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Tuberculosis in North West England: Annual review (2014 data)

Data from 2000 to 2014

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

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Data presented in this report are correct as of March 2015, when they were extracted from the Enhanced TB Surveillance (ETS) system; before being cleaned and validated by the end of August 2015.

Executive summary

National

A total of 6,520 cases of tuberculosis were reported in England in 2014.[1] This corresponds to an incidence rate of 12.0 per 100,000 population, a decrease from the previous year (13.5 per 100,000 in 2013).

Regional

A total of 646 cases of tuberculosis were reported to the Enhanced Surveillance scheme in North West England in 2014. This corresponds to a regional incidence rate of 9.1 per 100,000 population, a decrease from the previous year (10.1 per 100,000 in 2013).

Local

Greater Manchester continued to have the highest TB incidence rate, at 15.1 per 100,000 population (413 cases) in 2014. This was a decrease from the previous year (15.5 per 100,000 population, 421 cases), and continues a gradually decreasing trend since 2011. The North West local authorities with the highest incidence rates in 2014 were Manchester (26.1 per 100,000 population) and Blackburn with Darwen (23.9 per 100,000 population).

Age groups

In 2014, age-specific incidence rates were highest in the 15-44 years age group at 11.8 per 100,000 population. The rate in the 0-14 age group remained low, increasing slightly from 2.2 per 100,000 in 2013 to 2.5 per 100,000 in 2014.

Ethnic groups

Incidence rates remain highest in the Black-African and Pakistani ethnic groups. The greatest proportion of TB cases in 2014 occurred in the Pakistani ethnic group (31%), followed by the White ethnic group (30%).

In 2014, 63% of TB cases reported in the North West were born outside the UK. Of cases born outside the UK, 40% were in the Pakistani ethnic group; 19% were diagnosed within one year after entry; and 36% were diagnosed 11 or more years after entry.

Clinical characteristics

More than half of the TB cases reported in the North West in 2014 had pulmonary disease (55%); a slightly higher proportion than in previous years (50% in 2013; 51% in 2012). Of those cases with pulmonary disease, 72% were confirmed by culture; a similar proportion to previous years (75% in 2013).

Treatment outcome

Among drug sensitive TB cases with non-CNS*, spinal, miliary or cryptic disseminated disease, 83% of those notified in 2013 completed treatment within 12 months (compared with 84% of cases reported in 2012). The most common reasons for non-completion of treatment were death (6%) and continued TB treatment (4%).

Among drug sensitive TB cases with CNS, spinal, miliary or cryptic disseminated disease, 55% of those reported in 2013 completed treatment within 12 months; however, many required continued treatment (28%). A total of 72% had completed treatment at the last recorded outcome.

Six drug resistant TB cases were reported in 2012. At 12 months, all six cases were still on treatment. At 24 months, five cases had completed treatment and one case remained on treatment.

Drug resistance

The proportion of culture positive cases with resistance to at least one first-line drug was 8% in 2014; similar to the previous year (7% in 2013) and in line with national levels.[1] A total of 8% (30/389) had isoniazid resistance; 2% (6/389) were resistant to rifampicin; 2% (6/389) had multi-drug resistance (MDR-TB, resistant to isoniazid and rifampicin); and 0.3% (1/389) had extensively drug resistant (XDR) TB.

* CNS – central nervous system

Introduction

Tuberculosis continues to be a serious public health problem in the UK.

Surveillance provides relevant information on TB cases to local teams in order to help plan and evaluate their services. This report is based on surveillance data from TB clinics, collected via the national Enhanced TB Surveillance (ETS) system; and microbiological information, including drug resistance and strain type, provided by the National Mycobacterium Reference Laboratory (NMRL).

As part of the *Collaborative TB Strategy for England 2015 to 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 indicators is presented in Appendix D. Data for indicators which are presented at upper tier local authority level can be found at http://fingertips.phe.org.uk/profile/tb-monitoring.

Objectives

This annual review provides an update on the epidemiology of TB in residents of North West England, including characteristics and distribution of TB cases, trends in anti-tuberculosis drug resistance, genetic clustering of TB cases and case outcomes. We aim to update public health, clinical and other colleagues, including clinical commissioning groups, NHS England and local authorities of the latest trends; identify at-risk population groups; and highlight opportunities for interventions and prevention of future cases.

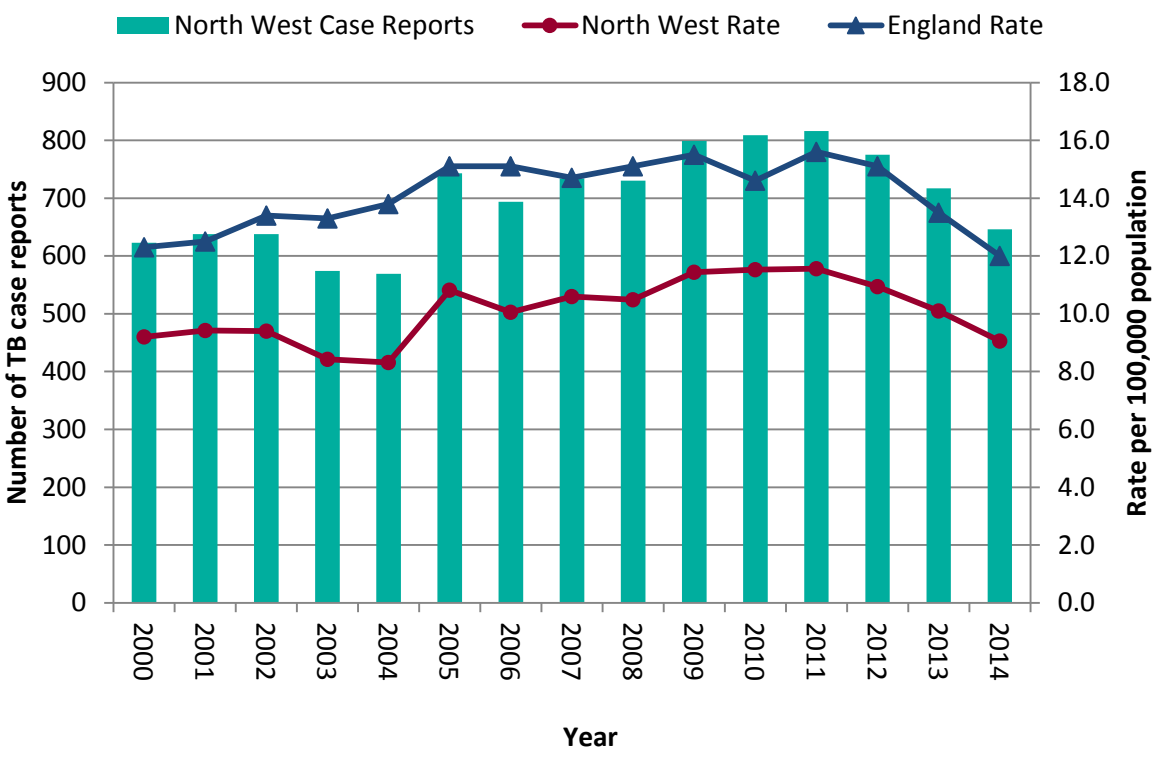
Tuberculosis epidemiology

Overall numbers, rates and geographical distribution

In 2014, 646 tuberculosis (TB) cases were reported among North West residents; a rate of 9.1 per 100,000 population. This was a decrease of 10% compared to 2013 (717 cases; rate of 10.1 per 100,000 population). The North West TB rate remained below the England rate of 12.0 per 100,000 (Figure 1). Compared to other regions in England, the North West rate in 2014 was the third highest of all regions outside London.[1]

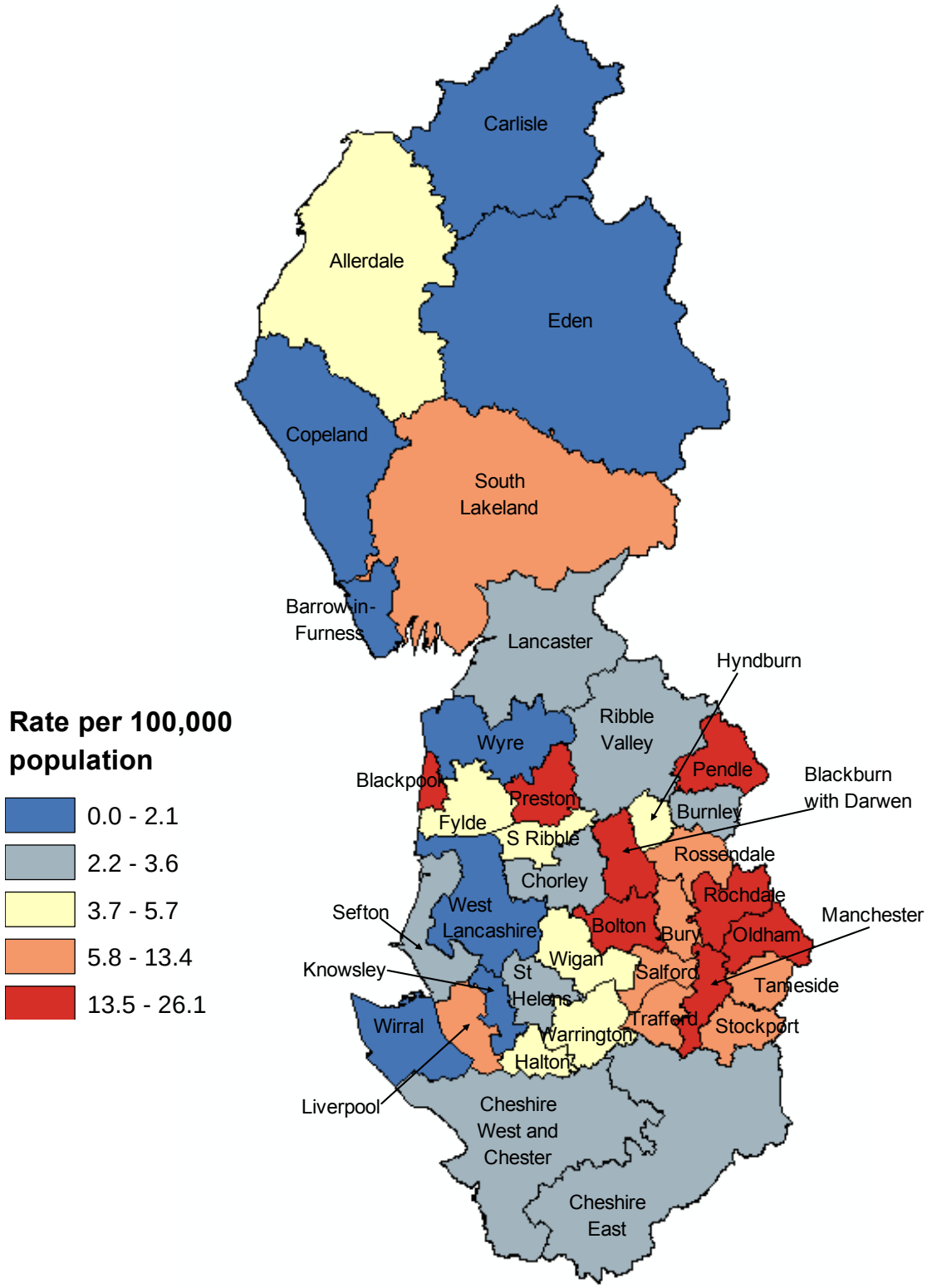
TB Monitoring Indicator 1: Overall TB incidence per 100,000 population

Figure 1: TB case reports and rates, North West and England, 2000 – 2014



Among North West local authorities, the highest rates were in Manchester at 26.1 per 100,000 and Blackburn with Darwen at 23.9 per 100,000. Rates in both of these areas decreased from the previous year: by 19% in Manchester and by 40% in Blackburn with Darwen.

