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Field Epidemiology Service

Tuberculosis in Yorkshire and the Humber

2015 report (presenting data to end of
2014)

Public Health England



Reader Information Box

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Important Information	The data supplied in this report includes small numbers of cases, for your organisation's internal use only. Please note for reasons of confidentiality, that these small numbers must not be published or disclosed without masking figures based on numbers between one and five cases, if these represent local data such as for a local authority or trust.
Acknowledgements	We are grateful to all those who contribute information on tuberculosis cases in Yorkshire and the Humber, including nurses, physicians, microbiologists, scientists, outreach and social care and administrative staff. Further thanks are due to colleagues in the TB section at the national PHE Centre for Infectious Disease Surveillance and Control who provided the cleaned matched dataset

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Acronyms used in the report

CMO	Chief Medical Officer
DOT	Directly Observed Therapy
ETS	Enhanced Tuberculosis Surveillance
HCW	Healthcare worker
HPA	Health Protection Agency
HPSC	Health Protection Services Colindale (HPA formally <i>Centre for Infections</i>)
HPU	Health Protection Unit
IGRA	Interferon-Gamma Release Assay
IMD	Index of Multiple Deprivation
INH	Isoniazid
ISC	Indian Sub-continent
LA	Local Authority
MDR-TB	Multi-drug resistant Tuberculosis
NHS	National Health Service
PCT	Primary Care Trust
PHE	Public Health England
RIF	Rifampicin
SHA	Strategic Health Authority
TOM	Treatment Outcome Monitoring
YOE	Year of Entry

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1. TB in Yorkshire and the Humber in 2013: Key points

Foreword

We are pleased to present our 2015 Annual TB report, containing data on the burden of TB in Yorkshire and Humber in 2014.

Much has changed in the past year, with the launch of the Collaborative Tuberculosis Strategy for England, dedicated NHS funding to support a latent TB infection screening programme, and the establishment of a TB Control Board jointly covering Yorkshire and the Humber and the North East.

In keeping with the national picture, the incidence of TB in Yorkshire and Humber continues to decline, but remains the second highest in a Public Health England Centre outside London, with a widening gap in incidence between local authority areas. The reduced incidence of TB in children is a welcome finding, but recent problems with BCG vaccine supply are cause for some concern and it remains to be seen whether this will have an impact on these rates. Meanwhile, there has been a small, but significant increase in cases of MDR-TB which is associated with considerable work pressures for a number of teams and agencies, and has raised concerns around sufficient infectious diseases capacity within the region. The number of TB incidents occurring in hospital and care settings remains an issue and we need to consider how best to address these findings.

In spite of all these challenges, local teams continue to deliver high quality services and this is reflected in a number of outcomes including continued improvements in treatment completion. We would like to take this opportunity to thank all those involved in commissioning and providing TB control activities for their enthusiasm and dedication to this important public health problem.



Dr Renu Bindra
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Introduction

Tuberculosis remains a serious public health problem in the UK and in Yorkshire and the Humber.

In 2014 the Collaborative Tuberculosis Strategy for England 2015 to 2020 was launched; developed in partnership by Public Health England and NHS England and in consultation with the British Thoracic Society, TB Alert, Local Government Association, Association of Directors of Public Health and the National Institute for Health and Care Excellence. The strategy sets out the ambition of achieving a year on year decrease in incidence, a reduction in health inequalities and ultimately the elimination of TB as a public health problem in England and describes a suite of TB Strategy monitoring indicators

(https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/403231/Collaborative_TB_Strategy_for_England_2015_2020_.pdf) Data for indicators which are presented at Upper tier Local Authority can be found at <http://fingertips.phe.org.uk/profile/tb-monitoring>.

This report on the epidemiology of tuberculosis in Yorkshire and the Humber is based on surveillance data on patients collected via the national Enhanced TB surveillance (ETS) system and microbiological information including drug resistance and strain typing, provided by the National Mycobacterium Reference Laboratory.

The information is presented at Public Health England Centre level (Yorkshire and the Humber) and by local authority (unitary or upper tier authority) and includes analyses of TB incidence in the region by demographic, socio-economic, clinical and microbiological characteristics. TB data from 2000 are updated annually to take into account denotifications, late notifications and other updates. The data from the current year's report supersedes data in previous reports.

It is hoped that the information presented in this report will support the local joint TB Control Board and assist Directors of Public Health, local authority health and wellbeing boards and health and social care service providers in developing and implementing action plans for TB prevention, management and control.

Summary

There were 524 cases of TB reported in Yorkshire and the Humber during 2014, with an incidence rate of 9.8 per 100,000, which is a reduction on 2013 (10.9 per 100,000) and below the peak incidence observed in 2009. This is consistent with the national trend.

There is considerable variation in TB rates across Yorkshire and the Humber and the gap between the highest burden local authority and other areas is widening.

The incidence rate in children aged 0-14 years reduced significantly in 2014 (2.2/100,000; 95%CI 1.37-3.38), compared to 2013 (5.6/100,000; 95%CI 4.2-7.34) and 2004 (3.9/100,000). Children aged 0 to 14 made up 4% (n=20) of all TB cases diagnosed in the region in 2014, a considerable reduction from 2013 when children accounted for 9% of cases (n=53). These figures are in keeping with the national picture with an incidence in children under 15 years of age of 2.1 (1.8- 2.4) However approximately two-thirds (13/20) of all children under 15 diagnosed with TB in the region during 2014 were UK born, compared to approximately half in 2013 (highlighting that potential missed opportunities for prevention remain).

Approximately two thirds of TB cases in Yorkshire and the Humber were non-UK born and 44% of these were diagnosed more than 10 years after migration.

The proportion of TB cases diagnosed with multi-drug resistant TB increased slightly in 2014 from 1.37% in 2013 to 2.44% in 2014. Mono-resistance to Isoniazid declined from 7.9% in 2011 to 5.5% in 2014.

Early diagnosis and treatment is key to preventing further transmission of TB. It is therefore worth noting that in 2014 almost two-thirds of TB cases commenced treatment more than two months after onset of symptoms.

