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Tuberculosis in North West England: Annual review (2015 data)

Data from 2000 to 2015

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Public Health England

Wellington House,
133-155 Waterloo Road,
London SE1 8UG

Tel: 020 7654 8000

<http://www.gov.uk/phe>,

Twitter: @PHE_uk, Facebook: www.facebook.com/PublicHealthEngland

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Prepared by: Field Epidemiology Service, North West.

For queries relating to this document, please contact: FES.NorthWest@phe.gov.uk.

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Data presented in this report are correct as of April 2016, when they were extracted from the Enhanced TB Surveillance (ETS) system; before being cleaned and validated by August 2016.

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Authors

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Notes on the report

Intended audience

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

Data sources

This report presents detailed data on TB case notifications made to the Enhanced Tuberculosis Surveillance system (ETS) in England to the end of 2015. Data from notifications made to ETS from 2000 are updated annually to take into account denotifications, late notifications and other updates. The data presented in the current year's report supersedes data in previous reports.

Other data displays

The national report presenting recent epidemiology of TB in England is available at <https://www.gov.uk/government/publications/tuberculosis-in-england-annual-report>. Additional high-level data on TB notifications in the UK to the end of 2015, and breakdowns by country, can be found in the Official Statistic for TB, 'Reports of cases of tuberculosis to enhanced tuberculosis surveillance systems: United Kingdom, 2000 to 2015'. This is available at <https://www.gov.uk/government/collections/tuberculosis-and-other-mycobacterial-diseases-diagnosis-screening-management-and-data>.

As part of the Collaborative TB Strategy for England 2015-2020, a suite of TB Strategy Monitoring Indicators have been developed (https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/403231/Collaborative_TB_Strategy_for_England_2015_2020_.pdf). Where data for these indicators are presented in this report, the indicator name is shown; and a summary table of national-level indicators is presented in Appendix D.

Data for indicators which are presented at upper tier local authority and clinical commissioning group can be found at <http://fingertips.phe.org.uk/profile/tb-monitoring>.

Executive summary

National

A total of 5,758 cases of tuberculosis were reported in England in 2015.¹ This corresponds to an incidence rate of 10.5 per 100,000 population, a decrease from the previous year (11.9 per 100,000 in 2014).

Regional

A total of 570 cases of tuberculosis were reported to the enhanced surveillance scheme in North West England in 2015. This corresponds to a regional incidence of 7.9 per 100,000 population, a decrease from the previous year (9.0 per 100,000 in 2014).

Local

Greater Manchester continued to have the highest TB incidence, at 13.1 per 100,000 population (360 cases) in 2015. This was a decrease from the previous year (15.0 per 100,000 population, 409 cases), and continues a gradually decreasing trend since 2011. The North West local authorities with the highest incidence in 2015 were Blackburn with Darwen (23.8 per 100,000 population), Oldham (23.4 per 100,000 population) and Manchester (23.0 per 100,000 population).

Age groups

In 2015, age-specific incidence was highest in the 15-44 years age group at 12.2 per 100,000 population. The rate in the 0-14 age group remained low, decreasing from 2.4 per 100,000 in 2014 to 1.8 per 100,000 in 2015.

Ethnic groups

Incidence remains highest in the Black-African and Pakistani ethnic groups. The greatest proportion of TB cases in 2015 occurred in the Pakistani ethnic group (29%), followed by the White ethnic group (26%).

In 2015, 67% of TB cases reported in the North West were born outside the UK. Of cases born outside the UK, 34% were in the Pakistani ethnic group; 22% were diagnosed within one year of entry; and 39% were diagnosed 11 or more years after entry (similar proportions to previous years).

Clinical characteristics

More than half of the TB cases reported in the North West in 2015 had pulmonary disease (53%); a similar proportion to previous years (55% in 2014; 50% in 2013). Of those cases with pulmonary disease, 77% were confirmed by culture; a similar proportion to previous years (73% in 2014; 75% in 2013).

Treatment outcome

Among drug sensitive TB cases notified in 2014, 84% of those with an expected treatment duration of less than twelve months completed treatment within twelve months (compared with 84% of cases reported in 2013). The most common reasons for non-completion of treatment were death (8%) and continued TB treatment (4%).

Among drug sensitive TB cases with CNS, spinal, miliary or cryptic disseminated disease, 58% of those reported in 2014 completed treatment within twelve months; 14% required continued treatment. A total of 68% had completed treatment at the last recorded outcome.

Twelve drug resistant TB cases were reported in 2013 (compared with seven cases in 2010, 2011 and 2012). At twelve months, eight cases were still on treatment; two died; one completed treatment; and one was lost to follow up. At twenty-four months, five cases had completed treatment; two cases remained on treatment; and one case had stopped treatment.

Drug resistance

The proportion of culture positive cases with resistance to at least one first-line drug was 5% in 2015; similar to previous years (8% in 2014, 6% in 2013) and in line with national levels (7% in 2015).¹ A total of 5% (16/355) had isoniazid resistance; 1% (4/355) were resistant to rifampicin; and 1% (3/355) had multi-drug resistant TB (MDR-TB, resistant to isoniazid and rifampicin). There were no recorded cases of extensively drug resistant (XDR) TB in the North West in 2015.

* CNS – central nervous system

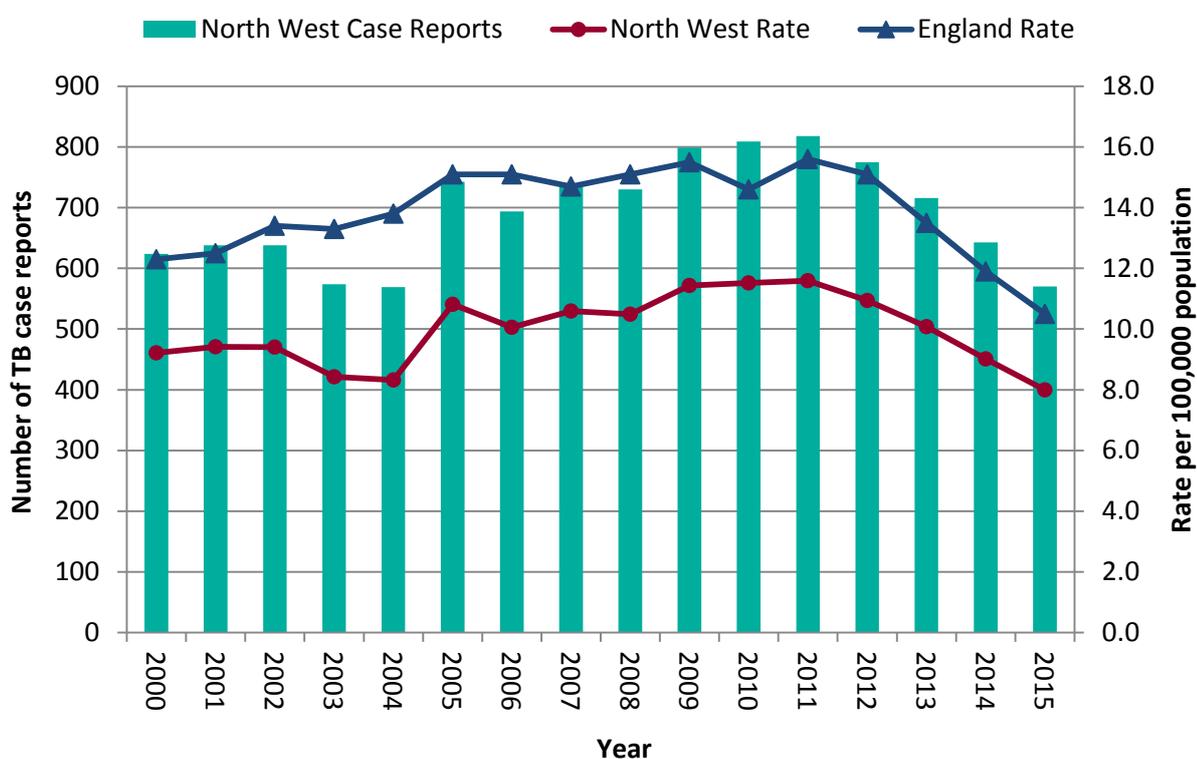
1. TB notifications and incidence

Overall numbers, rates and geographical distribution

In 2015, 570 tuberculosis (TB) cases were reported among North West residents; a rate of 7.9 per 100,000 population. This was a decrease of 11% compared to 2014 (643 cases; rate of 9.0 per 100,000 population). The North West TB rate remained below the England rate of 10.5 per 100,000 (Figure 1), and was the fourth highest of all regions in England.¹

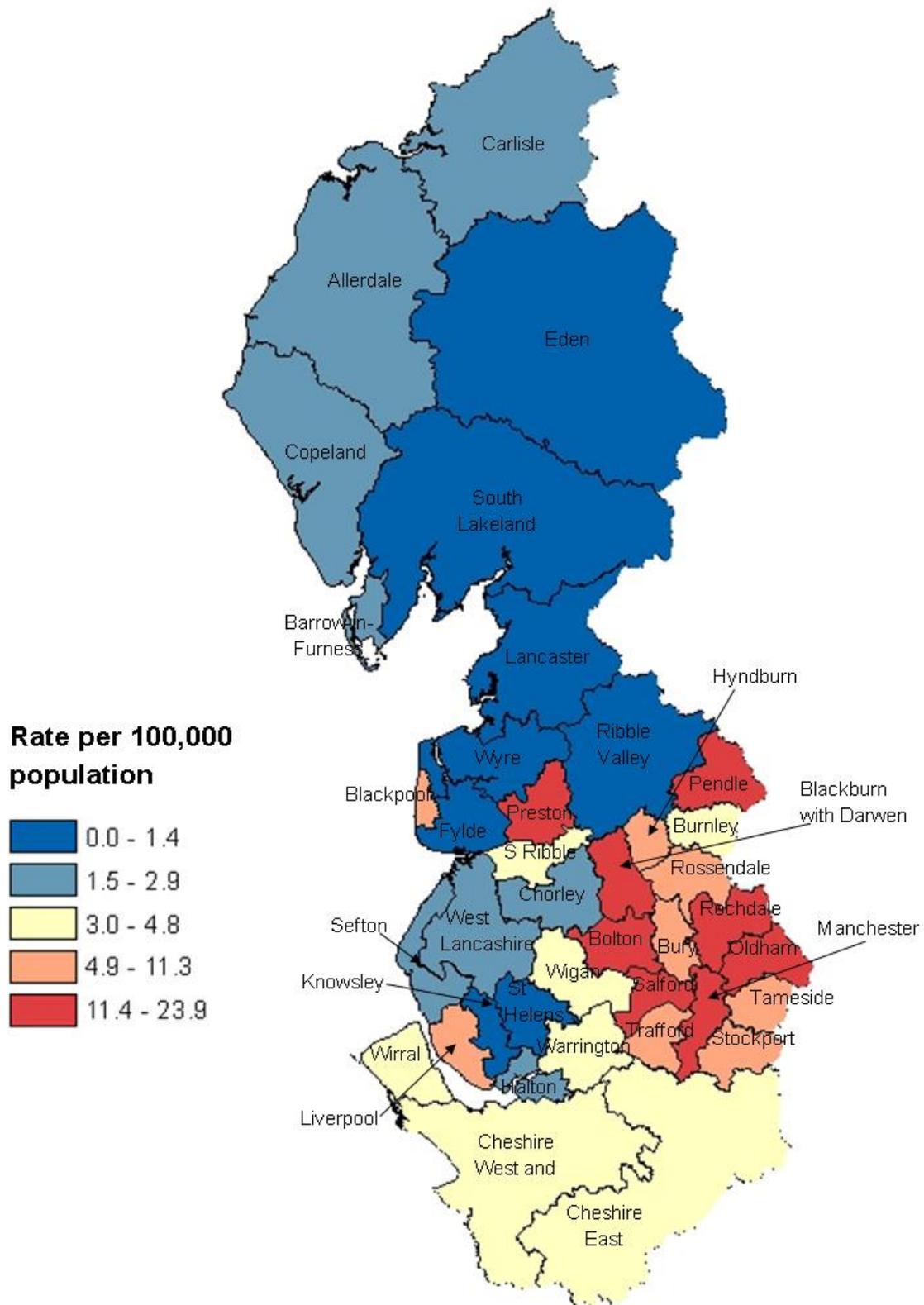
TB Monitoring Indicator 1: Overall TB incidence per 100,000 population

Figure 1: TB case reports and rates, North West and England, 2000 – 2015



Among North West local authorities, the highest rates were in Blackburn with Darwen at 23.8 per 100,000 population; Oldham at 23.4 per 100,000; and Manchester at 23.0 per 100,000. Rates in Blackburn with Darwen and Oldham increased slightly from the previous year: by 3% in Blackburn with Darwen and by 2% in Oldham. The rate in Manchester decreased by 10%.

