



UK Health
Security
Agency

Tuberculosis in the North West of England

Annual review 2021 (presenting data to
end of 2020)

Data from 2000 to 2020

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Data presented in this report is correct as of May 2021, when it was extracted from the Enhanced TB Surveillance (ETS) system, before being cleaned and validated by June 2021.

Executive summary

The number TB cases reported in England decreased by 12.7% in 2020, an incidence of 7.3 per 100,000 population. TB incidence in the North West of England also decreased to 6.2 per 100,000 population.

Those in under-served populations (including migrants, refugees, asylum seekers and those with social risk factors, such as substance misuse, prison history and homelessness) have a higher risk of acquiring tuberculosis. TB control in this group of individuals has become a priority area across England. In the North West, 9.2% of 2020 cases had at least one social risk factor (SRF). The proportion of cases with social risk factors has remained fairly consistent since 2011, comprising 11.1% of cases on average.

The majority of cases with at least one SRF were UK born (64.5%) and most of these UK born cases were White (90.0%). Most cases with at least one SRF had pulmonary disease (84.4%).

In 2020, 22.2% of TB cases were resident in areas containing the 10% most socio-economically deprived populations in the North West. TB rates were highest among these areas of the North West (13.5 and 13.3 per 100,000 population in the 2 most deprived deciles) compared with the least socio-economically deprived areas (1.8 per 100,000 population).

In 2020, the majority of TB cases reported in the North West (69.8%) were born outside the UK. Of these cases, 20.2% were diagnosed within one year of entry and 50.2% were diagnosed 11 or more years after entry.

Pulmonary TB comprised 47.5% of North West cases, and almost two-thirds of these started treatment within 4 months of symptom onset.

Among 517 drug sensitive TB cases with an expected treatment duration of less than 12 months, 81.4% of those notified in 2019 completed treatment within 12 months.

The proportion of North West TB cases with isoniazid resistance (without MDR-TB) was the highest recorded so far in the North West, at 8.9% (25/280). This was a higher proportion than reported nationally.

The data presented in this report, alongside recommendations made, highlight the challenges we face within the North West. Despite a positive trend in overall rates, a number of issues remain. The largest burden of disease falls in those populations which are socio-economically disadvantaged, and most new TB cases in the North West were born outside the UK.

Continued efforts to control TB in these groups represent an opportunity to reduce health inequalities, and this focus is reflected in this report's recommendations.

Recommendations

Main recommendations for the NHS and UKHSA derived from data presented in this report include:

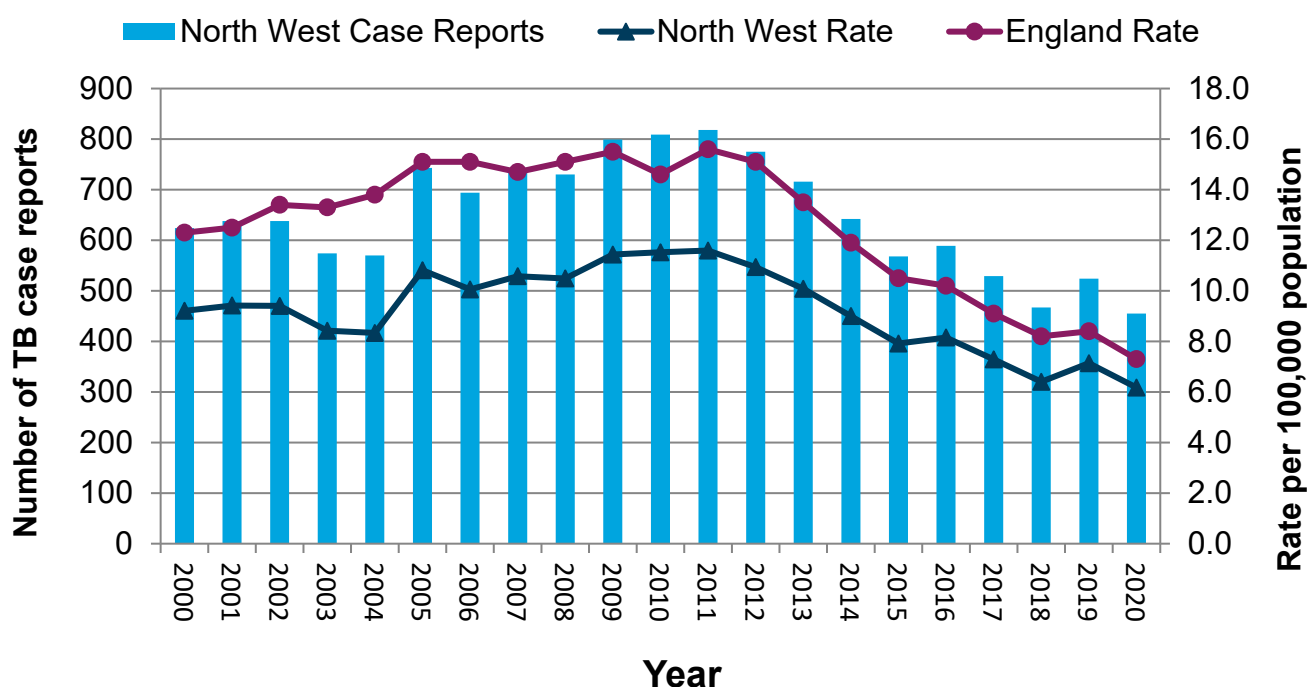
1. TB rates were highest among the most socio-economically deprived areas of the North West, and the proportion of cases with social risk factors highlights that underserved populations must remain a priority for intervention. Engage with prison health, drug and alcohol services and homelessness sectors to promote TB prevention and treatment in these groups, and to consider a more holistic view of health and health protection.
2. Of cases born abroad who were notified in 2020, a substantial proportion had been resident in the UK for at least 11 years. This highlights the continued need for the identification and treatment of migrants with latent TB infection to reduce the risk of future development of active disease. Commissioners and care providers should continue to support the latent TB (LTBI) screening programme to ensure the effective prevention, detection and treatment of TB and LTBI in high risk groups. Work should continue to raise awareness about TB in migrant communities and with their primary and secondary care providers. Clinical pathways should be in place to increase detection and diagnosis for those at highest risk.
3. Every effort should be made to increase the proportion of sputum smear results among pulmonary cases to enable better TB control.
4. UKHSA and partner organisations should continue to ensure cohort review is used as an opportunity to review local incidents (such as TB deaths) to promote learning and sharing of ideas for case management.
5. The Collaborative Tuberculosis Strategy for England 2015 to 2020 (2) sets out the improvements that need to be achieved to bring about a sustained decline in TB and the mechanism by which these improvements should be achieved. The North West TB Control Board (covering Greater Manchester, Cumbria, Lancashire, Cheshire and Merseyside) oversees improvements in TB control, especially among the most vulnerable groups, in addition to the provision of strong and effective public health and clinical services. TB service providers should utilise the UKHSA TB Strategy Monitoring Indicators Tool (3) to track performance and support development of local TB action plans.
6. The NHS should offer HIV testing for all those diagnosed with tuberculosis and ensure that tests are done in line with national guidance (4).

1. TB notifications and incidence

Overall numbers, rates and geographical distribution

In 2020, 455 tuberculosis (TB) cases were reported among North West residents, a rate of 6.2 per 100,000 population. This was a 13.2% decrease compared to 2019 (524 cases, rate of 7.1 per 100,000 population). However, this decrease should be interpreted with caution due to the likely impact of the COVID-19 pandemic on TB detection and transmission. The North West TB rate remained below the England rate of 7.3 per 100,000 (Figure 1), and the North West was the fifth highest of the 9 UKHSA regions in England (1).

Figure 1. TB case reports and rates* in the North West and England, 2000 to 2020

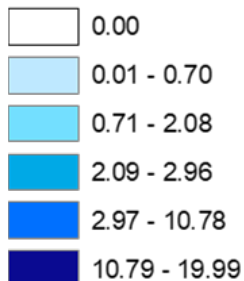


Among North West upper tier local authorities, the highest rates were in Blackburn with Darwen at 20.0 per 100,000 and Pendle at 19.5 per 100,000 population. The most significant changes in incidence occurred in Burnley, which increased from 3.4 per 100,000 population in 2019 to 12.3 per 100,000 population in 2020 (from 3 to 11 cases), and in Rochdale, where incidence increased from 7.2 per 100,000 population in 2019 to 13.0 per 100,000 population in 2020 (from 16 to 29 cases). In Preston, the rate decreased from 17.5 per 100,000 population in 2019 to 11.8 per 100,000 population in 2020 (from 25 to 17 cases).

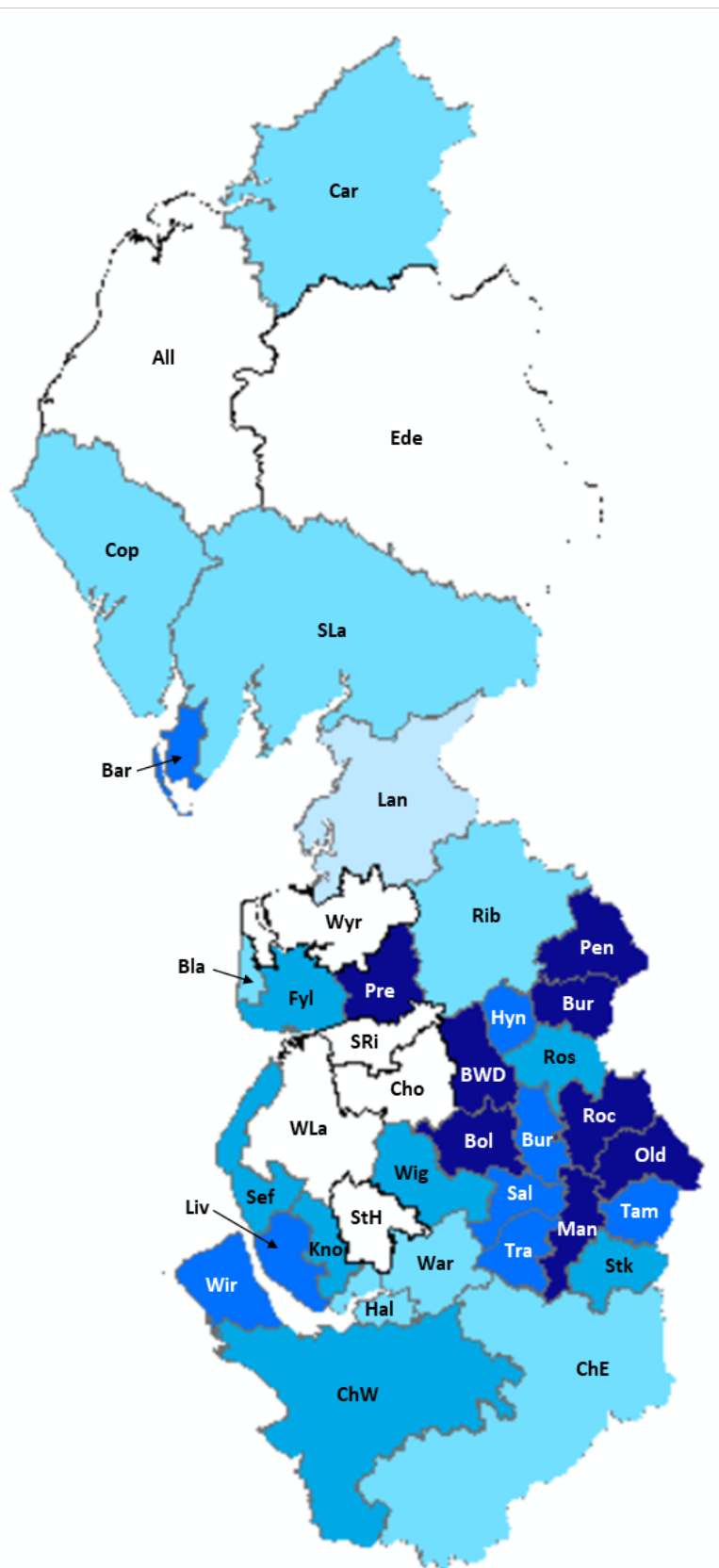
In 2020, 7 of the 39 North West local authorities had zero notifications of TB (Appendix C, [Table Bi](#)).