The proportion of TB cases completing treatment within 12 months of diagnosis in the region (85%) has improved year on year and is consistent with the England average. There is however, considerable variation in treatment completion rates across the region with lower treatment completion reported from both low and high burden areas. Encouragingly many of the highest burden areas in Yorkshire and the Humber achieved or exceeded this level of treatment completion. Death and loss to follow up remain the most commonly reported reasons for failing to complete treatment. A process of root cause analysis of TB deaths has been developed and is being piloted in one area with a view to extension across Yorkshire and the Humber. The proportion of cases lost to follow-up at 12 months increased in 2014 to 4.7% and Yorkshire and Humber is an outlier on this indicator above the England average of 3.7%.

Cohort review, a system of quality assurance and accountability for the management of TB cases and their contacts has been successfully implemented across Yorkshire and the Humber in 2014. A review of the first year has been completed and improvements implemented to support the effective continuation of this process and facilitate its contribution to improvements in TB outcomes.

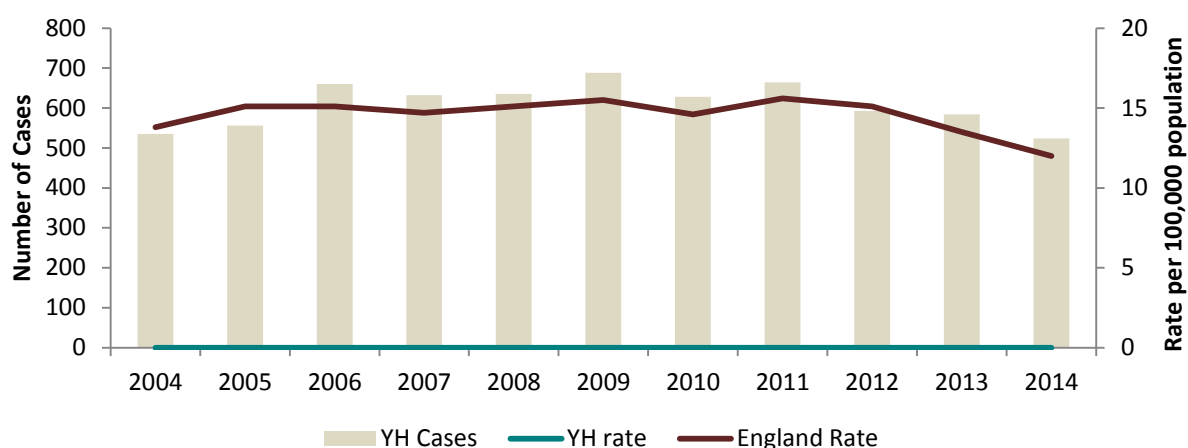
2. TB notifications and Incidence

Numbers, rates and geographical distribution

In 2014, a total of 524 cases of tuberculosis were reported in Yorkshire and the Humber; a rate of 9.8 per 100,000 population (95%CI 9.0-10.7) which is an improvement on 2013 (584 cases; rate of 10.9/100,000, 95%CI 10.1-11.9) (Figures 1 and 2). The TB incidence in Yorkshire and the Humber is the second highest rate in Public Health England (PHE) Centres outside London (Figure 3).

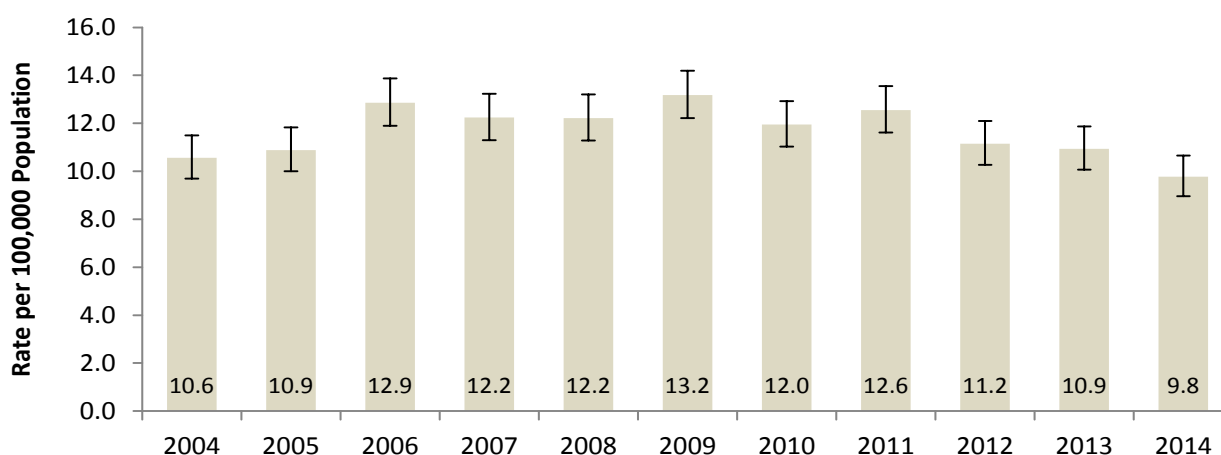
While the Yorkshire and Humber TB incidence rate remains below the England rate in 2014, (12 per 100,000 population); three local authorities in the region have significantly higher rates than the national average – Kirklees (20.41 per 100,000 population), Bradford and Airedale (18.2 per 100,000 population), and Sheffield (14.9 per 100,000 population).