Figure 2: TB rate per 100,000 population by upper tier local authority of residence, North West, 2015



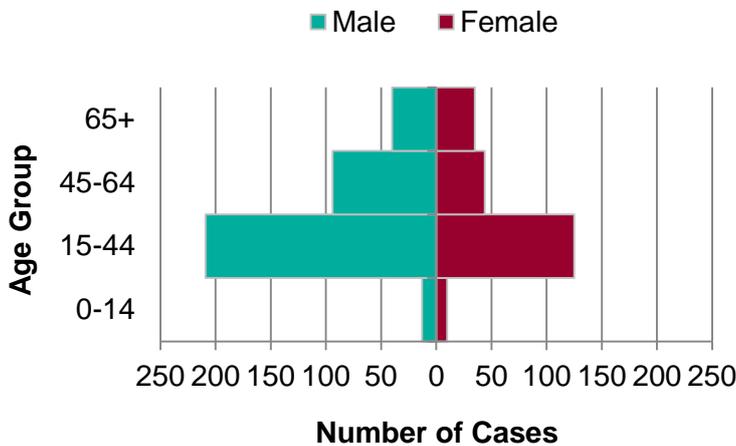
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Demographic characteristics

Age and sex

In 2015, 62% of North West TB cases were male, and rates among males were higher than in females (10.1 per 100,000 in males and 5.9 per 100,000 in females). There was a greater proportion of males than females across all age groups; but the greatest disparity was in the 45-64 age group, in which 68% of cases were male and 32% were female (Figure 3). Twenty-three cases of TB in children aged 0-14 years were reported; fewer than in the previous year (30 cases reported in 2014).*

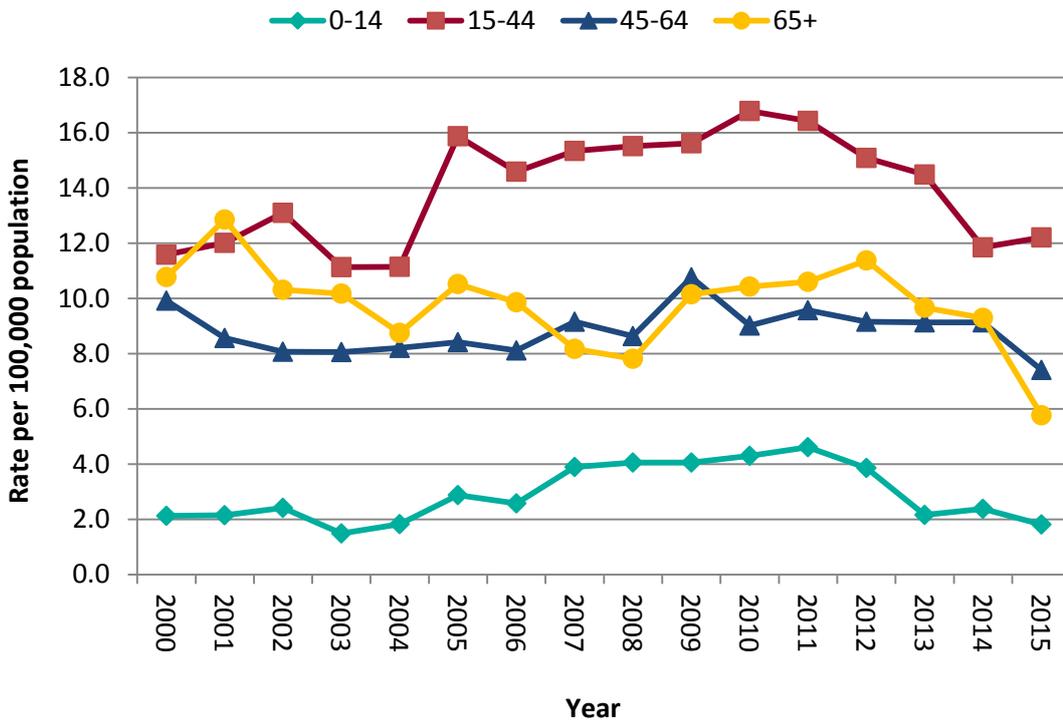
Figure 3: TB case reports by age and sex, North West, 2015



Rates were highest in residents aged 15-44 years (Figure 4). The rate in the 15-44 age group increased slightly from 11.8 per 100,000 in 2014 to 12.2 per 100,000 in 2015. Rates across all other age groups decreased in 2015, with the largest decrease seen in the 65+ years age group (from 9.3 per 100,000 population in 2014 to 5.8 per 100,000 population in 2015). The rate in the 0-14 age group remained low.

* Thirty-six cases aged 0-17 years were reported in 2015; an incidence of 1.2 per 100,000 population (compared with 45 cases and an incidence of 1.5 per 100,000 population reported in 2014).

Figure 4: TB case rates by age group, North West, 2000 – 2015



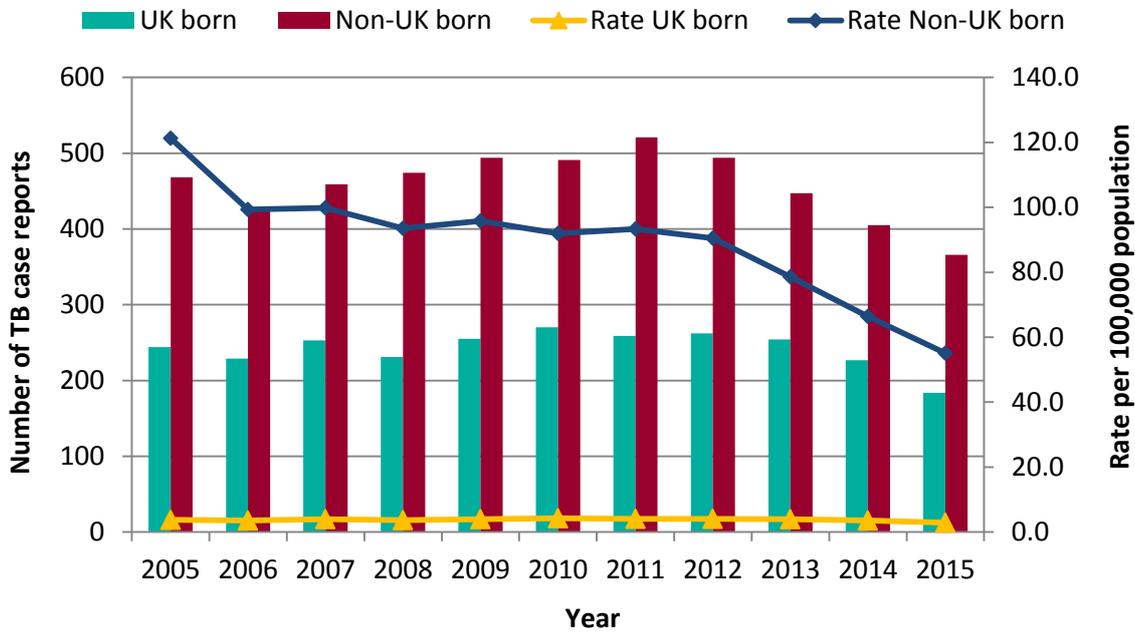
Place of birth and time since entry to the UK

In 2015, place of birth was known for 96% (550/570) of North West TB cases. Of these, 33% (184/550) were born in the UK; a similar proportion to previous years.

In 2015, the rate of TB among the non-UK born population was almost 20 times higher than the rate in the UK born, at 55.1 per 100,000 (Figure 5); a 17% decrease from the previous year (66.4 per 100,000 in 2014). The rate in the UK born population decreased by 19%, from 3.5 to 2.9 per 100,000.

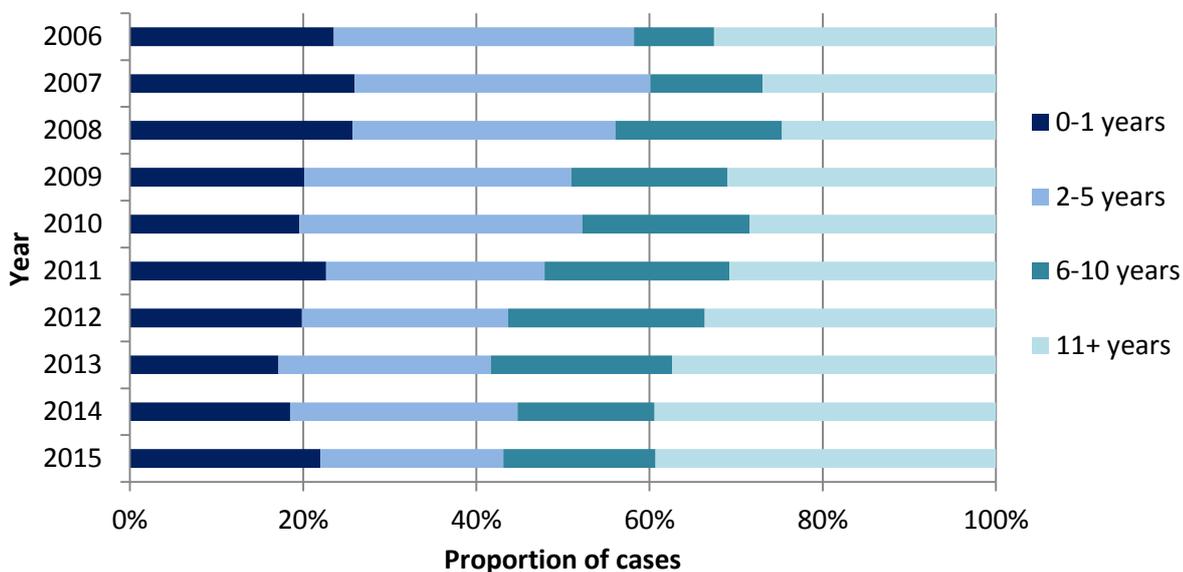
TB Monitoring Indicator 2: TB incidence in UK born and non-UK born populations (England)

Figure 5: TB case reports and rates by place of birth, North West, 2005 – 2015



Year of entry was reported for 93% (341/366 cases) of non-UK born cases in 2015. Of these, 39% (134/341) of cases were notified to TB surveillance 11 or more years after entering the UK (Figure 6). A further 22% were notified less than two years after entry and 21% were notified two to five years after entry; meaning that, overall, 45% were notified within five years of entering the UK.

Figure 6: Time between entry to the UK and TB notification for non-UK born cases by year, North West, 2006 – 2015



Approximately two in five non-UK born TB cases reported in the North West in 2015 were born in Pakistan; more than one fifth originated from India (Table 1).

Table 1: Most common countries of birth of non-UK born TB cases, North West, 2015

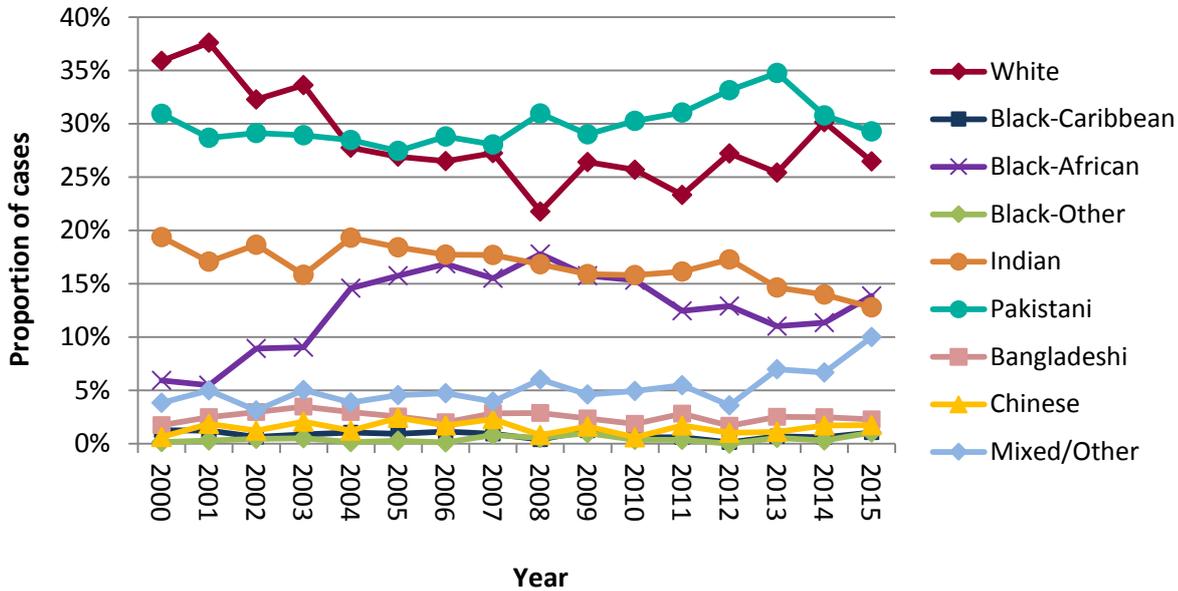
Country of birth	Number of cases	Proportion of cases
Pakistan	151	41%
India	79	22%
Somalia	13	4%
Nigeria	13	4%
Eritrea	13	4%
Bangladesh	9	2%
Zimbabwe	9	2%
Timor-Leste	8	2%
Poland	8	2%
Others (each < 2%)	61	17%
Total*	364	100%