Figure 2: TB case rate per 100,000 population by upper tier local authority of residence, North West, 2014

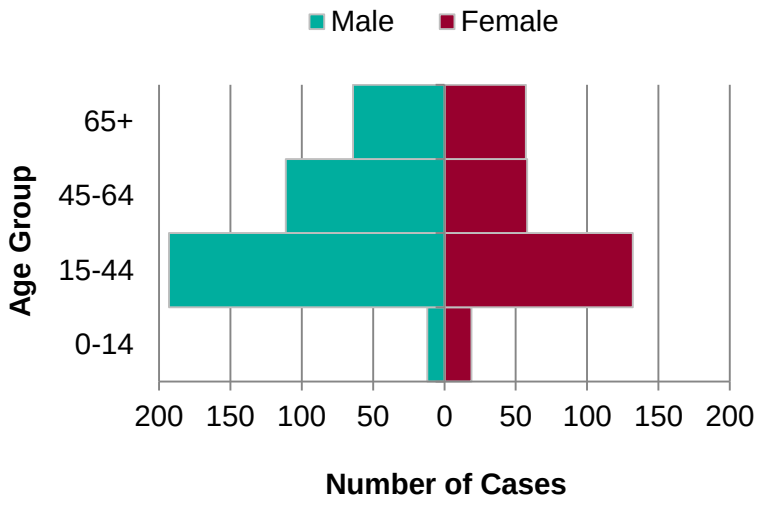


Demographic characteristics

Age and sex

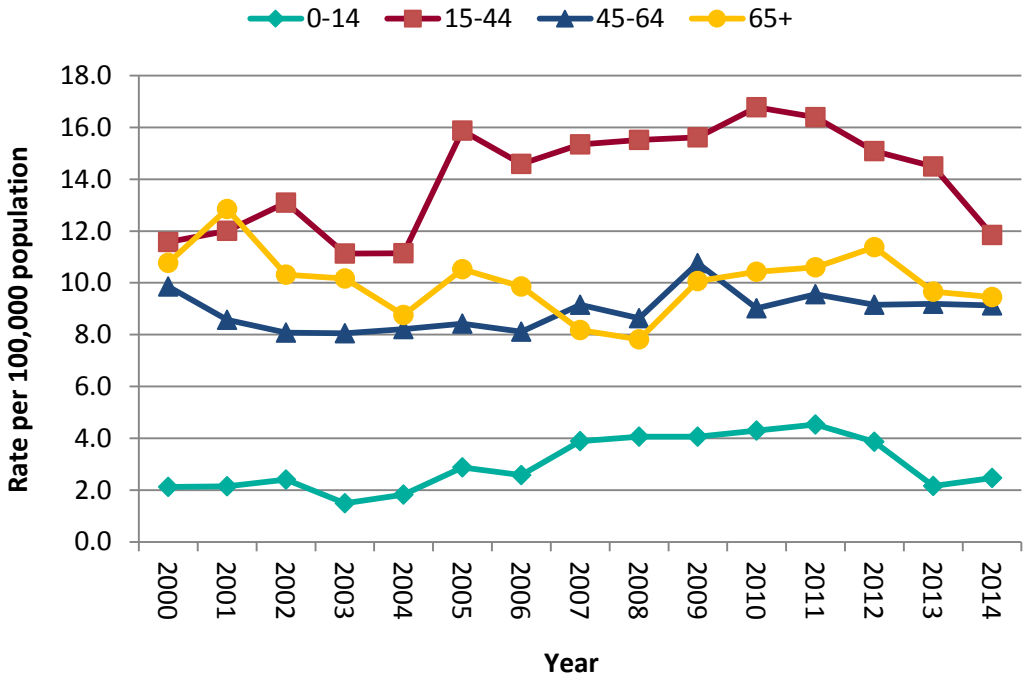
In 2014, 59% of North West TB cases were male, and rates among males were higher than in females (10.8 per 100,000 in males and 7.3 per 100,000 in females). The proportion of males was greater than females across all age groups; but the greatest disparity was in the 45-64 age group, in which 66% of cases were male and 34% were female (Figure 3). Thirty-one cases of TB in children aged 0-14 years were reported; a slight increase on the previous year (27 cases reported in 2013).

Figure 3: TB case reports by age and sex, North West, 2014



Rates were highest in residents aged 15-44 years (Figure 4). The rate in the 0-14 age group remained low, increasing slightly from 2.2 per 100,000 in 2013 to 2.5 per 100,000 in 2014. Rates across all other age groups decreased in 2014, with the largest decrease seen in the 15-44 years age group (from 14.5 per 100,000 population in 2013 to 11.8 per 100,000 population in 2014).

Figure 4: TB case rates by age group, North West, 2000 – 2014



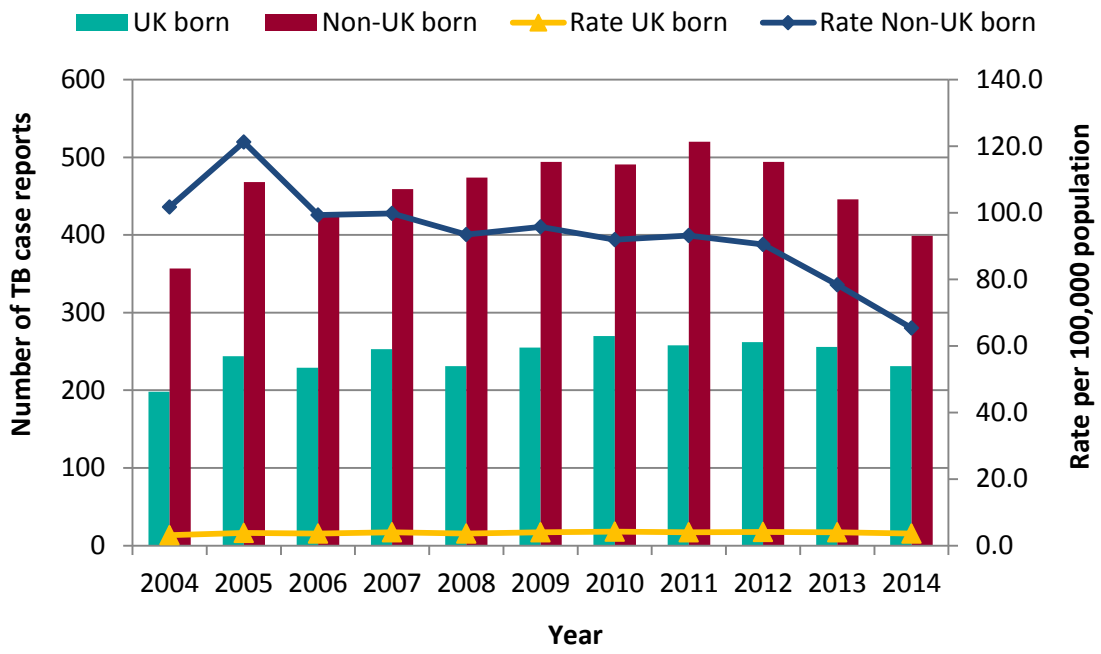
Place of birth and time since entry to the UK

In 2014, place of birth was known for 98% (630/646) of North West TB cases. Of these, 37% (231/630) were born in the UK; a similar proportion to previous years.

In 2014, the rate of TB among the non-UK born population was 18 times higher than the rate in the UK born, at 65.4 per 100,000 (Figure 5); a 17% decrease from the previous year (78.4 per 100,000 in 2013). The rate in the UK born population decreased by 10%, from 4.0 to 3.6 per 100,000.

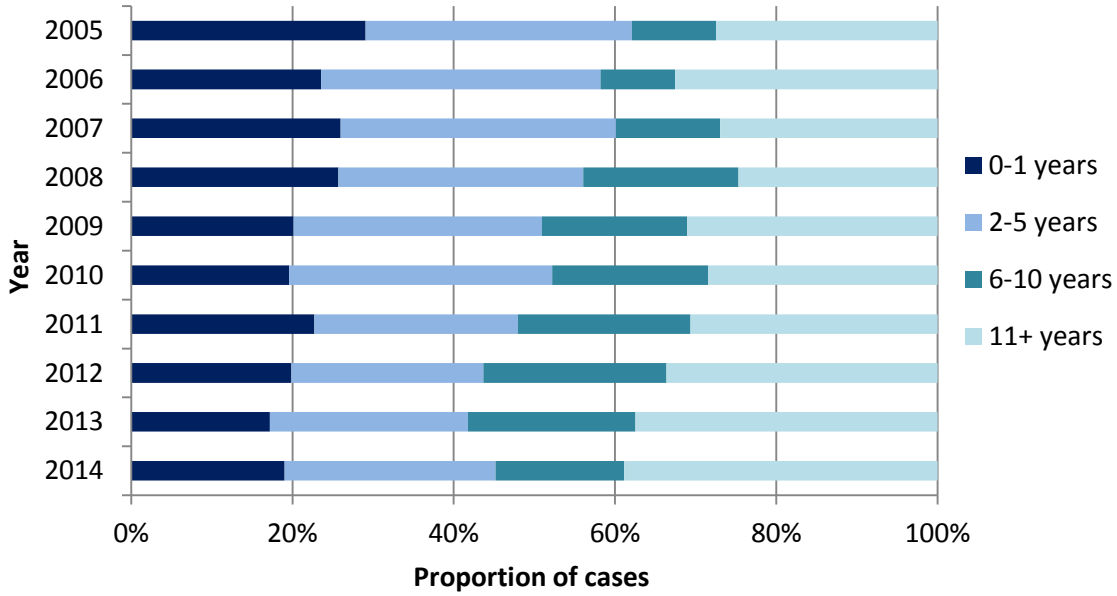
TB Monitoring Indicator 2: TB incidence in UK born and non-UK born populations (England)

Figure 5: TB case reports and rate by place of birth, North West, 2004 – 2014



Year of entry was reported for 91% (363/399 cases) of non-UK born cases in 2014. Of these, 39% of cases were notified to TB surveillance 11 or more years after entering the UK (Figure 6). A further 19% were notified less than two years after entry and 26% 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, 2005 – 2014



More than one third of non-UK born TB cases reported in the North West in 2014 were born in Pakistan, while one fifth originated from India (Table 1).