Figure 1: Tuberculosis case reports and rates Yorkshire and the Humber and England, 2004-2014



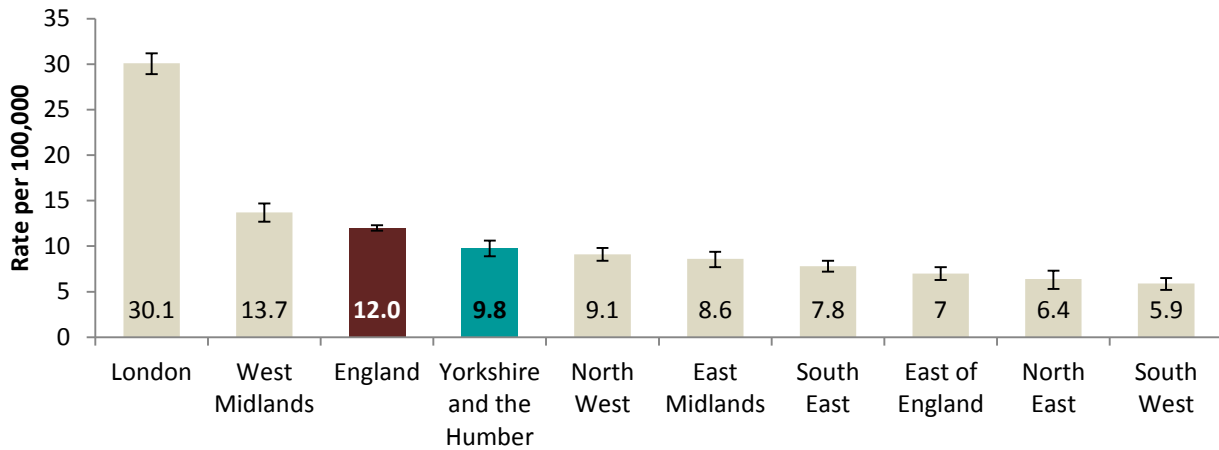
Source: ETS September 2015

Figure 2: Tuberculosis incidence rates in Yorkshire and the Humber with 95% confidence intervals, 2004-2014



Source: ETS September 2015

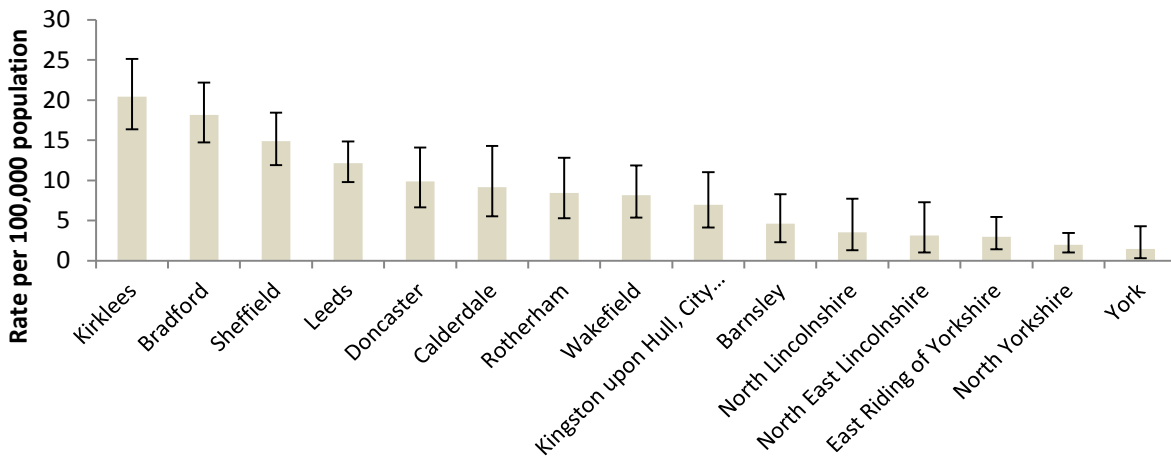
Figure 3: Tuberculosis rates by Public Health England Centre and England, 2014



Source: ETS September 2015

Almost two-thirds (61.6%) of the TB cases diagnosed in the region in 2014 were resident in West Yorkshire. Bradford and Airedale has the highest number of cases of TB in the region but has reported a marked decrease for the second of two consecutive years and the rate is declining. Kirklees had the highest TB rate in the region in 2014. The trend over time in the region is mixed; with many areas showing a decline in TB incidence rates between 2004 and 2014, while others have shown an increase. For areas with traditionally low incidence the change often reflects a specific local incident but the increase in the relatively high burden area of Kirklees is a concern. (Figures 4, 5, 6 and 7 and Table 1).

Figure 4: Tuberculosis incidence rates with 95% confidence intervals by local authority, Yorkshire and the Humber, 2014