*Where country of birth was known

Ethnic group

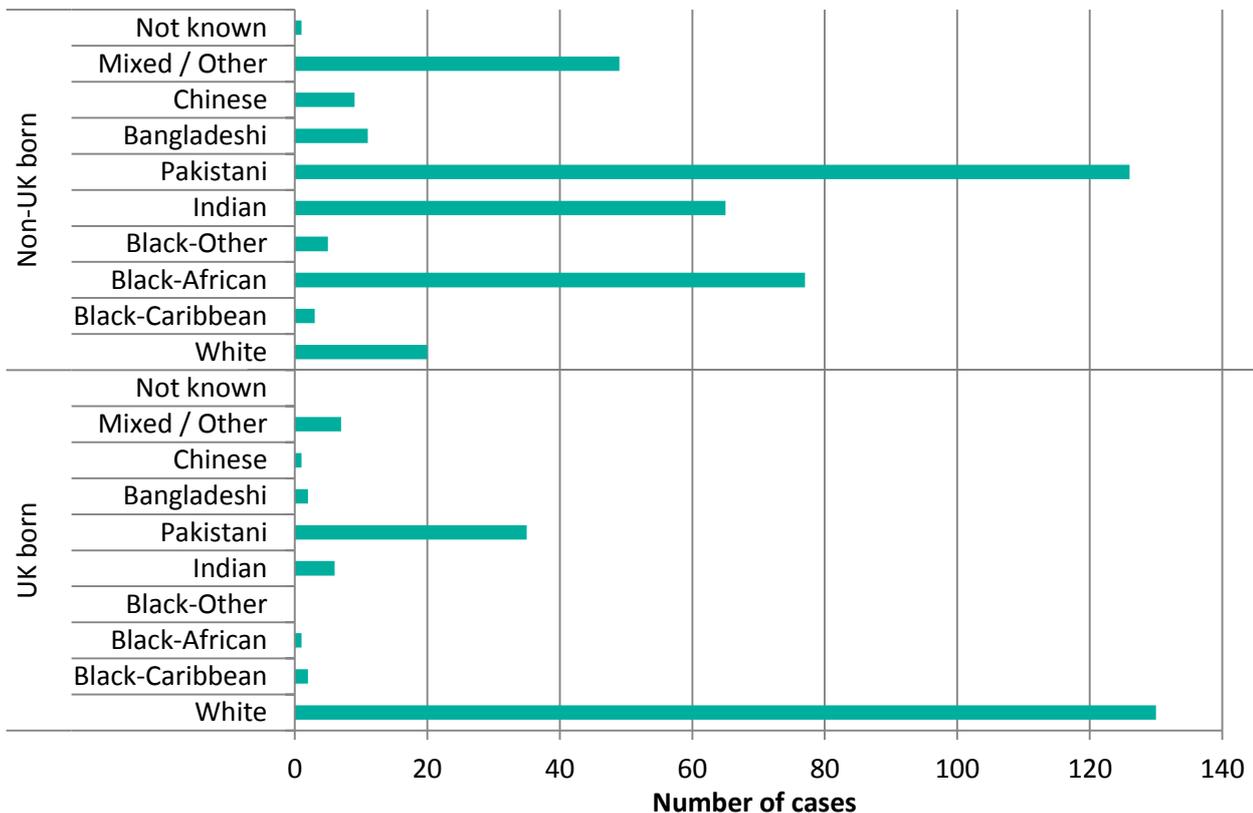
The most common ethnic groups among all tuberculosis cases in the North West were the Pakistani and White ethnic groups (Figure 7). The proportion of Pakistani, White and Indian cases decreased in 2015; whereas there were increases in the proportion of Black-African cases and cases with Mixed/Other ethnicity.

Figure 7: Proportion of TB cases by ethnic group, North West, 2000 – 2015



Of UK born TB cases in 2015, the greatest proportion (71%, 130/184) were in the White ethnic group (Figure 8). Among the non-UK born, 34% (126/366) were in the Pakistani ethnic group; 21% (77/366) were in the Black-African ethnic group; and 18% (71/39) were in the Indian ethnic group.

Figure 8: TB case numbers by ethnic group and place of birth, North West, 2015



Occupation

In 2015, information on occupation was known for 92% (426/465) of North West TB cases aged between 18 and 65 years. Of these, 38% (164/426) were not in education or employment; 9% (39/426) were healthcare workers; 6% (26/426) were either studying or working in education; and the remaining cases (46%, 197/426) were working in other occupations.

Clinical characteristics

Site of disease

In 2015, 53% of TB cases in North West England had pulmonary disease (Table 2). Of the 304 pulmonary cases, 234 (77%) were culture confirmed (compared with 73% in 2014). The next most common site was extra-thoracic lymph nodes, accounting for 22% of all cases.

Table 2: Site of disease of TB cases, North West, 2015

Site of disease*	Number of cases	Proportion of cases
Pulmonary	304	53%
Lymph nodes (extra-thoracic)	123	22%
IT lymph nodes	74	13%
Extra-pulmonary (unknown)	60	11%
Pleural	49	9%
Extra-pulmonary (other)	40	7%
Gastrointestinal	28	5%
Bone (spine)	22	4%
CNS meningitis	20	4%
Miliary	19	3%
Bone (other - not spine)	17	3%
Genitourinary	11	2%
CNS (other - not meningitis)	9	2%
Cryptic	6	1%
Laryngeal	2	> 1%

* With or without disease at another site

Previous diagnosis of tuberculosis

Information on previous history of TB was known for 93% (530/570) of North West cases in 2015. Of these, 7% (35/530) had received a previous diagnosis of TB; a similar proportion to previous years.

BCG vaccination

Information on BCG vaccination was available for 43% (246/570) of North West cases in 2015; 62% (153/246) of these had reportedly received BCG vaccination. Information on BCG vaccination was recorded for 65% (15/23) of cases aged 0-14 years; approximately half of which (8/15) had received BCG vaccination.*

* Information was recorded for 61% (22/36) of cases aged 0-17 years; 64% (14/22) of which had received BCG vaccination.

2. Laboratory confirmation of TB

Laboratory tests data collection

Data for all culture confirmed TB isolates from the Mycobacterium Reference Laboratories, including speciation, drug susceptibility testing and Mycobacterial Interspersed Repetitive Unit-Variable Number Tandem Repeats (MIRU-VNTR) typing were matched to TB case notifications, and the results were used to report culture confirmation. Results for microscopy, PCR and histology were also collected in ETS.¹

Sputum smear

Of the 304 pulmonary cases in the North West in 2015, 54% (163/304) had a sputum smear result reported; 65% (106/163) of which were positive. Ninety per cent (95/106) of pulmonary, sputum smear positive cases were also culture confirmed.

Culture confirmation and speciation

A total of 62% (355/570) of all cases in 2015, both pulmonary and extra-pulmonary, were confirmed by culture. Of the 304 pulmonary cases, 77% (234/304) were culture confirmed; compared with 45% (121/266) of extra-pulmonary cases.

Among all culture confirmed cases, 98% (348/355) were identified with *Mycobacterium tuberculosis* (*M. tuberculosis*) infection; 1.1% (4/355) with *Mycobacterium bovis* (*M. bovis*)

and 0.8% (3/355) with *Mycobacterium africanum* (*M. africanum*). There were no cases of *Mycobacterium microti* or *Mycobacterium tuberculosis complex* recorded in 2015.

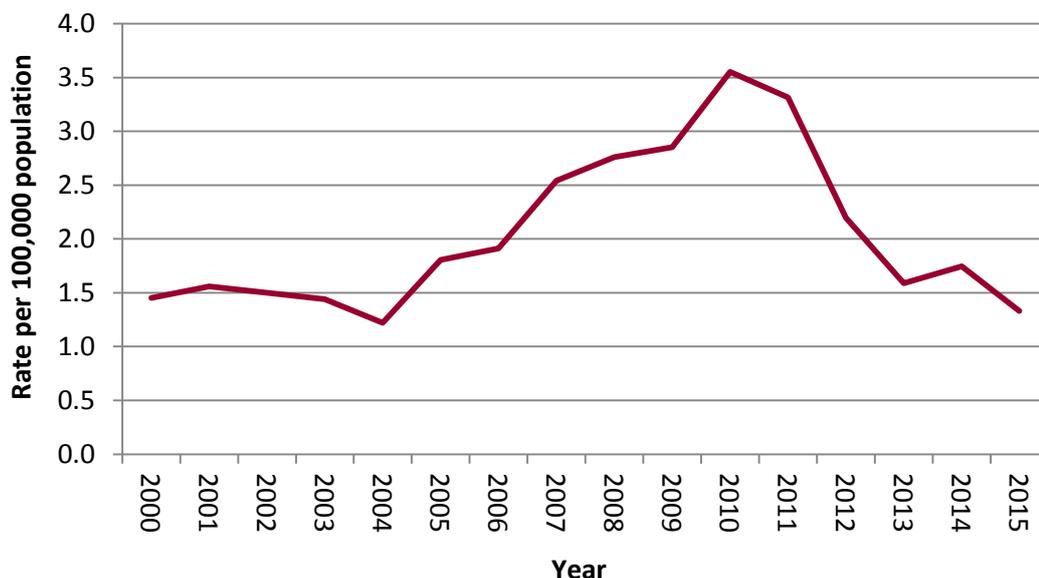
3. TB transmission

Incidence of TB in UK born children

The incidence of TB in children is considered to be an acceptable, indirect indicator of recent transmission within communities. In the North West, the rate of TB in UK born children under 15 years of age was 1.3 per 100,000 in 2015, lower than in the previous year (1.7 per 100,000 in 2014). This continues the overall decrease since the peak of 3.6 per 100,000 in 2010 (Figure 9) and remains lower than the national rate of 1.8 per 100,000.¹

TB Monitoring Indicator 5: Incidence of TB in UK born children aged under fifteen years

Figure 9: Incidence of TB in UK born children*, North West, 2000 – 2015



* Aged 0-14 years

Strain typing and clustering

The PHE National Strain Typing Service was established in January 2010. All TB isolates were typed using 24 loci mycobacterial interspersed repetitive unit-variable number tandem repeats (MIRU-VNTR) at the National Mycobacterium Reference Laboratory (NMRL). Cases with an identical strain pattern are considered clustered.² Many clusters

occur among household and social contacts; but clustering in strain patterns may identify links between cases that would otherwise appear unrelated. However, it is important to bear in mind that not all clusters identified by strain typing can be linked epidemiologically. All cluster data shown below are for cases reported between 2010 and 2015.

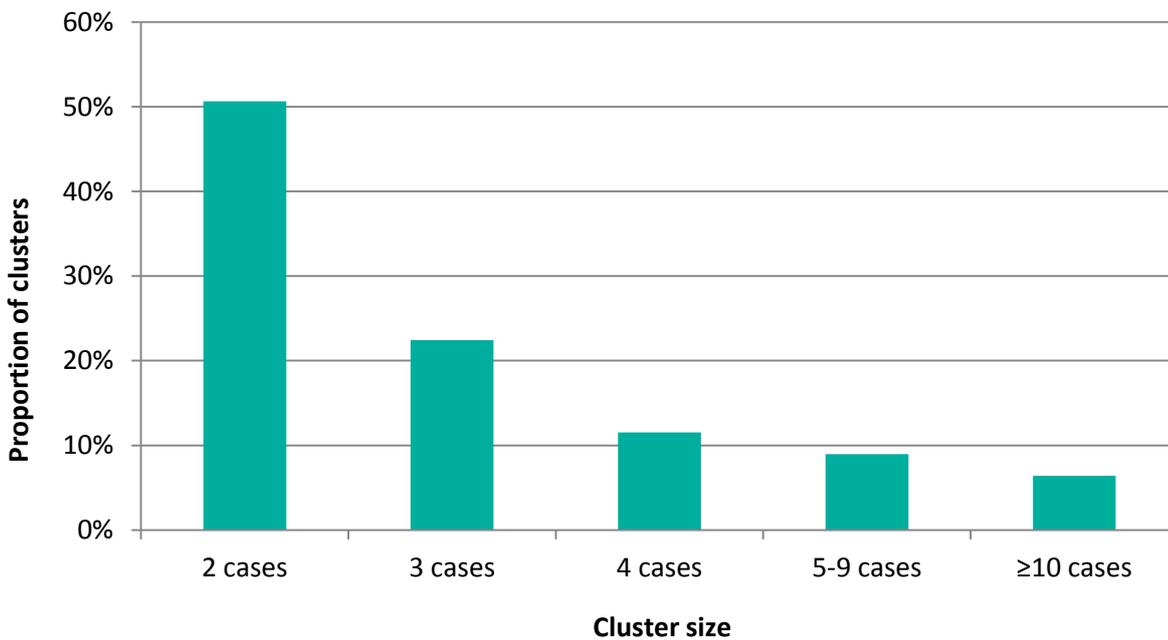
Proportion of cases clustered and geographical distribution

Between 2010 and 2015, 2,659 cases of TB were confirmed by culture in the North West. Of those, 69% (1,832/2,659) had a MIRU-VNTR profile with typing of at least 23 loci. Fifty-four per cent (991/1,832) were clustered with at least one other individual at UK level, and were linked to 508 national clusters; 34% (621/1,832) were clustered with other cases within the North West and comprised 156 different regional clusters.

Size of clusters

Of the 156 North West clusters in the period 2010 to 2015, 85% (132/156) consisted of fewer than five cases; 9% (14/156) had five to nine cases; and 6% (10/156) comprised ten or more cases (Figure 10). The median cluster size was two cases (range 2 to 32 cases).

Figure 10: Proportion of regional TB clusters by size, North West, 2010 – 2015



Cluster lineage

In the period 2010 to 2015, 53% (329/621) of cases in North West clusters had strains of Euro-American lineage; 31% (190/621) were of Central Asian lineage; 3% (17/621) were of East African Indian lineage; and 3% (20/621) were of Beijing lineage. Thirty-

nine per cent (329/841) of all cases infected with the Euro-American lineage were in North West clusters, as were a third of all culture confirmed cases in the North West which had at least 23 loci identified (Table 3).