Figure 2. TB incidence per 100,000 population by local authority of residence, North West, 2020

Rate per 100,000 population (quintiles)



Label	Local authority
All	Allerdale
Bar	Barrow-in-Furness
BWD	Blackburn with Darwen
Bla	Blackpool
Bol	Bolton
Brn	Burnley
Bur	Bury
Car	Carlisle
ChE	Cheshire East
ChW	Cheshire West and Chester
Cho	Chorley
Cop	Copeland
Ede	Eden
Fyl	Fylde
Hal	Halton
Hyn	Hyndburn
Kno	Knowsley
Lan	Lancaster
Liv	Liverpool
Man	Manchester
Old	Oldham
Pen	Pendle
Pre	Preston
Rib	Ribble Valley
Roc	Rochdale
Ros	Rossendale
Sal	Salford
Sef	Sefton
Sla	South Lakeland
Sri	South Ribble
StH	St. Helens
Stk	Stockport
Tam	Tameside
Tra	Trafford
War	Warrington
Wla	West Lancashire
Wig	Wigan
Wir	Wirral
Wyr	Wyre



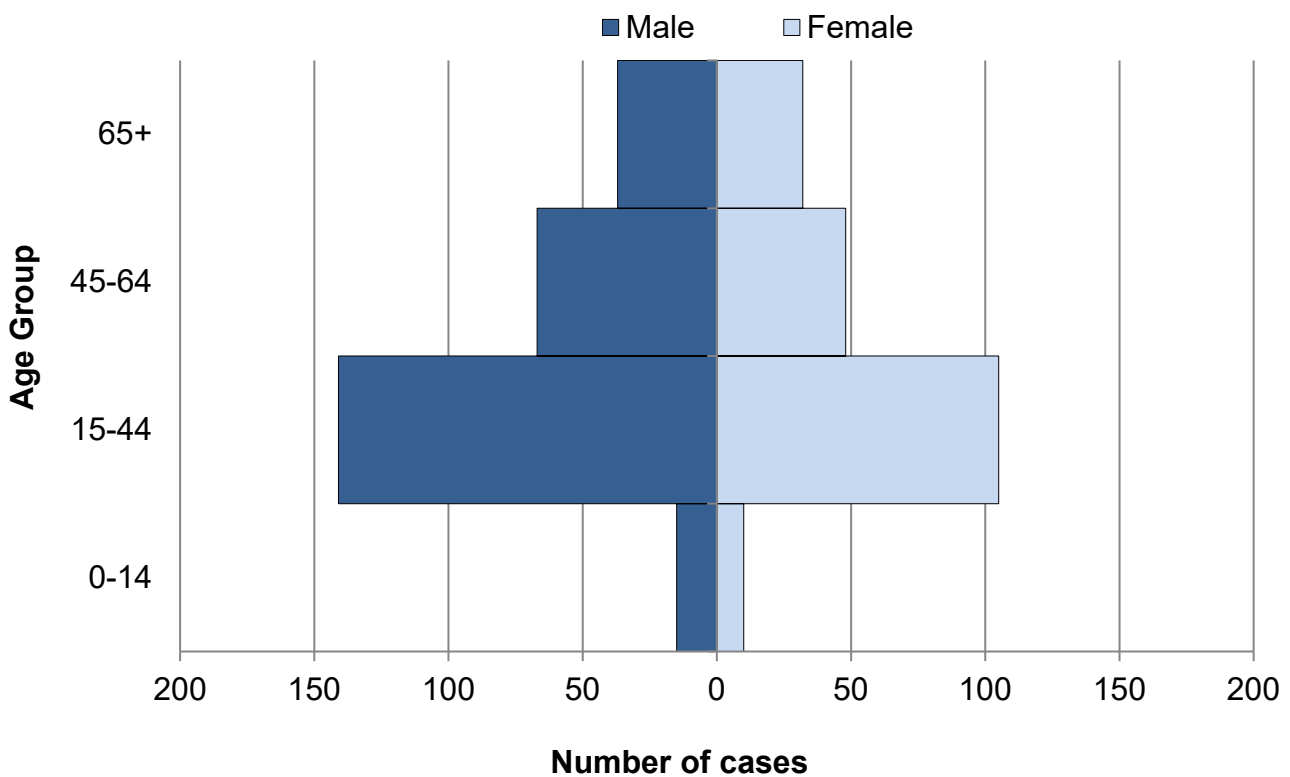
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Demographic characteristics

Age and sex

In 2020, 57.1% of North West TB cases were male, and rates among males were higher than in females (7.1 per 100,000 in males and 5.2 per 100,000 in females), a consistent pattern from previous years. More than half (54.1%) of TB cases occurred in the 15 to 44 years age group. There were 25 cases of TB reported in children aged 0 to 14 years, similar to the previous year (27 cases reported in 2019).¹

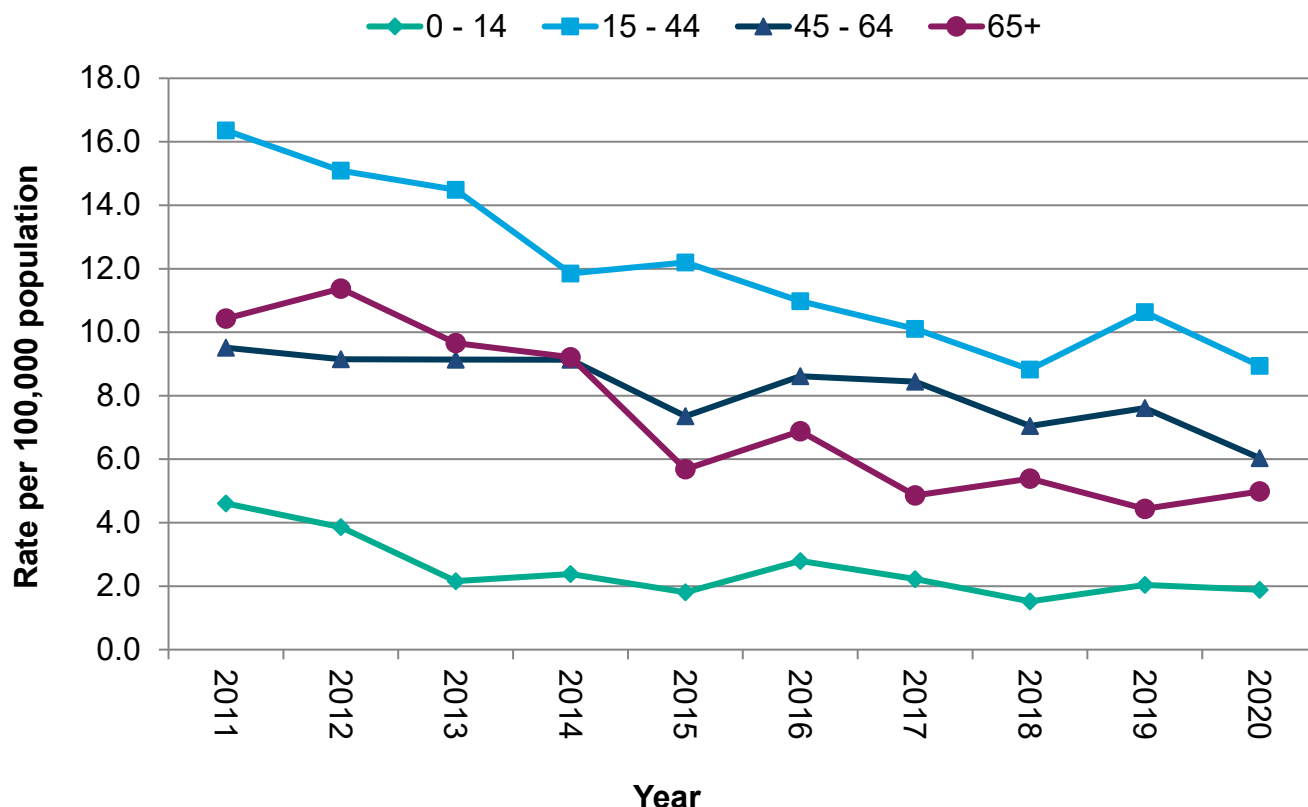
Figure 3. TB case reports by age and sex in the North West, 2020



Rates were highest in residents aged 15 to 44 years (Figure 4). The rate in the 15 to 44 years age group decreased from 10.6 per 100,000 in 2019 to 8.9 per 100,000 in 2020. Incidence in the 65+ years age group increased from 4.4 per 100,000 population in 2019 to 5.0 per 100,000 population in 2020.

¹ 33 cases aged 0 to 17 years were reported in 2020, an incidence of 2.1 per 100,000 population (compared with 47 cases and an incidence of 3.0 per 100,000 population reported in 2019).

Figure 4. TB case rates by age group in the North West, 2011 to 2020

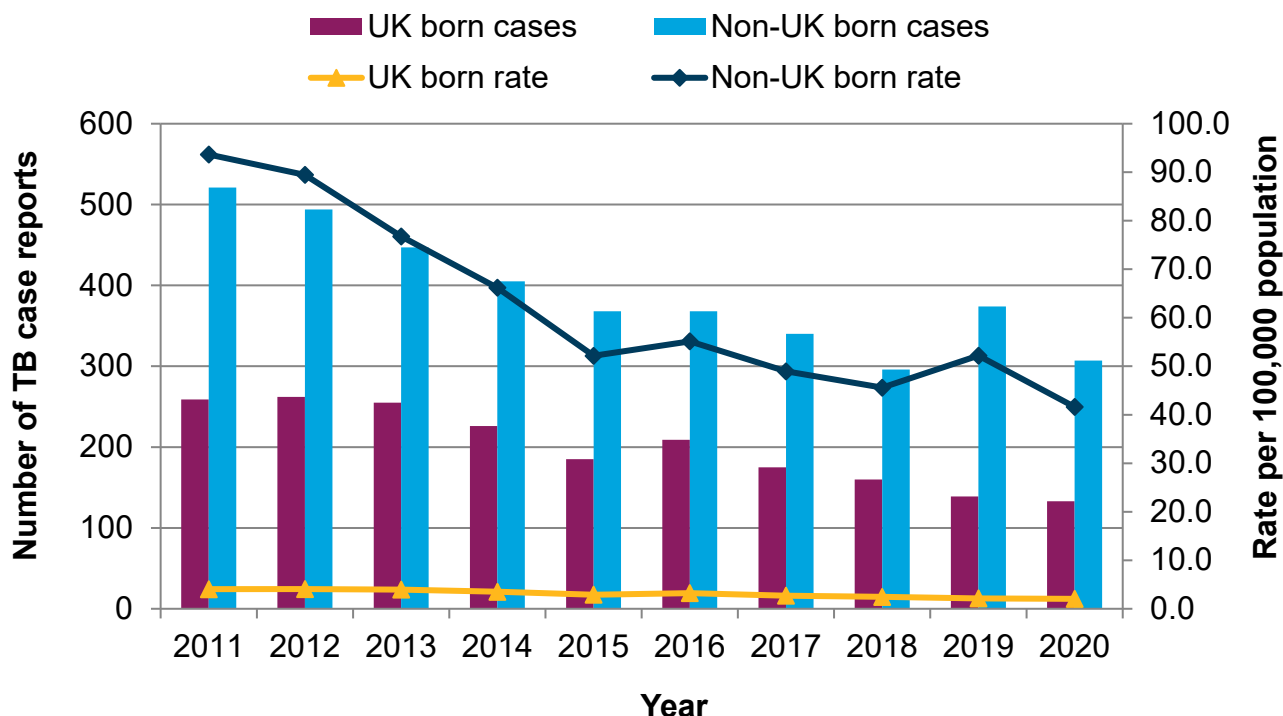


Place of birth and time since entry to the UK

In 2020, place of birth was known for 96.7% (440 out of 455) of North West TB cases. Of these, 30.2% (133 out of 440) were born in the UK, similar to previous years (27.1% in 2019, 35.1% in 2018).

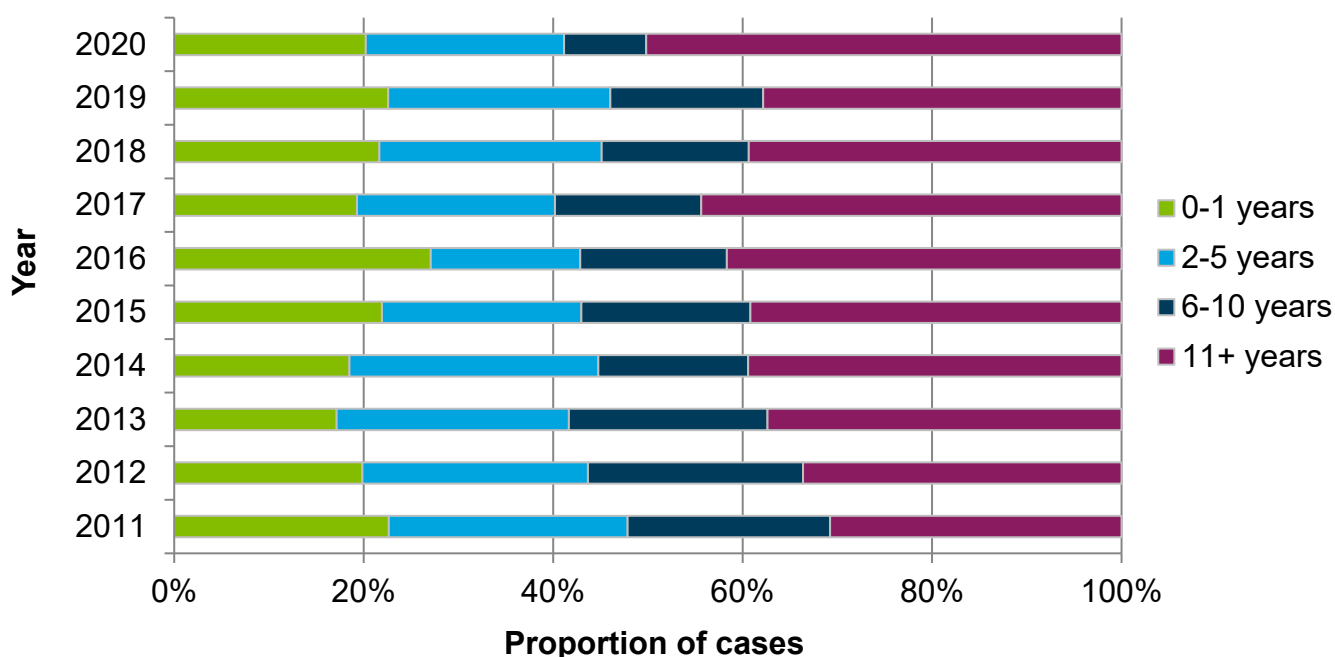
In line with national trends (1), the rate of TB in the non-UK born population was considerably higher than the rate of TB among those born in the UK. In 2020, the rate in the non-UK born population was 20 times higher than the rate in the UK born, at 41.6 per 100,000 (Figure 5), lower than in the previous year (52.2 per 100,000 in 2019). The rate in the UK born population remained low at 2.0 per 100,000 in 2020 (2.1 per 100,000 in 2019).

Figure 5. TB case reports and rates by place of birth, North West, 2011 to 2020



Year of entry was reported for 90.2% (277 out of 307 cases) of non-UK born cases in 2020. Of these, 20.2% were notified less than 2 years after entry and 20.9% were notified 2 to 5 years after entry, meaning that, overall, 41.2% were notified within 5 years of entering the UK. A further 8.7% were notified 6 to 10 years after entry. Over half of cases (50.2%, 139 out of 277) were notified to TB surveillance 11 or more years after entering the UK.

Figure 6. Time between entry to the UK and TB notification for non-UK born cases by year, North West, 2011 to 2020*



* Showing cases where year of entry was recorded.

Approximately one third of non-UK born TB cases reported in the North West in 2020 were born in Pakistan (Table 1), similar to the previous year (33.8% in 2020 compared with 31.4% in 2019).

