial or acquired) including non-culture confirmed patients treated for presumptive MDR-TB (4). TB outcomes among patients with drug-resistant disease are considered in the next chapter (Chapter 5).

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

For patients with an expected duration of treatment less than 12 months, outcomes at 12 months are reported. This group excludes individuals with central nervous system (CNS) disease, who would be treated for 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.

For patients with CNS, spinal, cryptic disseminated or miliary disease, the last recorded treatment outcome is reported.

Outcomes for TB patients with expected duration of treatment less than 12 months

Table 7. Number and proportion completing treatment at 12 months, East Midlands, 2001 to 2020*

Year of diagnosis	Patients completing treatment at 12 months		
	Rifampicin-sensitive cases	Number	Proportion (%)
2001	515	149	29
2002	444	144	32
2003	433	128	30
2004	387	140	36
2005	492	140	28
2006	520	389	75
2007	474	382	81
2008	429	333	78
2009	483	392	81

Year of diagnosis	Patients completing treatment at 12 months		
	Rifampicin-sensitive cases	Number	Proportion (%)
2010	435	371	85
2011	439	362	82
2012	437	353	81
2013	360	317	88
2014	339	278	82
2015	303	233	77
2016	305	230	75
2017	290	234	81
2018	304	255	84
2019	320	242	76

* Excludes rifampicin-resistant TB, and patients with CNS, spinal, miliary or cryptic disseminated disease.

Of the 78 patients who weren't recorded as completing treatment at 12 months, 42% were still on treatment (33 out of 78), and 21% had died (which may or may not have been caused by TB) (16 out of 78). However, nearly one-third of outcomes (32%, 25 out of 78) were unknown due to cases being lost to follow-up or not evaluated (Table 8).

Table 8. TB outcome at 12 months, East Midlands, patients diagnosed in 2019*

Outcome	Number of patients	Proportion (%)
Treatment completed	242	75.6
Died	16	5.0
Lost to follow up	10	3.1
Still on treatment	33	10.3
Treatment stopped	4	1.3
Not evaluated	15	4.7
Total	320	

* Excludes rifampicin-resistant TB, and patients with CNS, spinal, miliary or cryptic disseminated disease.

Of the 10 patients lost to follow up, 8 out of 9 were non-UK born (89%, one unknown), and 5 out of 7 were recorded as lost to follow up because they had left the UK (71%, 3 unknown). The median age of patients lost to follow up was 30 years.

Patients aged 65 years or older had the highest death and treatment non-completion rates, with over a third not completing treatment within 12 months (37% 15 out of 41), and 20% patient

deaths within 12 months (8 out of 41) compared to with 9% deaths in the 45 to 64 age group (the next highest category) (8 out of 92).

Out of the 16 patient deaths, 38% (6 out of 16) were UK born. Causes of death reported by clinicians to ETS¹¹ indicated that TB had contributed to, or caused, the death of 6% of TB patients. TB was incidental to the death of 19% of patients and the relationship between TB and death was unknown for 75% of patients. The median age of patients who died was 65 years.

Outcomes for drug sensitive cohort of patients with CNS, spinal, miliary or cryptic disseminated TB

At the last recorded outcome for patients diagnosed in 2019 with rifampicin sensitive TB and possible CNS involvement (which is no more than 24 months after starting treatment), 71% (25 out of 35) had completed treatment (Table 9). These patients have a higher rate of treatment completion compared to similar patients diagnosed in 2018 60% (18 out of 30). The median treatment duration for these individuals was under one year (305 days, IQR 271-368 days). Of this cohort, less than 5 patients died with a median age 52 years. TB contributed to the death in less than 5 cases and cause of death was unknown in less than 5 cases (Table 9).

Table 9. TB outcome for patients with rifampicin sensitive, CNS, spinal, miliary or cryptic disseminated disease, East Midlands, patients diagnosed in 2019*

Outcome	Number of cases	Proportion (%)
Treatment completed	25	71.4
Died	<5	Suppressed
Lost to follow up	<5	Suppressed
Still on treatment	<5	Suppressed
Not evaluated	<5	Suppressed
Total	35	

* Excludes rifampicin-resistant TB.

¹¹ Causes of death reported to ETS were not necessarily based on review of death certificates completed in routine death registration.

7. Drug-resistant TB (including outcomes in the drug-resistant cohort)

Drug resistance

There are several groups of TB antibiotics, and resistance to TB antibiotic drugs may occur to one or more of these drugs and in different combinations. A distinction is made between first, second and third line TB antibiotic drugs depending upon their clinical effectiveness (5). First line drugs include rifampicin, isoniazid, pyrazinamide and ethambutol. Second line drugs include injectable agents (for example, amikacin, capreomycin, kanamycin), fluoroquinolones (for example, moxifloxacin, ofloxacin, ciprofloxacin) and other oral bacteriostatic agents. Multi-drug resistant cases (MDR-TB) are initially resistant to at least isoniazid and rifampicin. Extensively drug-resistant TB cases (XDR-TB) are both MDR and resistant to at least one injectable agent, one of which must be a fluoroquinolone (4).¹²