Table 3 Lineage of TB clusters, North West, 2010 – 2015

Lineage	Number of cases*	Number of cases clustered	Proportion of cases clustered
Euro-American	841	329	39%
Central Asian	534	190	36%
East African Indian	150	17	11%
Beijing	67	20	30%
Other**	240	65	27%
Total	1832	621	34%

* Number of culture confirmed cases with at least 23 loci

** Including *M. bovis* cases, *M. africanum* cases, cases with multiple lineages and cases with no known lineage

Most cases with East African Indian lineage were born outside the UK (94%, 16/17); as were those of Beijing (90%, 18/20) and Central Asian (68%, 129/190) lineage. Seventy-one per cent (233/329) of those with Euro-American lineage were UK born; as were all four *M. bovis* cases. Ninety per cent (295/329) of cases in North West clusters which had Euro-American lineage had pulmonary disease.

Characteristics of cases in clusters*

Of the 621 clustered North West cases notified between 2010 and 2015, 63% (391/619) were male and 59% (366/621) were aged 15 to 44 years. Children aged under 15 years comprised just 3% (20/621) of clustered cases.

Over half (56%, 333/600) of clustered cases were UK born. Of those which were born outside the UK, 50% (121/243) were notified within five years of entering the UK and 31% (75/243) were notified more than ten years after entry.

The majority of clustered North West cases notified between 2010 and 2015 were in the White ethnic group (43%, 255/589) and over one quarter (28%, 166/589) were in the Pakistani ethnic group.

Seventy-nine per cent (489/621) of clustered cases had pulmonary TB. Of those, only 36% (177/489) were smear positive; however, this figure is distorted by the fact that sputum smear results were missing for 48% (237/489) of pulmonary cases. Seven per cent (38/555) of clustered cases had received a previous diagnosis of TB.

Twenty-three per cent (111/480) of clustered cases had at least one social risk factor (current or previous history of prison, homelessness, alcohol use and/or drug use); however, over three quarters (77%, 369/480) recorded having no social risk factors.

Isoniazid resistance was observed in 4% (23/621) of clustered North West cases between 2010 and 2015, and multi-drug resistant (MDR-TB) cases comprised 0.5% (3/621) of clustered cases.

* Cases with missing or unknown information are excluded from denominators unless otherwise specified.

4. Delay from onset of symptoms to start of treatment

Time symptomatic

The time between onset of symptoms and starting treatment was available for 90% of North West cases notified in 2015. The median number of days was 134 (Table 4). This was lower among those with pulmonary disease at 105 days, and higher among extra-pulmonary cases at 111 days. Among pulmonary cases, 40% (108/268) were treated within two months of symptom onset, and 71% (190/268) were treated within four months.

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

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

Table 4: Time between symptom onset and treatment start*, North West, 2015

	Median days (IQR)	0-2 months		2-4 months		>4 months	
		n	%	n	%	n	%
Extra-pulmonary	111 (55-199)	77	32%	74	30%	92	38%
Pulmonary	105 (50-198)	108	40%	82	31%	78	29%
Pulmonary smear positive	79 (32-177)	49	49%	23	23%	27	27%
All Cases	134 (65-228)	185	36%	156	31%	170	33%

* Excluding asymptomatic cases, and those with missing onset dates

Characteristics of pulmonary TB cases with a delay from onset of symptoms to treatment of more than four months

Among pulmonary cases, treatment delays of more than four months occurred in 30% of males and 27% of females. A greater proportion of cases were in older age groups: 11% in the 0-14 age group compared with 26% for those aged 15-44, 39% for those aged 45-64, and 29% for those aged 65 years and over. There was also a greater proportion of UK born cases with a treatment delay of more than four months: 36% compared with 24% of non-UK born cases.

5. TB outcome in drug sensitive cohort

Drug sensitive cohort

For the purposes of TB outcome reporting, the drug sensitive cohort excludes all TB cases with rifampicin resistant TB (initial or amplified) including MDR-TB (initial or amplified), and non-culture confirmed cases treated as 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. For TB outcomes in the drug resistant cohort, see Chapter 6.

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

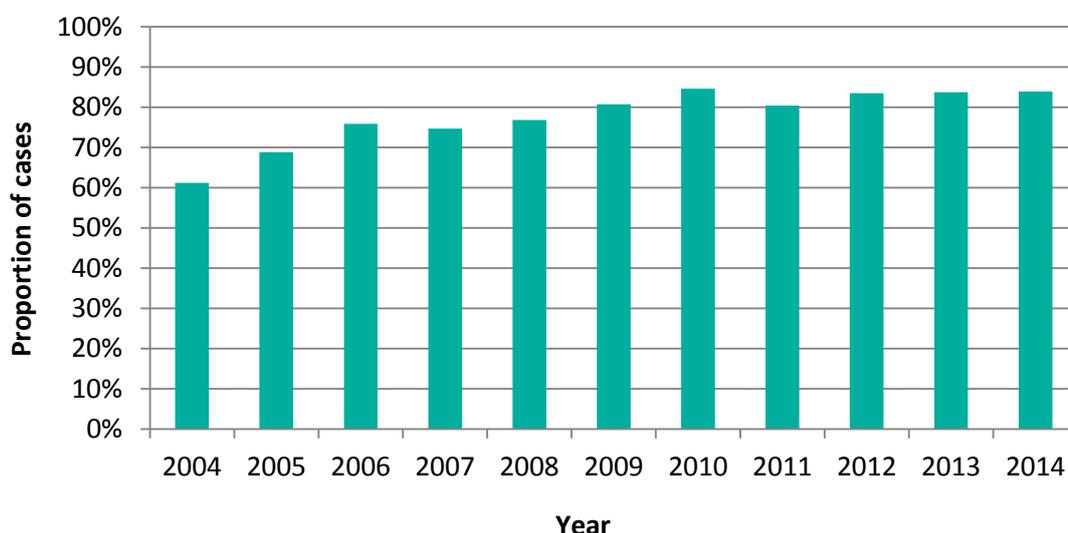
- for cases with an expected treatment duration of less than 12 months, TB outcomes at 12 months are reported. This group excludes cases with CNS (central nervous system) disease, who have an expected treatment duration of 12 months. In addition, those with spinal, cryptic disseminated or miliary disease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

1: Outcomes for TB cases with expected duration of treatment less than 12 months

In 2014, 643 TB cases were notified in the North West; 87% (560/643) of which were expected to complete treatment within 12 months (excluding rifampicin resistant TB and cases with CNS, spinal, miliary or cryptic disseminated disease). Treatment completion

for this group improved from 61% in 2004 to 85% in 2010, and has since remained fairly stable at 80-84% (Figure 11).

Figure 11: Treatment completion at 12 months for drug sensitive cases with expected treatment duration of 12 months, North West, 2004 – 2014*



* Excludes rifampicin resistant TB, and cases with CNS, spinal, miliary or cryptic disseminated disease

In 2014, 84% (470/560) of cases in this group completed treatment at 12 months (Table 5), compared with 84% (542/647) in 2013. The most common reasons for not completing treatment were death (8%, 42/560) and still being on treatment (4%, 25/560).

Table 5: TB outcome at 12 months for drug sensitive cases with expected treatment duration of 12 months, North West, cases diagnosed in 2014*

TB outcome	n	%
Treatment completed	470	84%
Died	42	8%
Lost to follow up	14	3%
Still on treatment	25	4%
Treatment stopped	6	1%
Not evaluated**	3	1%
Total	560	100%

* Excludes initial and amplified to rifampicin resistant TB and MDR-TB cases and MDR-TB treated cases and those with CNS, spinal, miliary or cryptic disseminated TB

** Not evaluated includes missing, unknown and transferred out

Of the 42 deaths, the relationship between TB and death was unknown for 67% (28/42). Among the 14 cases for which information was recorded, TB caused one death; contributed to five; and was incidental to eight.

The median age of those who died was 75; fourteen cases (33%) were diagnosed at post-mortem. Older cases were less likely to complete treatment: 66% (66/100) of those aged 65 years or older completed treatment within twelve months, compared with 83-90% of cases in the other age groups. The 65 years and over age group also had a higher proportion of cases who died (28%, 28/100).

Treatment completion was 87% (300/343) among the non-UK born, compared to 80% (169/211) among the UK born. A greater proportion of UK born cases died before completing treatment (11%, 24/211) than those born abroad (4%, 14/343). Eighty-nine per cent of cases with no recorded risk factors completed treatment within twelve months, compared with 69% of cases with known risk factors.

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

Of the 74 cases with CNS, spinal, miliary or cryptic disseminated disease in 2014, 68% (50/74) had completed treatment at the last recorded outcome (Table 6). 58% (43/74) completed treatment within 12 months, while 14% (10/74) remained on treatment. Nine per cent (7/74) completed treatment in more than 12 months.

Table 6: TB outcome at last recorded outcome for drug sensitive cohort with CNS, spinal, miliary or cryptic disseminated disease, North West, cases diagnosed in 2014*

TB outcome	n	%
Treatment completed	50	68%
Died	13	18%
Lost to follow up	4	5%
Still on treatment	3	4%
Treatment stopped	3	4%
Not evaluated**	1	1%
Total	74	100%

* Excludes initial and amplified to rifampicin resistant TB and MDR-TB cases and MDR-TB treated cases and only includes drug sensitive cases with CNS, spinal, miliary or cryptic disseminated TB

** Not evaluated includes missing, unknown and transferred out

Four per cent (3/74) were still on treatment at last recorded outcome; 4% (3/74) had treatment stopped; 18% (13/74) died; and 5% (4/74) were lost to follow up. One case was classified as 'not evaluated' due to missing or incorrect outcome information. Of the 13 deaths, TB was a contributing factor in two cases, and was incidental in two cases. In nine cases, the relationship between TB and death was unknown.

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 remained fairly stable from 2004 to 2013, ranging from 5% to 7% overall; although in 2014, this increased slightly to 9%. Of the 634 drug sensitive cases notified in 2014, 56 cases (9%) died. Of these, the relationship between TB and death was unknown for 66% (37/56). TB was incidental to 20% (11/56) of deaths; contributed to 13% (7/56) of deaths; and caused 2% (1/56) of deaths. Seventy-one per cent of deaths were in cases aged 65 years and over.

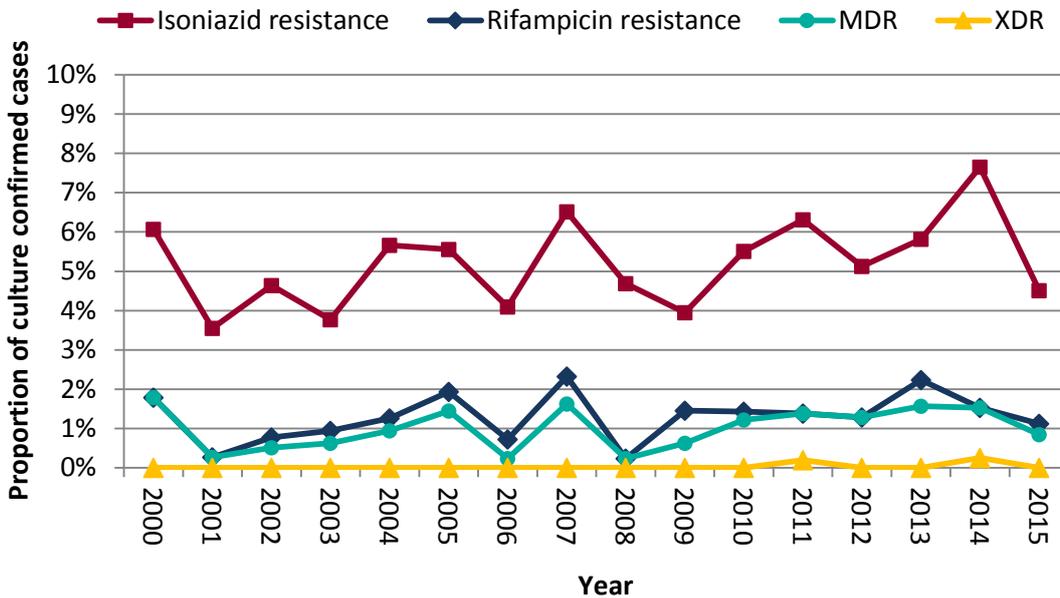
The proportion of drug sensitive cases that were lost to follow up at the last recorded outcome has remained reasonably stable since 2004, ranging from 3% to 5% overall. Three per cent (18/634) of cases were lost to follow up in 2014. Of these, 89% (16/18) were born outside the UK; and 83% (15/18) had left the UK. Males accounted for 56% (10/18) of cases lost to follow up and 61% (11/18) were in the 15-44 age group.

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

Drug resistance

In 2015, 5% (17/355) of culture confirmed TB cases were resistant to one or more first line drugs. Five per cent (16/355 cases) had isoniazid resistance; a decrease from the previous year (8%, 30/392, in 2014). One per cent (4/355) were resistant to rifampicin; 1% (3/355) had MDR-TB (resistant to isoniazid and rifampicin). There were no cases of extensively drug resistant (XDR) TB in the North West in 2015 (Figure 12).

Figure 12: Proportion of drug resistant TB cases, North West, 2000 – 2015*



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

Two of the resistant cases reported a previous history of TB treatment. Most drug resistant cases were male (53%, 9/17), and most were aged between 15 and 44 years old (76%, 13/17). Over half had pulmonary disease (65%, 11/17); and, of these, 27% (3/11) had a positive sputum smear result. Of the three MDR-TB cases, two had pulmonary disease, and all three were non-UK born males in the 15-44 years age group.

Of drug resistant cases notified in 2014, 63% (19/30) had completed treatment at the last recorded outcome, compared with 83% (24/29) in 2013. The most common reasons for not completing treatment were still being on treatment (20%, 6/30) and death (7%, 2/30).