Table 1. Most common countries of birth of non-UK born TB cases, North West, 2020

Country of birth	Number of cases	Proportion of cases*	Median time since entry to UK (IQR)**
Pakistan	103	33.8%	11 (3 to 22)
India	40	13.1%	15 (9 to 39)
Sudan	16	5.2%	2 (1 to 4)
Somalia	14	4.6%	8 (3 to 15)
Bangladesh	13	4.3%	21 (11 to 39)
Kenya	11	3.6%	12 (1 to 20)
Eritrea	9	3.0%	1 (0 to 4)
Zimbabwe	9	3.0%	17 (17 to 17)
Others (each <3.0%)	90	29.5%	10 (4 to 18)
Total*	305	100.0%	11 (2 to 19)

* Where country of birth was known.

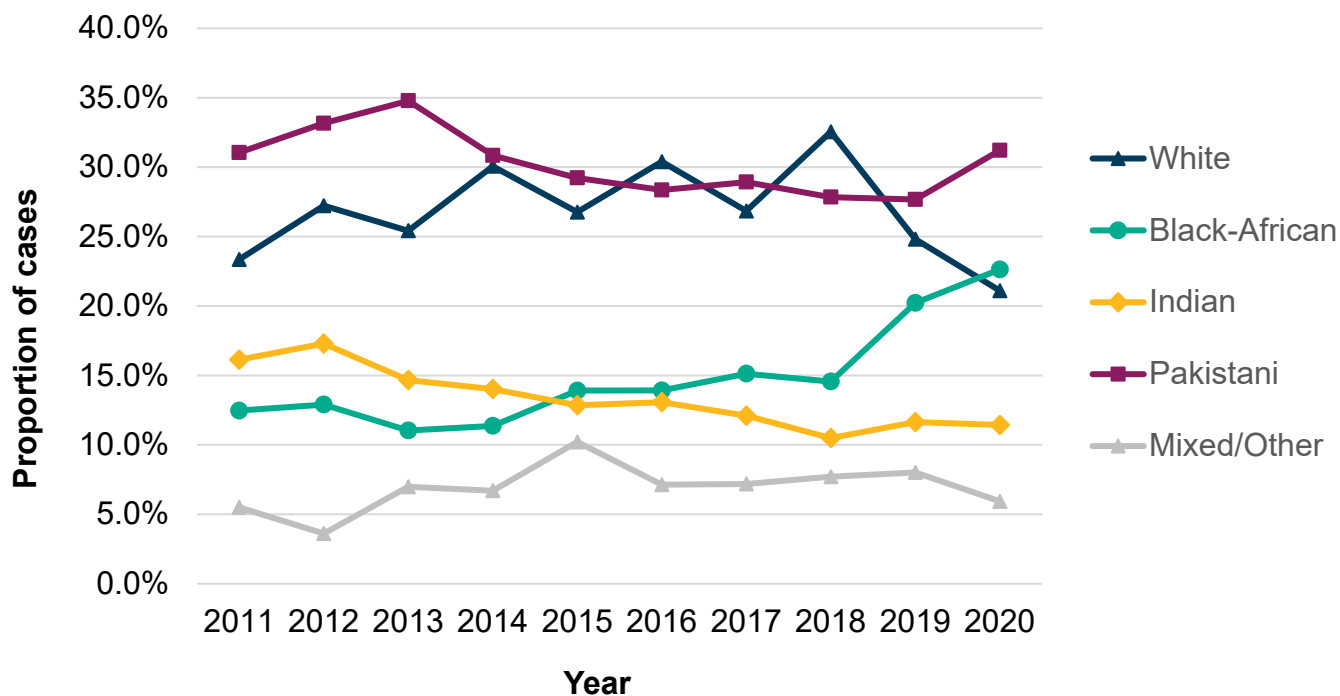
** Interquartile range (time in years).

Among the most common countries of birth for non-UK born TB cases in 2020, those born in Eritrea and Sudan had the shortest median time between entry to the UK and TB notification. The country with the longest median time between entry to the UK and notification was Bangladesh (21 years, IQR 11 to 39 years).

Ethnic group

In 2020, ethnicity was known for 99.1% (451 out of 455) of cases. The most common ethnic groups among all tuberculosis cases in the North West were the Pakistani, Black-African and White ethnic groups (Figure 7). The proportion of cases in the Pakistani ethnic group increased from 27.7% in 2019 to 31.2% in 2020, while the proportion of White cases decreased from 24.8% in 2019 to 21.1% in 2020. The proportion of cases with Black-African ethnicity has increased overall since 2013, from 11.0% to 22.6% in 2020.

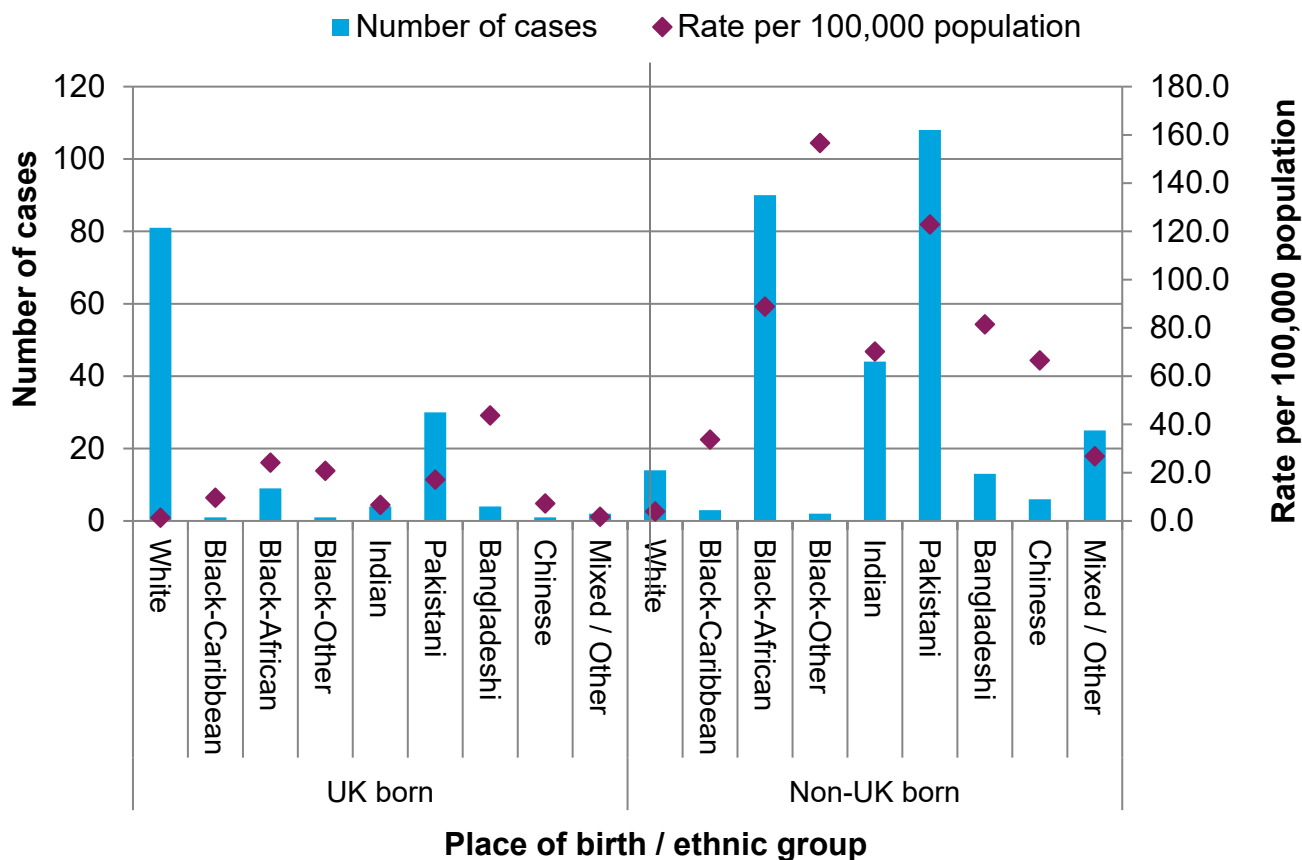
Figure 7. Proportion of TB cases in most common ethnic groups, North West, 2011 to 2020



In terms of overall annual numbers, 6 of the 9 ethnic groups showed a decrease between 2019 and 2020. Numbers in the Mixed/Other ethnic group decreased by 35.7% (from 42 to 27 cases), and in the White ethnic group by 26.2% (from 130 to 96 cases).

Of UK born TB cases in 2020, the greatest proportion (60.9%, 81 out of 133) were in the White ethnic group, followed by the Pakistani ethnic group (22.6%, 30 out of 133). Among the non-UK born, 35.4% (108 out of 305) were in the Pakistani ethnic group, 29.5% (90 out of 305) were in the Black-African ethnic group, and 14.4% (44 out of 305) were in the Indian ethnic group.

Figure 8. TB case numbers and incidence by ethnic group and place of birth, North West, 2020



Among UK born TB cases in 2020, the highest rate occurred in the Bangladeshi ethnic group (43.7 per 100,000 population, 4 cases), followed by the Black-African ethnic group (24.1 per 100,000 population, 9 cases). Rates were highest among those born outside the UK (Figure 8), with the highest rates occurring in the Black-Other ethnic group (156.6 per 100,000 population, 2 cases) and the Pakistani ethnic group (122.9 per 100,000 population, 108 cases).

The rate of TB increased in non-UK born cases of Pakistani ethnicity (from 108.5 per 100,000 population in 2019 to 122.9 per 100,000 in 2020). However, this reflects a decrease in numbers from 123 to 108 cases. Among Black-African TB patients born outside the UK, incidence decreased from 120.6 per 100,000 population in 2019 to 88.8 per 100,000 in 2020 (from 101 cases in 2019 to 90 cases in 2020).

These rates should be interpreted with caution, as the population estimates used as denominators for the different ethnic groups were calculated using the Labour Force Survey (5), which is liable to sampling error for small population groups.²

² The Labour Force Survey (LFS) was used to calculate population estimates based on a random sample of surveyed individuals, weighted to represent others in the region. Small populations are often underrepresented in the LFS sample, which may inflate TB rates for ethnic groups such as Black-Caribbean and Black-Other.

Occupation

In 2020, occupation information was known for 90.7% (322 out of 355) of North West TB cases aged between 18 and 65 years, similar to the previous year (90.0% known in 2019). Of these, 38.2% (123 out of 322) were not in education or employment, 9.6% (31 out of 322) were healthcare workers, 5.9% (19 out of 322) were either studying or working in education, and the remaining cases (46.3%, 149 out of 322) were working in other occupations.

A significant proportion of TB cases working in healthcare were born outside the UK (83.3%, 25 out of 30 cases).

Clinical characteristics

Site of disease

In 2020, site of disease was known for 99.6% of TB cases in North West England. Of these cases, 47.5% had pulmonary disease (Table 2), similar to the national level of 48.6% (1). Of the 215 pulmonary cases, 80.0% (172 cases) were culture confirmed (compared with 77.3% in 2019). The most common extra-pulmonary site was extra-thoracic lymph nodes.

Table 2. Site of disease of TB cases, North West, 2020

Site of disease (with or without disease at another site)	Number of cases	Proportion of cases
Pulmonary	215	47.5%
Miliary	16	3.5%
Laryngeal	1	0.2%
Extra-pulmonary	238	52.5%
Lymph nodes (extra-thoracic)	105	23.2%
Intrathoracic lymph nodes	86	19.0%
Extra-pulmonary (unknown)	83	18.3%
Extra-pulmonary (other)	58	12.8%
Pleural	33	7.3%
Gastrointestinal	19	4.2%
Genitourinary	18	4.0%
Bone (spine)	13	2.9%
CNS (other - not meningitis)	10	2.2%
CNS meningitis	8	1.8%
Bone (other - not spine)	5	1.1%
Cryptic	5	1.1%

Previous history of tuberculosis

Information on previous history of TB was known for 94.5% (430 out of 455) of North West cases in 2020. Of these, 5.3% (23 out of 455) had received a previous diagnosis of TB, similar to previous years (4.8% in 2019, 6.3% in 2018). For those with a previous history of TB reported, information on previous treatment was known for 78.3% (18 out of 23) of cases. Of these, 88.9% (16 out of 18) had previously received treatment (at least one month of treatment for active TB with a minimum of 2 anti-TB drugs for suspected TB disease).

2. Laboratory confirmation of TB

Laboratory tests data collection

Laboratory data on culture confirmed TB isolates from the National Mycobacterium Reference Service were matched to TB case notifications, and the results were used to report culture confirmation. Results for microscopy, PCR and histology were also recorded in ETS.

Culture confirmation and speciation

A total of 63.5% (289 out of 455) of all cases in 2020, both pulmonary and extra-pulmonary, were confirmed by culture in the North West, compared with 60.7% nationally (1). Of the 215 pulmonary cases, 80.0% (172 out of 215) were culture confirmed, higher than national levels (75.3%) (1). Among extra-pulmonary cases in the North West, 49.2% (117 out of 238) were culture confirmed, higher than national levels (44.2%) (1).

Culture confirmation was 24.0% (6 out of 25) in those aged 0-14 years, lower than in other age groups (61.7% and over).

Among all culture confirmed cases, 97.9% (283 out of 289) were identified with *Mycobacterium tuberculosis* (*M. tuberculosis*) infection, 1.4% (4 out of 289) with *Mycobacterium africanum* (*M. africanum*), and 0.7% (2 out of 289) with *Mycobacterium bovis* (*M. bovis*).

Sputum smear

Of the 215 pulmonary cases in the North West in 2020, 63.3% (136 out of 215) had a sputum smear result reported, a higher proportion than in previous years (55.3% in 2019) and similar to national levels (65.9%) (1). Among cases with a known sputum smear result, 68.4% (93 out of 136) were positive, 91.4% (85 out of 93) of those with a positive sputum smear were also culture confirmed.

Other laboratory test results

Of the 166 TB cases without a positive culture result to confirm diagnosis, only 15.1% (25 out of 166) had an alternative positive laboratory result (microscopy, PCR or histology). Overall, 36.5% (166 out of 455) of all North West TB cases did not have any laboratory confirmation, higher than national levels (30.4%) (1).