Table 1: Ten most common countries of birth of non-UK born TB cases, North West, 2014

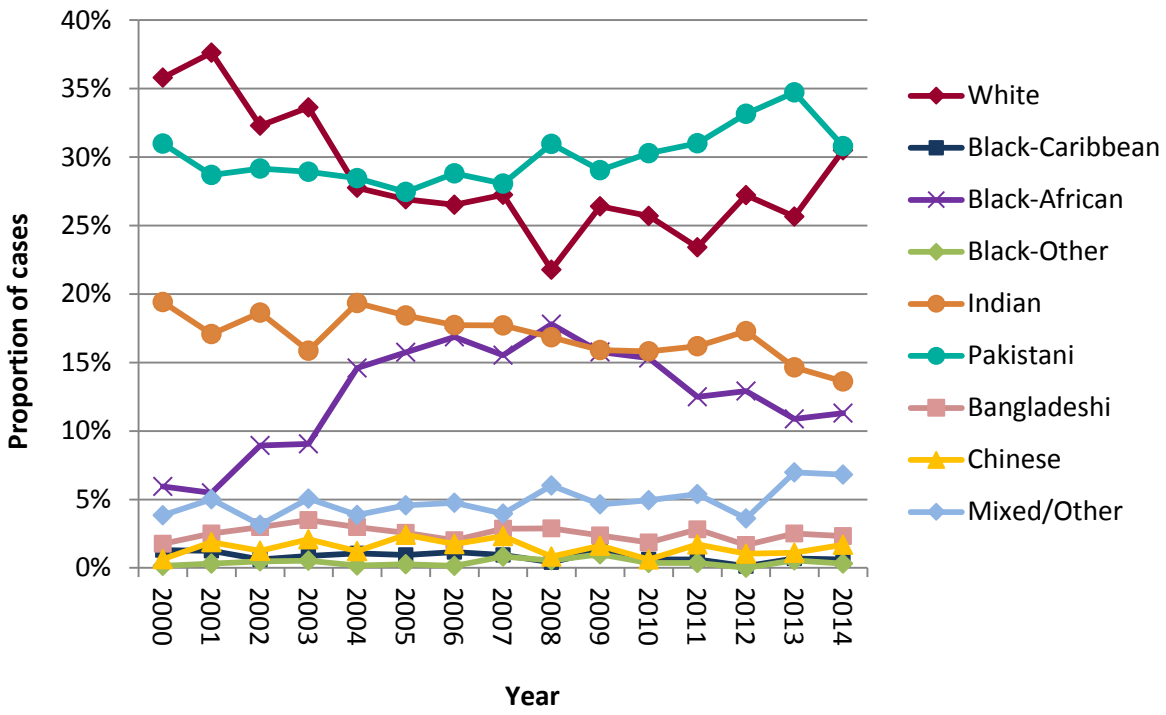
Country of birth	Number of cases	Proportion of cases
Pakistan	151	38%
India	79	20%
Bangladesh	13	3%
Nigeria	13	3%
Zimbabwe	13	3%
Eritrea	9	2%
Somalia	9	2%
Ethiopia	8	2%
Philippines	8	2%
Poland	8	2%
Others (each < 2%)	85	21%
Total*	396	100%

*Where country of birth was known

Ethnic group

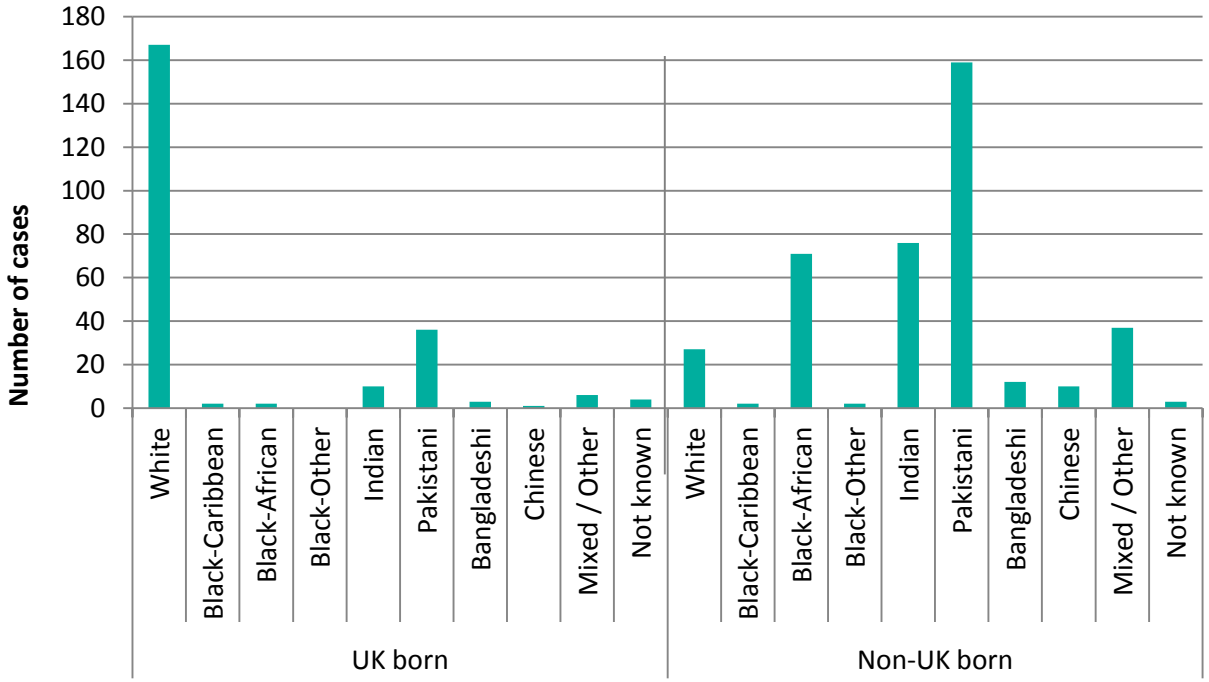
The most common ethnic groups among tuberculosis cases in the North West were the Pakistani and White ethnic groups (Figure 7). The proportion of Pakistani cases decreased from 35% (249/717) in 2013 to 31% (199/646) in 2014; while the proportion of White cases increased from 26% (184/717) in 2013 to 30% (197/646) in 2014.

Figure 7: Proportion of TB cases by ethnic group, North West, 2000 – 2014



Of the UK born TB cases in 2014, the greatest proportion (72%, 167/231) were in the White ethnic group (Figure 8). Among the non-UK born, 40% (159/399) were in the Pakistani ethnic group; 19% (76/399) were in the Indian ethnic group; and 18% (71/399) were in the Black-African ethnic group.

Figure 8: TB case numbers by ethnic group and place of birth, North West, 2014



Occupation

In 2014, information on occupation was known for 93% (453/486) of North West TB cases aged between 18 and 65 years. Of these, 42% (191/453) were not in education or employment; 12% (53/453) were either studying or working in education; 7% (31/453) were healthcare workers; and the remaining cases (42%, 191/453) were working in other occupations.

Clinical characteristics

Site of disease

In 2014, 55% of TB cases in North West England had pulmonary disease (Table 2). Of the 353 pulmonary cases, 253 (72%) were culture confirmed (75% in 2013). The next most common site was extra-thoracic lymph nodes, accounting for 20% of all cases.

Table 2: Site of disease of TB cases, North West, 2014

Site of disease*	Number of cases	Proportion of cases
Pulmonary	353	55%
Lymph nodes (extra-thoracic)	127	20%
IT lymph nodes	92	14%
Extra-pulmonary (other)	57	9%
Pleural	45	7%
Extra-pulmonary (unknown)	44	7%
Bone (spine)	35	5%
Gastrointestinal	35	5%
Bone (other - not spine)	21	3%
Miliary	21	3%
CNS meningitis	17	3%
Genitourinary	12	2%
CNS (other - not meningitis)	10	2%
Laryngeal	3	> 1%
Cryptic	2	> 1%

* With or without disease at another site

Previous diagnosis of tuberculosis

Information on previous history of TB was known for 92% (595/646) of North West cases in 2014. Of these, 6% (37/595) had received a previous diagnosis of TB; a similar proportion to previous years.

BCG vaccination

Information on BCG vaccination was available for 44% (286/646) of North West cases in 2014; 60% (173/286) of these had reportedly received BCG vaccination. Information on BCG vaccination was recorded for 65% (20/31) of cases aged 0-14 years; half of which (10/20) had received BCG vacination.

Microbiological information

Sputum smear

Of the 353 pulmonary cases in the North West in 2014, 58% (205/353) had a sputum smear result reported; 51% (105/205) of which were positive. Ninety-three per cent (98/105) of pulmonary, sputum smear positive cases were also culture confirmed.

Culture confirmation and speciation

A total of 60% (389/646) of all cases in 2014, both pulmonary and extra-pulmonary, were confirmed by culture. Of the 353 pulmonary cases, 72% (253/353) were culture confirmed; compared with 47% (136/289) of extra-pulmonary cases.

Among all culture confirmed cases, 98% (381/389) were identified with *Mycobacterium tuberculosis* (*M. tuberculosis*) infection; 0.5% (2/389) with *Mycobacterium bovis* (*M. bovis*), 1.3% (5/389) with *Mycobacterium africanum* (*M. africanum*) and 0.3% (1/389) with *Mycobacterium tuberculosis complex* (MTBC). There were no cases of *Mycobacterium microti* recorded in 2014.

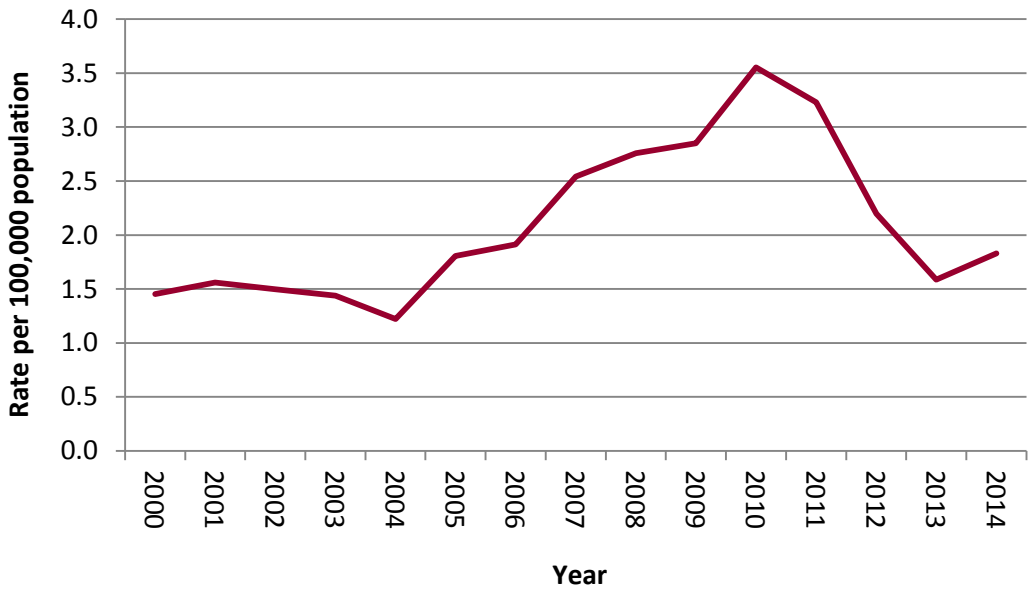
TB transmission

Rate of TB in UK born children

The rate 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 1.8 per 100,000 in 2014. This was slightly higher than in the previous year (1.6 per 100,000 in 2013); however, the rate has decreased since the peak of 3.6 per 100,000 in 2010 (Figure 9) and remains lower than the national rate of 2.1 per 100,000.[1]

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

Figure 9: Rate of TB in UK born children*, North West, 2000 – 2014



* 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 2014.