TB outcome at 24 months for cases with rifampicin resistant disease

In 2013, ten cases had rifampicin resistant TB and 70% (7/10) of these cases had MDR-TB. All seven MDR cases were male; five were in the 15-44 years age group; and four were born outside the UK.

At 12 months, one of the ten rifampicin resistant cases had completed treatment; six were still on treatment; two were deceased; and one was lost to follow up. Of the six that were still on treatment, 24 month outcomes showed that three cases completed treatment; two remained on treatment; and one had stopped treatment (Table 7).

Table 7: TB outcome at 24 months for cases with rifampicin resistant disease, North West, cases diagnosed in 2013

TB outcome	n	%
Treatment completed	3	30%
Died	0	0%
Lost to follow up	0	0%
Still on treatment	2	20%
Treatment stopped	1	10%
Total	6	100%

7. TB in under-served populations

Social risk factors

Information on social risk factors (homelessness, drug and alcohol misuse and imprisonment) has been available since 2009. In 2015, information on social risk factors was recorded for 78% (426/547) of TB cases in the North West aged 15 years and over, and 14% (59/426) of these cases had at least one social risk factor (Table 8). Where information on individual risk factors was known, 6% (25/441) reported imprisonment, 5% (26/487) reported alcohol misuse, 4% (19/473) reported drug use and 4% (20/478) reported homelessness.

TB Monitoring Indicator 17: Proportion of drug sensitive TB cases with at least one social risk factor who completed treatment within 12 months (England and PHEC)

Table 8: Social risk factors among TB cases*, North West, 2009 – 2015

Risk Factor	2009		2010		2011		2012		2013		2014		2015	
	n	%												
At least one risk factor	51	12%	54	11%	54	11%	56	10%	52	9%	51	11%	59	14%
Drug use	16	3%	19	3%	16	3%	21	4%	18	3%	17	3%	19	4%
Alcohol use	27	5%	24	4%	23	4%	23	4%	27	4%	20	4%	26	5%
Homelessness	16	3%	21	4%	17	3%	11	2%	24	4%	24	4%	20	4%
Prison	18	4%	22	4%	23	4%	24	4%	21	4%	21	4%	25	6%

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

The majority of cases with at least one social risk factor were male (81%, 48/59) and 58% (34/59) were in the 15 to 44 years age group. Over two-thirds of cases (71%, 41/58) with

at least one social risk factor were UK born; a similar proportion to previous years (67%, 34/51, in 2014). Among UK born cases, 93% (38/41) of cases with at least one social risk factor were in the White ethnic group. In non-UK born cases, the highest proportions were in the Black-African ethnic group (53%, 9/17) and the White ethnic group (24%, 4/17).

Fifty-six per cent (29/52) of cases with at least one social risk factor received directly observed therapy (DOT) in 2015 (for cases where use of DOT was recorded). Of those, 62% (18/29) had current or previous history of alcohol use; 52% (15/29) had current or previous drug use; 41% (12/29) had current or previous imprisonment; and 31% (9/29) had current or previous homelessness. Sixty-six per cent (19/29) of cases receiving DOT had more than one social risk factor recorded.

A higher proportion of drug sensitive cases with at least one social risk factor notified in 2014 had been lost to follow-up at the last recorded outcome (6%, 3/50) compared to cases with no social risk factors (2%, 8/450). Twelve per cent (6/50) of cases with at least one risk factor died, compared with 6% (27/450) of cases with no social risk factors.

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

HIV testing

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

Information on HIV testing was available for 87% (464/531) of North West cases reported in 2015 (with previously unknown HIV status and excluding those diagnosed post-mortem). Of these, 95% (440/464) were offered and received an HIV test; an increase since 2012 (84%). Four per cent (17/464) of cases were not offered a test and 2% (7/464) were offered a test but did not receive it; of which 43% (3 cases) refused testing.

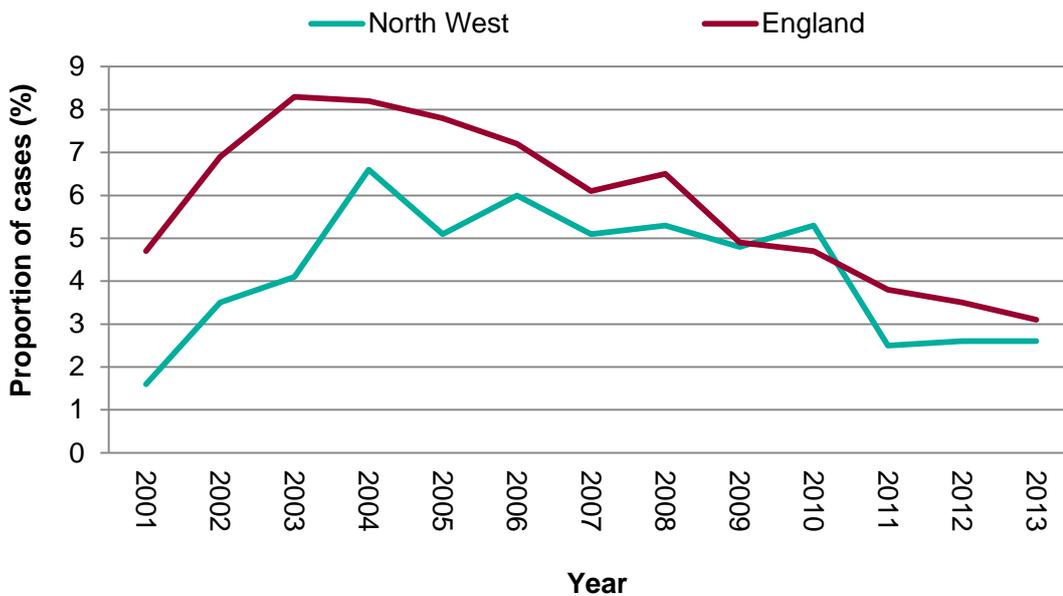
UK born cases were slightly less likely to be offered a test (95%, 148/156) compared with non-UK born cases (97%, 291/299). Cases in certain age groups were also less likely to be offered a test: 87% of cases in the 15-44 and 45-64 years age groups were offered an HIV test, compared with 67% (46/69) of cases aged 65 years and over and 77% (17/22) of cases aged 0-14 years.

Information on HIV testing also varied by geographical area. In areas of the North West with the highest TB incidence, the proportion of cases with completed HIV testing information varied from 84% (36/43) in Bolton to 100% in Blackburn with Darwen (35/35) and Pendle (12/12). In 21 of the 36 local authorities where TB was notified in 2015, 100% of eligible cases were offered an HIV test.

TB-HIV co-infection

The proportion of North West TB cases co-infected with HIV has generally declined since 2004, in line with the national trend (Figure 14).¹ In 2013 (the latest year for which data are available), 2.6% of North West TB cases aged 15 years and over were co-infected with HIV, compared with 3.1% of cases across England.

Figure 14: Proportion of TB cases with HIV co-infection, North West and England, 2001 – 2013



9. Latent TB infection testing and treatment

A national programme of latent TB infection (LTBI) testing and treatment for new entrants has begun phased implementation in seven CCGs in the North West: Blackburn with Darwen, Bolton, Central Manchester, East Lancashire, Liverpool, North Manchester and Oldham. Further information on this programme is presented in Public Health England’s *Tuberculosis in England: 2016 report*.¹

Discussion

Numbers and rates of TB in North West England have decreased each year since 2011, and rates remain lower than at national level. The regional rate decreased by 11% between 2014 and 2015, reflecting a decrease of 10% among non-UK born TB cases and 19% among the UK born. In the North West, rates are falling markedly in the non-UK born population, but also in the UK born population. The number of cases with social risk factors has changed little. The North West remains among the higher incidence regions in England, with 2015 rates ranked the third highest of all regions outside London.¹

While most cases were born abroad (and rates were highest in Black-African and Pakistani ethnic groups), the ethnic groups with the highest proportion of total cases were the Pakistani and White ethnic groups. Of cases born abroad who were notified in 2015, the greatest proportion had been resident in the UK for at least 11 years. This shows the importance of timely identification and treatment of migrants from high incidence TB countries who have latent TB infection, in order to prevent the future development of active TB disease.

Rates across most age groups decreased in 2015, with the largest decrease seen in the 65+ years age group. The rate in the 0-14 age group decreased overall, reflecting a parallel decrease in the rate among UK born children.

More than half of pulmonary cases in 2015 had a sputum smear result; an improvement on previous years. This is an important indication of infectiousness, and should be obtained for all cases where possible.

From 2011 to 2015, 54% of strain typed cases in the North West were found to cluster genetically with at least one other case at UK level; 34% were clustered with other cases within the North West. More than half of North West clusters consisted of only two people and the largest North West cluster during this period comprised 32 people.

More than two-thirds of pulmonary cases in the North West started TB treatment within four months of symptom onset; however, this means that almost a third of cases started treatment more than four months after symptom onset, which may have increased the opportunity for TB transmission.

The proportion of drug sensitive (and non-CNS, spinal, miliary or cryptic disseminated) TB cases in the North West completing treatment within 12 months remained stable at 84% since 2012. One of the most commonly reported reasons for not completing treatment was death; but, for most of these cases, information on the relationship between TB and death was unknown. This information is important to determine if these deaths were preventable.

UK born cases were more likely to have social risk factors, resulting in poorer recognition of symptoms and difficulties accessing healthcare; and highlighting the need for extra support for vulnerable cases with complex needs. Delays in diagnosis could lead to worse outcomes for a case and increased risk of transmission of infection to others.

Among cases that were offered HIV testing, uptake was 98% in 2015; 3% of cases were not offered a test. Some case groups including children (aged under 15 years) and those aged over 65 years, were less likely to be offered a test. Testing results were available for 88% of cases; and in 21 of the 36 local authorities where TB was notified in 2015, 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

Conclusions and recommendations

The rate of TB in the North West has decreased in recent years; however, further improvements in TB control are required to reduce the number of cases and improve case outcomes.

Key recommendations for the NHS and PHE derived from the data presented in this report include:

1. The NHS should ensure complete and accurate information is recorded on the PHE Enhanced TB Surveillance (ETS) system, so that high quality surveillance data is available.
2. The NHS should continue to report treatment outcome for all cases, and review the reasons for low completion in some areas.
3. The NHS should offer HIV testing for all those diagnosed with tuberculosis; and ensure that tests are done in line with national guidance.⁴
4. The NHS should make every effort to increase the proportion of pulmonary cases with a sputum smear result to enable better TB control.
5. PHE should 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.
6. Commissioners should ensure TB services are commissioned in line with the Department of Health's toolkit and NICE TB guidelines; and consider collaborative commissioning for TB services across large geographical footprints, in order to ensure sufficient capacity and expertise are available for a high quality TB service.
7. The *Collaborative Tuberculosis Strategy for England 2015 to 2020*⁶ sets out the improvements that need to be achieved to bring about a sustained decline in TB in England; and the mechanism by which these improvements should be achieved. The

North West TB Control Board (which covers Greater Manchester, Cumbria and Lancashire and 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 PHE's TB Strategy Monitoring Indicators Tool⁷ to track their performance and to support development of local TB action plans.

References

1. Public Health England. (2016) Tuberculosis in England: 2016. Public Health England: London.
<https://www.gov.uk/government/publications/tuberculosis-in-england-annual-report>.
2. Public Health England. TB Strain Typing Cluster Investigation Handbook, 3rd Edition, February 2014.
http://webarchive.nationalarchives.gov.uk/20140714084352/http://www.hpa.org.uk/webc/HPAwebFile/HPAweb_C/1317140774833.
3. World Health Organization. Definitions and reporting framework for tuberculosis – 2013 revision, updated December 2014. WHO 2013.
<http://www.who.int/tb/publications/definitions/en/>.
4. British HIV Association. UK National Guidelines for HIV Testing. September 2008
<http://www.bhiva.org/documents/guidelines/testing/glineshivtest08.pdf>.
5. National Institute of Health and Clinical Excellence. Tuberculosis - full guideline [Internet]. NICE. January 2016, updated May 2016.
<https://www.nice.org.uk/guidance/ng33>.
6. Collaborative Tuberculosis Strategy for England: 2015 to 2020. January 2015. Public Health England.
<https://www.gov.uk/government/publications/collaborative-tuberculosis-strategy-for-england>.
7. Public Health England. TB Strategy Monitoring Indicators Tool.
<http://fingertips.phe.org.uk/profile/tb-monitoring>.

Appendix A: Description of data sources and definitions

Data sources

Data on tuberculosis cases in the North West are derived from the national Enhanced TB Surveillance (ETS) system. Data collected includes notification details, and demographic, clinical and microbiological information, including drug resistance and strain type, provided by the National Mycobacterium Reference Laboratory (NMRL).

Treatment outcome

Information on treatment outcomes are reported for all cases reported in the previous year, excluding those with known rifampicin resistant disease (treatment outcomes for these cases are reported at 24 months). Definitions for treatment outcome are based on World Health Organization and European definitions, adapted to the UK context. In this report, all data were obtained from the ETS matched dataset provided in August 2016.

Population denominator

Tuberculosis rates by geographical area, age, sex and place of birth were calculated using ONS mid-year population estimates.

Cluster definitions

Strain typing was performed at the TB reference laboratories using 24 MIRU-VNTR profiling. Analysis was undertaken on strain type clusters defined as two or more people with TB caused by indistinguishable strains, with at least 23 complete VNTR loci.