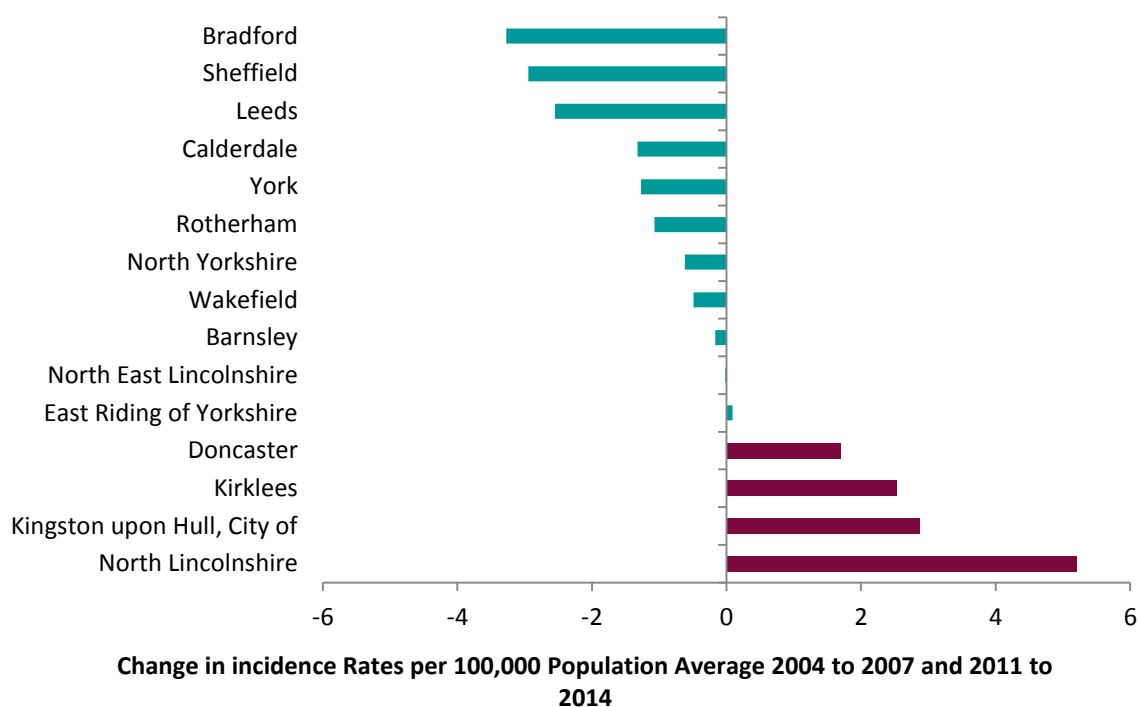
Source: ETS September 2015

Table 1: Number of cases of tuberculosis and regional ranking by local authority, Yorkshire and the Humber, 2004–2007, 2011-2014, and 2014

Local Authority	Average no. of cases 2004 - 2007	Rank Average 2004 - 2007	Average no. of cases 2011 - 2014	Rank Average 2011 - 2014	No of cases 2014	PHEC Rank
Bradford	155.8	1	148.8	1	96	1
Leeds	116.3	2	101.0	2	93	2
Kirklees	77.5	4	93.0	3	88	3
Sheffield	100.0	3	89.8	4	84	4
Doncaster	17.3	8	23.0	5	30	5
Wakefield	21.3	7	20.3	8	27	6
Rotherham	23.3	5	21.0	6	22	7
Calderdale	22.0	6	20.3	9	19	8
Hull	13.3	10	20.8	7	18	9
North Yorkshire	17.0	9	13.8	10	12	10
Barnsley	7.8	13	7.8	13	11	11
East Riding of Yorkshire	8.3	11	8.8	12	10	12
North Lincolnshire	4.3	14	13.3	11	6	13
North East Lincolnshire	3.8	15	3.8	15	5	14
York	8.3	12	6.3	14	3	15

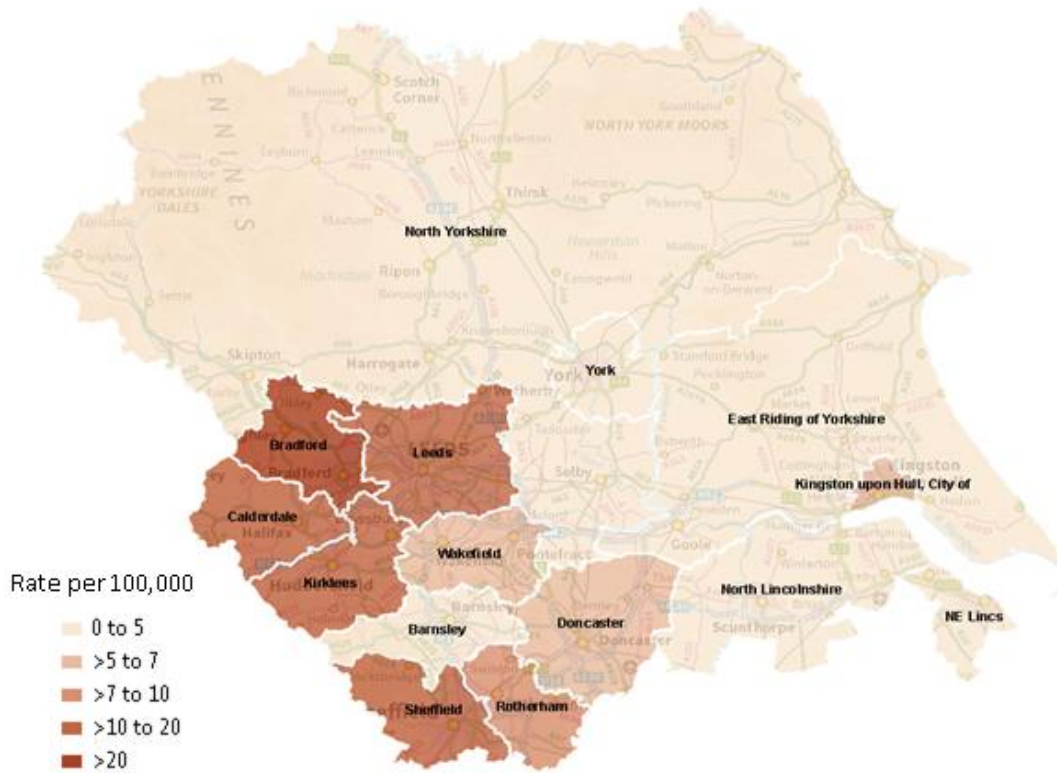
Source: ETS September 2015

Figure 5: Change in incidence rates of tuberculosis between 2004-2007 and 2011-2014, by local authority, Yorkshire and the Humber