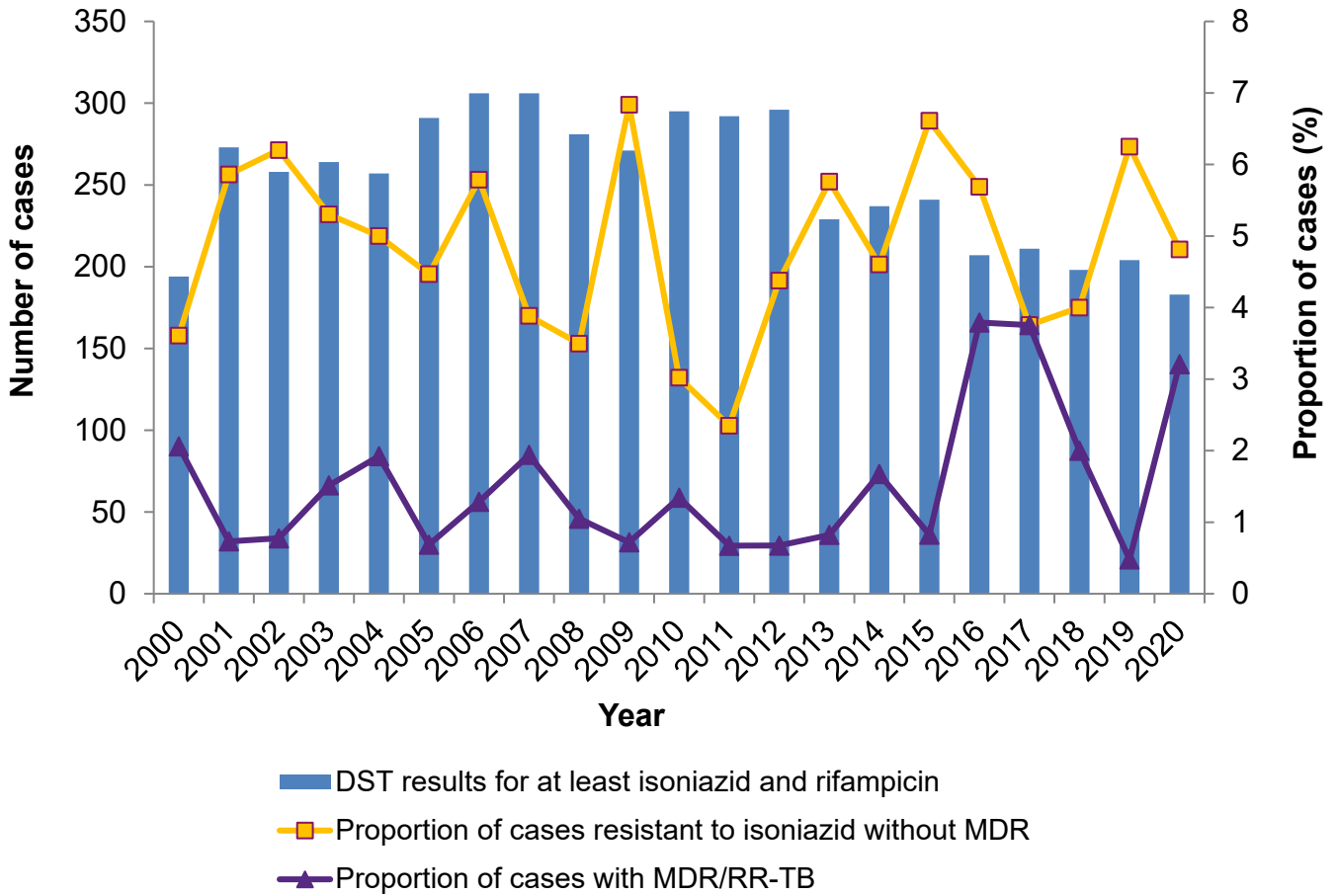
Overall initial drug resistance and geographical distribution

In 2020, first line drug defence for TB in the East Midlands follows similar patterns to previous years. Phenotypic drug sensitivity testing (DST) was known for 59% of cases in 2020 (183 out of 310). Among these 183 culture-confirmed cases of TB, 10% (19 out of 183) had first line drug resistance. This is similar to proportions seen in 2016 to 2019, which have been recording the highest proportion since records began in year 2000.

5% of the cases with known DST (9 out of 183) were resistant to isoniazid but not rifampicin (INH-R) and 3% (6 out of 183) had multi-drug resistant or rifampicin-resistant TB (MDR out of RR-TB). (Figure 13). Cases of extensively drug-resistant TB (XDR-TB) are rare in England and the East Midlands. There were a total of 5 cases notified between 2016 to 2020 in the East Midlands (this was 0.5% of all people with culture confirmed TB with a result (drug sensitivities or WGS) for at least isoniazid and rifampicin).

¹² Injectable agents: amikacin, capreomycin or kanamycin. Fluoroquinolones: moxifloxacin, ofloxacin or ciprofloxacin.