Appendix B: TB among North West residents

Table Bi: TB case numbers by local authority of residence, North West, 2006 – 2015

Local Authority	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Allerdale	0	3	1	0	1	0	2	2	4	2
Barrow-in-Furness	0	7	1	2	4	4	5	2	1	2
Blackburn with Darwen	53	49	53	62	74	42	56	59	34	35
Blackpool	9	11	16	11	12	31	20	12	19	9
Bolton	72	62	63	75	66	61	47	58	56	43
Burnley	15	9	3	15	10	13	11	9	2	3
Bury	5	11	8	24	14	21	23	16	25	17
Carlisle	1	5	2	0	0	1	12	4	1	3
Cheshire East	11	4	9	6	8	12	9	21	12	18
Cheshire West and Chester	16	10	5	8	10	8	8	11	12	11
Chorley	5	0	1	2	1	3	9	6	5	2
Copeland	0	1	0	0	2	0	2	2	0	1
Eden	0	3	2	0	0	0	1	1	1	0
Fylde	4	2	1	8	2	1	2	2	3	1
Halton	5	3	1	2	2	0	0	2	5	2
Hyndburn	11	22	26	11	6	11	9	14	4	9
Knowsley	8	0	4	4	3	5	2	5	3	2
Lancaster	3	1	0	1	8	8	8	4	5	1
Liverpool	58	44	50	45	61	42	48	41	36	43
Manchester	161	175	171	203	198	220	181	166	135	122
Oldham	44	41	46	36	52	46	50	43	53	54
Pendle	25	28	19	27	19	25	18	19	15	12
Preston	22	36	33	23	33	46	35	28	22	17
Ribble Valley	3	5	3	4	0	1	1	2	1	0
Rochdale	32	43	51	47	41	42	35	23	39	25
Rossendale	5	4	2	2	5	1	2	3	4	4
Salford	26	27	34	29	36	24	24	30	26	32
Sefton	9	6	12	9	10	7	17	6	9	6
South Lakeland	1	4	2	5	4	6	7	3	7	0
South Ribble	1	3	3	4	3	9	2	4	6	4
St. Helens	0	4	4	2	4	5	5	3	5	2
Stockport	18	22	24	14	10	28	15	16	19	14
Tameside	18	21	29	46	35	33	34	22	19	17
Trafford	16	29	19	31	23	27	39	31	26	22
Warrington	4	9	9	12	12	6	9	14	9	8
West Lancashire	2	1	2	1	4	1	1	2	3	2
Wigan	13	11	9	16	15	9	7	14	11	14
Wirral	15	16	10	10	16	10	11	11	6	10
Wyre	3	2	2	2	5	9	8	5	0	1
Cheshire and Merseyside	126	96	104	98	126	95	109	114	97	102
Cumbria and Lancashire	163	196	172	180	193	212	211	183	137	108
Greater Manchester	405	442	454	521	490	511	455	419	409	360
NORTH WEST	694	734	730	799	809	818	775	716	643	570

Table Bii: TB rate per 100,000 population by local authority of residence, North West, 2006 – 2015

Local Authority	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Allerdale	0.0	3.1	1.0	0.0	1.0	0.0	2.1	2.1	4.1	2.1
Barrow-in-Furness	0.0	10.0	1.4	2.9	5.8	5.8	7.3	2.9	1.5	3.0
Blackburn with Darwen	37.0	34.0	36.6	42.4	50.4	28.4	37.9	40.0	23.2	23.8
Blackpool	6.3	7.7	11.2	7.7	8.4	21.8	14.1	8.5	13.5	6.4
Bolton	27.0	23.1	23.3	27.5	24.0	22.0	16.8	20.7	20.0	15.3
Burnley	17.1	10.3	3.4	17.2	11.5	14.9	12.6	10.4	2.3	3.4
Bury	2.8	6.0	4.4	13.1	7.6	11.3	12.4	8.6	13.3	9.0
Carlisle	0.9	4.7	1.9	0.0	0.0	0.9	11.1	3.7	0.9	2.8
Cheshire East	3.0	1.1	2.5	1.6	2.2	3.2	2.4	5.6	3.2	4.8
Cheshire West and Chester	4.9	3.0	1.5	2.4	3.0	2.4	2.4	3.3	3.6	3.3
Chorley	4.8	0.0	0.9	1.9	0.9	2.8	8.3	5.4	4.5	1.8
Copeland	0.0	1.4	0.0	0.0	2.8	0.0	2.8	2.9	0.0	1.4
Eden	0.0	5.7	3.8	0.0	0.0	0.0	1.9	1.9	1.9	0.0
Fylde	5.3	2.7	1.3	10.6	2.6	1.3	2.6	2.6	3.9	1.3
Halton	4.1	2.5	0.8	1.6	1.6	0.0	0.0	1.6	4.0	1.6
Hyndburn	13.5	27.0	32.0	13.6	7.4	13.7	11.2	17.5	5.0	11.2
Knowsley	5.4	0.0	2.7	2.7	2.0	3.4	1.4	3.4	2.0	1.4
Lancaster	2.2	0.7	0.0	0.7	5.8	5.8	5.7	2.8	3.5	0.7
Liverpool	12.8	9.7	11.0	9.8	13.2	9.0	10.2	8.7	7.6	9.0
Manchester	34.7	37.2	35.8	42.0	40.2	43.7	35.4	32.3	26.0	23.0
Oldham	20.0	18.6	20.7	16.2	23.2	20.4	22.1	18.9	23.2	23.4
Pendle	28.2	31.5	21.3	30.2	21.3	27.9	20.1	21.1	16.7	13.3
Preston	16.0	26.0	23.8	16.7	23.8	32.8	24.9	19.9	15.7	12.0
Ribble Valley	5.3	8.8	5.2	7.0	0.0	1.7	1.7	3.5	1.7	0.0
Rochdale	15.4	20.6	24.3	22.4	19.5	19.8	16.5	10.8	18.3	11.7
Rossendale	7.6	6.0	3.0	3.0	7.4	1.5	2.9	4.4	5.8	5.8
Salford	11.7	12.1	15.0	12.7	15.5	10.2	10.1	12.6	10.7	13.0
Sefton	3.3	2.2	4.4	3.3	3.7	2.6	6.2	2.2	3.3	2.2
South Lakeland	1.0	3.8	1.9	4.8	3.8	5.8	6.8	2.9	6.8	0.0
South Ribble	0.9	2.8	2.8	3.7	2.8	8.2	1.8	3.7	5.5	3.6
St. Helens	0.0	2.3	2.3	1.1	2.3	2.9	2.8	1.7	2.8	1.1
Stockport	6.4	7.8	8.5	5.0	3.5	9.9	5.3	5.6	6.6	4.8
Tameside	8.4	9.8	13.4	21.2	16.0	15.0	15.4	10.0	8.6	7.7
Trafford	7.4	13.2	8.6	13.9	10.2	11.9	17.1	13.5	11.2	9.4
Warrington	2.1	4.6	4.5	6.0	6.0	3.0	4.4	6.8	4.4	3.9
West Lancashire	1.8	0.9	1.8	0.9	3.6	0.9	0.9	1.8	2.7	1.8
Wigan	4.2	3.6	2.9	5.1	4.7	2.8	2.2	4.4	3.4	4.3
Wirral	4.8	5.1	3.2	3.1	5.0	3.1	3.4	3.4	1.9	3.1
Wyre	2.8	1.8	1.8	1.9	4.6	8.4	7.4	4.6	0.0	0.9
Cheshire and Merseyside	5.3	4.0	4.4	4.1	5.2	3.9	4.5	4.7	4.0	4.2
Cumbria and Lancashire	8.4	10.1	8.8	9.2	9.9	10.8	10.7	9.3	7.0	5.5
Greater Manchester	15.7	17.0	17.3	19.7	18.4	19.0	16.8	15.4	15.0	13.1
NORTH WEST	10.1	10.6	10.5	11.4	11.5	11.6	10.9	10.1	9.0	7.9

Table Biii: TB case numbers and rates by age and sex, North West, 2015

Age Group	Female		Male	
	Number	Rate	Number	Rate
0-14	10	1.6	13	2.0
15-44	125	9.2	209	15.2
45-64	44	4.7	94	10.2
65+	35	4.9	40	6.8

Table Biv: Drug resistance among TB cases with culture confirmed disease, North West, 2006 – 2015

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Culture confirmed	415	430	427	481	490	507	468	447	392	355
Drug resistant*	19	31	21	23	28	32	24	29	30	17
% Drug resistant	5%	7%	5%	5%	6%	6%	5%	6%	8%	5%

* Resistance to at least one first-line drug (isoniazid, rifampicin, pyrazinamide or ethambutol)

Appendix C: All TB cases notified by North West clinics

Table Ci: Number of TB cases & pulmonary cases notified by North West hospitals, 2012 – 2015

Hospital/clinic	2012		2013		2014		2015	
	Total	Pulm	Total	Pulm	Total	Pulm	Total	Pulm
Alder Hey Children's Hospital	5	5	0	0	5	3	0	0
Arrowe Park Hospital	12	3	10	5	6	4	12	8
Blackpool Victoria Hospital	26	23	19	13	23	19	10	7
Broadgreen Hospital	0	0	0	0	1	1	0	0
Burnley General Hospital	7	2	0	0	0	0	0	0
Chorley & South Ribble Hospital	0	0	5	5	5	4	3	2
Countess of Chester Hospital	5	3	6	2	10	8	6	5
Cumberland Infirmary	14	7	7	5	4	1	5	5
Fairfield General Hospital	19	7	3	1	5	3	10	8
Furness General Hospital	12	9	4	1	7	5	2	1
Leighton Hospital	3	2	12	6	6	5	11	8
Liverpool Heart and Chest Hospital	10	8	8	3	4	3	4	1
Macclesfield District General Hospital	2	2	10	5	4	4	8	3
Manchester Royal Infirmary	133	49	120	39	100	43	101	38
North Manchester General Hospital	58	32	58	30	53	24	48	21
Ormskirk & District General Hospital	0	0	0	0	1	0	0	0
Rochdale Infirmary	24	10	26	14	44	27	22	14
Royal Blackburn Hospital	81	35	103	44	52	23	60	37
Royal Bolton Hospital	46	18	54	22	55	23	37	20
Royal Lancaster Infirmary	8	5	4	2	5	3	1	1
Royal Liverpool University Hospital	42	26	38	19	31	16	41	22
Royal Manchester Children's Hospital	21	10	13	10	12	7	13	9
Royal Oldham Hospital	40	26	32	17	40	17	38	24
Royal Preston Hospital	47	24	32	23	26	15	20	9
Salford Royal	23	11	26	7	26	11	31	9
Southport & Formby District General Hospital	7	7	4	2	4	4	2	1
Stepping Hill Hospital	9	4	11	7	10	6	10	6
Tameside General Hospital	26	15	17	9	13	11	12	8
Thomas Linacre Centre	6	4	13	8	11	7	13	7
Trafford General Hospital	14	6	15	11	15	10	7	5
University Hospital Aintree	6	2	6	6	7	5	6	6
Warrington Hospital	6	5	10	7	7	6	7	3
West Cumberland Hospital	3	1	1	0	2	1	1	1
Westmorland General Hospital	1	1	1	0	0	0	0	0
Whiston Hospital	5	2	8	6	9	7	4	3
Wythenshawe Hospital	46	22	27	17	35	23	19	8
North West	767	386	703	346	638	349	564	300

Table Cii: HIV testing (offered and uptake) of TB cases by North West hospital, 2015

Hospital/clinic	HIV status already known	Not offered	Offered and done	Offered but not done	Offered but refused	Not known	Total cases	Test offered/ status known*	Test done/ status known**
Arrove Park Hospital	0	0	12	0	0	0	12	100%	100%
Blackpool Victoria Hospital	0	2	6	0	0	2	10	75%	100%
Chorley & South Ribble Hospital	1	0	2	0	0	0	3	100%	100%
Countess of Chester Hospital	0	0	6	0	0	0	6	100%	100%
Cumberland Infirmary	0	0	5	0	0	0	5	100%	100%
Fairfield General Hospital	0	0	9	0	0	1	10	100%	100%
Furness General Hospital	0	0	0	0	0	2	2	-	-
Leighton Hospital	1	1	7	0	0	2	11	89%	100%
Liverpool Heart and Chest Hospital	0	1	3	0	0	0	4	75%	100%
Macclesfield District General Hospital	0	0	3	0	0	5	8	100%	100%
Manchester Royal Infirmary	1	3	82	0	0	15	101	97%	100%
North Manchester General Hospital	7	0	37	0	0	4	48	100%	100%
Rochdale Infirmary	0	1	18	0	0	3	22	95%	100%
Royal Blackburn Hospital	1	2	56	0	1	0	60	97%	98%
Royal Bolton Hospital	2	6	20	1	1	7	37	80%	92%
Royal Lancaster Infirmary	0	0	0	0	0	1	1	-	-
Royal Liverpool University Hospital	6	0	32	0	0	3	41	100%	100%
Royal Manchester Children's Hospital	0	1	10	0	0	2	13	91%	100%
Royal Oldham Hospital	0	1	32	0	0	5	38	97%	100%
Royal Preston Hospital	4	0	16	0	0	0	20	100%	100%
Salford Royal	1	1	22	0	0	7	31	96%	100%
Southport & Formby District General Hospital	0	0	2	0	0	0	2	100%	100%
Stepping Hill Hospital	1	1	5	0	0	3	10	86%	100%
Tameside General Hospital	1	0	8	0	0	3	12	100%	100%
Thomas Linacre Centre	1	0	9	2	0	1	13	100%	83%
Trafford General Hospital	0	0	7	0	0	0	7	100%	100%
University Hospital Aintree	0	1	3	0	1	1	6	80%	75%
Warrington Hospital	0	0	5	1	0	1	7	100%	83%
West Cumberland Hospital	0	0	1	0	0	0	1	100%	100%
Whiston Hospital	0	0	3	0	0	1	4	100%	100%
Wythenshawe Hospital	1	1	16	0	0	1	19	94%	100%
North West	28	22	437	4	3	70	564	96%	99%