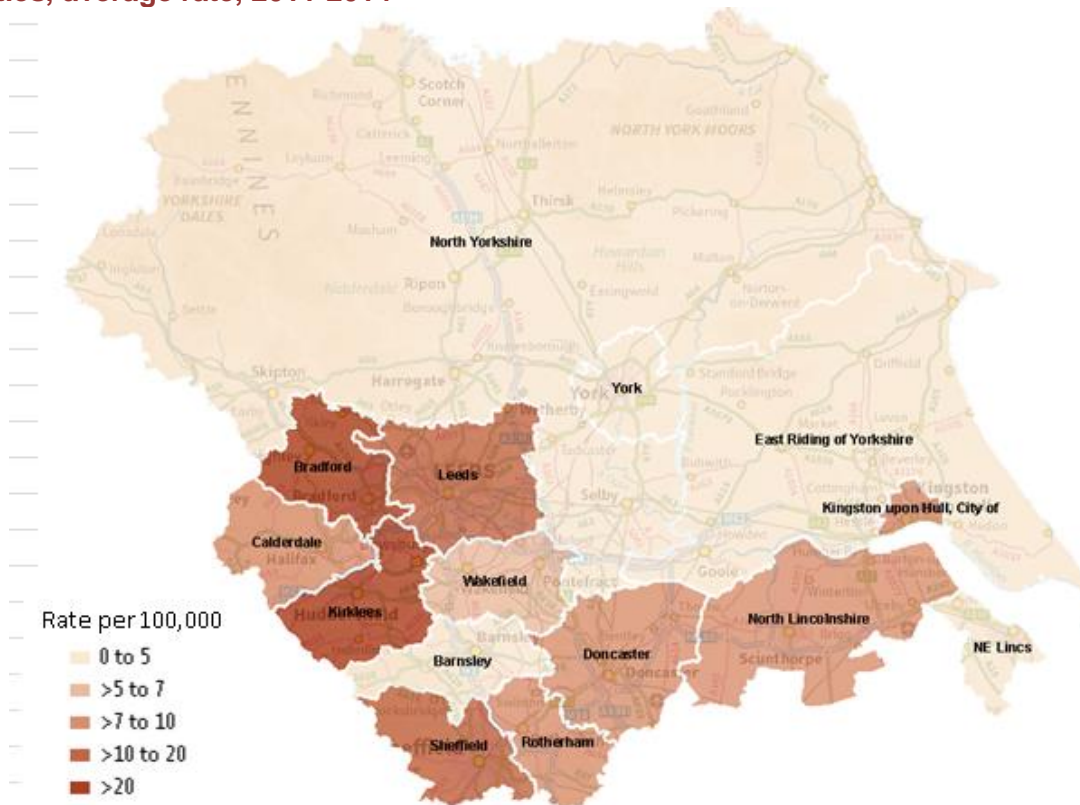
Source: ETS September 2015

Figure 6: Tuberculosis incidence per 100,000 population for Yorkshire and the Humber local authorities, average rate, 2004-2007



Source: ETS September 2015

Figure 7: Tuberculosis incidence per 100,000 population for Yorkshire and the Humber local authorities, average rate, 2011-2014



Source: ETS September 2015

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TB incidents in 2014

A TB incident is defined as a situation where potential transmission to non-household contacts is identified, warranting wider public health investigation beyond routine contact tracing. This includes potential, suspected or confirmed transmission in:

- An educational setting involving a child, student or member of staff
- A prison, reception centre or detention setting
- A healthcare setting involving a patient or a health care worker
- A workplace
- Other settings such as a place of worship, a club or pub, etc.
- Exposure on an aircraft

We also categorise as incidents, situations where legal public health action, such as applications made under the Health Protection 2010 Regulations (e.g. Part 2A orders) are considered necessary for the effective management of a TB patient.

Table 2 contains a selection of TB incidents reported in Yorkshire and the Humber in 2013. These incidents require a joint response from the NHS, Health Protection Teams in Public Health England, local authority public health and other services, and other agencies and can be prolonged and resource intensive. There has been a steady increase in the number and complexity of TB incidents reported across the region, reflecting increases in occurrence of these incidents and improvements in reporting and investigation, but also as a consequence of an increasingly complex health and social care landscape.

A recurring theme identified from these incidents is a failure to consider TB when patients with respiratory symptoms are admitted to hospital wards. Limited access to side rooms for patients with potentially infectious respiratory conditions remains a challenge. TB incidents in schools and workplaces also continue to be reported in Yorkshire and the Humber and across the country. These are labour intensive investigations which can cause a lot of anxiety for those involved.

Lack of clarity about responsibilities for funding the management of TB incident continue to pose a challenge for timely and efficient management of these incidents and should be a priority for resolution by local NHS commissioners.

Table 2: A selection of tuberculosis incidents in Yorkshire and the Humber, 2014

Area	Setting	Brief description	Number exposed	Outcome
North Yorkshire & the Humber	Workplace	Smear positive TB in a factory worker	31 factory co-workers (limited exposure)	31 inform and advise letters sent
	Hospital	Smear positive TB in a patient receiving outpatient chemotherapy and radiotherapy	31 patients	27 contacts screened, of whom 2 diagnosed with latent TB infection and commenced treatment. In 2, patients TB screening not advised but kept under review, 2 patients deceased (end of life pathway)
	Workplace	Smear positive TB in a call centre worker	17 co-workers screened	No evidence of transmission
	Hospital	Smear positive TB in an in-patient repatriated from abroad.	12 patients	10 patients no evidence of transmission. 2 patients kept under chest physician review

	Workplace	Smear positive TB in a call centre worker	130	Initially poor co-operation by employer requiring environmental health support. Large number of DNA. Of 96 screened, 3 diagnosed with latent TB infection.
South Yorkshire	School	A student with of smear positive TB in a secondary school	42	35/42 screened, 7 did not attend, including two who had left the country. One adult positive for latent TB infection, and referred for further investigations
	Supported accommodation	One of the residents in supported accommodation for homeless young people died of pulmonary TB	84	41/84 screened, 43 did not attend in spite of two additional offers of screening. 6 were positive for latent TB and referred – one of them subsequently being treated for active disease
West Yorkshire	School	Sputum smear positive pulmonary TB in a senior school student	109; 3 family, 1 HCW, 92 pupils & 14 staff	Screening identified 2 positives in school (out of 104 screened). Confirmed transmission to HCW.
	Hospital	Patient diagnosed with pulmonary TB during hospital admission	33; 21 family, 8 patients & 4 staff	No positive contacts found on screening of 16 family contacts.
	Care home	A resident of a care home for young people was diagnosed on post mortem and it was reported that 8 members of staff and 8 other residents had coughs.	16, 8 residents & 8 staff	16 people screened but nothing found
	Public house	A sputum smear positive case spent most of the weekend at the pub	53	53 people were screened, 3 were found to have active TB and 6 with LTBI
	Office workplace	A sputum smear positive case in an office environment.	26	26 people were screened, 1 was found to have active TB and 6 with LTBI
	School	Smear positive TB in a school pupil. Family screening identified 1 latent TB case. Two contacts commenced on prophylaxis. Further screening undertaken in school.	19 in school	No evidence of transmission.
	Hospital	Smear positive TB in a healthcare worker	51 patients 26 staff	No evidence of transmission to patients 2 HCW identified with latent TB
	Workplace	Index case diagnosed with smear positive TB	Family members 39 screened from workplace	3 latent and 1 active TB case in family Screening at work place identified 1 active 8 latent cases. Screening offered more widely many missed appointments