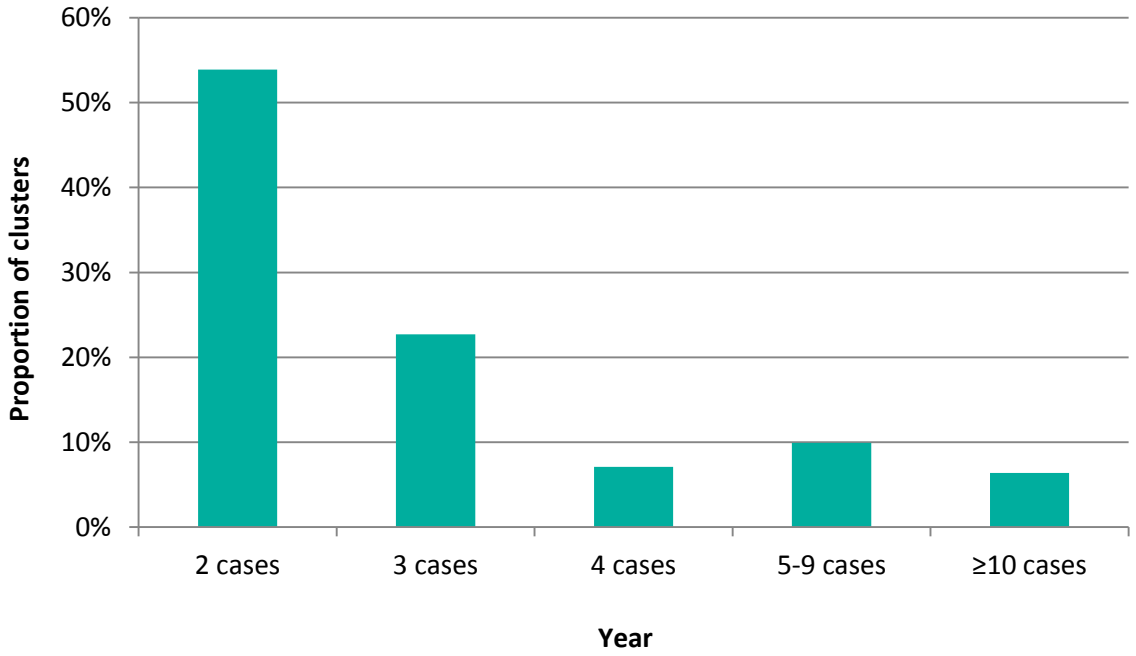
Proportion of cases clustered and geographical distribution

Between 2010 and 2014, 2,302 cases of TB were confirmed by culture in the North West. Of those, 68% (1,570/2,302) had a MIRU-VNTR profile with typing of at least 23 loci. Fifty-four per cent (851/1,570) were clustered with at least one other individual at UK level, and were linked to 452 national clusters; 33% (524/1,570) were clustered with other cases within the North West and comprised 141 different regional clusters.

Size of clusters

Of the 141 North West clusters in the period 2010 to 2014, 84% (118/141) consisted of fewer than five cases; 10% (14/141) had six to nine cases; and 6% (9/141) comprised ten or more cases (Figure 10). The median cluster size was two cases (range 2 to 29 cases).

Figure 10: Proportion of regional TB clusters by size, North West, 2010 – 2014



Cluster lineage

In the period 2010 to 2014, 55% (290/524) of clustered cases had strains of Euro-American lineage; 29% (151/524) were of Central Asian lineage; 3% (14/524) were of East African Indian lineage; and 3% (14/524) were of Beijing lineage. Forty per cent (290/723) of cases infected with the Euro-American lineage were clustered, 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 – 2014

Lineage	Number of cases*	Number of cases clustered	Proportion of cases clustered
Euro-American	723	290	40%
Central Asian	476	151	32%
East African Indian	122	14	11%
Beijing	51	14	27%
Other**	198	55	28%
Total	1570	524	33%

* 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 (93%, 13/14); as were those of Beijing (86%, 12/14) and Central Asian (68%, 103/151) lineage. Seventy per cent (203/290) of those with Euro-American lineage were UK born. Eighty-nine per cent (258/290) of clustered cases with Euro-American lineage had pulmonary TB.

Characteristics of cases in clusters

Of the 524 clustered North West cases between 2010 and 2014, 62% (326/524) were male and 59% (310/524) were aged 15 to 44 years. Children aged under 15 years comprised just 3% (15/524) of all clustered cases.

Over half (55%, 286/524) of clustered cases were UK born. Of those which were non-UK born, 44% (97/219) were notified within five years of entering the UK and 28% were notified more than ten years after entry.

The majority of clustered North West cases notified between 2010 and 2014 were in the White ethnic group (41%, 216/524) and approximately one quarter (26%, 134/524) were in the Pakistani ethnic group.

Seventy-eight per cent (409/524) of clustered cases had pulmonary TB. Of those, only 35% were smear positive; however, this figure is distorted by the fact that sputum smear results were missing for 50% (204/409) of pulmonary cases. Six per cent (32/524) of all clustered cases had received a previous diagnosis of TB.

Eighteen per cent (94/524) 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 half (58%, 303/524) recorded having no social risk factors, and a quarter (24%, 127/524) had no social risk factor information recorded.

Isoniazid resistance was observed in 4% (21/524) of clustered North West cases between 2010 and 2014, and multi-drug resistant (MDR-TB) cases comprised 1% (3/524) of clustered cases.

Delay from onset of symptoms to start of treatment

Time symptomatic

The time between onset of symptoms and starting treatment was available for 84% of North West cases notified in 2014. The median number of days was 82 (Table 4). This was lower among those with pulmonary disease at 73 days, and higher among extra-pulmonary cases at 92 days. Among pulmonary cases, 37% (111/297) were treated within two months of symptom onset, and 70% (209/297) 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, 2014

	Median days	0-2 months		2-4 months		>4 months	
	(IQR)	n	%	n	%	n	%
Extra-pulmonary	92 (44-160)	88	35%	68	27%	92	37%
Pulmonary	73 (41-151)	111	37%	98	33%	88	30%
Pulmonary smear positive	77 (38-120)	39	41%	32	34%	24	25%
All Cases	82 (42-153)	199	37%	166	30%	180	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 32% of males compared with 25% of females. A greater proportion of cases were in older age groups: 11% in the 0-14 age group compared with 28% for those aged 15-44, 35% for those aged 45-64, and 32% for those aged 65 years and over. There was also a slightly greater proportion of UK born cases with a treatment delay of more than four months: 32% compared with 28% of non-UK born cases.

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.

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

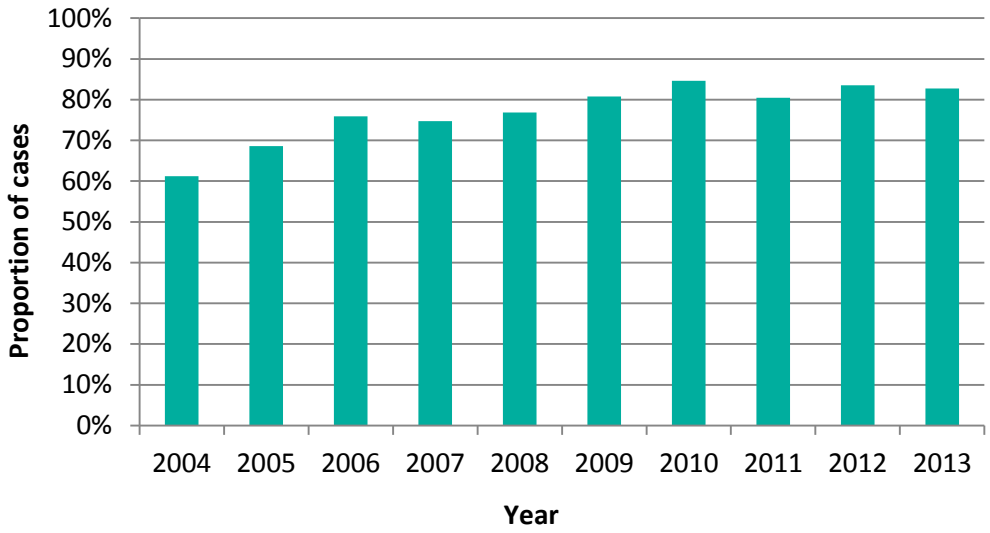
- for cases with an expected duration of treatment less than 12 months, TB outcomes at 12 months are reported. This group excludes cases with CNS (central nervous system) disease, who have an expected treatment duration of 12 months. In addition, those with spinal, cryptic disseminated or miliary disease 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 2013, 717 TB cases were notified in the North West; 90% (648/717) 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 – 2013*



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

In 2013, 83% (536/648) of cases in this group completed treatment at 12 months (Table 5), compared with 84% (574/687) in 2012. The most common reasons for not completing treatment were death (6%, 40/648) and still being on treatment (4%, 29/648).

Table 5: TB outcome at 12 months for drug sensitive cases with expected treatment duration of 12 months, North West, cases diagnosed in 2013*

TB outcome	n	%
Treatment completed	536	83%
Died	40	6%
Lost to follow up	20	3%
Still on treatment	29	4%
Treatment stopped	9	1%
Not evaluated**	14	2%
Total	648	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 40 deaths, the relationship between TB and death was unknown for 63% (25/40). Among the 15 cases for which information was recorded, TB caused two deaths; contributed to three; and was incidental to ten.

The median age of those who died was 78; nine cases (23%) were diagnosed at post-mortem. Older cases were less likely to complete treatment: 65% (73/113) of those aged 65 years or older completed treatment within twelve months, compared with 86% in both the 15-44 and 45-64 age groups and 96% in the 0-14 years age group. The 65 years and over age group also had a higher proportion of cases who died (27%, 30/113).

Treatment completion was 84% (338/402) among the non-UK born, compared to 82% (192/233) among the UK born. A greater proportion of UK born cases died before completing treatment (9%, 20/233) than those born abroad (4%, 16/402).

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

Of the 58 cases with CNS spinal, miliary or cryptic disseminated disease, 72% (42/58) had completed treatment at the last recorded outcome (Table 6); 55% (32/58) completed treatment within 12 months, while 28% (16/58) remained on treatment. Seventeen per cent (10/58) 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 2013*

TB outcome	n	%
Treatment completed	42	72%
Died	3	5%
Lost to follow up	1	2%
Still on treatment	6	10%
Treatment stopped	0	0%
Not evaluated**	6	10%
Total	58	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

Ten per cent (6/58) were still on treatment at last recorded outcome; 5% (3/58) died; and 2% (1/58) were lost to follow up. Ten per cent (6/58) were classified as ‘not evaluated’ due to missing or incorrect outcome information.

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 fairly stable since 2004, ranging from 5% to 7% overall; and remaining at 6% from 2011 to 2013. Of the 706 drug sensitive cases notified in 2013,

43 cases died. Of these, the relationship between TB and death was unknown for 65% (28/43). TB was incidental to 23% (10/43) of deaths; contributed to 7% (3/43) of deaths; and caused 5% (2/43) of deaths.