*Of cases where testing status was known (excludes 'not known')

**Of cases where HIV testing was offered or status was already known

Table Ciii: Social risk factors* among TB cases by North West hospital, 2012 – 2015

Hospital/clinic	2012		2013		2014		2015	
	n	%	n	%	n	%	n	%
Alder Hey Children's Hospital	0	-	0	-	0	0%	0	-
Arrowe Park Hospital	0	0%	1	11%	1	20%	4	33%
Blackpool Victoria Hospital	1	8%	5	45%	6	33%	4	40%
Broadgreen Hospital	0	-	0	-	0	0%	0	-
Burnley General Hospital	0	0%	0	-	0	-	0	-
Chorley & South Ribble Hospital	0	-	1	33%	1	25%	1	33%
Countess of Chester Hospital	0	0%	0	0%	0	0%	0	0%
Cumberland Infirmary	1	7%	0	0%	0	0%	0	0%
Fairfield General Hospital	1	8%	0	0%	1	20%	1	13%
Furness General Hospital	2	67%	0	0%	1	17%	0	0%
Leighton Hospital	2	100%	0	0%	1	20%	0	0%
Liverpool Heart and Chest Hospital	2	22%	0	0%	0	0%	0	0%
Macclesfield District General Hospital	2	100%	0	0%	1	50%	0	0%
Manchester Royal Infirmary	1	1%	3	4%	5	9%	11	15%
North Manchester General Hospital	6	12%	3	8%	5	13%	4	11%
Ormskirk & District General Hospital	0	-	0	-	0	0%	0	-
Rochdale Infirmary	1	5%	2	9%	3	8%	2	10%
Royal Blackburn Hospital	2	5%	1	1%	1	2%	2	3%
Royal Bolton Hospital	2	5%	4	9%	1	2%	5	16%
Royal Lancaster Infirmary	2	33%	0	0%	1	25%	0	0%
Royal Liverpool University Hospital	9	22%	7	19%	5	19%	4	14%
Royal Manchester Children's Hospital	0	0%	0	0%	0	0%	0	-
Royal Oldham Hospital	3	9%	4	14%	5	16%	7	23%
Royal Preston Hospital	4	9%	5	18%	3	13%	4	20%
Salford Royal	5	29%	1	4%	3	13%	3	19%
Southport & Formby District General Hospital	2	33%	1	25%	0	0%	0	0%
Stepping Hill Hospital	1	33%	1	33%	0	0%	1	33%
Tameside General Hospital	3	23%	4	27%	0	0%	2	25%
Thomas Linacre Centre	1	17%	0	0%	0	0%	0	0%
Trafford General Hospital	0	0%	0	0%	0	0%	0	0%
University Hospital Aintree	0	0%	3	60%	2	33%	2	50%
Warrington Hospital	0	0%	2	25%	0	0%	1	17%
West Cumberland Hospital	0	0%	0	0%	0	0%	0	0%
Westmorland General Hospital	0	-	0	0%	0	-	0	-
Whiston Hospital	1	25%	2	25%	0	0%	0	0%
Wythenshawe Hospital	1	3%	0	0%	4	13%	1	7%
North West	55	10%	50	9%	50	10%	59	14%

* Social risk factors include homelessness, imprisonment, alcohol and drug misuse. Proportions are given for cases with any risk factor information recorded.

Table Civ: Sputum smear and culture confirmation of TB notifications by North West clinics, 2015

Hospital/clinic	Total pulmonary cases	Pulmonary with sputum smear		Pulmonary with positive sputum		Pulmonary with positive culture	
		n	%	n	%	n	%
Arrowe Park Hospital	8	5	63%	4	80%	8	100%
Blackpool Victoria Hospital	7	4	57%	3	75%	4	57%
Chorley & South Ribble Hospital	2	0	0%	0	-	2	100%
Countess of Chester Hospital	5	4	80%	0	0%	3	60%
Cumberland Infirmary	5	2	40%	2	100%	3	60%
Fairfield General Hospital	8	3	38%	2	67%	5	63%
Furness General Hospital	1	0	0%	0	-	1	100%
Leighton Hospital	8	2	25%	0	0%	3	38%
Liverpool Heart and Chest Hospital	1	1	100%	0	0%	1	100%
Macclesfield District General Hospital	3	3	100%	1	33%	3	100%
Manchester Royal Infirmary	38	20	53%	12	60%	30	79%
North Manchester General Hospital	21	11	52%	5	45%	18	86%
Rochdale Infirmary	14	7	50%	5	71%	10	71%
Royal Blackburn Hospital	37	23	62%	18	78%	28	76%
Royal Bolton Hospital	20	17	85%	14	82%	18	90%
Royal Lancaster Infirmary	1	1	100%	1	100%	1	100%
Royal Liverpool University Hospital	22	15	68%	6	40%	18	82%
Royal Manchester Children's Hospital	9	0	0%	0	-	3	33%
Royal Oldham Hospital	24	14	58%	12	86%	21	88%
Royal Preston Hospital	9	6	67%	4	67%	8	89%
Salford Royal	9	2	22%	1	50%	6	67%
Southport & Formby District General Hospital	1	0	0%	0	-	0	0%
Stepping Hill Hospital	6	3	50%	2	67%	6	100%
Tameside General Hospital	8	5	63%	5	100%	7	88%
Thomas Linacre Centre	7	4	57%	3	75%	5	71%
Trafford General Hospital	5	2	40%	1	50%	3	60%
University Hospital Aintree	6	3	50%	2	67%	6	100%
Warrington Hospital	3	0	0%	0	-	3	100%
West Cumberland Hospital	1	0	0%	0	-	0	0%
Whiston Hospital	3	1	33%	1	100%	2	67%
Wythenshawe Hospital	8	5	63%	2	40%	5	63%
North West	300	163	54%	106	65%	231	77%

Table Cv: Drug resistance of culture confirmed TB cases by North West clinics, 2015

Hospital/clinic	Resistance to any first line drug*		Isoniazid resistant		Multi-drug resistant	
	n	%	n	%	n	%
Arrowe Park Hospital	1	8%	1	8%	0	0%
Blackpool Victoria Hospital	1	20%	1	20%	1	20%
Chorley & South Ribble Hospital	0	0%	0	0%	0	0%
Countess of Chester Hospital	0	0%	0	0%	0	0%
Cumberland Infirmary	0	0%	0	0%	0	0%
Fairfield General Hospital	1	14%	1	14%	0	0%
Furness General Hospital	0	0%	0	0%	0	0%
Leighton Hospital	0	0%	0	0%	0	0%
Liverpool Heart and Chest Hospital	0	0%	0	0%	0	0%
Macclesfield District General Hospital	0	0%	0	0%	0	0%
Manchester Royal Infirmary	5	9%	5	9%	0	0%
North Manchester General Hospital	2	6%	1	3%	0	0%
Rochdale Infirmary	0	0%	0	0%	0	0%
Royal Blackburn Hospital	1	3%	1	3%	0	0%
Royal Bolton Hospital	1	4%	1	4%	0	0%
Royal Lancaster Infirmary	0	0%	0	0%	0	0%
Royal Liverpool University Hospital	1	4%	1	4%	1	4%
Royal Manchester Children's Hospital	0	0%	0	0%	0	0%
Royal Oldham Hospital	1	4%	1	4%	0	0%
Royal Preston Hospital	1	10%	1	10%	0	0%
Salford Royal	1	5%	1	5%	0	0%
Southport & Formby District General Hospital	0	0%	0	0%	0	0%
Stepping Hill Hospital	0	0%	0	0%	0	0%
Tameside General Hospital	0	0%	0	0%	0	0%
Thomas Linacre Centre	0	0%	0	0%	0	0%
Trafford General Hospital	1	25%	1	25%	1	25%
University Hospital Aintree	0	0%	0	0%	0	0%
Warrington Hospital	0	0%	0	0%	0	0%
Whiston Hospital	0	0%	0	0%	0	0%
Wythenshawe Hospital	0	0%	0	0%	0	0%
North West	17	5%	16	5%	3	1%

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

Table Cvi: Treatment status at 12 months of rifampicin sensitive, non-CNS, miliary, spinal or cryptic TB notifications by North West clinics, 2014*

Hospital/clinic	Total cases	Treatment completed	Still on treatment	Died	Lost to follow up	Treatment stopped	Not evaluated
Alder Hey Children's Hospital	4	100%	0%	0%	0%	0%	0%
Arrowe Park Hospital	3	33%	0%	67%	0%	0%	0%
Blackpool Victoria Hospital	22	64%	9%	23%	0%	5%	0%
Broadgreen Hospital	1	100%	0%	0%	0%	0%	0%
Chorley & South Ribble Hospital	5	80%	20%	0%	0%	0%	0%
Countess of Chester Hospital	10	80%	0%	20%	0%	0%	0%
Cumberland Infirmary	4	100%	0%	0%	0%	0%	0%
Fairfield General Hospital	4	50%	0%	25%	0%	25%	0%
Furness General Hospital	6	50%	17%	17%	0%	0%	17%
Leighton Hospital	6	100%	0%	0%	0%	0%	0%
Liverpool Heart and Chest Hospital	4	75%	25%	0%	0%	0%	0%
Macclesfield District General Hospital	3	67%	0%	33%	0%	0%	0%
Manchester Royal Infirmary	80	86%	3%	3%	6%	1%	1%
North Manchester General Hospital	37	89%	8%	3%	0%	0%	0%
Ormskirk & District General Hospital	1	100%	0%	0%	0%	0%	0%
Rochdale Infirmary	42	93%	0%	7%	0%	0%	0%
Royal Blackburn Hospital	49	90%	2%	8%	0%	0%	0%
Royal Bolton Hospital	53	92%	6%	0%	2%	0%	0%
Royal Lancaster Infirmary	5	80%	0%	20%	0%	0%	0%
Royal Liverpool University Hospital	24	79%	13%	4%	4%	0%	0%
Royal Manchester Children's Hospital	12	83%	8%	0%	8%	0%	0%
Royal Oldham Hospital	36	81%	3%	11%	0%	6%	0%
Royal Preston Hospital	24	75%	4%	8%	13%	0%	0%
Salford Royal	22	91%	5%	5%	0%	0%	0%
Southport & Formby District General Hospital	4	75%	0%	25%	0%	0%	0%
Stepping Hill Hospital	9	78%	11%	11%	0%	0%	0%
Tameside General Hospital	13	92%	0%	8%	0%	0%	0%
Thomas Linacre Centre	10	90%	0%	10%	0%	0%	0%
Trafford General Hospital	13	77%	8%	15%	0%	0%	0%
University Hospital Aintree	6	83%	0%	0%	17%	0%	0%
Warrington Hospital	6	83%	0%	17%	0%	0%	0%
West Cumberland Hospital	2	100%	0%	0%	0%	0%	0%
Whiston Hospital	9	56%	11%	33%	0%	0%	0%
Wythenshawe Hospital	29	83%	0%	3%	7%	3%	3%
North West	558	84%	4%	8%	3%	1%	1%

* Treatment status is collected one year after notification for rifampicin sensitive TB notifications. Shown are notifications for 2014, with outcomes collected one year later in 2015.

Table Cvii: Treatment status at 12 months of rifampicin sensitive, CNS, miliary, spinal or cryptic TB notifications by North West clinics, 2014*

Hospital/clinic	Total cases	Treatment completed	Still on treatment	Died	Lost to follow up	Treatment stopped	Not evaluated
Alder Hey Children's Hospital	1	100%	0%	0%	0%	0%	0%
Arrowe Park Hospital	1	0%	0%	100%	0%	0%	0%
Blackpool Victoria Hospital	1	0%	100%	0%	0%	0%	0%
Fairfield General Hospital	1	0%	0%	100%	0%	0%	0%
Furness General Hospital	1	0%	0%	100%	0%	0%	0%
Manchester Royal Infirmary	17	76%	0%	18%	6%	0%	0%
North Manchester General Hospital	15	87%	13%	0%	0%	0%	0%
Rochdale Infirmary	2	50%	50%	0%	0%	0%	0%
Royal Blackburn Hospital	3	67%	33%	0%	0%	0%	0%
Royal Bolton Hospital	2	100%	0%	0%	0%	0%	0%
Royal Liverpool University Hospital	5	20%	0%	20%	20%	20%	20%
Royal Oldham Hospital	4	25%	25%	0%	25%	25%	0%
Royal Preston Hospital	2	0%	0%	100%	0%	0%	0%
Salford Royal	4	25%	75%	0%	0%	0%	0%
Stepping Hill Hospital	1	0%	0%	100%	0%	0%	0%
Thomas Linacre Centre	1	100%	0%	0%	0%	0%	0%
Trafford General Hospital	2	50%	0%	0%	0%	50%	0%
University Hospital Aintree	1	0%	0%	100%	0%	0%	0%
Warrington Hospital	1	0%	0%	100%	0%	0%	0%
Wythenshawe Hospital	6	83%	0%	0%	17%	0%	0%
North West	71	59%	13%	17%	6%	4%	1%

* Treatment status is collected one year after notification for rifampicin sensitive TB notifications. Shown are notifications for 2014, with outcomes collected one year later in 2015.