Figure 13. Proportion of TB cases with initial first line drug resistance, East Midlands, 2000 to 2020



Abbreviations

DST: drug sensitivity testing

MDR: multi-drug resistant TB

RR-TB: rifampicin-resistant TB (with or without resistance to other antibiotics)

In the 19 cases with any first line drug resistance males were represented more than in the general East Midlands TB patients (74% versus 54%), as were non-UK born cases (84% versus 73%). The 15 to 44 age group had the largest proportion of patients with first line drug resistance (63%, 12 out of 19).

Amongst ethnic groups, those of Indian ethnicity made up over half of first line resistance cases (58%, 11 out of 19), followed by White, Black African, then any other ethnicity. 68% of patients with first line resistance had pulmonary TB (13 out of 19) and 37% were sputum smear positive (7 out of 19).

Amongst the 6 patients who had MDR out of RR-TB, all were non UK born (100%), and the majority were in the 15 to 44 age category (83%, 5 out of 6). In terms of patient clinical characteristics, 5 had pulmonary TB (83%) and fewer than 5 were sputum smear positive (50%).

TB outcome at 24 months for patients with rifampicin-resistant disease

Of the 5 East Midlands cases with MDR TB notified in 2018, 24 months later 2 have completed treatment, whilst the remaining 3 are either lost to follow up or still on treatment.

8. TB in under-served populations

Social risk factors

Of the 298 patients with TB aged 15 years or older in 2020, 80% (239 out of 298) had a recorded risk factor status, including homelessness, imprisonment and drug or alcohol misuse. Among those individuals, 16% (38 out of 239) had at least one recorded risk factor, which is the lowest since 2016 (Table 10).

Table 10. Social risk factors among TB patients, East Midlands, 2009 to 2019

Year	Total with status recorded	Any social risk factor	
		Number of patients	Proportion (%)
2010	480	384	25
2011	480	363	29
2012	481	362	24
2013	394	305	29
2014	386	275	34
2015	345	273	30
2016	320	265	30
2017	332	257	51
2018	331	286	43
2019	343	292	43
2020	298	239	38

The most common risk factor reported in 2020 in the East Midlands was homelessness (7%, 17 out of 272, Table 11) followed by drug use (5.8 %, 14 out of 268), prison (5.4%, 13 out of 242) and alcohol misuse (5.0%, 12 out of 272).

Table 11. Social risk factors among TB patients, East Midlands, 2020

Risk factor	Total with status recorded	Number of patients	Proportion (%)
Prison	242	13	5.4%
Homelessness	272	17	7.0%
Alcohol misuse	272	12	5.0%
Drug use	268	14	5.8%

Compared to patients with no social risk factors (SRF) between 2009 and 2020, cases with at least one social risk factor were more likely to be male (82% versus 50% with no SRF), UK born (44% versus 26% with no SRF), white (50% versus 24% with no SRF), be sputum smear positive (62% versus 36% with no SRF) have pulmonary disease (81% versus 54% with no SRF) and have a previous diagnosis of TB (12% versus 6% with no SRF) (Table 12).

Table 12. Characteristics of patients aged 15 years or older in relation to social risk factors, East Midlands, patients diagnosed between 2009 and 2020

Characteristic		Patients with risk factors		Patients with no risk factors	
		Number of patients	Proportion (%)	Number of patients	Proportion (%)
Sex					
	Female	74	18.3	1600	45.5
	Male	331	81.7	1625	54.5
Age					
	15 to 44	259	63.8	1902	56.5
	45 to 64	134	33.0	812	24.3
	65+	13	3.2	520	19.2
Country of birth					
	Non-UK born	220	55.7	2383	70.8
	UK born	175	44.3	821	29.2
Ethnicity					
	White	202	49.8	765	20.1
	Black-Caribbean	17	4.2	38	2.8
	Black African	72	17.7	373	13.1
	Black Other	5	1.2	17	0.6
	Indian	48	11.8	1445	29.8
	Pakistani	13	3.2	281	22.7
	Bangladeshi	<5	Suppressed	60	2.9
	Chinese	<5	Suppressed	41	1.3
	Mixed / Other	36	8.9	190	5.9
	Unknown ethnicity	10	2.5	24	0.7
Clinical characteristics					
	Pulmonary	327	80.5	1745	54.1

Characteristic		Patients with risk factors		Patients with no risk factors	
		Number of patients	Proportion (%)	Number of patients	Proportion (%)
	Sputum smear positive	148	61.9	494	36.2
	Previous TB diagnosis	43	11.5	194	6.1
Drug sensitivity					
	First line drug resistance	25	8.3	152	8.6
HIV test					
	Offered	276	96.8	1831	95.0

From overall data from 2009 to 2019, it can be seen that patients with risk factors were slightly less likely to complete treatment (76% in patients with no risk factors, 89% in patients with risk factors) and were more likely to be lost to follow up (9% in patients with no risk factors, 4% in patients with risk factors) (Table 13).