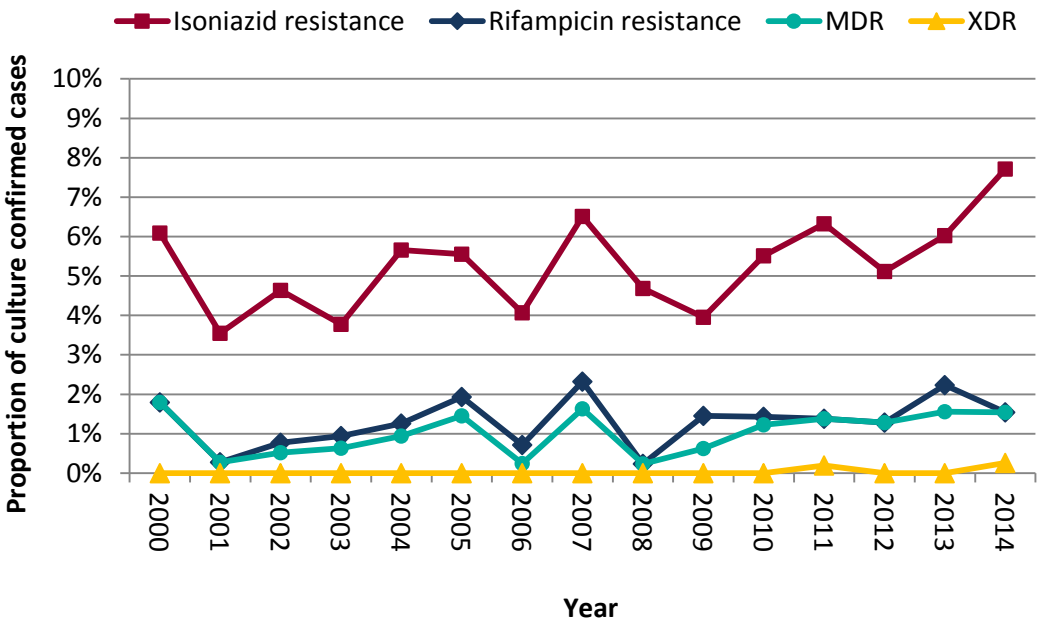
The proportion of drug sensitive cases that were lost to follow up at the last recorded outcome has remained reasonably stable since 2004, ranging from 3% to 5% overall. Three per cent (21/706) of cases were lost to follow up in 2013. Of these, 81% (17/21) were born outside the UK; and 57% (12/21) had left the UK. Males accounted for 71% (15/21) of cases lost to follow up and 67% (14/21) were in the 15-44 age group.

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

Drug resistance

In 2014, 8% (30/389) of culture confirmed TB cases were resistant to one or more first line drugs. 8% (30/389 cases) had isoniazid resistance; an increase on the previous year (6%, 27/448, in 2013). Two per cent (6/389) of culture confirmed cases were resistant to rifampicin; 2% (6/389) had MDR-TB (resistant to isoniazid and rifampicin); and 0.3% (1/389) had extensively drug resistant (XDR) TB (Figure 12).

Figure 12: Proportion of drug resistant TB cases, North West, 2000 – 2014*



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

Two of the resistant cases reported previous history of TB treatment. Most drug resistant cases were male (57%, 17/30), and most were aged between 15 and 44 years old (80%, 24/30). Just over half had pulmonary disease (53%, 16/30); and, of these, 31% (5/16) had a positive sputum smear result. Of the six MDR-TB cases, four had pulmonary disease and were born outside the UK.

Of drug resistant cases notified in 2013, 63% (19/30) had completed treatment at the last recorded outcome, compared with 92% (22/24) in 2012. The most common reasons for not completing treatment were: still being on treatment (23%, 7/30); death (7%, 2/30); and being lost to follow up (7%, 2/30).

TB outcome at 24 months for cases with rifampicin resistant disease

In 2012, six cases had rifampicin resistant TB and each of these cases had MDR-TB. Half were male; four were in the 15-44 years age group. All six cases were born outside the UK: three entered the UK less than one year prior to notification; two cases had entered the UK six to ten years prior to notification.

At 12 months, all six cases were still on treatment. At 24 months, five cases had completed treatment and one case remained on treatment (Table 7).

Table 7: TB outcome at 24 months for cases with rifampicin resistant disease, North West, cases diagnosed in 2012

TB outcome	n	%
Treatment completed	5	83%
Died	0	0%
Lost to follow up	0	0%
Still on treatment	1	17%
Treatment stopped	0	0%
Not evaluated**	0	0%
Total	6	100%

TB in those with social risk factors and health inequalities associated with TB

Social risk factors

Information on social risk factors (homelessness, drug and alcohol misuse and imprisonment) has been available since 2009. In 2014, information on social risk factors was recorded for 79% (511/646) of TB cases in the North West, and 10% (50/511) of these cases had at least one social risk factor (Table 8). Where information on individual risk factors was known, 4% (20/564) reported alcohol misuse, 4% (20/525) reported imprisonment, 4% (24/572) reported homelessness and 3% (17/562) reported drug use.

Table 8: Social risk factors among TB cases*, North West, 2009 – 2014

	2009		2010		2011		2012		2013		2014	
Risk Factor	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
At least one risk factor	52	11%	54	10%	53	10%	56	10%	52	9%	50	10%
Drug use	16	3%	19	3%	16	3%	21	3%	18	3%	17	3%
Alcohol use	27	5%	24	4%	23	4%	23	4%	27	4%	20	4%
Homelessness	16	3%	21	3%	17	3%	11	2%	24	4%	24	4%
Prison	19	4%	21	4%	22	4%	24	4%	21	4%	20	4%

* Where information on individual risk factors was recorded

The majority of cases with at least one social risk factor were male (80%, 40/50) and 62% (31/50) were in the 15 to 44 years age group. Two-thirds of cases (66%, 33/50) with at least one social risk factor were UK born; a similar proportion to previous years (73%, 37/51, in 2013). Among UK born cases, 94% (31/33) 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-Caribbean ethnic group (47%, 8/17) and the White ethnic group (24%, 4/17).

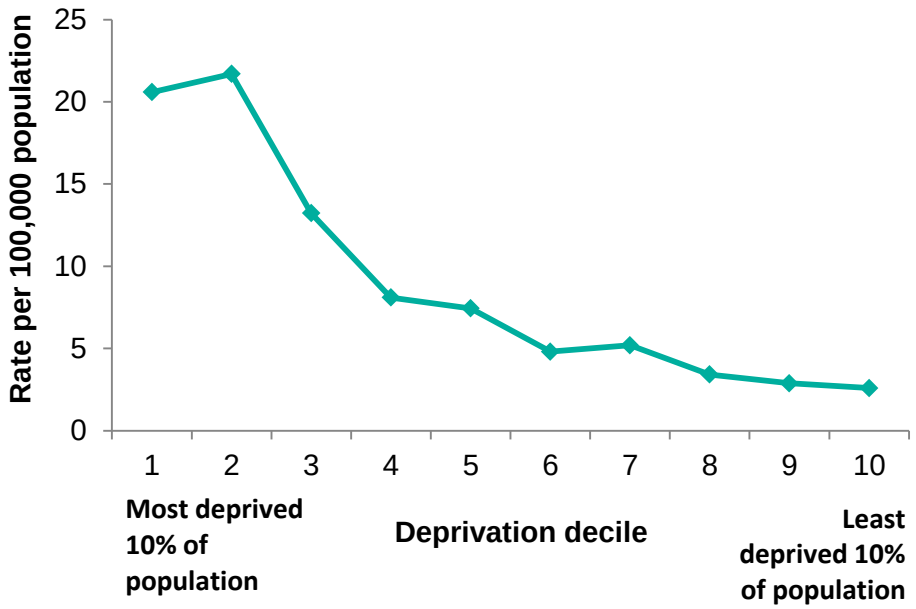
Forty-three per cent (18/42) of cases with at least one social risk factor received directly observed therapy (DOT) in 2014 (for cases where use of DOT was recorded). Of those, 67% (12/18) had current or previous history of drug use; 61% (11/18) had current or previous imprisonment; 50% (9/18) had current or previous alcohol use; and 50% (9/18) had current or previous homelessness. Seventy-eight per cent (14/18) 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 2013 had been lost to follow-up at the last recorded outcome (6%, 3/51) compared to cases with no social risk factors (2%, 9/521). Six per cent of cases with at least one risk factor had their treatment stopped, compared with 1% (4/521) of cases with no social risk factors.

Deprivation

There is a clear relationship between TB and deprivation in the North West, with higher incidence rates seen in the most deprived areas (Figure 13). In 2014, the rate of TB was 20.6 per 100,000 in the 10% of the population living in the most deprived areas compared with only 2.6 per 100,000 in the 10% of the population living in the least deprived areas.

Figure 13: TB case rate by deprivation, North West, 2014



Testing for HIV and TB-HIV co-infection

HIV testing

Information on HIV testing was available for 90% (570/630) of North West cases reported in 2014 (excluding those diagnosed post-mortem). Eighty-six per cent (540/630) were offered an HIV test or their HIV status was already known. Among those offered testing, uptake was 99% (507/513). Five per cent (30/630) of cases were not offered a test.

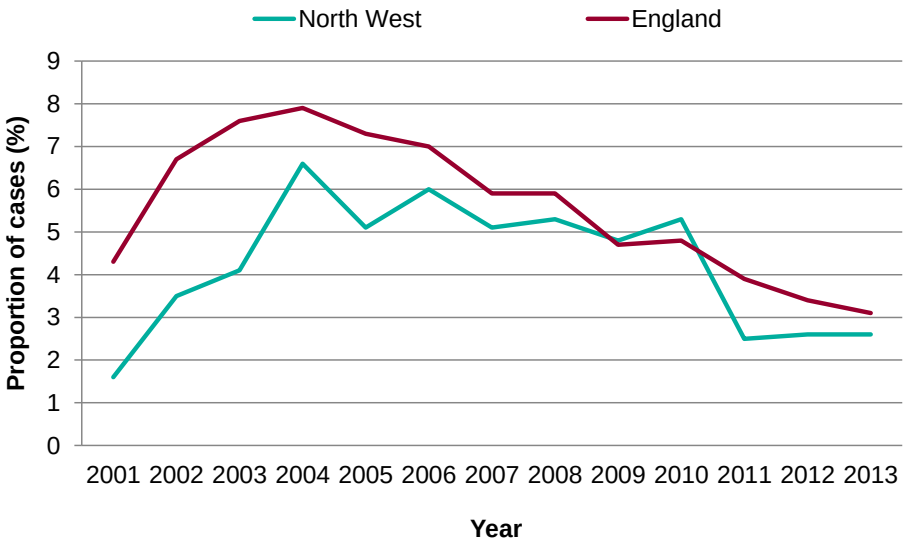
Among eligible cases (where HIV status was not already known), UK born cases were slightly less likely to be offered a test (84%, 177/211) compared with non-UK born cases (87%, 330/380). Cases in certain age groups were also less likely to be offered a test: 90% (278/310) of cases in the 15-44 years age group were offered an HIV test, compared with 70% (75/107) of cases aged 65 years and over and 81% (25/31) of cases aged 0-14 years.

Information on HIV testing also varied by geographical area. In the areas of the North West with the highest TB incidence, the proportion of cases with completed HIV testing information varied from 97% (34/35) in Blackburn with Darwen to 84% (48/57) in Bolton. In 9 of the 37 local authorities where TB was notified in 2014, 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 3.2% of cases across England.

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



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 10% between 2013 and 2014, reflecting a decrease of 17% among non-UK born TB cases and 10% among the UK born. However, the North West remains among the higher incidence regions in England, with 2014 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 2014, 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 2014, with the largest decrease seen in the 15-44 years age group. The rate in the 0-14 age group increased slightly, but remained low; reflecting a parallel increase in the rate of TB in UK born children in the North West.

More than half of pulmonary cases in 2014 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 2010 to 2014, 54% of strain typed cases in the North West were found to cluster genetically with at least one other case at UK level; 33% 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 29 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 83% between 2012 and 2013. 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.

TB continues to be concentrated in large urban centres and among the most deprived populations, with a rate almost eight times higher in the most deprived compared with the least deprived populations.

Among cases that were offered HIV testing, uptake was 99% in 2014; however, 5% of cases were not offered a test. Some case groups including the UK born, children (aged under 15 years) and those aged over 65 years, were less likely to be offered a test. Testing results were available for 90% of cases; and in 9 of the 37 local authorities where TB was notified in 2014, 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 Tool[7] to track their performance and to support development of local TB action plans.