Table Cviii: Treatment status at 24 months of rifampicin resistant TB notifications by North West clinics, 2013*

Hospital/clinic	Total cases	Treatment completed	Still on treatment	Treatment stopped	Not submitted
Arrowe Park Hospital	1	0%	0%	0%	100%
Macclesfield District General Hospital	1	0%	0%	0%	100%
Manchester Royal Infirmary	3	67%	33%	0%	0%
North Manchester General Hospital	2	50%	50%	0%	0%
Rochdale Infirmary	1	0%	0%	100%	0%
Royal Liverpool University Hospital	1	100%	0%	0%	0%
Tameside General Hospital	1	100%	0%	0%	0%
Trafford General Hospital	1	0%	0%	0%	100%
Warrington Hospital	1	0%	0%	0%	100%
North West	12	42%	17%	8%	33%

* Treatment status is collected two years after notification for rifampicin resistant TB notifications. Shown are notifications for 2013, with outcomes collected two years later in 2015.

Appendix D: Baseline data for TB strategy monitoring indicators, North West & England, 2000-2015

Year	Indicator 1: Overall TB incidence per 100,000 population			
	North West		England	
	Number of cases	Rate	Number of cases	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	569	8.3	6,929	13.8
2005	743	10.8	7,658	15.1
2006	694	10.1	7,682	15.1
2007	734	10.6	7,578	14.7
2008	730	10.5	7,809	15.1
2009	799	11.4	8,112	15.5
2010	809	11.5	7,676	14.6
2011	818	11.6	8,280	15.6
2012	775	10.9	8,086	15.1
2013	716	10.1	7,261	13.5
2014	643	9.0	6,472	11.9
2015	570	7.9	5,758	10.5

Year	Indicator 2: TB incidence in UK born and non-UK born populations							
	North West				England			
	UK born		Non-UK born		UK born		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	3.1	357	101.7	1,791	4.0	4,570	95.1
2005	244	3.8	468	121.2	1,804	4.0	5,186	100.7
2006	229	3.6	426	99.3	1,729	3.9	5,175	92.9
2007	253	4.0	459	99.8	1,799	4.0	5,136	85.5
2008	231	3.6	474	93.5	1,867	4.2	5,417	86.0
2009	255	4.0	494	95.7	1,906	4.2	5,663	86.8
2010	270	4.2	491	91.9	1,814	4.0	5,515	83.1
2011	259	4.0	521	93.4	1,958	4.3	6,021	85.9
2012	262	4.1	494	90.5	2,005	4.4	5,839	81.4
2013	254	4.0	447	78.6	1,840	4.0	5,256	70.6
2014	227	3.5	405	66.4	1,759	3.8	4,607	60.3
2015	184	2.9	366	55.1	1,550	3.4	4,087	51.2

Year	Indicator 5: Incidence of TB in UK born children aged under fifteen			
	North West		England	
	Number of cases	Rate	Number of cases	Rate
2000	19	1.5	209	2.3
2001	20	1.6	229	2.5
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	162	1.8

Tuberculosis in North West England (2015 data)

Year	Indicator 6: Number and proportion of pulmonary TB cases starting treatment within two months of symptom onset			
	North West		England	
	Number of cases	Proportion	Number of cases	Proportion
2000	117	44.2	-	-
2001	130	47.4	-	-
2002	124	41.6	-	-
2003	122	43.7	-	-
2004	98	36.6	-	-
2005	137	40.8	-	-
2006	122	39.9	-	-
2007	128	37.9	-	-
2008	113	38.7	-	-
2009	127	44.9	-	-
2010	119	43.8	-	-
2011	122	43.9	1,318	45.0
2012	124	43.4	1,368	44.0
2013	94	37.9	1,224	41.2
2014	120	39.5	1,158	39.5
2015	108	40.9	1,186	42.8

Year	Indicator 7: Number and proportion of pulmonary TB cases starting treatment within four months of symptom onset			
	North West		England	
	Number of cases	Proportion	Number of cases	Proportion
2000	187	50.40	-	-
2001	208	54.31	-	-
2002	223	58.22	-	-
2003	199	58.53	-	-
2004	195	61.90	-	-
2005	238	58.05	-	-
2006	226	61.58	-	-
2007	253	62.78	-	-
2008	204	55.14	-	-
2009	207	47.48	-	-
2010	198	46.81	-	-
2011	200	48.54	2,173	74.2
2012	202	51.79	2,291	73.8
2013	160	45.20	2,122	71.5
2014	218	62.11	2,046	69.7
2015	186	61.18	2,002	72.2

Year	Indicator 8: Number and proportion of pulmonary TB cases that were culture confirmed			
	North West		England	
	Number of cases	Proportion	Number of cases	Proportion
2000	195	52.6	1,864	52.2
2001	253	66.1	2,040	56.5
2002	265	69.2	2,622	64.9
2003	216	63.5	2,586	66.1
2004	213	67.6	2,740	68.4
2005	271	66.1	2,989	69.1
2006	264	71.9	2,980	69.4
2007	293	72.7	2,850	68.7
2008	277	74.9	2,904	67.8
2009	317	72.7	3,008	68.1
2010	312	73.8	2,867	70.4
2011	298	72.3	3,075	71.7
2012	285	73.1	2,949	70.4
2013	265	74.9	2,712	72.9
2014	255	72.6	2,489	73.2
2015	234	77.0	2,228	72.7

Tuberculosis in North West England (2015 data)

Year	Indicator 9: Number and proportion of microbiologically confirmed cases with drug susceptibility testing reported for the four first line agents			
	North West		England	
	Number of cases	Proportion	Number of cases	Proportion
2000	262	93.6	2,780	99.3
2001	353	96.4	3,126	99.2
2002	369	95.1	3,793	98.6
2003	303	95.3	3,800	99.2
2004	296	93.1	4,020	98.6
2005	387	93.5	4,532	98.9
2006	393	94.7	4,607	98.7
2007	394	91.6	4,366	98.2
2008	401	93.9	4,429	97.6
2009	454	94.4	4,521	96.8
2010	460	93.9	4,517	98.0
2011	471	92.9	4,895	97.3
2012	440	94.0	4,787	97.8
2013	420	94.0	4,287	97.6
2014	363	92.6	3,832	97.7
2015	336	94.6	3,385	97.8

Year	Indicator 10: Number and proportion of drug sensitive TB cases with full course of treatment completed by 12 months			
	North West		England	
	Number of cases	Proportion	Number of cases	Proportion
2000	-	-	-	-
2001	284	44.6	3,631	63.7
2002	472	74.4	4,111	67.4
2003	412	72.3	4,191	69.6
2004	334	59.2	4,426	70.1
2005	497	67.7	4,875	70.3
2006	515	74.5	5,214	75.5
2007	530	73.2	5,286	78.1
2008	545	74.8	5,585	80.0
2009	624	78.9	5,912	81.9
2010	648	80.8	5,632	82.6
2011	627	77.3	6,004	81.9
2012	619	80.6	6,001	83.5
2013	576	81.8	5,487	85.4
2014	513	80.9	4,827	84.4
2015	-	-	-	-

Year	Indicator 11: Number and proportion of drug sensitive TB cases lost to follow-up at last reported outcome			
	North West		England	
	Number of cases	Proportion	Number of cases	Proportion
2000	-	-	-	-
2001	19	3.0	237	3.9
2002	27	4.3	296	4.5
2003	13	2.3	290	4.4
2004	16	2.8	333	4.9
2005	30	4.1	380	5.0
2006	31	4.5	413	5.4
2007	38	5.2	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	362	4.5
2013	23	3.3	295	4.1
2014	18	2.8	266	4.2
2015	-	-	-	-

Tuberculosis in North West England (2015 data)

Year	Indicator 12: Number and proportion of drug sensitive TB cases that had died at last reported outcome			
	North West		England	
	Number of cases	Proportion	Number of cases	Proportion
2000	-	-	-	-
2001	45	7.1	377	6.1
2002	45	7.1	438	6.6
2003	58	10.2	407	6.2
2004	40	7.1	402	5.9
2005	40	5.4	447	5.9
2006	45	6.5	430	5.7
2007	42	5.8	432	5.8
2008	39	5.3	437	5.7
2009	48	6.1	420	5.2
2010	36	4.5	383	5.0
2011	47	5.8	384	4.7
2012	45	5.9	391	4.9
2013	44	6.3	336	4.7
2014	56	8.8	351	5.5
2015	-	-	-	-

Year	Indicator 13: Number and proportion of TB cases with rifampicin resistance or MDR-TB with treatment completed at 24 months			
	North West		England	
	Number of cases	Proportion	Number of cases	Proportion
2000	-	-	-	-
2001	-	-	-	-
2002	-	-	-	-
2003	-	-	-	-
2004	4	75.0	37	52.1
2005	8	75.0	39	62.9
2006	3	100.0	41	51.3
2007	10	50.0	30	42.3
2008	1	0.0	45	57.7
2009	7	85.7	40	52.6
2010	7	42.9	38	48.1
2011	7	57.1	48	50.5
2012	6	83.3	56	60.2
2013	10	20.0	48	57.8
2014	-	-	-	-
2015	-	-	-	-

Year	Indicator 14: Number and proportion of TB cases with rifampicin resistance or MDR-TB lost to follow-up at last reported outcome			
	North West		England	
	Number of cases	Proportion	Number of cases	Proportion
2000	-	-	-	-
2001	-	-	-	-
2002	-	-	-	-
2003	-	-	-	-
2004	0	0.0	9	12.7
2005	1	12.5	9	14.5
2006	0	0.0	8	10.0
2007	1	10.0	6	8.5
2008	0	0.0	10	12.8
2009	0	0.0	11	14.5
2010	2	28.6	9	11.4
2011	1	14.3	18	18.9
2012	0	0.0	11	11.8
2013	1	10.0	11	13.3
2014	-	-	-	-
2015	-	-	-	-

Tuberculosis in North West England (2015 data)

Year	Indicator 15: Number and proportion of TB cases with rifampicin resistance or MDR-TB that had died at last reported outcome			
	North West		England	
	Number of cases	Proportion	Number of cases	Proportion
2000	-	-	-	-
2001	-	-	-	-
2002	-	-	-	-
2003	-	-	-	-
2004	0	0.0	4	5.6
2005	0	0.0	4	6.5
2006	0	0.0	3	3.8
2007	2	20.0	10	14.1
2008	0	0.0	7	9.0
2009	0	0.0	4	5.3
2010	0	0.0	1	1.3
2011	0	0.0	6	6.3
2012	0	0.0	4	4.3
2013	2	20.0	4	4.8
2014	-	-	-	-
2015	-	-	-	-

Year	Indicator 16: Number and proportion of TB cases offered an HIV test			
	North West		England	
	Number of cases	Proportion	Number of cases	Proportion
2000	-	-	-	-
2001	-	-	-	-
2002	-	-	-	-
2003	-	-	-	-
2004	-	-	-	-
2005	-	-	-	-
2006	-	-	-	-
2007	-	-	-	-
2008	-	-	-	-
2009	-	-	-	-
2010	-	-	-	-
2011	-	-	-	-
2012	451	90.2	5,209	66.5
2013	541	87.0	5,791	82.8
2014	546	94.5	5,404	86.9
2015	447	96.3	4,829	87.9

Year	Indicator 17: Number and proportion of drug sensitive TB cases with at least one social risk factor who completed treatment within 12 months			
	North West		England	
	Number of cases	Proportion	Number of cases	Proportion
2000	-	-	-	-
2001	-	-	-	-
2002	-	-	-	-
2003	-	-	-	-
2004	-	-	-	-
2005	-	-	-	-
2006	-	-	-	-
2007	-	-	-	-
2008	-	-	-	-
2009	-	-	-	-
2010	34	63.0	372	73.4
2011	40	74.1	370	71.3
2012	44	78.6	393	74.6
2013	42	82.4	405	77.1
2014	35	70.0	359	74.5
2015	-	-	-	-

Tuberculosis in North West England (2015 data)

Year	Indicator 18: Number and proportion of culture confirmed TB cases with any first line drug resistance			
	North West		England	
	Number of cases	Proportion	Number of cases	Proportion
2000	17	6.1	193	6.9
2001	13	3.6	224	7.1
2002	20	5.2	297	7.8
2003	13	4.1	309	8.1
2004	19	6.0	326	8.1
2005	25	6.1	346	7.6
2006	19	4.6	370	8.0
2007	31	7.2	332	7.5
2008	21	4.9	306	6.8
2009	23	4.8	371	8.1
2010	28	5.8	322	7.1
2011	32	6.4	412	8.3
2012	24	5.2	358	7.4
2013	29	6.5	332	7.7
2014	30	7.7	286	7.3
2015	17	4.8	255	7.4

Year	Indicator 19: Number and proportion of culture confirmed TB cases with multi-drug resistant TB			
	North West		England	
	Number of cases	Proportion	Number of cases	Proportion
2000	5	1.8	28	1.0
2001	1	0.3	22	0.7
2002	2	0.5	35	0.9
2003	2	0.6	49	1.3
2004	3	0.9	45	1.1
2005	6	1.4	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	77	1.6
2013	7	1.6	69	1.6
2014	6	1.5	52	1.3
2015	3	0.8	46	1.3