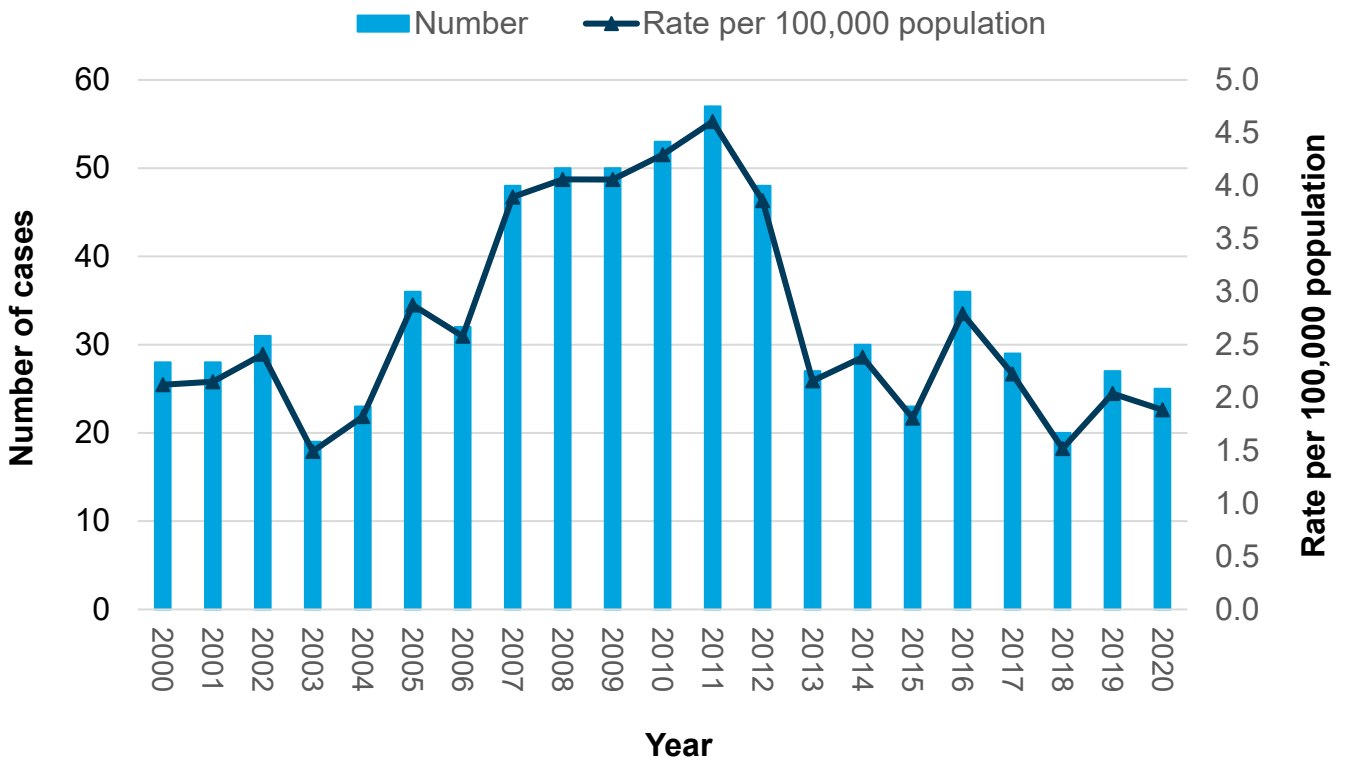
3. TB in children

The incidence of TB in children is considered to be an acceptable, indirect indicator of recent transmission within communities, since TB in children is likely to be caused by recent exposure (as opposed to reactivation of latent TB infection acquired some time previously).

Overall numbers and incidence

In 2020, 25 children (aged under 15 years) were notified with TB in the North West, a rate of 1.9 per 100,000 population. This was similar to the previous year (27 cases, 2.0 per 100,000 in 2019) and slightly higher than the national rate of 1.5 per 100,000 (1). Overall, annual rates have declined since the peak of 4.6 per 100,000 (57 cases) in 2011 (Figure 9).

Figure 9. Numbers and incidence of TB in children (aged under 15 years), North West, 2000 to 2020

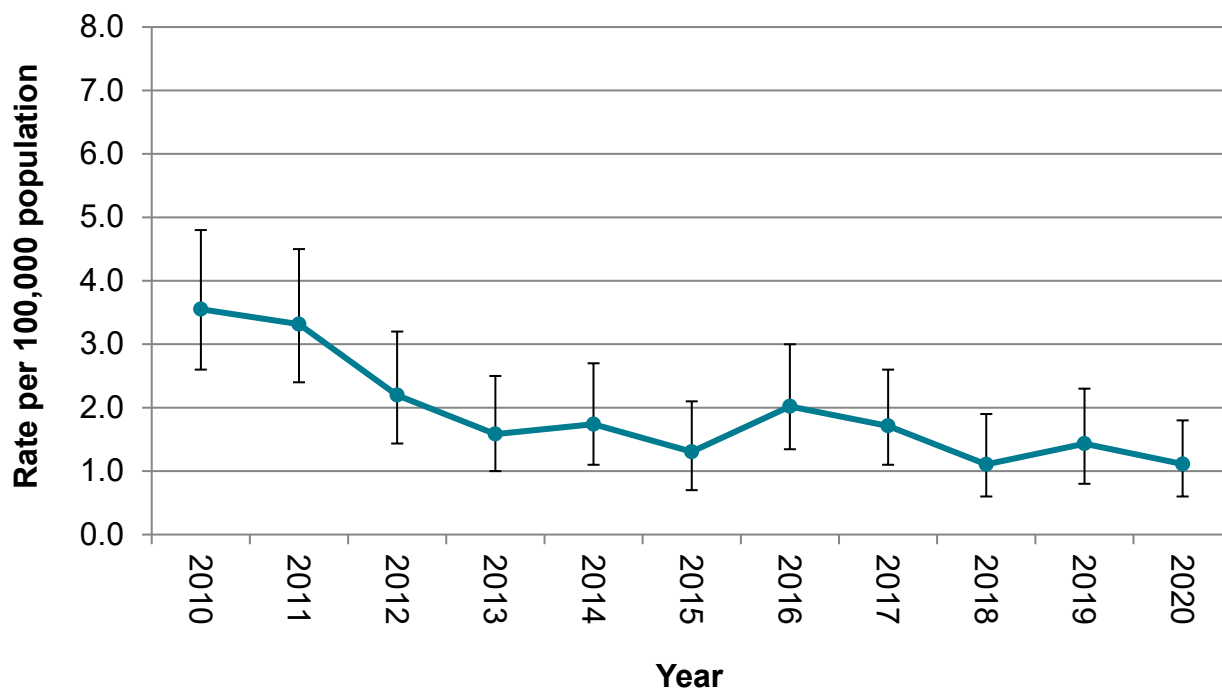


Demographic characteristics

Over half (60.9%, 14 out of 23 cases) of children notified with TB in 2020 were born in the UK. The rate of TB in UK born children was 1.1 per 100,000 population in 2020, lower than in the previous year (1.4 per 100,000 in 2019) and lower than the national rate of 7.2 per 100,000 (1).

There has been an overall decrease in the North West rate since the peak of 3.6 per 100,000 in 2010 (Figure 10).

Figure 10. Incidence of TB in UK born children*, North West, 2010 to 2020



* Aged 0 to 14 years. Rates calculated using Labour Force Survey population estimates (5). Error bars represent upper and lower 95% confidence intervals.

Among children born outside the UK, the rate of TB declined from 15.2 per 100,000 in 2019 to 11.6 per 100,000 in 2020 (although numbers remained stable at 9 cases in each year).

In 2020, 60% of children with TB (15 out of 25 cases) were male. Most common ethnic groups were Pakistani (44.0%, 11 out of 25 cases) and Black-African (40.0%, 10 out of 25 cases).

Site of disease

In 2020, less than half (44.0%, 11 out of 25 cases) of children with TB had pulmonary disease, with or without extra-pulmonary TB. The most common extra-pulmonary site of disease was intra-thoracic lymph nodes (52.0%, 13 out of 25 cases), followed by extra-thoracic lymph nodes (16.0%, 4 out of 25 cases).

Culture confirmation

Overall, 24.0% (6 out of 25) of cases of TB in children were confirmed by culture in 2020, compared with 29.0% nationally (1). Most culture confirmed cases were extra-pulmonary (66.7%, 4 out of 6 cases).

Time to treatment start and outcomes

Of the 15 children notified with TB in the North West in 2020 (with known symptom onset and treatment start dates), 86.7% (13 cases) started treatment within 2 months. The remaining 2 cases (13.3%) experienced a treatment delay of more than 4 months. All children with pulmonary disease (100%, 7 out of 7 cases) started treatment within 2 months.

In 2019, 88.5% (23 out of 26 cases) of children with drug sensitive TB (excluding multi-drug resistant/rifampicin resistant TB and cases with CNS, spinal, miliary or cryptic disseminated disease) completed treatment within 12 months. At the last recorded outcome, 92.3% (24 out of 26 cases) had completed treatment, compared with 95.0% in the previous year (19/20 cases) and 92.8% nationally ([1](#)).

4. Delay from onset of symptoms to start of treatment

Time symptomatic

The time between onset of symptoms and start of treatment was available for 75.6% of North West TB cases notified in 2020. The median number of days between symptom onset and treatment start was 104 (Table 3). This was lower among those with pulmonary disease at 83 days, and higher among extra-pulmonary cases at 114 days. Among pulmonary cases, 39.5% (66 out of 167) were treated within 2 months of symptom onset, and 65.3% (109 out of 167) were treated within 4 months.

Table 3. Time between symptom onset and treatment start*, North West, 2020

	Median days (IQR)	0 to 2 months		2 to 4 months		More than 4 months	
		n	%	n	%	n	%
Extra-pulmonary	114 (60 to 274)	51	29.0%	53	30.1%	72	40.9%
Pulmonary	83 (39 to 155)	66	39.5%	43	25.7%	58	34.7%
Pulmonary smear positive	87 (35 to 183)	29	38.7%	19	25.3%	27	36.0%
All Cases	104 (47 to 205)	117	34.0%	96	27.9%	131	38.1%

* 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

Among pulmonary cases with treatment delays of more than 4 months, half (50.0%, 29 out of 58 cases) were in the 15 to 44 years age group. Delays occurred equally in males and females (50.0%, 29 out of 58 cases). Of the 29 local authorities with notifications of pulmonary TB in 2020, 9 had at least half of their cases treated more than 4 months after symptom onset. Among non-UK born cases of pulmonary TB, the greatest proportion (44.3%, 47 out of 106 cases) were treated within 2 months of symptom onset, compared with a smaller proportion of UK born pulmonary cases (31.6%, 18 out of 57 cases).

There was variation among ethnic groups: 50.0% (10 out of 20) of pulmonary cases (with known onset and treatment dates) in the Indian ethnic group were treated within 2 months of symptom onset, compared to 35.0% (7 out of 20) with treatment delays of more than 4 months. In the Bangladeshi ethnic group, 37.5% (3 out of 8) were treated within 2 months of symptom onset, while 50.0% (4 out of 8) had treatment delays of more than 4 months.

5. TB outcomes in drug sensitive cohort

Drug sensitive cohort

For the purposes of TB outcome reporting, drug sensitive cases exclude all patients with rifampicin resistant (RR) TB (initial or amplified) including multidrug-resistant TB (MDR-TB, initial or amplified), and non-culture confirmed patients treated for MDR-TB. Under this definition, cases with resistance to isoniazid, ethambutol and/or pyrazinamide but without resistance to rifampicin are included in the drug sensitive cohort. 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:

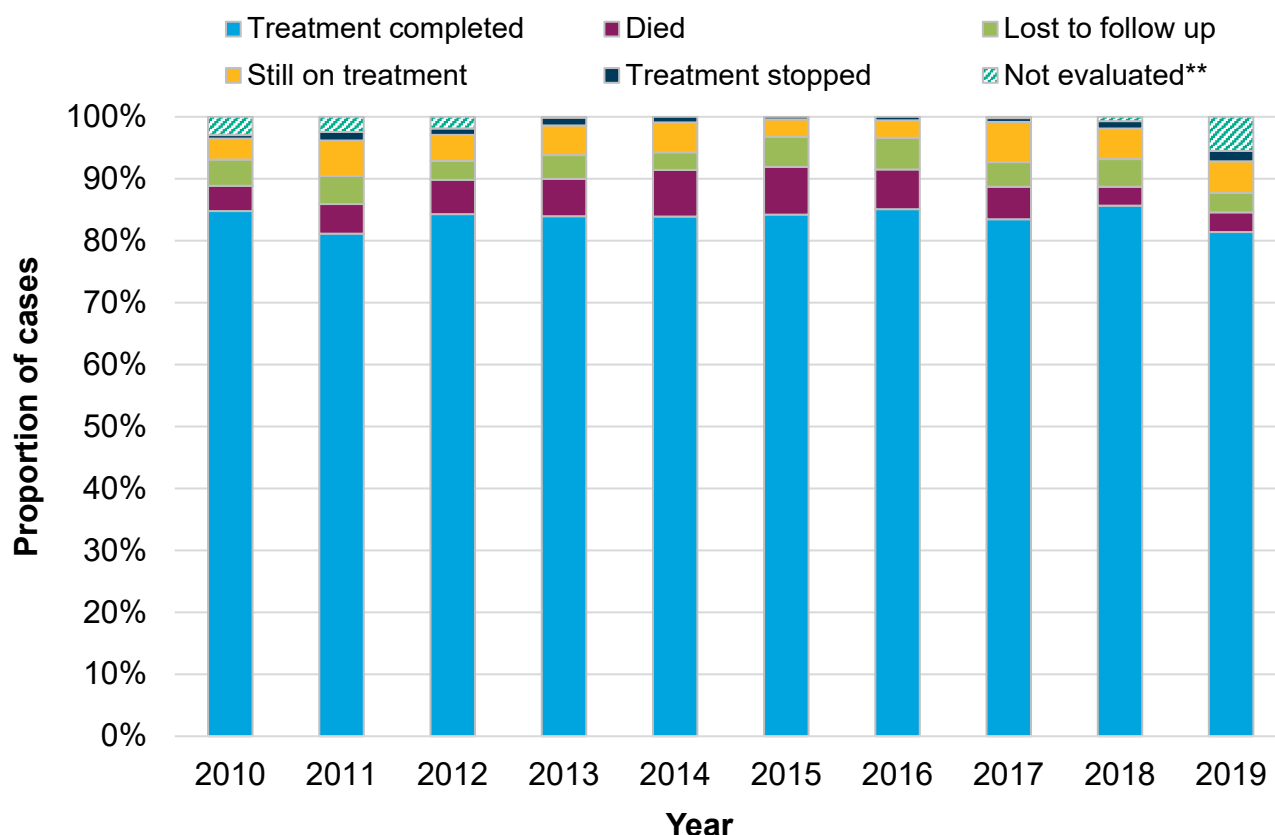
For patients with an expected duration of treatment less than 12 months, outcomes at 12 months are reported. This group excludes individuals with central nervous system (CNS) disease, who would be treated for 12 months. In addition, those with spinal, cryptic disseminated or miliary disease are excluded 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.