Table 13. Last recorded TB outcome for patients aged 15 years or older, East Midlands, patients diagnosed 2009 to 2019

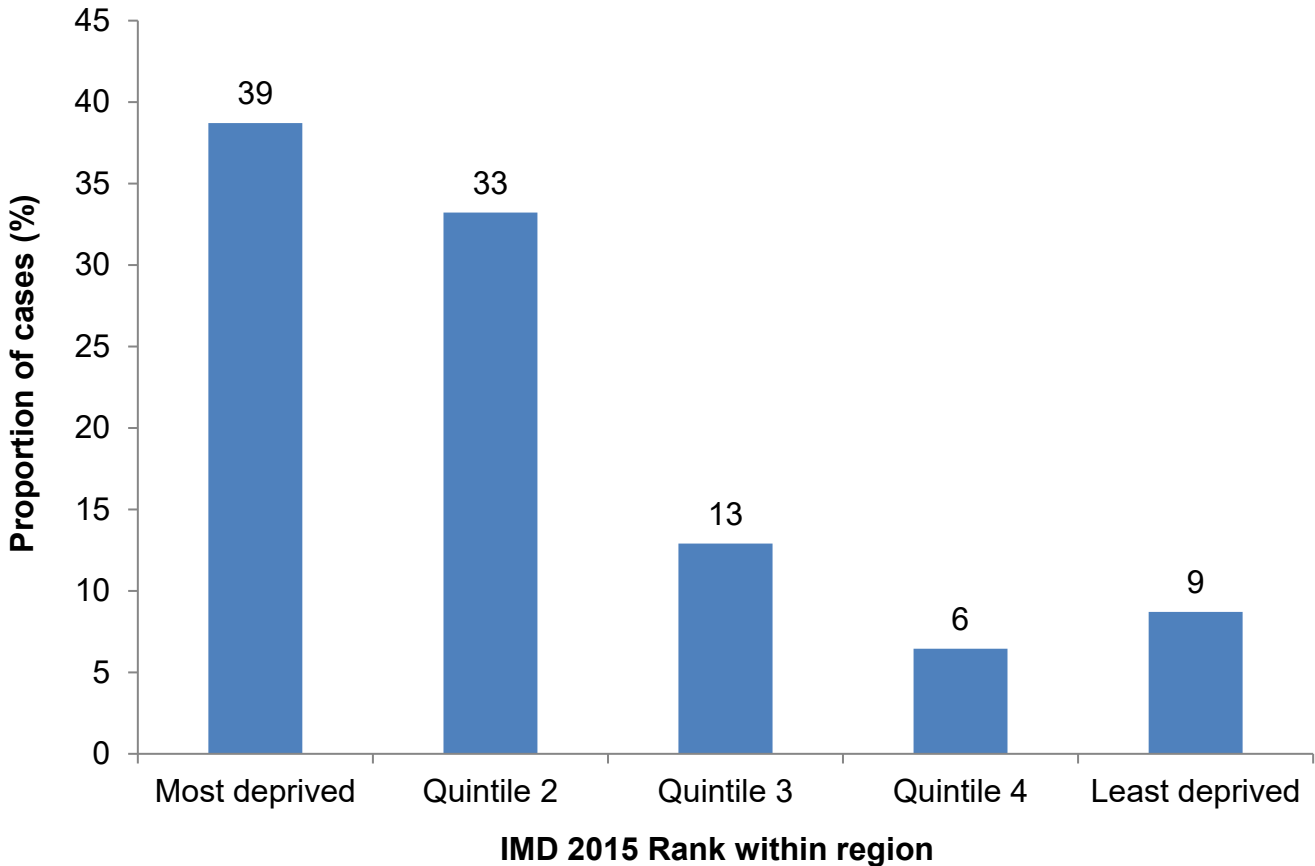
Last recorded outcome	Patients with risk factors		Patients with no risk factors	
	Number of patients	Proportion (%)	Number of patients	Proportion (%)
Treatment completed	249	75.9	2410	89.4
Died	31	9.5	126	4.7
Lost to follow up	30	9.1	99	3.7
Still on treatment	≤5	Suppressed	6	0.2
Treatment stopped	≤5	Suppressed	33	1.2
Not evaluated	9	2.7	23	0.9
Total	328		2697	

* Excludes rifampicin-resistant TB, and patients with CNS, spinal, miliary or cryptic disseminated disease.

Deprivation

Based on the Index of Multiple Deprivation (IMD 2019) rank assigned to geographical areas in the East Midlands,¹³ 39% (120 out of 310) of patients were resident in the most deprived quintile (Figure 14). As in previous years, TB case rate has higher proportions in the more deprived quintiles.

Figure 14. TB case rate by deprivation, East Midlands, 2020



¹³ The Index of Multiple Deprivation 2019 rank for each lower super output area (LSOA), based on deprivation score assigned, relative to other LSOAs in the PHE East Midlands area.