Source: HPZone PHE Yorkshire & the Humber Centre, December 2015

3. Demographic Characteristics

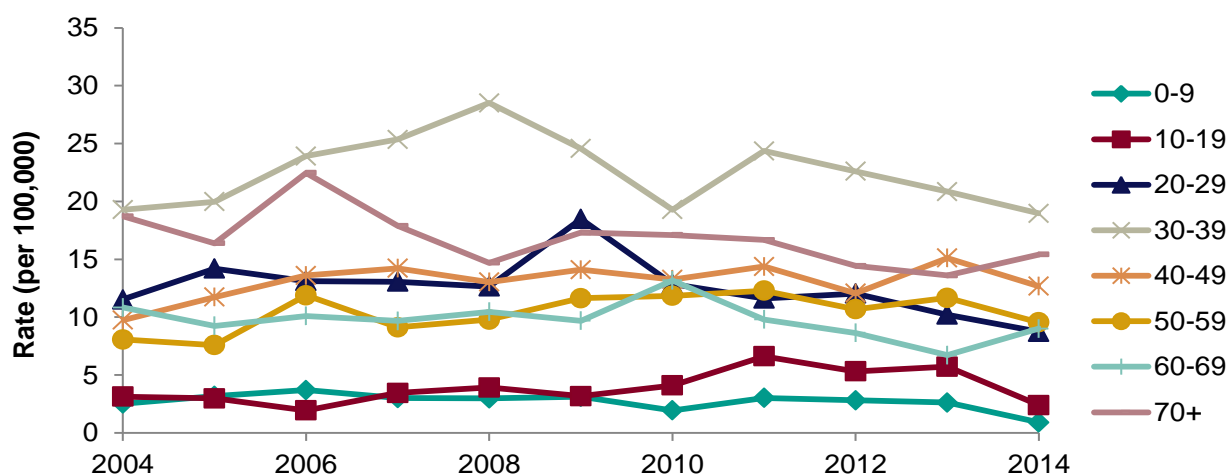
Age and gender

Fifty-four per cent of the TB cases in the region in 2014 were aged between 20 and 49 years. The proportion of cases in the 70 year and over age-group has declined from 25% in 2000 to 19% in 2014 and is now in line with the national figure.

The proportion of TB cases in the region occurring in children aged 1 years and under in 2014 was 4% which is a decline from 2013 when it was 9%. Similarly the incidence rate in this age group in Yorkshire and the Humber declined from 5.6 per 100,000 (95%CI 4.2-7.34) in 2013 to 2.2 per 100,000 (95%CI 1.37-3.38) in 2014 which is consistent with the national rate in children under fifteen (2.1 per 100,000). Of the TB cases in children in the region, 65% were UK-born. This is particularly a concern in Bradford where almost one in every ten TB cases in the last five years (9.9%) has been a child aged 14 years or younger.

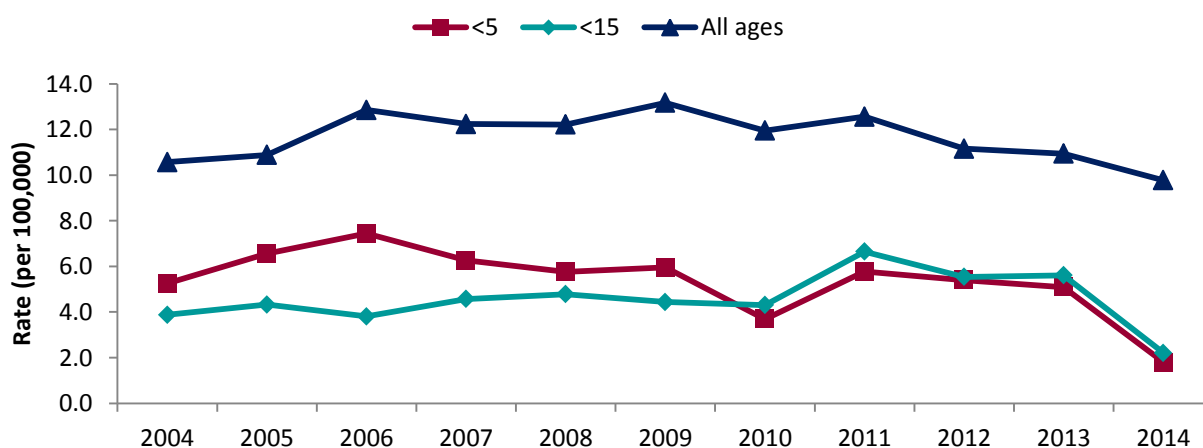
The epidemiology of TB in children in Yorkshire and the Humber indicates on-going TB transmission, indicating a failing TB control programme in some parts of the region.

Figure 8: All persons tuberculosis rates by age group, Yorkshire and the Humber, 2004-2014