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

In 2019, 524 TB cases were notified in the North West, 98.7% (517 out of 524) of which were drug sensitive. Of the drug sensitive cohort, 91.5% (473 out of 517) were expected to complete treatment within 12 months. Treatment completion for this group was 81.4% (385 out of 473), which was lower than the previous year (85.6%, 364 out of 425). However, this proportion is likely to increase as more outcomes are recorded. Nationally, treatment completion was similar at 82.0% in 2019 ([1](#)).

Figure 11. Outcomes at 12 months for drug sensitive cases with expected treatment duration of 12 months or less, North West, 2010 to 2019*



*Excluding MDR/RR TB, and cases with CNS, spinal, miliary or cryptic disseminated disease.

** Not evaluated includes missing and unknown outcomes, and cases transferred out.

Of cases that did not complete treatment within 12 months (18.6%, 88 out of 473), the most common reasons for not completing treatment were still being on treatment (5.1%, 24 out of 473), death (3.2%, 15 out of 473) and being lost to follow up (3.2%, 15 out of 473).

Table 4. TB outcomes at 12 months for drug sensitive cases with expected treatment duration of 12 months or less, North West cases notified in 2019*

TB outcome	n	%
Treatment completed	385	81.4%
Died	15	3.2%
Lost to follow up	15	3.2%
Still on treatment	24	5.1%
Treatment stopped	8	1.7%
Not evaluated**	26	5.5%
Total	473	100.0%

*Excluding MDR/RR TB, and cases with CNS, spinal, miliary or cryptic disseminated disease.

** Not evaluated includes missing and unknown outcomes, and cases transferred out.

Of the 15 cases that died before treatment completion, the relationship between TB and death was unknown for 26.7% (4 out of 15). Of the 11 cases for which information was recorded, TB caused 1 death, contributed to 3, and was incidental to 7. The median age of those who died was 74 years. Two cases were diagnosed at post-mortem.

Older cases were less likely to complete treatment: 70.2% (40 out of 57) of those aged 65 years or older completed treatment within 12 months, compared with over 82% in other age groups. The 65+ years age group also had a higher proportion of deaths (17.5%, 10 out of 57).

Treatment completion was 84.1% (285 out of 339) among the non-UK born, and lower in the UK born at 77.0% (97 out of 126). The proportion of males lost to follow up was 4.1% (12 out of 291), compared with 1.6% (3 out of 182) of females.

A greater proportion (86.4%, 299 out of 346) of cases with no recorded social risk factors completed treatment within 12 months than cases with at least one recorded risk factor (66.7%, 26 out of 39).

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

Of the 44 cases with CNS, spinal, miliary or cryptic disseminated disease in 2019, 79.5% (35 out of 44) had completed treatment at the last recorded outcome (Table 5). This was higher than in the previous year (73.0%, 27 out of 37) and higher than recorded nationally (74.8%, 353 out of 472) (1). Half (50.0%, 22 out of 44) of cases in this cohort completed treatment within 12 months, while 29.5% (13 out of 44 cases) remained on treatment.

Table 5. TB outcome at last recorded outcome for drug sensitive cohort with CNS, spinal, miliary or cryptic disseminated disease, North West cases notified in 2019*

TB outcome	n	%
Treatment completed	35	79.5%
Died	5	11.4%
Lost to follow up	2	4.5%
Still on treatment	0	0.0%
Treatment stopped	0	0.0%
Not evaluated**	2	4.5%
Total	44	100.0%

*Excluding MDR/RR TB and only including cases with CNS, spinal, miliary or cryptic disseminated disease

** Not evaluated includes missing and unknown outcomes, and cases transferred out

For most of the 5 cases that died before treatment completion, the relationship between TB and death was unknown (60.0% (3 out of 5), TB caused death in one case and was incidental to death in one further case. The median age of those who died was 45 years. One case was diagnosed at post-mortem.

The median age of all cases in this cohort was 34 years. Older cases were less likely to complete treatment: 50.0% (2 out of 4) of those aged 65 years or older had completed treatment at the last recorded outcome, compared with 66.7 to 100.0% in other age groups.

Deaths and lost to follow up in the entire drug sensitive cohort

The proportion of cases in the entire drug sensitive cohort who had died at the last recorded outcome has remained low, decreasing from 4.5% (21 out of 462) in 2018 to 3.9% (20 out of 517) in 2019. In 2019, the relationship between TB and death was unknown for 46.7% (7 out of 20) of cases in this cohort. TB was incidental to 53.3% (8 out of 20) of deaths, contributed to 20.0% (3 out of 20) of deaths, and caused 13.3% (2 out of 20) of deaths. Over half of deaths (55.0%, 11 out of 20) were in cases aged 65 years and over.

The proportion of drug sensitive cases that were lost to follow up at the last recorded outcome has remained reasonably stable since 2010, ranging from 3.3% to 5.1% overall, 3.5% (18 out of 517) of cases were lost to follow up in 2019. Of these, most were born outside the UK (72.2%, 13 out of 18), and 44.4% (8 out of 18) had left the UK. Males accounted for 77.8% (14 out of 18) of cases lost to follow up and 88.9% (16 out of 18) of cases were in the 15 to 44 years age group.

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

Drug resistance

Resistance to one or more TB antibiotic drugs may be in complex combinations. A distinction is made between first, second and third line TB antibiotic drugs depending upon their clinical effectiveness. First line drugs include isoniazid, rifampicin, pyrazinamide and ethambutol. Second line drugs are injectable agents (for example, amikacin, capreomycin, kanamycin), fluoroquinolones (for example, moxifloxacin, ofloxacin, ciprofloxacin) and other oral bacteriostatic agents. MDR-TB cases are initially resistant to at least isoniazid and rifampicin. Extensively drug resistant TB cases (XDR-TB) are initially MDR and resistant to at least one injectable agent and at least one fluoroquinolone (7).

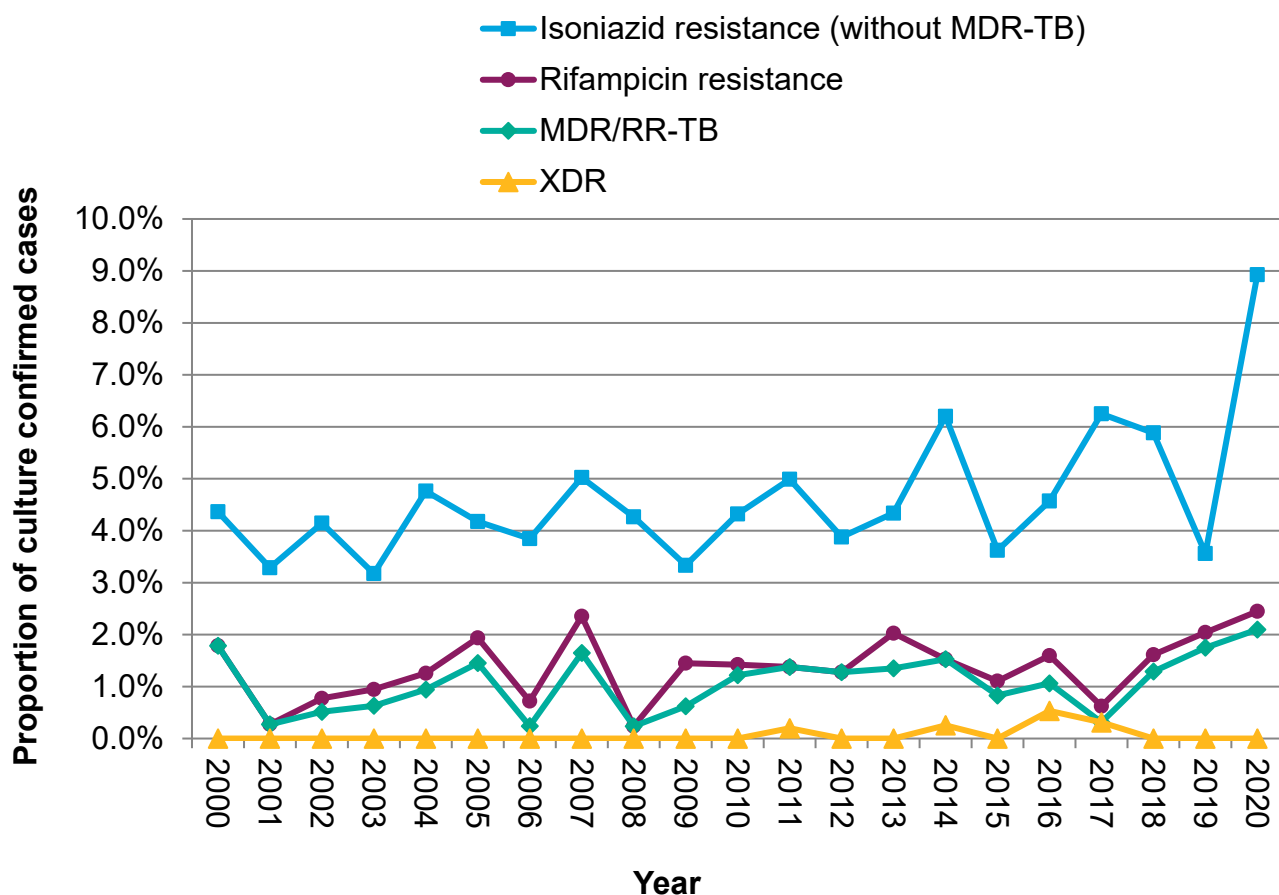
Overall initial drug resistance and geographical distribution

In 2020, 99.0% (286 out of 289) of culture confirmed North West TB cases had susceptibility results for at least isoniazid and rifampicin, similar to previous years. Of these, 15.2% (40 out of 264) were resistant to one or more first line drugs, an increase on previous years and a higher proportion than reported nationally (11.6%) (1).

The proportion of North West TB cases with isoniazid resistance was 10.8% (31 out of 286) in 2020. For cases of isoniazid resistance without MDR-TB, the proportion was 8.9% (25 out of 280), higher than reported nationally (6.4%) (1). This level of isoniazid resistance is the highest recorded so far in the North West (Figure 12).

A further 2.4% (7 out of 286) of cases were resistant to rifampicin and 2.1% (6 out of 286) were classified as MDR/RR-TB (rifampicin resistance with MDR-TB), slightly higher than in the previous year (1.7%, 6 out of 343 MDR/RR-TB cases in 2019) and similar to the 2.4% reported nationally in 2020 (1). There were no cases of XDR-TB reported in the North West in 2020.

Figure 12. Proportion of drug resistant TB cases, North West, 2000 to 2020*



* Culture confirmed cases with resistance to at least one first-line drug (isoniazid, rifampicin, pyrazinamide or ethambutol)

Among cases of isoniazid resistance without MDR-TB, over half were aged between 15 and 44 years (56.0%, 14 out of 25), with more males (68.0%, 17 out of 25) than females. Most cases were born outside the UK (80.0%, 20 out of 25). Countries of birth varied, but the highest proportion originated in Pakistan (30.0%, 6 out of 20). The highest proportions of isoniazid resistant cases without MDR-TB occurred in Pakistani (32.0%, 8 out of 25) and Black-African (24.0%, 6 out of 25) ethnic groups. Most cases had pulmonary disease (72.0%, 18 out of 25).

Of cases notified in 2019, 83.3% (10 out of 12) of those resistant to isoniazid without MDR-TB had completed treatment at 12 month, the remaining cases (16.7%, 2 out of 12) were still on treatment. All cases had completed treatment at the last recorded outcome.

MDR out of RR-TB cases notified in 2020 were equally distributed between males and females, and two-thirds were in the 15 to 44 years age group (66.7%, 4 out of 6). Half of MDR out of RR-TB cases notified in 2019 were still on treatment at 12 months (50.0%, 3 out of 6). One case had completed treatment at the last recorded outcome, 2 were still on treatment, one had died and 2 had no treatment outcome recorded.

TB outcome at 24 months for patients with rifampicin resistant disease

In 2018, 5 culture confirmed cases had rifampicin resistant TB, and 4 of these cases also had MDR-TB. At 12 months, one of the 5 rifampicin resistant cases had completed treatment, 3 were still on treatment and 1 had died. At 24 months, 3 cases had completed treatment and outcomes were unknown for the other 2 cases (Table 6).