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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 September 2015.

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, 2005 – 2014

Local Authority	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Allerdale	0	0	3	1	0	1	0	2	2	4
Barrow-in-Furness	1	0	7	1	2	4	4	5	2	1
Blackburn with Darwen	57	53	49	53	62	74	42	56	59	35
Blackpool	6	9	11	16	11	12	31	20	12	19
Bolton	68	72	62	63	75	66	60	47	58	57
Burnley	14	15	9	3	15	10	13	11	9	2
Bury	8	5	11	8	24	14	21	23	16	25
Carlisle	4	1	5	2	0	0	1	12	4	1
Cheshire East	1	11	4	9	6	8	12	9	21	12
Cheshire West and Chester	14	16	10	5	8	10	8	8	11	12
Chorley	7	5	0	1	2	1	3	9	6	4
Copeland	0	0	1	0	0	2	0	2	2	0
Eden	0	0	3	2	0	0	0	1	1	1
Fylde	4	4	2	1	8	2	1	2	2	3
Halton	1	5	3	1	2	2	0	0	2	5
Hyndburn	23	11	22	26	11	6	11	9	14	4
Knowsley	3	8	0	4	4	3	5	2	5	3
Lancaster	6	3	1	0	1	8	8	8	4	5
Liverpool	87	58	44	50	45	61	42	48	40	36
Manchester	146	161	175	171	203	198	220	181	166	136
Oldham	45	44	41	46	36	52	46	50	44	52
Pendle	27	25	28	19	27	19	25	18	19	15
Preston	29	22	36	33	23	33	46	35	28	22
Ribble Valley	0	3	5	3	4	0	1	1	2	2
Rochdale	32	32	43	51	47	41	42	35	23	38
Rossendale	5	5	4	2	2	5	1	2	3	4
Salford	22	26	27	34	29	36	24	24	30	26
Sefton	14	9	6	12	9	10	7	17	6	9
South Lakeland	0	1	4	2	5	4	6	7	3	6
South Ribble	0	1	3	3	4	3	9	2	4	6
St. Helens	5	0	4	4	2	4	4	5	3	5
Stockport	21	18	22	24	14	10	28	15	16	20
Tameside	39	18	21	29	46	35	33	34	22	21
Trafford	18	16	29	19	31	23	27	39	31	26
Warrington	6	4	9	9	12	12	6	9	14	9
West Lancashire	2	2	1	2	1	4	1	1	2	2
Wigan	13	13	11	9	16	15	9	7	15	12
Wirral	12	15	16	10	10	16	10	11	11	6
Wyre	3	3	2	2	2	5	9	8	5	0
Cheshire and Merseyside	143	126	96	104	98	126	94	109	113	97
Cumbria and Lancashire	188	163	196	172	180	193	212	211	183	136
Greater Manchester	412	405	442	454	521	490	510	455	421	413
NORTH WEST	743	694	734	730	799	809	816	775	717	646

Table Bii: TB rate per 100,000 population by local authority of residence, North West, 2005 – 2014

Local Authority	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Allerdale	0.0	0.0	3.1	1.0	0.0	1.0	0.0	2.1	2.1	4.1
Barrow-in-Furness	1.4	0.0	10.0	1.4	2.9	5.8	5.8	7.3	2.9	1.5
Blackburn with Darwen	40.1	37.0	34.0	36.6	42.4	50.4	28.4	37.9	40.0	23.9
Blackpool	4.2	6.3	7.7	11.2	7.7	8.4	21.8	14.1	8.5	13.5
Bolton	25.7	27.0	23.1	23.3	27.5	24.0	21.6	16.8	20.7	20.3
Burnley	16.0	17.1	10.3	3.4	17.2	11.5	14.9	12.6	10.4	2.3
Bury	4.4	2.8	6.0	4.4	13.1	7.6	11.3	12.4	8.6	13.3
Carlisle	3.8	0.9	4.7	1.9	0.0	0.0	0.9	11.1	3.7	0.9
Cheshire East	0.3	3.0	1.1	2.5	1.6	2.2	3.2	2.4	5.6	3.2
Cheshire West and Chester	4.3	4.9	3.0	1.5	2.4	3.0	2.4	2.4	3.3	3.6
Chorley	6.8	4.8	0.0	0.9	1.9	0.9	2.8	8.3	5.4	3.6
Copeland	0.0	0.0	1.4	0.0	0.0	2.8	0.0	2.8	2.9	0.0
Eden	0.0	0.0	5.7	3.8	0.0	0.0	0.0	1.9	1.9	1.9
Fylde	5.3	5.3	2.7	1.3	10.6	2.6	1.3	2.6	2.6	3.9
Halton	0.8	4.1	2.5	0.8	1.6	1.6	0.0	0.0	1.6	4.0
Hyndburn	28.3	13.5	27.0	32.0	13.6	7.4	13.7	11.2	17.5	5.0
Knowsley	2.0	5.4	0.0	2.7	2.7	2.0	3.4	1.4	3.4	2.0
Lancaster	4.4	2.2	0.7	0.0	0.7	5.8	5.8	5.7	2.8	3.5
Liverpool	19.2	12.8	9.7	11.0	9.8	13.2	9.0	10.2	8.5	7.6
Manchester	32.0	34.7	37.2	35.8	42.0	40.2	43.7	35.4	32.3	26.1
Oldham	20.5	20.0	18.6	20.7	16.2	23.2	20.4	22.1	19.4	22.7
Pendle	30.6	28.2	31.5	21.3	30.2	21.3	27.9	20.1	21.1	16.7
Preston	21.3	16.0	26.0	23.8	16.7	23.8	32.8	24.9	19.9	15.7
Ribble Valley	0.0	5.3	8.8	5.2	7.0	0.0	1.7	1.7	3.5	3.4
Rochdale	15.4	15.4	20.6	24.3	22.4	19.5	19.8	16.5	10.8	17.8
Rossendale	7.6	7.6	6.0	3.0	3.0	7.4	1.5	2.9	4.4	5.8
Salford	10.0	11.7	12.1	15.0	12.7	15.5	10.2	10.1	12.6	10.7
Sefton	5.1	3.3	2.2	4.4	3.3	3.7	2.6	6.2	2.2	3.3
South Lakeland	0.0	1.0	3.8	1.9	4.8	3.8	5.8	6.8	2.9	5.8
South Ribble	0.0	0.9	2.8	2.8	3.7	2.8	8.2	1.8	3.7	5.5
St. Helens	2.9	0.0	2.3	2.3	1.1	2.3	2.3	2.8	1.7	2.8
Stockport	7.5	6.4	7.8	8.5	5.0	3.5	9.9	5.3	5.6	7.0
Tameside	18.3	8.4	9.8	13.4	21.2	16.0	15.0	15.4	10.0	9.5
Trafford	8.4	7.4	13.2	8.6	13.9	10.2	11.9	17.1	13.5	11.2
Warrington	3.1	2.1	4.6	4.5	6.0	6.0	3.0	4.4	6.8	4.4
West Lancashire	1.8	1.8	0.9	1.8	0.9	3.6	0.9	0.9	1.8	1.8
Wigan	4.2	4.2	3.6	2.9	5.1	4.7	2.8	2.2	4.7	3.7
Wirral	3.8	4.8	5.1	3.2	3.1	5.0	3.1	3.4	3.4	1.9
Wyre	2.8	2.8	1.8	1.8	1.9	4.6	8.4	7.4	4.6	0.0
Cheshire and Merseyside	6.0	5.3	4.0	4.4	4.1	5.2	3.9	4.5	4.7	4.0
Cumbria and Lancashire	9.7	8.4	10.1	8.8	9.2	9.9	10.8	10.7	9.3	6.9
Greater Manchester	16.1	15.7	17.0	17.3	19.7	18.4	19.0	16.8	15.5	15.1
NORTH WEST	10.8	10.1	10.6	10.5	11.4	11.5	11.6	10.9	10.1	9.1

Table Biii: TB case numbers and rates by age and sex, North West, 2014

	Female		Male	
Age Group	**Number**	**Rate**	**Number**	**Rate**
0-14	19	3.1	12	1.9
15-44	132	9.6	193	14.1
45-64	58	6.2	111	12.1
65+	57	8.1	64	11.1

Table Biv: Drug resistance among TB cases with culture confirmed disease, North West, 2005 – 2014

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Culture confirmed	414	418	430	427	481	490	506	469	448	389
Drug resistant*	25	19	31	21	23	28	32	24	30	30
% Drug resistant	6%	5%	7%	5%	5%	6%	6%	5%	7%	8%

* 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, 2011 – 2014

	2011		2012		2013		2014	
Hospital/clinic	Total	Pulm	Total	Pulm	Total	Pulm	Total	Pulm
Alder Hey Children's Hospital	3	2	5	5	0	0	5	3
Arrowe Park Hospital	8	3	12	3	10	5	6	4
Blackpool Victoria Hospital	31	25	26	23	19	13	23	19
Broadgreen Hospital	0	0	0	0	0	0	1	1
Burnley General Hospital	0	0	7	2	0	0	0	0
Chorley & South Ribble Hospital	0	0	0	0	5	5	4	4
Countess of Chester Hospital	11	7	6	4	8	3	9	7
Cumberland Infirmary	0	0	15	7	7	5	4	1
Fairfield General Hospital	13	6	19	7	3	1	6	3
Furness General Hospital	3	2	12	9	4	1	6	4
Leighton Hospital	1	0	3	2	13	7	7	6
Liverpool Heart and Chest Hospital	12	6	10	8	9	4	3	3
Macclesfield District General Hospital	2	1	2	2	10	5	4	4
Manchester Royal Infirmary	164	68	134	50	128	44	98	42
North Manchester General Hospital	69	34	59	33	57	29	54	24
Rochdale Infirmary	40	19	24	10	26	14	42	26
Royal Blackburn Hospital	81	40	81	35	105	44	54	23
Royal Bolton Hospital	54	31	47	18	55	23	59	27
Royal Lancaster Infirmary	10	10	7	4	4	2	5	3
Royal Liverpool University Hospital	36	13	44	27	42	21	32	16
Royal Manchester Children's Hospital	34	17	21	10	13	10	13	8
Royal Oldham Hospital	36	20	40	26	32	17	40	17
Royal Preston Hospital	64	25	47	24	33	23	26	15
Salford Royal	23	9	24	11	27	7	29	13
Southport & Formby District General Hospital	3	3	7	7	4	2	4	4
St Helens Hospital	1	1	0	0	0	0	0	0
Stepping Hill Hospital	15	12	10	4	11	7	11	7
Tameside General Hospital	34	25	29	17	17	9	15	13
Thomas Linacre Centre	7	5	6	4	13	8	12	8
Trafford General Hospital	9	4	14	6	15	11	15	10
University Hospital Aintree	2	0	6	2	6	6	7	4
Warrington Hospital	3	1	6	5	10	7	8	6
West Cumberland Hospital	0	0	3	1	1	0	2	1
Westmorland General Hospital	5	4	1	1	1	0	0	0
Whiston Hospital	4	3	5	2	8	6	9	7
Wythenshawe Hospital	40	18	46	22	30	18	38	24
North West	818	414	778	391	726	357	651	357

Table Cii: HIV testing (offered and uptake) of TB cases by North West hospital, 2014