9. HIV testing of TB patients

HIV testing

For some patients who have TB, treatment can be more complicated because they also have HIV infection. However, both conditions can be successfully treated with a combination of antiretroviral therapy (ART) and appropriate TB antibiotic treatment (6). To optimise their outcome and reduce the risk of TB and HIV transmission to others, it is essential that all patients with TB undergo HIV testing to allow curative TB treatment and ART to be started as soon as possible.

HIV testing status was not recorded in 8% of cases (23 out of 308)¹⁴ and HIV status was already known in 3% of cases (8 out of 308). Of the remaining cases, 95% were offered an HIV test (264 out of 277), and an HIV test was received in 94% of cases (261 out of 277). 1% were offered but did not receive testing (2 out of 277), and 5% were not offered a test (13 out of 277). Of patients not offered an HIV test, 62% (8 out of 13) were female and 39% (5 out of 13) were white.

In 4 out of 9 upper tier local authority areas, 100% of cases were offered HIV testing and received the test (Table 14).

Table 14. HIV testing by upper tier local authority of residence, East Midlands, 2020

UTLA name	Total number of patients	Offered		Offered and received	
		Number of patients	Proportion (%)	Number of patients	Proportion (%)
Derby	25	25	100.0	25	100.0
Derbyshire	13	11	84.6	10	76.9
Leicester	121	116	95.9	115	95.0
Leicestershire and Rutland	28	25	89.3	25	89.3
Lincolnshire	20	20	100.0	19	95.0
North Northamptonshire	8	8	100.0	8	100.0
Nottingham	33	33	100.0	33	100.0
Nottinghamshire	9	9	100.0	9	100.0
West Northamptonshire	20	17	85.0	17	85.0
East Midlands	277	264	95.3	261	94.2

¹⁴ Excluding cases diagnosed post mortem.

References

1. UKHSA (2021). 'Tuberculosis in England: 2021' (presenting data to end of 2020)
2. UKHSA (2021). '[TB Action Plan for England, 2021 to 2026](#)'
3. UKHSA (2021). 'UK pre-entry tuberculosis screening report 2020'
4. WHO (2013). '[Definitions and reporting framework for tuberculosis – 2013 revision](#)'
5. Joint Formulary Committee. '[British National Formulary 2018](#)' 3 October 2018
6. WHO (2010). 'Guidelines for treatment of tuberculosis'

Appendix A. Notes on the report

About the Field Service

The Field Service (FS) supports PHE Centres and partner organisations through the application of epidemiological methods to inform public health action. It does this in 2 main ways, firstly by providing a flexible expert resource, available, as and when needed, to undertake epidemiological investigations for key health protection work and secondly through the expert analysis, interpretation and dissemination of surveillance information to PHE Centres, local health partners, service providers and commissioners of services. Within the FS network, excellence and innovation is encouraged, we foster academic collaborations and take active part and lead in research, development and training.

Intended audience

This report is for use by healthcare professionals who diagnose and/or care for people with TB, commissioners involved in planning and financing TB services, public health professionals working to improve TB control and the health of at-risk populations, researchers with an interest in TB, and government and non-governmental organisations working in the field of TB. In particular this report is for the use of the East Midlands TB Control Board and local health protection forums.

Aim of report

This report describes the recent epidemiology of TB in the East Midlands. It includes local trends, which areas and population groups have a high burden of disease, and detail on the care of patients.

More TB information

You can find more information about TB online:

- [the National Report of TB in England](#)
- additional data on TB notifications in the UK to the end of 2019, and breakdowns by country, can be found in the Official Statistic for TB, '[Reports of cases of tuberculosis to enhanced tuberculosis surveillance systems](#)'
- the [TB action plan for England, 2021 to 2026](#)
- a [number of TB indicators at upper tier local authority and clinical commissioning group level](#) are available online and were updated with data for 2020 in February 2021

Appendix B. Description of data sources and definitions

Data sources

This report is based on TB case notifications made to ETS in England to the end of 2020. This information is updated annually to take into account denotifications (where the patient was found not to have TB), late notifications and other updates. The data presented in this report supersedes data in previous reports.

Diagnostic laboratories serving acute hospitals are the first place in which TB infection-related samples are received and processed within the pathway of clinical diagnosis and management of suspected TB cases. Results for microscopy, PCR, histology and culture are collected in ETS. Appropriate referral of clinical specimens to the Mycobacterium Reference Laboratories is an important part of the routine work of the diagnostic laboratories in the investigation and management of TB cases.

The National Mycobacterium Reference Service (NMRS) receives these diagnostic materials and undertake characterisation using culture and molecular diagnostic methods to define species of Mycobacterium, TB antibiotic (drug) susceptibility and organism relatedness. Historically, organism relatedness has been determined by MIRU-VNTR typing, however this has been superseded in recent years by WGS.