Table 6. TB outcome at 24 months for culture confirmed cases with rifampicin resistant disease, North West, cases diagnosed in 2018

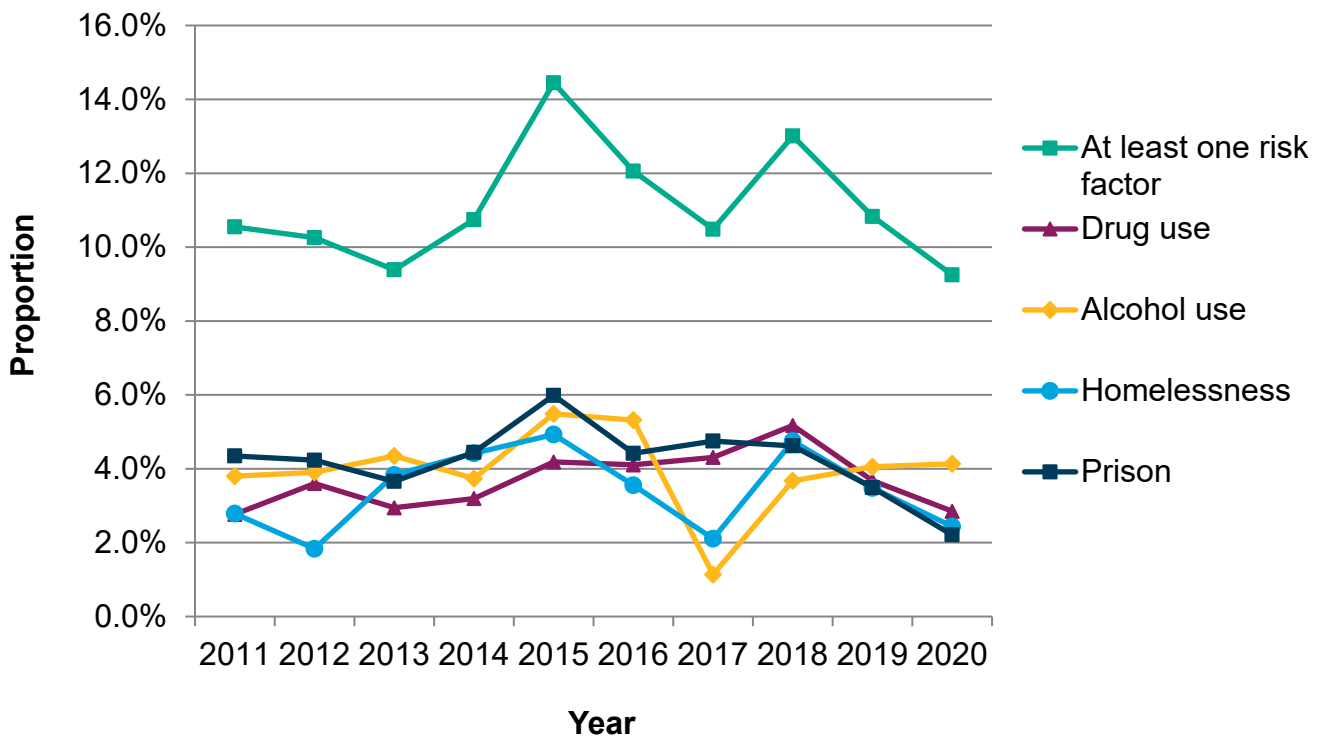
TB outcome	n	%
Treatment completed	3	60.0%
Died	0	0.0%
Lost to follow up	0	0.0%
Still on treatment	0	0.0%
Treatment stopped	0	0.0%
Blank/unknown	2	40.0%
Total	5	100.0%

7. TB in under-served populations

Social risk factors

Information on social risk factors (SRFs, including homelessness, drug and alcohol misuse and imprisonment) for TB cases has been available since 2009. In 2020, information on SRFs was recorded for 80.5% (346 out of 430) of TB cases in the North West aged 15 years and over, and 9.2% (32 out of 346) of these cases had at least one SRF. Where information on individual risk factors was known, 4.1% (16 out of 387) reported alcohol misuse, 2.8% (11 out of 386) reported drug use, 2.4% (9 out of 369) reported homelessness, and 2.2% (8 out of 362) reported imprisonment. A quarter of cases (25.0%, 8 out of 32) with at least one SRF recorded had 2 or more SRFs.

Figure 13. Social risk factors among TB cases*, North West, 2011 to 2020



* For cases aged 15 years and over, where information on individual risk factors was recorded.

Most cases with at least one SRF were male (81.3%, 26 out of 32) and 62.5% (20 out of 32) were in the 15 to 44 years age group. Almost two-thirds of cases (64.5%, 20 out of 31) with at least one SRF were UK born (where country of birth was known), over half were in the White ethnic group (59.4%, 19 out of 32). Among UK born cases, 90.0% (18 out of 20) of cases with at least one SRF were in the White ethnic group. Of non-UK born cases with at least one SRF, the highest proportion occurred in the Black-African ethnic group (54.5%, 6 out of 11). Most cases with at least one SRF had pulmonary disease (84.4%, 27 out of 32).

The prevalence of SRFs varied among local authorities. For the period 2018 to 2020, the highest proportion of cases with at least one SRF occurred in Manchester (17.9%, 22 out of 123), followed by Liverpool (12.2%, 15 out of 123).

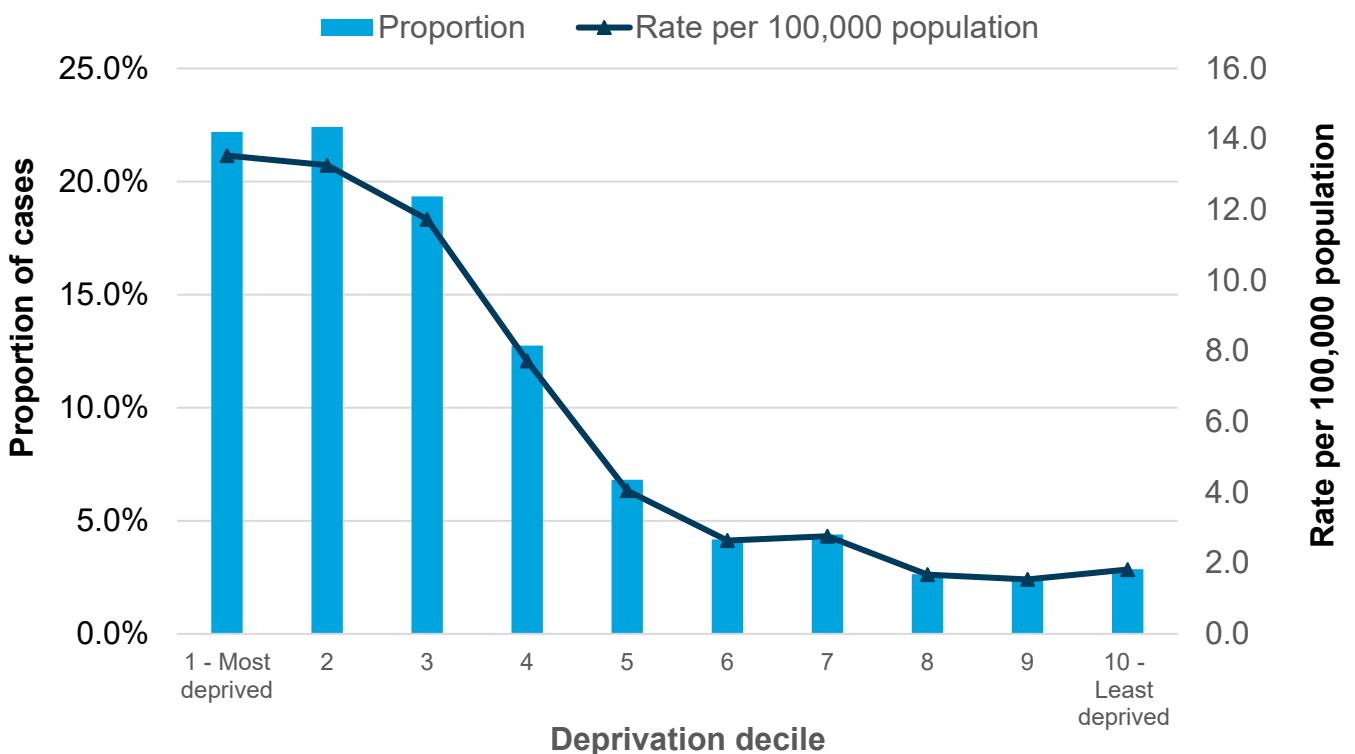
Directly observed therapy (DOT) was received in 29.2% (7 out of 24) of 2020 cases with at least one SRF (for cases where use of DOT was recorded). Of those, all 7 cases had current or previous history of alcohol misuse, 4 had current or previous imprisonment, 3 had current or previous history of homelessness and 3 cases had current or previous drug use. Six of the 7 cases receiving DOT had more than one social risk factor recorded.

Of cases notified in 2019, a higher proportion of drug sensitive cases with at least one SRF were lost to follow up at the last recorded outcome (10.0%, 4 out of 40) compared to cases with no SRFs (1.9%, 7 out of 375). Treatment completion was lower (70.0%, 28 out of 40) for cases with at least one SRF than for cases with no SRFs recorded (89.6%, 336 out of 375).

Deprivation

In 2020, the incidence of TB was 13.5 per 100,000 in the 10% of the population living in the most deprived areas of the North West compared to 1.8 per 100,000 in the 10% of the population living in the least deprived areas (Figure 13). Similarly, the proportion of TB cases was highest in the most socio-economically deprived decile (22.2%, 101 out of 455) compared with the least socio-economically decile (2.9%, 13 out of 455).

Figure 14. Rate of TB by socio-economic deprivation decile, North West, 2020



8. HIV testing of TB patients

HIV testing

TB is a well-recognised and serious complication of HIV infection, but is successfully treated with a combination of highly active antiretroviral therapy (HAART) and appropriate TB antibiotic treatment). For this reason, it is essential that all patients with TB should undergo HIV testing so that if they are diagnosed as having TB-HIV co-infection they have the opportunity to start curative TB treatment and HAART as soon as possible, and in so doing reduce the risk to themselves and reduce the risk of TB or HIV transmission to others.

Information on HIV testing was available for 92.5% (421 out of 455) of North West cases reported in 2020 (excluding cases diagnosed at post-mortem). Of these, 96.0% (404 out of 421) were offered and received an HIV test, higher than in previous years (93.6% in 2019 and 89.9% in 2018). The remaining cases did not receive a test: HIV status was already known in 2.9% (12 out of 421) of cases, 0.5% (2 out of 421) were not offered a test, 0.5% (2 out of 421) were offered a test but did not receive it, and 0.2% (1 out of 421) refused testing.

9. BCG vaccination

BCG vaccination status

Information on BCG vaccination status was available for 44.8% (204 out of 455) of North West cases in 2020, similar to previous years. Of these, 65.2% (133 out of 204) were reported to have received BCG vaccination.

The proportion of cases with known BCG vaccination status was higher in younger age groups: 84.0% (21 out of 25) in cases aged 0 to 14 years, compared with 39.1% (27 out of 69) of cases aged 65 and over. Where status was known, the proportion with reported BCG vaccination ranged from 85.7% (18 out of 21) in the 0 to 14 years age group to 51.9% (14 out of 27) in those 65 years and over.³

BCG vaccination data was available for 63.2% (84 out of 133) of UK born cases, compared with 38.1% (117 out of 307) of cases born outside the UK. Among cases with available information, 67.9% (57 out of 84) of UK born cases had received BCG vaccination, a slightly higher proportion than for cases born outside the UK (63.2%, 74 out of 117).

³ Information was recorded for 66.7% (22 out of 33) of cases aged 0 to 17 years, 86.4% (19 out of 22) of which had received BCG vaccination.

Discussion

Overall, numbers and rates of TB in North West England have decreased each year since 2011, and incidence remains below the national level. The regional rate decreased by 13.5% between 2019 and 2020, reflecting a decrease of 20.3% among non-UK born TB cases and 4.4% among the UK born. However, these data should be interpreted with caution due to the likely impact of the COVID-19 pandemic on TB detection and transmission.

The ethnic groups with the highest proportion of cases were the Pakistani and Black-African ethnic groups. Of cases born abroad who were notified in 2020, the greatest proportion had been resident in the UK for at least 11 years. This demonstrates the importance of timely identification and treatment of TB and latent TB infection in migrants arriving from high incidence TB countries via an effective LTBI screening programme, and of maintaining awareness of TB among migrant populations.

Rates across most age groups decreased in 2020, with a small increase seen in the 65 and over years age group. The rate in the 0 to 14 age group decreased, reflecting a parallel decrease in the rate among UK born children.

Overall, the proportion of cases with social risk factors has remained fairly consistent (between 9.2% and 14.4%) since 2011, indicating that underserved populations must remain a priority for intervention. This report clearly demonstrates that the largest burden of disease falls in those populations which are also socio-economically disadvantaged. Continued efforts to control TB in these groups represents an opportunity to reduce health inequalities.

Almost two-thirds of pulmonary cases in 2020 had a sputum smear result, a higher proportion than in recent years. This is an important indication of infectiousness, and should be obtained for all cases where possible.

Almost two-thirds of pulmonary cases in the North West started TB treatment within 4 months of symptom onset. However, this means that approximately a third of cases started treatment more than 4 months after symptom onset, which may have increased the opportunity for TB transmission. It is important to raise awareness of TB among high risk groups and service providers, and to ensure that clinical pathways are in place to increase detection and diagnosis.

The proportion of drug sensitive (and non-CNS, spinal, miliary or cryptic disseminated) TB cases in the North West completing treatment within 12 months decreased slightly to 81.4% (among cases notified in 2019).

Among cases that were offered HIV testing, uptake was 96.0% in 2020, 0.5% of cases were not offered a test. Some age groups, including those aged over 65 years, were less likely to be offered a test. Testing results were available for 92.5% of cases, and in 30 of the 32 local

authorities where TB was notified in 2020, 100% of eligible cases were offered an HIV test. UK guidance recommends all TB cases should be offered an HIV test regardless of age, ethnic group or place of residence (4).

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Appendix A. Notes on the report

About the Field Service

The Field Service (FS) supports UK Health Security Agency (UKHSA) 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 UKHSA 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 tuberculosis (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 North West TB Control Board and North West clinical leadership group.

Aim of report

This report describes the recent epidemiology of TB in the North West, providing an update on local trends, identifying areas of high burden of disease, at-risk population groups, and opportunities for interventions and prevention of future cases.

Further TB information

The [national report of TB in England](#) is available online.

Additional data on TB notifications in the UK, and breakdowns by country, can be found in the Official Statistic for TB, [Reports of cases of tuberculosis to enhanced tuberculosis surveillance systems: UK, 2000 to 2019](#).

As part of the Collaborative TB Strategy for England 2015 to 2020, [TB Strategy Monitoring Indicators](#) are available online. Data for these indicators are presented in [Appendix D](#).

[TB indicators at upper tier local authority and clinical commissioning group level](#) are available online.