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**
Alder Hey Children's Hospital	0	1	3	0	0	1	5	75%	100%
Arrowe Park Hospital	1	0	4	1	0	0	6	100%	83%
Blackpool Victoria Hospital	4	4	11	0	0	4	23	79%	100%
Broadgreen Hospital	0	0	1	0	0	0	1	100%	100%
Chorley & South Ribble Hospital	0	0	3	0	0	1	4	100%	100%
Countess of Chester Hospital	0	0	9	0	0	0	9	100%	100%
Cumberland Infirmary	0	0	3	0	0	1	4	100%	100%
Fairfield General Hospital	0	0	4	0	0	2	6	100%	100%
Furness General Hospital	0	2	2	0	0	2	6	50%	100%
Leighton Hospital	0	0	6	0	0	1	7	100%	100%
Liverpool Heart and Chest Hospital	0	0	3	0	0	0	3	100%	100%
Macclesfield District General Hospital	0	1	3	0	0	0	4	75%	100%
Manchester Royal Infirmary	5	0	80	0	0	13	98	100%	100%
North Manchester General Hospital	6	0	48	0	0	0	54	100%	100%
Rochdale Infirmary	1	1	37	0	0	3	42	97%	100%
Royal Blackburn Hospital	1	8	44	0	0	1	54	85%	100%
Royal Bolton Hospital	0	0	49	0	1	9	59	100%	98%
Royal Lancaster Infirmary	0	1	2	0	0	2	5	67%	100%
Royal Liverpool University Hospital	5	1	25	1	0	0	32	97%	97%
Royal Manchester Children's Hospital	0	0	12	0	0	1	13	100%	100%
Royal Oldham Hospital	0	6	32	0	0	2	40	84%	100%
Royal Preston Hospital	2	1	16	0	0	7	26	95%	100%
Salford Royal	0	1	24	0	0	4	29	96%	100%
Southport & Formby District General Hospital	0	0	2	0	1	1	4	100%	67%
Stepping Hill Hospital	0	0	8	0	0	3	11	100%	100%
Tameside General Hospital	0	1	10	0	0	4	15	91%	100%
Thomas Linacre Centre	1	0	8	0	0	3	12	100%	100%
Trafford General Hospital	0	1	12	0	1	1	15	93%	92%
University Hospital Aintree	0	1	6	0	0	0	7	86%	100%
Warrington Hospital	0	2	6	0	0	0	8	75%	100%
West Cumberland Hospital	0	1	1	0	0	0	2	50%	100%
Whiston Hospital	0	0	8	0	0	1	9	100%	100%
Wythenshawe Hospital	2	1	32	0	1	2	38	97%	97%
North West	28	34	514	2	4	69	651	94%	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, 2011 – 2014

	2011		2012		2013		2014	
Hospital/clinic	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Alder Hey Children's Hospital	0	0%	0	0%	0	-	0	0%
Arrowe Park Hospital	1	17%	0	0%	1	11%	1	20%
Blackpool Victoria Hospital	6	21%	1	5%	5	45%	6	32%
Broadgreen Hospital	0	-	0	-	0	-	0	0%
Burnley General Hospital	0	-	0	0%	0	-	0	-
Chorley & South Ribble Hospital	0	-	0	-	1	33%	1	25%
Countess of Chester Hospital	0	0%	0	0%	0	0%	0	0%
Cumberland Infirmary	0	-	1	7%	0	0%	0	0%
Fairfield General Hospital	0	0%	1	8%	0	0%	1	17%
Furness General Hospital	1	50%	2	67%	0	0%	1	17%
Leighton Hospital	0	0%	2	100%	0	0%	1	17%
Liverpool Heart and Chest Hospital	1	13%	2	22%	0	0%	0	0%
Macclesfield District General Hospital	1	100%	2	100%	0	0%	1	50%
Manchester Royal Infirmary	5	5%	1	1%	3	4%	4	7%
North Manchester General Hospital	4	8%	6	11%	3	7%	5	12%
Rochdale Infirmary	1	4%	1	5%	2	9%	3	8%
Royal Blackburn Hospital	0	0%	2	5%	2	2%	0	0%
Royal Bolton Hospital	1	2%	2	5%	4	9%	1	2%
Royal Lancaster Infirmary	1	20%	2	33%	0	0%	1	25%
Royal Liverpool University Hospital	3	11%	10	23%	8	20%	4	15%
Royal Manchester Children's Hospital	0	0%	0	0%	0	0%	0	0%
Royal Oldham Hospital	3	12%	3	8%	4	13%	5	15%
Royal Preston Hospital	6	11%	4	9%	5	16%	3	13%
Salford Royal	3	16%	5	28%	1	4%	4	15%
Southport & Formby District General Hospital	0	0%	2	33%	1	25%	0	0%
St Helens Hospital	0	-	0	-	0	-	0	-
Stepping Hill Hospital	0	0%	1	33%	1	33%	0	0%
Tameside General Hospital	7	21%	3	21%	4	27%	0	0%
Thomas Linacre Centre	2	33%	1	17%	0	0%	0	0%
Trafford General Hospital	0	0%	0	0%	0	0%	0	0%
University Hospital Aintree	0	0%	0	0%	3	60%	2	33%
Warrington Hospital	1	33%	0	0%	2	25%	0	0%
West Cumberland Hospital	0	-	0	0%	0	0%	0	0%
Westmorland General Hospital	1	50%	0	-	0	0%	0	-
Whiston Hospital	1	25%	1	25%	2	25%	0	0%
Wythenshawe Hospital	4	11%	1	3%	0	0%	4	12%
North West	53	9%	56	10%	52	9%	48	9%

* 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, 2014

Hospital/clinic	Total pulmonary cases	Pulmonary with sputum smear		Pulmonary with positive sputum		Pulmonary with positive culture	
		n	%	n	%	n	%
Alder Hey Children's Hospital	3	1	33%	0	0%	0	0%
Arrowe Park Hospital	4	4	100%	0	0%	3	75%
Blackpool Victoria Hospital	19	12	63%	9	75%	12	63%
Broadgreen Hospital	1	1	100%	0	0%	1	100%
Chorley & South Ribble Hospital	4	1	25%	1	100%	3	75%
Countess of Chester Hospital	7	4	57%	2	50%	5	71%
Cumberland Infirmary	1	0	0%	0	-	0	0%
Fairfield General Hospital	3	1	33%	0	0%	3	100%
Furness General Hospital	4	2	50%	1	50%	2	50%
Leighton Hospital	6	5	83%	1	20%	6	100%
Liverpool Heart and Chest Hospital	3	3	100%	0	0%	3	100%
Macclesfield District General Hospital	4	1	25%	0	0%	3	75%
Manchester Royal Infirmary	42	19	45%	11	58%	33	79%
North Manchester General Hospital	24	14	58%	10	71%	23	96%
Rochdale Infirmary	26	14	54%	4	29%	15	58%
Royal Blackburn Hospital	23	13	57%	6	46%	14	61%
Royal Bolton Hospital	27	16	59%	10	63%	19	70%
Royal Lancaster Infirmary	3	2	67%	2	100%	2	67%
Royal Liverpool University Hospital	16	13	81%	11	85%	15	94%
Royal Manchester Children's Hospital	8	6	75%	2	33%	4	50%
Royal Oldham Hospital	17	7	41%	5	71%	12	71%
Royal Preston Hospital	15	10	67%	4	40%	9	60%
Salford Royal	13	8	62%	3	38%	10	77%
Southport & Formby District General Hospital	4	2	50%	2	100%	2	50%
Stepping Hill Hospital	7	4	57%	2	50%	6	86%
Tameside General Hospital	13	8	62%	3	38%	4	31%
Thomas Linacre Centre	8	2	25%	0	0%	4	50%
Trafford General Hospital	10	8	80%	0	0%	8	80%
University Hospital Aintree	4	4	100%	2	50%	4	100%
Warrington Hospital	6	1	17%	1	100%	4	67%
West Cumberland Hospital	1	1	100%	1	100%	1	100%
Whiston Hospital	7	3	43%	2	67%	6	86%
Wythenshawe Hospital	24	17	71%	10	59%	20	83%
North West	357	207	58%	105	51%	256	72%

Table Cv: Drug resistance of culture confirmed TB cases by North West clinics, 2014

	Resistance to any first line drug*		Isoniazid resistant		Multi-drug resistant	
Hospital/clinic	**n**	**%**	**n**	**%**	**n**	**%**
Alder Hey Children's Hospital	0	0%	0	0%	0	0%
Arrowe Park Hospital	2	50%	2	50%	2	50%
Blackpool Victoria Hospital	0	0%	0	0%	0	0%
Broadgreen Hospital	0	0%	0	0%	0	0%
Chorley & South Ribble Hospital	1	33%	1	33%	0	0%
Countess of Chester Hospital	0	0%	0	0%	0	0%
Fairfield General Hospital	0	0%	0	0%	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	1	33%	1	33%	1	33%
Manchester Royal Infirmary	9	15%	9	15%	1	2%
North Manchester General Hospital	2	5%	2	5%	0	0%
Rochdale Infirmary	1	4%	1	4%	0	0%
Royal Blackburn Hospital	3	13%	3	13%	0	0%
Royal Bolton Hospital	3	10%	3	10%	0	0%
Royal Lancaster Infirmary	0	0%	0	0%	0	0%
Royal Liverpool University Hospital	3	14%	3	14%	2	9%
Royal Manchester Children's Hospital	1	17%	1	17%	0	0%
Royal Oldham Hospital	1	4%	1	4%	0	0%
Royal Preston Hospital	1	6%	1	6%	0	0%
Salford Royal	0	0%	0	0%	0	0%
Southport & Formby District General Hospital	0	0%	0	0%	0	0%
Stepping Hill Hospital	1	13%	1	13%	0	0%
Tameside General Hospital	0	0%	0	0%	0	0%
Thomas Linacre Centre	1	25%	1	25%	0	0%
Trafford General Hospital	0	0%	0	0%	0	0%
University Hospital Aintree	0	0%	0	0%	0	0%
Warrington Hospital	0	0%	0	0%	0	0%
West Cumberland Hospital	0	0%	0	0%	0	0%
Whiston Hospital	1	14%	1	14%	0	0%
Wythenshawe Hospital	1	4%	1	4%	0	0%
North West	32	8%	32	8%	6	2%

***** 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, 2013*

Hospital/clinic	Total cases	Treatment completed	Still on treatment	Died	Lost to follow up	Treatment stopped	Not evaluated
Arrowe Park Hospital	8	100%	0%	0%	0%	0%	0%
Blackpool Victoria Hospital	18	78%	11%	11%	0%	0%	0%
Chorley & South Ribble Hospital	5	100%	0%	0%	0%	0%	0%
Countess of Chester Hospital	7	86%	0%	14%	0%	0%	0%
Cumberland Infirmary	7	86%	14%	0%	0%	0%	0%
Fairfield General Hospital	3	67%	0%	33%	0%	0%	0%
Furness General Hospital	3	100%	0%	0%	0%	0%	0%
Leighton Hospital	13	69%	8%	23%	0%	0%	0%
Liverpool Heart and Chest Hospital	9	89%	0%	11%	0%	0%	0%
Macclesfield District General Hospital	9	89%	0%	11%	0%	0%	0%
Manchester Royal Infirmary	118	83%	5%	1%	4%	3%	4%
North Manchester General Hospital	45	87%	4%	2%	4%	0%	2%
Rochdale Infirmary	23	78%	0%	9%	9%	4%	0%
Royal Blackburn Hospital	98	83%	5%	8%	2%	1%	1%
Royal Bolton Hospital	43	86%	5%	2%	5%	0%	2%
Royal Lancaster Infirmary	4	75%	25%	0%	0%	0%	0%
Royal Liverpool University Hospital	35	86%	0%	6%	3%	3%	3%
Royal Manchester Children's Hospital	13	100%	0%	0%	0%	0%	0%
Royal Oldham Hospital	31	84%	0%	6%	3%	6%	0%
Royal Preston Hospital	32	81%	3%	3%	3%	0%	9%
Salford Royal	23	83%	9%	9%	0%	0%	0%
Southport & Formby District General Hospital	4	75%	0%	0%	0%	25%	0%
Stepping Hill Hospital	10	70%	0%	30%	0%	0%	0%
Tameside General Hospital	15	93%	7%	0%	0%	0%	0%
Thomas Linacre Centre	12	83%	8%	0%	0%	0%	8%
Trafford General Hospital	14	86%	0%	7%	7%	0%	0%
University Hospital Aintree	6	50%	0%	33%	0%	0%	17%
Warrington Hospital	9	89%	0%	0%	11%	0%	0%
West Cumberland Hospital	1	100%	0%	0%	0%	0%	0%
Westmorland General Hospital	1	0%	0%	0%	100%	0%	0%
Whiston Hospital	8	63%	0%	38%	0%	0%	0%
Wythenshawe Hospital	27	74%	15%	11%	0%	0%	0%
North West	654	83%	4%	6%	3%	1%	2%

***** Treatment status is collected one year after notification for rifampicin sensitive TB notifications. Shown are notifications for 2013, with outcomes collected one year later in 2014.