Source: ETS September 2015

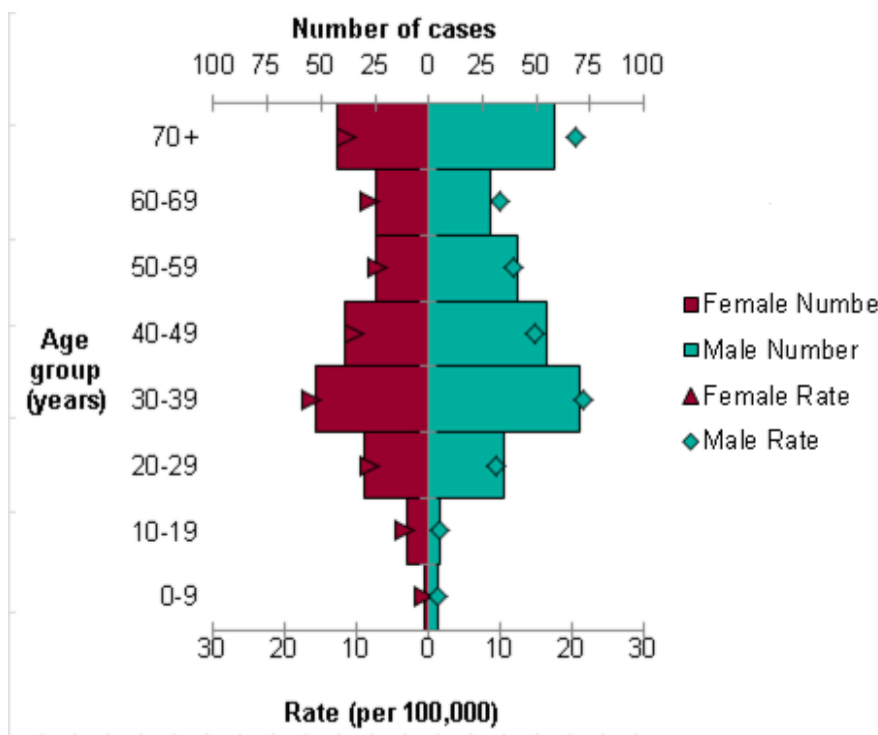
Figure 9: Child and adult tuberculosis notifications rates, Yorkshire and the Humber, 2004-2014



Source: ETS September 2015

In keeping with the national pattern, TB incidence in the Yorkshire and Humber region remained slightly higher in males than females. In 2014, there were more male TB cases in every age group except the 10-19 year age group, where there were more female cases. See Figure 11.

Figure 10: Tuberculosis reports & rates by age group and gender, Yorkshire and the Humber, 2014



Source: ETS September 2015

Place of birth

Place of birth was recorded for 92.9% (487/524) of cases reported in 2014, similar to 93% in 2013.

UK born

Thirty-six per cent of TB cases in Yorkshire and the Humber in 2014 were UK born. The incidence of TB in the UK-born population in the region has improved modestly between 2004 and 2013; with a UK-born TB incidence rate of 4.13/100,000 in 2004 declining to 3.6/100,000 in 2014 (Figure 12).

Non UK born

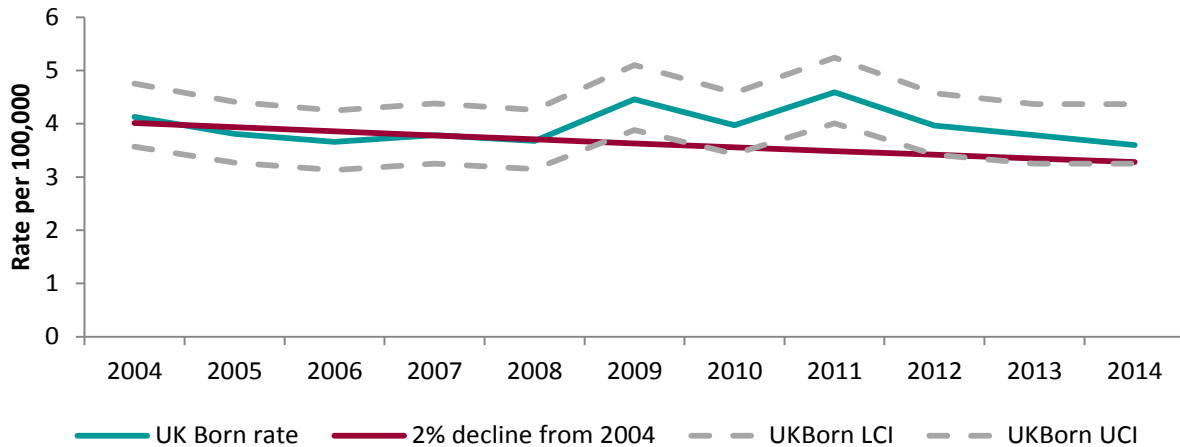
Sixty-four per cent of TB cases in the region in 2014 were born outside the UK (314/487). The incidence rate for TB in the non-UK born population in the region has declined from the peak of 112.5 per 100,000 population in 2006, to 67.8 per 100,000 population in 2014 (Figure 13)¹. However the TB incidence rate in the non UK born in the region remains higher than the national rate (60.3 per 100,000).

¹ The population estimates used to calculate TB incidence rates by country of birth have been updated. This has resulted in an increase in the denominator population for non-UK born and thus a **decrease** in the TB incidence rate for non-UK born compared to the rates reported in the previous annual report. The incidence rates in the UK-born remains mostly unchanged.

Place of birth and age

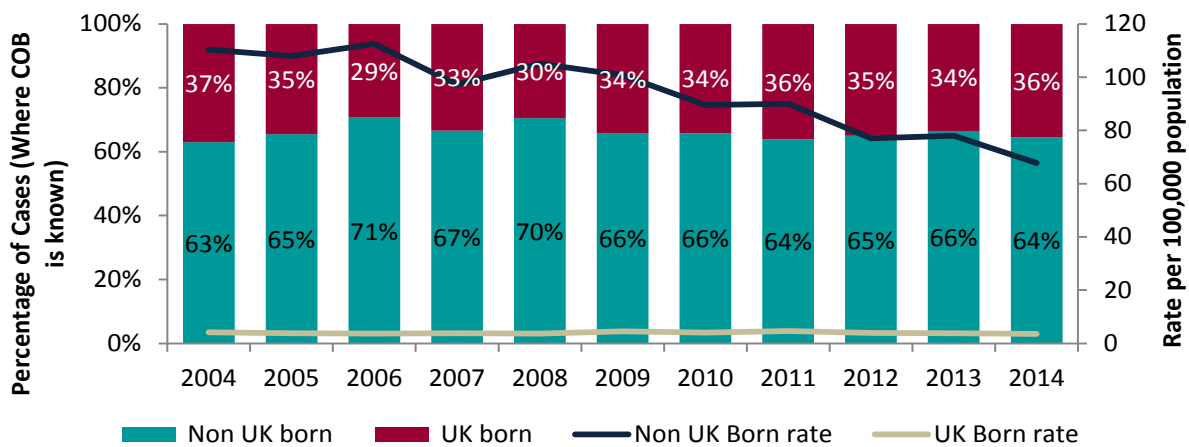
In 2014, the number of TB cases in non-UK-born exceeded that in the UK-born TB cases in every age group except the 0-14 age groups where cases in UK born children outnumber cases in children born outside of the UK (Figure 14). While the concentration of non-UK born TB cases in the adult age groups reflects migration patterns, the high proportion of UK-born TB cases in children under 15 years of age is of concern as it indicates recent TB transmission potentially occurring in the UK.