Appendix B. Description of data sources and definitions

Data sources

This report is based on TB case notifications made to the UKHSA Enhanced Tuberculosis Surveillance system (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, polymerase chain reaction (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 Mycobacterial Interspersed Repetitive Unit-Variable Number Tandem Repeats (MIRU-VNTR) typing, however this has been superseded in recent years by Whole Genome Sequencing (WGS).

Definitions

Term	Definition
BCG	Bacillus Calmette-Guérin vaccination
CI	Confidence interval
CNS	Central nervous system
Cryptic disseminated TB	Systemic illness without localising features
DOT	Directly observed treatment
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

Term	Definition
	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
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)
HAART	Highly active antiretroviral therapy
IQR	Interquartile range
LTBI	Latent TB infection
MDR	Multidrug resistance: 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 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,

Term	Definition
	ofloxacin, ciprofloxacin) and other oral bacteriostatic agents.
TB	Tuberculosis
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 was 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 ETS matched dataset provided in June 2021.

Proportions

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

Population denominator

Tuberculosis rates by geographical area, 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.

Appendix C. TB among region residents

Table C1. TB case numbers by local authority of residence, North West, 2011 to 2020

Local authority	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Allerdale	0	<5	<5	<5	<5	<5	<5	5	<5	0
Barrow-in-Furness	<5	5	<5	<5	<5	<5	0	<5	<5	<5
Blackburn with Darwen	42	56	59	34	35	37	32	18	37	30
Blackpool	31	20	12	19	9	14	11	6	5	<5
Bolton	61	47	58	56	43	50	44	34	31	39
Burnley	13	11	9	<5	<5	6	10	10	<5	11
Bury	21	23	16	25	17	11	19	13	19	13
Carlisle	<5	12	<5	<5	<5	<5	0	<5	5	<5
Cheshire East	12	9	21	12	18	17	7	6	8	8
Cheshire West and Chester	8	8	11	12	11	7	8	6	12	8
Chorley	<5	9	6	<5	<5	<5	<5	<5	<5	0
Copeland	0	<5	<5	0	<5	<5	0	<5	0	<5
Eden	0	<5	<5	<5	0	0	0	0	<5	0
Fylde	<5	<5	<5	<5	<5	0	0	<5	0	<5
Halton	0	0	<5	5	<5	0	<5	<5	<5	<5
Hyndburn	11	9	14	<5	9	6	5	9	<5	5
Knowsley	5	<5	5	<5	<5	<5	0	<5	0	<5
Lancaster	8	8	<5	5	<5	7	9	10	<5	<5
Liverpool	42	48	41	36	41	34	38	30	45	33
Manchester	220	181	166	135	122	135	121	89	130	104
Oldham	46	50	43	53	54	40	36	34	48	37
Pendle	25	18	19	15	11	13	9	15	15	18
Preston	46	35	28	22	17	24	21	17	25	17
Ribble Valley	<5	<5	<5	<5	0	<5	<5	0	<5	<5
Rochdale	42	35	23	39	26	31	25	31	16	29
Rossendale	<5	<5	<5	<5	<5	<5	<5	<5	6	<5
Salford	24	24	30	26	32	28	21	20	26	15
Sefton	7	17	6	9	6	8	5	6	10	6

Local authority	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
South Lakeland	6	7	<5	7	0	<5	<5	<5	<5	<5
South Ribble	9	<5	<5	6	<5	<5	<5	<5	<5	0
St. Helens	5	5	<5	5	<5	<5	<5	<5	<5	0
Stockport	28	15	16	19	14	13	18	17	<5	8
Tameside	33	34	22	19	16	21	29	21	17	12
Trafford	27	39	31	26	22	25	19	19	11	24
Warrington	6	9	14	9	8	9	5	7	7	<5
West Lancashire	<5	<5	<5	<5	<5	0	<5	<5	0	0
Wigan	9	7	14	11	14	15	5	8	11	7
Wirral	10	11	11	6	10	13	6	8	10	10
Wyre	9	8	5	0	<5	<5	<5	<5	<5	0
Cheshire and Merseyside	95	109	114	97	100	91	74	67	95	73
Cumbria and Lancashire	212	211	183	136	108	129	118	114	116	94
Greater Manchester	511	455	419	409	360	369	337	286	313	288
North West	818	775	716	642	568	589	529	467	524	455

Table C2. TB rate per 100,000 population by local authority of residence, North West, 2011 to 2020

Local authority	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Allerdale	0.0	2.1	2.1	4.1	2.1	3.1	2.1	5.1	1.0	0.0
Barrow-in-Furness	5.8	7.3	2.9	1.5	3.0	3.0	0.0	1.5	1.5	3.0
Blackburn with Darwen	28.4	37.9	39.9	23.1	23.7	24.9	21.5	12.1	24.7	20.0
Blackpool	21.8	14.1	8.5	13.5	6.4	10.0	7.9	4.3	3.6	0.7
Bolton	22.0	16.8	20.7	19.9	15.3	17.6	15.4	11.9	10.8	13.5
Burnley	14.9	12.6	10.4	2.3	3.4	6.9	11.4	11.3	3.4	12.3
Bury	11.3	12.4	8.6	13.3	9.1	5.8	10.0	6.8	9.9	6.8
Carlisle	0.9	11.1	3.7	0.9	2.8	0.9	0.0	2.8	4.6	0.9
Cheshire East	3.2	2.4	5.6	3.2	4.8	4.5	1.8	1.6	2.1	2.1
Cheshire West and Chester	2.4	2.4	3.3	3.6	3.3	2.1	2.4	1.8	3.5	2.3
Chorley	2.8	8.3	5.4	3.6	1.8	3.5	1.7	2.6	0.8	0.0
Copeland	0.0	2.8	2.9	0.0	1.4	1.4	0.0	1.5	0.0	1.5

Local authority	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Eden	0.0	1.9	1.9	1.9	0.0	0.0	0.0	0.0	1.9	0.0
Fylde	1.3	2.6	2.6	3.9	1.3	0.0	0.0	3.8	0.0	2.5
Halton	0.0	0.0	1.6	4.0	1.6	0.0	1.6	1.6	0.8	0.8
Hyndburn	13.7	11.2	17.5	5.0	11.2	7.5	6.2	11.1	4.9	6.2
Knowsley	3.4	1.4	3.4	2.0	1.4	0.7	0.0	0.7	0.0	2.6
Lancaster	5.8	5.7	2.9	3.6	1.4	4.9	6.3	6.9	1.4	0.7
Liverpool	9.0	10.2	8.7	7.6	8.5	7.0	7.7	6.1	9.0	6.6
Manchester	43.7	35.5	32.3	26.0	23.0	24.9	22.2	16.3	23.5	18.7
Oldham	20.4	22.1	18.9	23.2	23.5	17.2	15.4	14.4	20.2	15.6
Pendle	27.9	20.1	21.1	16.7	12.2	14.4	9.9	16.4	16.3	19.5
Preston	32.8	24.9	20.0	15.7	12.1	17.0	14.9	12.0	17.5	11.8
Ribble Valley	1.7	1.7	3.5	1.7	0.0	5.1	3.4	0.0	1.6	1.6
Rochdale	19.8	16.5	10.8	18.3	12.1	14.3	11.4	14.1	7.2	13.0
Rossendale	1.5	2.9	4.4	5.8	5.8	2.9	4.3	2.8	8.4	2.8
Salford	10.2	10.1	12.6	10.8	13.1	11.3	8.4	7.9	10.0	5.7
Sefton	2.6	6.2	2.2	3.3	2.2	2.9	1.8	2.2	3.6	2.2
South Lakeland	5.8	6.8	2.9	6.8	0.0	1.9	1.9	1.9	2.9	1.9
South Ribble	8.2	1.8	3.7	5.5	3.6	0.9	2.7	2.7	3.6	0.0
St. Helens	2.9	2.8	1.7	2.8	1.1	1.1	1.7	0.6	1.1	0.0
Stockport	9.9	5.3	5.6	6.6	4.9	4.5	6.2	5.8	1.4	2.7
Tameside	15.0	15.4	10.0	8.6	7.2	9.4	12.9	9.3	7.5	5.3
Trafford	11.9	17.1	13.5	11.2	9.4	10.7	8.1	8.0	4.6	10.1
Warrington	3.0	4.4	6.8	4.4	3.9	4.3	2.4	3.3	3.3	1.4
West Lancashire	0.9	0.9	1.8	2.7	1.8	0.0	2.6	1.8	0.0	0.0
Wigan	2.8	2.2	4.4	3.4	4.3	4.6	1.5	2.5	3.3	2.1
Wirral	3.1	3.4	3.4	1.9	3.1	4.0	1.9	2.5	3.1	3.1
Wyre	8.4	7.4	4.6	0.0	0.9	2.7	3.6	3.6	1.8	0.0
Cheshire and Merseyside	3.9	4.5	4.7	4.0	4.1	3.7	3.0	2.7	3.8	2.9
Cumbria and Lancashire	10.8	10.7	9.3	6.9	5.5	6.5	5.9	5.7	5.8	4.7
Greater Manchester	19.0	16.8	15.4	15.0	13.1	13.3	12.0	10.2	11.0	10.1
North West	11.6	10.9	10.1	9.0	7.9	8.2	7.3	6.4	7.1	6.2

Table C3. TB case numbers and rates by age and sex, North West, 2020

Age group	Female number	Female rate	Male number	Male rate
0 to 14	10	1.5	15	2.2
15 to 44	105	7.7	141	10.2
45 to 64	48	4.9	67	7.2
65 and over	32	4.3	37	5.8

Table C4. Drug resistance among TB cases with culture confirmed disease, North West, 2011 to 2020

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Culture confirmed*	508	470	444	393	362	376	321	310	343	286
Drug resistant n	32	24	28	30	17	23	32	43	38	40
Drug resistant %**	6.3%	5.2%	6.3%	7.7%	4.7%	6.1%	10.2%	14.0%	12.0%	15.2%

* Susceptibility results available for at least isoniazid and rifampicin.

** Proportion of cases with known results for first line drug resistance.

Appendix D. Baseline data for TB strategy monitoring indicators, North West and England 2000 to 2020

Indicator 1. Overall TB incidence per 100,000 population

Year	North West (number of cases)	North West (rate)	England (number of cases)	England (rate)
2000	624	9.2	6,044	12.3
2001	638	9.4	6,169	12.5
2002	638	9.4	6,675	13.4
2003	574	8.4	6,631	13.3
2004	570	8.3	6,929	13.8
2005	743	10.8	7,658	15.1
2006	694	10.1	7,682	15.1
2007	733	10.6	7,577	14.7
2008	730	10.5	7,809	15.1
2009	799	11.4	8,112	15.5
2010	809	11.5	7,675	14.6
2011	818	11.6	8,280	15.6
2012	775	10.9	8,086	15.1
2013	716	10.1	7,265	13.5
2014	642	9.0	6,472	11.9

Year	North West (number of cases)	North West (rate)	England (number of cases)	England (rate)
2015	568	7.9	5,735	10.5
2016	589	8.2	5,618	10.2
2017	529	7.3	5,067	9.1
2018	467	6.4	4,611	8.2
2019	524	7.1	4,702	8.4
2020	455	6.2	4,125	7.3

Indicator 2. TB incidence in UK born and non-UK born populations

Year	North West (UK born)		North West (non-UK born)		England (UK born)		England (non-UK born)	
	Number of cases	Rate	Number of cases	Rate	Number of cases	Rate	Number of cases	Rate
2000	261	-	348	-	1,830	4.1	3,329	79.6
2001	299	-	327	-	1,889	4.3	3,431	79.1
2002	258	-	352	-	1,852	4.2	4,111	90.5
2003	235	-	330	-	1,703	3.8	4,326	90.8
2004	198	-	358	-	1,791	4.0	4,571	95.2
2005	244	-	468	-	1,804	4.0	5,186	100.7
2006	229	-	426	-	1,729	3.9	5,175	92.9
2007	253	-	458	-	1,799	4.0	5,135	85.5
2008	231	-	474	-	1,867	4.2	5,417	86.0

Year	North West (UK born)		North West (non-UK born)		England (UK born)		England (non-UK born)	
	Number of cases	Rate	Number of cases	Rate	Number of cases	Rate	Number of cases	Rate
2009	255	-	494	-	1,907	4.2	5,662	86.8
2010	270	-	491	-	1,814	4.0	5,515	83.1
2011	259	4.0	521	93.7	1,958	4.3	6,021	85.9
2012	262	4.1	494	89.5	2,004	4.4	5,840	81.4
2013	255	4.0	447	76.8	1,842	4.0	5,260	70.6
2014	226	3.5	405	66.2	1,756	3.8	4,611	60.2
2015	185	2.9	368	52.1	1,532	3.3	4,099	51.3
2016	209	3.2	368	55.1	1,454	3.1	4,096	49.4
2017	175	2.7	340	49.0	1,426	3.1	3,577	41.3
2018	160	2.5	296	45.6	1,275	2.7	3,291	39.1
2019	139	2.1	374	52.2	1,216	2.6	3,420	39.7
2020	133	2.0	307	41.6	1,091	2.3	2,948	36.3

Indicator 5. Incidence of TB in UK-born children aged under fifteen years

Year	North West (number of cases)	North West (rate)	England (number of cases)	England (rate)
2000	19	1.5	209	2.3
2001	20	1.6	229	2.5

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2002	19	1.5	228	2.6
2003	18	1.4	179	2.0
2004	15	1.2	264	3.0
2005	22	1.8	247	2.8
2006	23	1.9	209	2.4
2007	30	2.5	290	3.4
2008	33	2.8	294	3.4
2009	34	2.9	257	2.9
2010	42	3.6	238	2.7
2011	39	3.3	234	2.6
2012	26	2.2	254	2.9
2013	19	1.6	195	2.2
2014	21	1.7	187	2.1
2015	16	1.3	157	1.7
2016	25	2.0	163	1.8
2017	21	1.7	127	1.4
2018	14	1.1	109	1.1
2019	18	1.4	123	1.3
2020	14	1.1	99	1.0

Indicator 6. Number and proportion of pulmonary TB cases starting treatment within 2 months of symptom onset