Definitions

Term	Definition
BCG	Bacillus Calmette-Guérin vaccination
CI	Confidence interval
CCG	Clinical commissioning group
Cluster	2 or more patients notified within the time period of analysis with TB caused by indistinguishable strains, with at least 23 complete MIRU-VNTR loci
CNS	Central nervous system
Cohort review	The systematic review of all TB patients notified by a TB service in a 3 to 4 month period, looking at standard outcomes in terms of patient care and number of contacts screened
Cryptic disseminated TB	Systemic illness without localising features
DOT	Directly observed treatment

Term	Definition
Drug	In the context of TB control, a drug is an anti-TB antibiotic
Drug-resistant cohort	The drug-resistant cohort includes any patients with rifampicin-resistant TB (initial or acquired), including MDR-TB (initial or acquired), as well as those without culture confirmation treated with an MDR-TB regimen
Drug sensitive cohort	The drug sensitive cohort excludes all TB patients with rifampicin-resistant TB (initial or acquired) including MDR-TB (initial or acquired), and non-culture confirmed patients treated with an MDR-TB regimen
DST	Drug sensitivity testing, based on phenotypic analysis of cultured TB isolates
ETS	Enhanced TB Surveillance system
First-line drug resistance	First-line anti-TB antibiotic drug resistance is defined as resistance to at least one of the first line antibiotics (isoniazid, rifampicin, ethambutol, pyrazinamide)
ART	Antiretroviral therapy
IGRA	Interferon-gamma release assay – blood test for TB infection which does not differentiate between active disease and LTBI
IMD 2019	The Index of Multiple Deprivation rank for each LSOA, based on deprivation score assigned, relative to other LSOAs in the PHE East Midlands area
IQR	Interquartile range
LSOA	Lower super output area (geographic definition)
LTBI	Latent TB infection
MDR	Multidrug resistance: cases initially resistant to at least isoniazid and rifampicin
Miliary TB	TB infection spread via the bloodstream to all parts of the body
MIRU-VNTR	Mycobacterial Interspersed Repetitive Unit-Variable Number Tandem Repeats
PCR	Polymerase chain reaction
Post-mortem diagnosis	A patient diagnosed at post-mortem is defined as where TB 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 pulmonary case is defined as a patient with TB involving the lungs and/or tracheobronchial tree, with or without extra-pulmonary TB diagnosis. In this report, in line with the WHO's recommendation and

Term	Definition
	international reporting definitions, miliary TB is classified as pulmonary TB due to the presence of lesions in the lungs
Second-line drugs	Second-line drugs include injectable agents (for example, amikacin, capreomycin, kanamycin), fluoroquinolones (for example, moxifloxacin, ofloxacin, ciprofloxacin) and other oral bacteriostatic agents.
SNP	Single nucleotide polymorphism – mutation of one base pair in the genome of an <i>M. tuberculosis complex</i> isolate
TB	Tuberculosis
UTLA	Upper tier local authority (geographic definition)
WGS	Whole genome sequencing
XDR	Extensive drug resistance: cases initially MDR and resistant to at least one injectable agent (amikacin, capreomycin or kanamycin) and at least one fluoroquinolone (moxifloxacin, ofloxacin or ciprofloxacin)

Treatment outcome

Information on outcomes were reported for all patients reported in the previous year, excluding those with known rifampicin-resistant disease: outcomes for these were reported at 24 months. Definitions for outcome are based on World Health Organization (WHO) and European definitions, but adapted to the UK context. In this report, all data was obtained from the NTBS 2020 database download.

Proportions

All proportions in this report are calculated among patients with known information or a known result, except where otherwise stated.

Confidence intervals

A 95% confidence interval for incidence was obtained using the relevant procedure in Stata, assuming a Poisson distribution.

Population denominator

Tuberculosis rates by geographical area (centre, upper and lower tier local authority), age, sex and place of birth were calculated using ONS mid-year population estimates. Tuberculosis rates by ethnic group were calculated using population estimates from the [Labour Force Survey](#) (LFS). The LFS is based on a population sample, so estimates are liable to sampling errors, particularly for small population subgroups, and should be interpreted with caution.

Cluster definitions

Strain typing was performed by the National Mycobacterial Reference Service using 24 MIRU-VNTR profiling. Analysis was undertaken on strain type clusters, as defined above.

Appendix C. TB among East Midlands residents

Table C1. TB case numbers by upper tier local authority of residence, East Midlands, 2000 to 2020

Upper tier local authority	Year																				
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Derby	42	46	46	59	39	28	36	40	55	45	40	53	34	34	37	35	28	30	29	29	27
Derbyshire	36	37	29	30	25	28	43	30	28	32	15	36	32	22	28	18	9	10	7	10	15
Leicester	148	262	196	199	155	263	226	216	178	206	207	188	184	158	142	125	130	135	143	146	131
Leicestershire and Rutland	32	51	43	33	37	43	56	50	40	51	41	35	38	38	24	24	23	33	25	37	30
Lincolnshire	11	6	14	14	18	13	25	16	20	20	21	23	31	26	34	36	30	28	26	20	24
North Northamptonshire	38	22	28	15	17	27	23	17	27	30	29	27	21	15	16	17	18	19	21	13	10
Nottingham	45	52	40	36	48	57	82	80	80	55	69	67	60	58	50	53	48	43	33	48	36
Nottinghamshire	28	23	20	31	21	22	29	36	19	36	33	25	38	31	38	18	23	32	20	12	13
West Northamptonshire	34	45	55	41	58	52	46	49	36	49	39	38	59	31	31	31	32	19	35	41	24
East Midlands	699	702	794	783	920	920	927	928	1008	1006	872	1004	1076	979	775	699	717	660	612	574	548