Table Cvii: Treatment status at 12 months of rifampicin sensitive, CNS, miliary, spinal or cryptic TB notifications by North West clinics, 2013*

Hospital/clinic	Total cases	Treatment completed	Still on treatment	Died	Lost to follow up	Treatment stopped	Not evaluated
Arrowe Park Hospital	1	0%	100%	0%	0%	0%	0%
Blackpool Victoria Hospital	1	0%	100%	0%	0%	0%	0%
Countess of Chester Hospital	1	100%	0%	0%	0%	0%	0%
Furness General Hospital	1	100%	0%	0%	0%	0%	0%
Manchester Royal Infirmary	6	33%	17%	0%	17%	0%	33%
North Manchester General Hospital	12	58%	42%	0%	0%	0%	0%
Rochdale Infirmary	2	50%	50%	0%	0%	0%	0%
Royal Blackburn Hospital	6	67%	17%	17%	0%	0%	0%
Royal Bolton Hospital	12	42%	25%	17%	0%	0%	17%
Royal Liverpool University Hospital	6	67%	17%	0%	17%	0%	0%
Royal Oldham Hospital	1	100%	0%	0%	0%	0%	0%
Royal Preston Hospital	1	0%	0%	0%	0%	0%	100%
Salford Royal	4	50%	25%	0%	0%	0%	25%
Stepping Hill Hospital	1	100%	0%	0%	0%	0%	0%
Tameside General Hospital	1	100%	0%	0%	0%	0%	0%
Thomas Linacre Centre	1	0%	0%	0%	0%	0%	100%
Wythenshawe Hospital	3	67%	33%	0%	0%	0%	0%
North West	60	55%	27%	5%	3%	0%	13%

***** Treatment status is collected one year after notification for rifampicin sensitive TB notifications. Shown are notifications for 2013, with outcomes collected one year later in 2014.

Table Cviii: Treatment status at 24 months of rifampicin resistant TB notifications by Nort West clinics, 2012*

Hospital/clinic	Total cases	Treatment completed	Still on treatment
Manchester Royal Infirmary	3	67%	33%
North Manchester General Hospital	2	50%	50%
Royal Liverpool University Hospital	1	100%	0%
Wythenshawe Hospital	1	100%	0%
North West	7	71%	29%

***** Treatment status is collected two years after notification for rifampicin resistant TB notifications. Shown are notifications for 2012, with outcomes collected two years later in 2014.

Appendix D: Baseline data for TB strategy monitoring indicators, North West & England, 2000-2014

	Indicator 1: Overall TB incidence per 100,000 population			
	North West		England	
Year	Number of cases	Rate	Number of cases	Rate
2000	623	9.2	6,044	12.3
2001	638	9.4	6,170	12.5
2002	638	9.4	6,674	13.4
2003	574	8.4	6,630	13.3
2004	569	8.3	6,929	13.8
2005	743	10.8	7,658	15.1
2006	694	10.1	7,681	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	7,677	14.6
2011	816	11.6	8,276	15.6
2012	775	10.9	8,086	15.1
2013	717	10.1	7,257	13.5
2014	646	9.1	6,520	12.0

	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	
Year	Number of cases	Rate	Number of cases	Rate	Number of cases	Rate	Number of cases	Rate
2000	260	-	348	-	1,830	4.1	3,329	79.6
2001	299	-	327	-	1,889	4.3	3,432	79.1
2002	258	-	352	-	1,852	4.2	4,110	90.5
2003	235	-	330	-	1,703	3.8	4,327	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	5,174	92.9
2007	253	4.0	459	99.8	1,799	4.0	5,136	85.5
2008	231	3.6	474	93.5	1,865	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	1,815	4.0	5,515	83.1
2011	258	4.0	520	93.2	1,954	4.3	6,019	85.8
2012	262	4.1	494	90.5	2,005	4.4	5,841	81.4
2013	256	4.0	446	78.4	1,843	4.0	5,249	70.5
2014	231	3.6	399	65.4	1,774	3.9	4,610	60.3

	Indicator 5: Incidence of TB in UK born			
	North West		England	
Year	Number of cases	Rate	Number of cases	Rate
2000	28	2.1	209	2.3
2001	28	2.2	229	2.5
2002	31	2.4	228	2.6
2003	19	1.5	179	2.0
2004	23	1.8	264	3.0
2005	36	2.9	247	2.8
2006	32	2.6	209	2.4
2007	48	3.9	290	3.4
2008	50	4.1	294	3.4
2009	50	4.1	257	2.9
2010	53	4.3	238	2.7
2011	56	4.5	233	2.6
2012	48	3.9	254	2.9
2013	27	2.2	195	2.2
2014	31	2.5	187	2.1

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	-	-	-	-
2001	-	-	-	-
2002	-	-	-	-
2003	-	-	-	-
2004	-	-	-	-
2005	-	-	-	-
2006	-	-	-	-
2007	-	-	-	-
2008	-	-	-	-
2009	-	-	-	-
2010	-	-	-	-
2011	124	44.4	1,317	45.0
2012	124	43.1	1,369	44.0
2013	95	38.2	1,222	41.2
2014	111	37.4	1,137	39.5

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	-	-	-	-
2001	-	-	-	-
2002	-	-	-	-
2003	-	-	-	-
2004	-	-	-	-
2005	-	-	-	-
2006	-	-	-	-
2007	-	-	-	-
2008	-	-	-	-
2009	-	-	-	-
2010	-	-	-	-
2011	202	72.4	2,173	74.3
2012	204	70.8	2,294	73.8
2013	161	64.7	2,122	71.6
2014	209	70.4	2,005	69.7

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	192	52.2	1,857	52.1
2001	253	66.1	2,037	56.5
2002	265	69.4	2,618	65.0
2003	216	63.7	2,585	66.1
2004	213	67.8	2,742	68.5
2005	271	66.3	2,989	69.2
2006	267	72.6	2,985	69.5
2007	293	72.9	2,851	68.8
2008	277	74.9	2,902	67.8
2009	317	72.7	3,007	68.2
2010	312	73.8	2,866	70.4
2011	296	72.2	3,070	71.6
2012	285	73.3	2,946	70.3
2013	265	74.9	2,709	73.0
2014	253	71.7	2,482	72.3

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	261	93.5	2,781	99.4
2001	353	96.4	3,126	99.2
2002	369	95.1	3,792	98.6
2003	303	95.3	3,801	99.2
2004	296	93.1	4,024	98.6
2005	387	93.5	4,535	98.9
2006	396	94.7	4,613	98.7
2007	394	91.6	4,370	98.2
2008	401	93.9	4,430	97.6
2009	454	94.4	4,523	96.8
2010	459	93.7	4,513	97.9
2011	470	92.9	4,894	97.3
2012	440	93.8	4,784	97.7
2013	419	93.5	4,282	97.5
2014	360	92.5	3,821	97.6

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	267	45.5	3,632	63.7
2002	450	75.0	4,111	67.4
2003	384	73.1	4,191	69.6
2004	319	61.2	4,425	70.1
2005	468	68.6	4,873	70.3
2006	476	75.9	5,214	75.5
2007	490	74.7	5,285	78.1
2008	507	76.8	5,580	79.9
2009	588	80.9	5,911	81.8
2010	601	84.6	5,633	82.6
2011	588	80.4	6,000	81.8
2012	574	83.6	6,007	83.6
2013	536	82.7	5,445	84.8
2014	-	-	-	-

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	238	3.9
2002	27	4.3	296	4.5
2003	13	2.3	290	4.4
2004	16	2.8	333	4.9
2005	31	4.2	381	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	341	4.5
2011	36	4.4	426	5.2
2012	28	3.6	355	4.4
2013	21	3.0	283	3.9
2014	-	-	-	-

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	378	6.2
2002	45	7.1	439	6.6
2003	58	10.2	407	6.2
2004	40	7.1	402	5.9
2005	40	5.4	448	5.9
2006	45	6.5	430	5.7
2007	42	5.8	431	5.7
2008	39	5.3	436	5.6
2009	47	5.9	420	5.2
2010	36	4.5	382	5.0
2011	47	5.8	382	4.7
2012	44	5.7	387	4.8
2013	43	6.1	330	4.6
2014	-	-	-	-

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	3	75.0	36	52.2
2005	6	75.0	38	62.3
2006	3	100.0	39	49.4
2007	5	50.0	30	42.9
2008	0	0.0	43	58.9
2009	6	85.7	38	52.1
2010	3	42.9	37	47.4
2011	4	57.1	46	50.0
2012	5	83.3	53	56.4
2013	-	-	-	-
2014	-	-	-	-

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	13.0
2005	1	12.5	8	13.1
2006	0	0.0	8	10.1
2007	1	10.0	6	8.6
2008	0	0.0	10	13.7
2009	0	0.0	11	15.1
2010	2	28.6	9	11.5
2011	1	14.3	18	19.6
2012	0	0.0	9	9.6
2013	-	-	-	-
2014	-	-	-	-

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	5.8
2005	0	0.0	4	6.6
2006	0	0.0	3	3.8
2007	2	20.0	10	14.3
2008	0	0.0	7	9.6
2009	0	0.0	4	5.5
2010	0	0.0	1	1.3
2011	0	0.0	5	5.4
2012	0	0.0	4	4.3
2013	-	-	-	-
2014	-	-	-	-

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	452	60.9	5,201	66.9
2013	542	80.1	5,778	83.3
2014	513	85.1	5,297	85.4

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	30	60.0	373	72.7
2011	35	67.3	368	71.2
2012	36	75.0	395	74.7
2013	35	74.5	398	76.1
2014	-	-	-	-

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	308	8.0
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	333	7.6
2008	21	4.9	306	6.8
2009	23	4.8	369	8.0
2010	28	5.8	320	7.0
2011	32	6.4	414	8.3
2012	24	5.2	359	7.4
2013	30	6.7	332	7.7
2014	30	7.8	286	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	49	1.1
2009	3	0.6	59	1.3
2010	6	1.2	65	1.4
2011	7	1.4	80	1.6
2012	6	1.3	78	1.6
2013	7	1.6	68	1.6
2014	6	1.5	52	1.3