Year	North West (number of cases)	North West (proportion)	England (number of cases)	England (proportion)
2000	121	44.3	-	-
2001	132	47.7	-	-
2002	124	41.9	-	-
2003	124	44.9	-	-
2004	99	37.2	-	-
2005	139	41.6	-	-
2006	123	40.6	-	-
2007	128	37.6	-	-
2008	117	39.4	-	-
2009	130	45.6	-	-
2010	120	44.4	-	-
2011	126	44.8	1,339	45.5
2012	127	43.5	1,390	44.5
2013	98	39.2	1,240	41.7
2014	121	39.5	1,173	40.0
2015	111	41.3	1,199	42.6
2016	120	40.7	1,092	38.8
2017	77	37.0	989	38.3
2018	79	39.1	972	41.2

Year	North West (number of cases)	North West (proportion)	England (number of cases)	England (proportion)
2019	94	43.7	929	40.0
2020	66	39.5	754	39.2

Indicator 7. Number and proportion of pulmonary TB cases starting treatment within 4 months of symptom onset

Year	North West (number of cases)	North West (proportion)	England (number of cases)	England (proportion)
2000	194	71.1	-	-
2001	211	76.2	-	-
2002	225	76.0	-	-
2003	201	72.8	-	-
2004	198	74.4	-	-
2005	242	72.5	-	-
2006	228	75.2	-	-
2007	254	74.7	-	-
2008	210	70.7	-	-
2009	210	73.7	-	-
2010	199	73.7	-	-
2011	205	73.0	2,210	75.1
2012	208	71.2	2,334	74.7
2013	165	66.0	2,156	72.4

Year	North West (number of cases)	North West (proportion)	England (number of cases)	England (proportion)
2014	221	72.2	2,071	70.7
2015	195	72.5	2,049	72.7
2016	204	69.2	1,959	69.6
2017	135	64.9	1,781	69.0
2018	133	65.8	1,706	72.3
2019	157	73.0	1,600	68.8
2020	109	65.3	1,300	67.6

Indicator 8. Number and proportion of pulmonary TB cases that were culture confirmed

Year	North West (number of cases)	North West (proportion)	England (number of cases)	England (proportion)
2000	201	53.2	1,921	52.7
2001	255	66.2	2,100	57.2
2002	268	69.3	2,633	64.8
2003	216	63.5	2,614	66.2
2004	214	67.5	2,755	68.4
2005	271	66.1	3,013	69.2
2006	265	72.2	3,010	69.5
2007	292	72.3	2,850	68.4
2008	278	74.9	2,922	67.7

Year	North West (number of cases)	North West (proportion)	England (number of cases)	England (proportion)
2009	318	72.9	3,023	68.1
2010	317	74.4	2,911	70.8
2011	303	72.5	3,140	72.0
2012	293	73.8	3,015	70.7
2013	270	75.2	2,774	73.4
2014	261	73.1	2,522	73.2
2015	245	78.8	2,296	74.4
2016	253	73.8	2,370	76.9
2017	190	75.1	2,131	75.7
2018	203	79.6	1,980	75.4
2019	228	77.3	1,967	75.1
2020	172	80.0	1,659	75.3

Indicator 9. Number and proportion of microbiologically confirmed cases with drug susceptibility testing reported for the 4 first line agents

Year	North West (number of cases)	North West (proportion)	England (number of cases)	England (proportion)
2000	279	99.6	2,780	99.4
2001	366	100.0	3,141	99.2
2002	388	100.0	3,787	98.7
2003	316	99.4	3,802	99.2

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2004	316	99.1	4,015	98.6
2005	412	99.5	4,533	98.9
2006	415	99.3	4,613	98.7
2007	424	99.1	4,374	98.7
2008	422	98.8	4,447	98.0
2009	482	99.6	4,535	97.1
2010	492	99.8	4,531	97.9
2011	508	100.0	4,919	97.4
2012	470	100.0	4,819	98.2
2013	443	99.3	4,275	97.1
2014	393	100.0	3,866	98.2
2015	361	99.7	3,464	98.8
2016	376	99.2	3,480	97.0
2017	320	98.8	3,109	98.0
2018	308	99.0	2,818	98.3
2019	317	92.4	2,637	91.1
2020	265	91.7	2,201	87.9

Indicator 10. Number and proportion of drug sensitive TB cases with full course of treatment completed by 12 months

Year	North West (number of cases)	North West (proportion)	England (number of cases)	England (proportion)
2000	-	-	-	-
2001	267	45.5	3,628	63.7
2002	450	75.0	4,112	67.4
2003	384	73.1	4,191	69.6
2004	320	61.3	4,426	70.1
2005	469	68.9	4,878	70.3
2006	475	75.9	5,212	75.5
2007	489	74.7	5,289	78.2
2008	514	77.9	5,602	80.3
2009	589	80.9	5,918	81.9
2010	602	84.8	5,655	83.0
2011	594	81.1	6,024	82.1
2012	579	84.3	6,015	83.7
2013	544	84.0	5,504	85.7
2014	469	83.9	4,847	84.9
2015	416	84.2	4,205	84.0
2016	451	85.1	4,230	85.2
2017	399	83.5	3,817	85.3
2018	364	85.6	3,506	84.8

Year	North West (number of cases)	North West (proportion)	England (number of cases)	England (proportion)
2019	385	81.4	3,425	82.0
2020	-	-	-	-

Indicator 11. Number and proportion of drug sensitive TB cases lost to follow-up at last reported outcome

Year	North West (number of cases)	North West (proportion)	England (number of cases)	England (proportion)
2000	-	-	-	-
2001	19	3.0	237	3.9
2002	27	4.3	296	4.5
2003	13	2.3	291	4.4
2004	16	2.8	332	4.8
2005	30	4.1	381	5.0
2006	31	4.5	413	5.4
2007	38	5.3	345	4.6
2008	40	5.5	368	4.8
2009	33	4.2	354	4.4
2010	41	5.1	342	4.5
2011	36	4.4	425	5.2
2012	29	3.8	365	4.6
2013	26	3.7	298	4.2

Year	North West (number of cases)	North West (proportion)	England (number of cases)	England (proportion)
2014	21	3.3	276	4.3
2015	28	5.0	253	4.5
2016	29	5.0	225	4.1
2017	21	4.0	223	4.5
2018	22	4.8	197	4.3
2019	18	3.5	162	3.0
2020	-	-	-	-

Indicator 12. Number and proportion of drug sensitive TB cases that had died at last reported outcome

Year	North West (number of cases)	North West (proportion)	England (number of cases)	England (proportion)
2000	-	-	-	-
2001	45	7.1	377	6.1
2002	45	7.1	436	6.6
2003	58	10.2	407	6.2
2004	40	7.1	403	5.9
2005	40	5.4	448	5.9
2006	45	6.5	430	5.7
2007	42	5.8	432	5.8
2008	39	5.3	436	5.6

Year	North West (number of cases)	North West (proportion)	England (number of cases)	England (proportion)
2009	47	5.9	419	5.2
2010	36	4.5	382	5.0
2011	46	5.7	382	4.7
2012	45	5.9	390	4.9
2013	43	6.1	335	4.7
2014	56	8.8	354	5.5
2015	49	8.7	346	6.1
2016	39	6.7	307	5.5
2017	32	6.1	266	5.3
2018	21	4.5	234	5.1
2019	20	3.9	229	5.0
2020	-	-	-	-

Indicator 13. Number and proportion of TB cases with rifampicin resistance or MDR-TB with treatment completed at 24 month

Year	North West (number of cases)	North West (proportion)	England (number of cases)	England (proportion)
2000	-	-	-	-
2001	-	-	-	-
2002	-	-	-	-
2003	-	-	-	-

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Year	North West (number of cases)	North West (proportion)	England (number of cases)	England (proportion)
2004	3	75.0	35	51.5
2005	6	75.0	38	64.4
2006	3	100.0	40	50.0
2007	5	50.0	30	42.3
2008	0	0.0	45	57.7
2009	6	85.7	40	51.9
2010	3	42.9	38	48.1
2011	4	57.1	48	50.5
2012	5	83.3	58	61.7
2013	4	44.4	51	60.0
2014	4	66.7	39	52.7
2015	3	75.0	41	61.2
2016	4	66.7	46	65.7
2017	2	100.0	41	64.1
2018	4	80.0	31	62.0
2019	-	-	-	-
2020	-	-	-	-

Indicator 14. Number and proportion of TB cases with rifampicin resistance or MDR-TB lost to follow-up at last reported outcome

Year	North West (number of cases)	North West (proportion)	England (number of cases)	England (proportion)
2000	-	-	-	-
2001	-	-	-	-
2002	-	-	-	-
2003	-	-	-	-
2004	0	0	9	13
2005	1	13	8	14
2006	0	0	8	10
2007	1	10	6	8
2008	0	0	10	13
2009	0	0	11	14
2010	2	29	9	11
2011	1	14	18	19
2012	0	0	10	11
2013	1	11	14	16
2014	2	33	14	19
2015	0	0	5	7
2016	1	17	9	13
2017	0	0	7	11

Year	North West (number of cases)	North West (proportion)	England (number of cases)	England (proportion)
2018	0	0	5	10
2019	-	-	-	-
2020	-	-	-	-

Indicator 15. Number and proportion of TB cases with rifampicin resistance or MDR-TB that had died at last reported outcome

Year	North West (number of cases)	North West (proportion)	England (number of cases)	England (proportion)
2000	-	-	-	-
2001	-	-	-	-
2002	-	-	-	-
2003	-	-	-	-
2004	0	0	3	4
2005	0	0	3	5
2006	0	0	3	4
2007	2	20	10	14
2008	0	0	7	9
2009	0	0	4	5
2010	0	0	1	1
2011	0	0	7	7
2012	0	0	4	4

Year	North West (number of cases)	North West (proportion)	England (number of cases)	England (proportion)
2013	2	22	4	5
2014	0	0	2	3
2015	0	0	5	7
2016	0	0	6	9
2017	0	0	7	11
2018	1	20	4	8
2019	-	-	-	-
2020	-	-	-	-

Indicator 16. Number and proportion of TB cases offered an HIV test

Year	North West (number of cases)	North West (proportion)	England (number of cases)	England (proportion)
2000	-	-	-	-
2001	-	-	-	-
2002	-	-	-	-
2003	-	-	-	-
2004	-	-	-	-
2005	-	-	-	-
2006	-	-	-	-
2007	-	-	-	-

Year	North West (number of cases)	North West (proportion)	England (number of cases)	England (proportion)
2008	-	-	-	-
2009	-	-	-	-
2010	-	-	-	-
2011	-	-	-	-
2012	451	90.2	5,207	93.2
2013	541	87.0	5,787	93.6
2014	547	94.6	5,401	95.4
2015	477	97.0	4,951	96.3
2016	533	96.9	5,025	97.0
2017	457	96.0	4,558	96.5
2018	394	95.4	4,157	96.7
2019	463	98.7	4,243	97.6
2020	407	99.5	-	-

Indicator 17. Number and proportion of drug sensitive TB cases with at least one social risk factor who completed treatment within 12 months

Year	North West (number of cases)	North West (proportion)	England (number of cases)	England (proportion)
2000	-	-	-	-
2001	-	-	-	-
2002	-	-	-	-

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Year	North West (number of cases)	North West (proportion)	England (number of cases)	England (proportion)
2003	-	-	-	-
2004	-	-	-	-
2005	-	-	-	-
2006	-	-	-	-
2007	-	-	-	-
2008	-	-	-	-
2009	-	-	-	-
2010	31	57.4	373	73.7
2011	36	66.7	371	71.5
2012	38	67.9	394	74.9
2013	39	76.5	402	77.2
2014	34	66.7	360	74.8
2015	50	79.4	392	75.7
2016	32	64.0	368	76.5
2017	27	69.2	363	75.6
2018	36	76.6	359	73.9
2019	26	65.0	372	73.7
2020	-	-	-	-

Indicator 18. Number and proportion of culture confirmed TB cases with any first line drug resistance

Year	North West (number of cases)	North West (proportion)	England (number of cases)	England (proportion)
2000	17	6.1	193	6.9
2001	13	3.6	228	7.3
2002	20	5.2	297	7.8
2003	13	4.1	308	8.1
2004	19	6.0	325	8.1
2005	25	6.1	346	7.6
2006	19	4.6	371	8.0
2007	31	7.3	331	7.6
2008	21	5.0	307	6.9
2009	23	4.8	371	8.2
2010	28	5.7	323	7.2
2011	32	6.3	414	8.5
2012	24	5.2	360	7.5
2013	28	6.3	327	7.7
2014	30	7.7	289	7.5
2015	17	4.7	255	7.4
2016	23	6.1	266	7.7
2017	32	10.2	285	9.3
2018	43	14.0	330	11.8

Year	North West (number of cases)	North West (proportion)	England (number of cases)	England (proportion)
2019	38	12.0	310	11.8
2020	40	15.2	-	-

Indicator 19. Number and proportion of culture confirmed TB cases with multi-drug resistant TB

Year	North West (number of cases)	North West (proportion)	England (number of cases)	England (proportion)
2000	5	1.8	28	1.0
2001	1	0.3	23	0.7
2002	2	0.5	34	0.9
2003	2	0.6	49	1.3
2004	3	0.9	45	1.1
2005	6	1.5	41	0.9
2006	1	0.2	54	1.2
2007	7	1.6	49	1.1
2008	1	0.2	50	1.1
2009	3	0.6	59	1.3
2010	6	1.2	65	1.4
2011	7	1.4	81	1.6
2012	6	1.3	76	1.6
2013	6	1.4	67	1.6

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Year	North West (number of cases)	North West (proportion)	England (number of cases)	England (proportion)
2014	6	1.5	53	1.4
2015	3	0.8	45	1.3
2016	4	1.1	53	1.5
2017	1	0.3	46	1.5
2018	4	1.3	36	1.3
2019	6	1.7	37	1.3
2020	6	2.1	-	-

Appendix E. Local authority TB epidemiological summaries

Local authority TB epidemiological summaries will provide further information about TB cases among residents of region upper tier local authorities with an average of at least 50 TB cases per year over the previous 3 years. These will be available from your local Field Service team.

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