Table C2. Three-year average count by lower tier local authority of residence, East Midlands, 2000 to 2020

LTLA name	Year																		
	2000-2002	2001-2003	2002-2004	2003-2005	2004-2006	2005-2007	2006-2008	2007-2009	2008-2010	2009-2011	2010-2012	2011-2013	2012-2014	2013-2015	2014-2016	2015-2017	2016-2018	2017-2019	2018-2020
Amber Valley	6	4	3	3	5	5	5	4	4	4	4	5	5	4	4	2	1	0	1
Ashfield	1	3	4	4	4	3	3	3	3	4	4	4	6	5	6	5	6	4	2
Bassetlaw	2	2	2	3	3	3	3	4	4	3	3	3	4	3	2	1	1	1	1
Blaby	6	6	7	8	9	9	9	7	8	7	6	5	5	5	3	4	3	6	6
Bolsover	2	2	2	2	2	2	2	1	1	1	3	2	3	1	1	0	0	1	2
Boston	1	4	5	5	3	2	4	3	4	3	4	5	6	8	8	10	10	8	8
Broxtowe	6	7	6	4	4	4	5	6	6	7	6	7	7	6	4	4	3	2	2
Charnwood	14	14	14	15	18	19	17	18	17	19	14	11	7	7	6	10	12	14	10
Chesterfield	8	7	8	9	10	10	8	6	4	5	5	7	6	6	4	3	2	4	2
Corby	6	5	3	4	5	7	5	8	9	9	7	5	5	3	4	3	4	4	4
Daventry	6	4	3	1	2	1	2	3	4	4	3	4	4	3	2	2	2	3	3
Derby	45	50	48	42	34	35	44	47	47	46	42	40	35	35	33	31	29	29	28
Derbyshire Dales	2	3	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	0	1
East Lindsey	1	1	1	1	1	2	2	3	3	4	3	2	3	5	6	5	3	4	3
East Northamptonshire	3	2	2	2	2	1	1	2	4	3	3	2	3	3	3	3	3	2	1

LTLA name	Year																		
	2000-2002	2001-2003	2002-2004	2003-2005	2004-2006	2005-2007	2006-2008	2007-2009	2008-2010	2009-2011	2010-2012	2011-2013	2012-2014	2013-2015	2014-2016	2015-2017	2016-2018	2017-2019	2018-2020
Erewash	6	6	5	4	2	2	3	4	3	4	5	5	4	4	3	3	2	2	1
Gedling	5	4	3	4	5	7	6	5	5	6	7	6	7	5	5	5	4	3	2
Harborough	3	3	3	3	3	3	4	4	3	2	2	3	5	4	3	3	3	2	3
High Peak	5	4	2	1	4	5	5	3	3	4	4	4	2	2	2	1	1	1	1
Hinckley and Bosworth	5	6	4	4	4	4	4	5	3	2	2	5	5	3	2	2	2	2	3
Kettering	11	8	9	7	9	7	7	6	7	7	7	6	4	4	3	6	6	7	4
Leicester	202	219	183	206	215	235	207	200	197	200	193	177	161	142	132	130	136	141	140
Lincoln	1	1	1	2	3	4	4	3	3	3	4	5	5	4	4	4	5	4	5
Mansfield	6	4	5	5	5	4	4	4	4	5	4	4	5	5	4	2	2	3	2
Melton	1	1	1	1	1	2	2	2	2	1	1	1	1	0	0	0	1	1	2
Newark and Sherwood	1	2	3	3	2	2	2	2	2	3	2	2	3	2	2	3	4	3	2
North East Derbyshire	2	3	3	4	3	4	4	4	2	2	1	1	1	1	1	1	1	0	1
North Kesteven	2	1	1	1	1	1	1	1	2	2	3	2	1	2	2	2	2	2	2
North West Leicestershire	2	3	2	2	3	3	4	2	3	2	3	2	3	3	3	2	1	2	2
Northampton	36	40	45	46	48	47	40	40	35	37	39	36	34	27	27	24	23	26	27
Nottingham	46	43	41	47	62	73	81	72	68	64	65	62	56	54	50	48	41	41	39

Table C3. TB case numbers and rate by age and sex, East Midlands, 2020

Age group (years)	Female					Male					Overall				
	Number	Rate	95% CI			Number	Rate	95% CI			Number	Rate	95% CI		
0 to 14	7	1.69	0.68	-	3.48	5	1.15	0.37	-	2.69	12	1.41	0.73	-	2.47
15 to 44	78	8.82	6.97	-	11.01	93	10.35	8.35	-	12.68	171	9.59	8.21	-	11.14
45 to 64	34	5.25	3.63	-	7.33	51	8.08	6.01	-	10.62	85	6.64	5.31	-	8.21
65+	25	4.89	3.17	-	7.22	17	3.83	2.23	-	6.14	42	4.40	3.17	-	5.95
All ages	144	5.86	4.94	-	6.90	166	6.89	5.89	-	8.03	310	6.37	5.68	-	7.12

* Rates calculated using ONS mid-year population estimates.

Table C4. Drug resistance among TB patients with culture confirmed disease*, East Midlands, 2000 to 2020

Year	DST results	First line drug resistance		INH-R without MDR-TB		MDR/RR-TB		Pre-XDR		XDR	
	Number	Number	%	Number	%	Number	%	Number	%	Number	%
2000	194	11	5.7	7	4	<5	Suppressed	<5	Suppressed	0	0
2001	273	19	7.0	16	6	<5	Suppressed	<5	Suppressed	0	0
2002	258	18	7.0	16	6	<5	Suppressed	<5	Suppressed	0	0
2003	264	18	6.8	14	5	<5	2	<5	Suppressed	<5	Suppressed
2004	257	19	7.3	13	5	5	2	<5	Suppressed	0	0
2005	291	15	5.2	13	4	<5	Suppressed	<5	Suppressed	0	0
2006	306	22	7.1	18	6	<5	Suppressed	<5	Suppressed	0	0
2007	306	20	6.5	12	4	6	2	5	2	<5	Suppressed
2008	281	13	4.5	10	3	<5	Suppressed	<5	Suppressed	0	0
2009	271	24	8.6	19	7	<5	Suppressed	<5	Suppressed	0	0
2010	295	16	5.4	9	3	<5	Suppressed	<5	Suppressed	<5	Suppressed
2011	292	9	3.0	7	2	<5	Suppressed	<5	Suppressed	<5	Suppressed
2012	296	16	5.4	13	4	<5	Suppressed	<5	Suppressed	0	0
2013	229	17	7.0	14	6	<5	Suppressed	<5	Suppressed	0	0
2014	237	17	7.1	11	5	<5	Suppressed	<5	Suppressed	<5	Suppressed
2015	241	20	8.3	16	7	<5	Suppressed	<5	Suppressed	0	0
2016	207	23	10.9	12	6	8	4	8	4	<5	Suppressed
2017	211	22	10.3	8	4	8	4	7	3	<5	Suppressed
2018	198	21	10.5	8	4	<5	Suppressed	<5	Suppressed	0	0
2019	204	27	13.0	13	6	<5	Suppressed	0	0	0	0
2020	183	19	10.2	9	5	6	3	<5	Suppressed	<5	Suppressed

* Culture-confirmed cases with drug susceptibility testing results for at least isoniazid and rifampicin.

Appendix D. All TB patients notified by East Midlands clinics

Tables of further information about TB cases treated by hospital clinics and TB services based in the East Midlands can be requested by public health and clinical stakeholders from your local FS team.

Appendix E. Local authority TB epidemiological summaries

Local authority TB epidemiological summaries can provide further information about TB cases among residents of East Midlands upper tier local authorities with high rates of TB cases per year over the previous 3 years. These can be requested from your local FS team.

Acknowledgements

We are grateful to all those who contribute information on people with tuberculosis in the East Midlands, including nurses, physicians, microbiologists, scientists, outreach and social care and administrative staff. We also acknowledge colleagues at the PHE National Mycobacterium Reference Service for information on culture confirmation and drug susceptibility testing. Further thanks are due to the National TB Unit for providing the cleaned matched data set, the East Midlands Centre Health Protection Team and the Field Service (Midlands) team for their work supporting Enhanced Tuberculosis Surveillance.

Authors

This report was prepared by Helen Bagnall, Eliza Allsop and Jennifer Gunther of the Field Service (Midlands), and Tony McGinty, Health Protection, East Midlands Region, UKHSA.

Suggested citation

UK Health Security Agency. (April 2022) Tuberculosis in the East Midlands: Annual review (2020 data), 2020. UK Health Security Agency: (Field Service Midlands)

About the UK Health Security Agency

UKHSA is responsible for protecting every member of every community from the impact of infectious diseases, chemical, biological, radiological and nuclear incidents and other health threats. We provide intellectual, scientific and operational leadership at national and local level, as well as on the global stage, to make the nation health secure.

[UKHSA](#) is an executive agency, sponsored by the [Department of Health and Social Care](#).

© Crown copyright 2022
Version 1

Prepared by: Field Service Midlands
For queries relating to this document, please contact: fsmidlands@phe.gov.uk

Published: August 2022
Publishing reference: GOV-12952



You may re-use this information (excluding logos) free of charge in any format or medium, under the terms of the Open Government Licence v3.0. To view this licence, visit [OGL](#). Where we have identified any third party copyright information you will need to obtain permission from the copyright holders concerned.



UKHSA supports the
Sustainable Development Goals