Figure 11: Tuberculosis rate per 100,000 population for UK born cases, with 95% confidence intervals and 2% decline target from 2004, Yorkshire and the Humber, 2004-2014



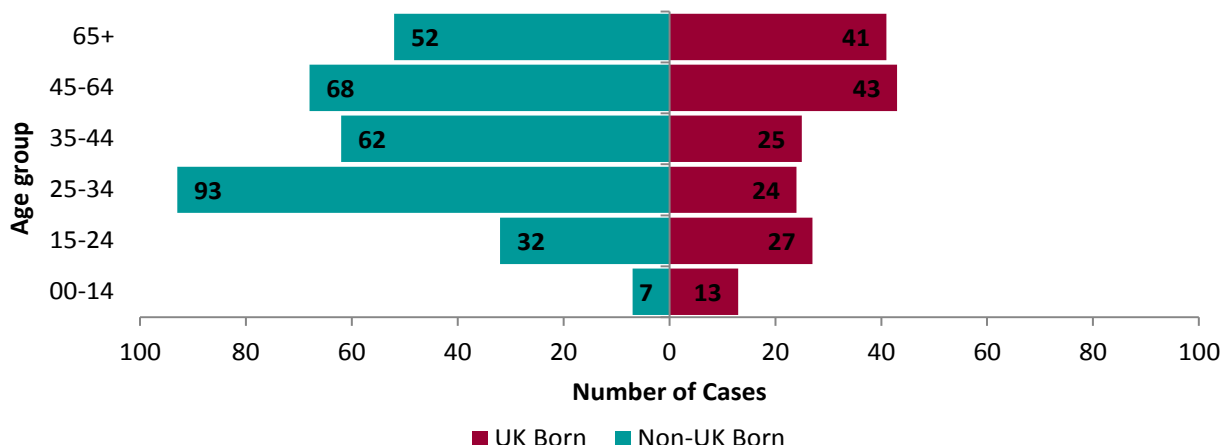
Source: ETS September 2015

Figure 102: Tuberculosis case reports by place of birth, proportion of cases and rate per 100,000 population, Yorkshire and the Humber, 2004-2014



Source: ETS September 2015

Figure 13: Tuberculosis case reports by place of birth and age group, Yorkshire and the Humber, 2014



Source: ETS September 2015

Country of birth

Amongst non-UK-born TB cases in the region, the most commonly reported country of birth was Pakistan, accounting for 41% of all non-UK born cases in 2014, followed by India (16%). Four sub-Saharan African countries – Somalia, Zimbabwe, Eritrea and South Africa – collectively accounted for 12.4% of cases in 2014. See Table 3. The proportion of TB cases from eastern European countries has remained stable, with 5% of the TB cases notified in 2014 coming from Eastern European countries (Slovakia, Poland, Lithuania, Latvia and Romania).

Table 3: Reported country of birth for non UK born tuberculosis cases, Yorkshire and the Humber, 2014

Birth Country	Number of Cases	% of Non UK Born Total
Pakistan	128	40.76
India	51	16.24
Zimbabwe	14	4.46
Somalia	11	3.50
Eritrea	10	3.18
Afghanistan	8	2.55
Bangladesh	7	2.23
Ethiopia	5	1.59
Congo	4	1.27
Latvia	4	1.27
Philippines	4	1.27
South Africa	4	1.27
Other <= 1% each and Unknown*	64	20.38

*Unknown country but known Non UK

Source: ETS September 2015

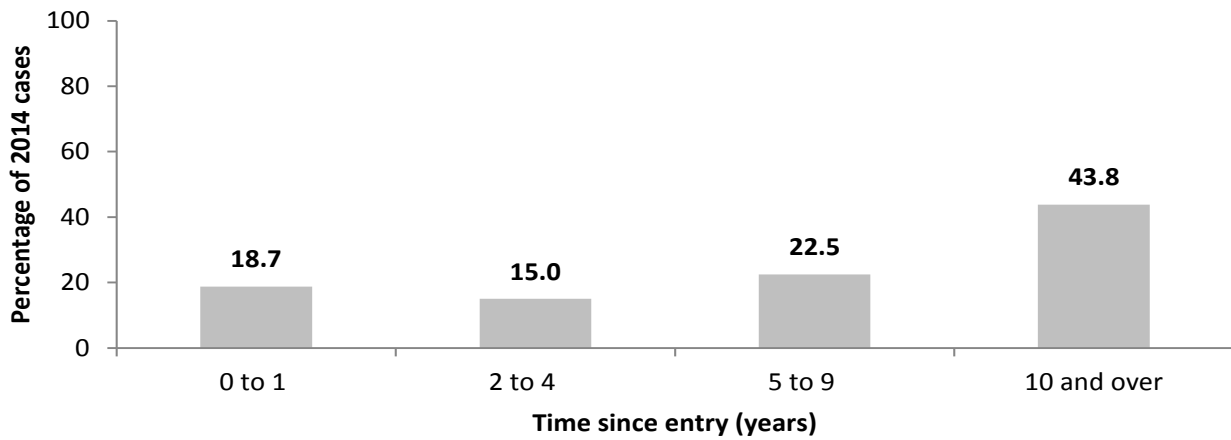
Time since entry into the UK

Time from entry to the UK to TB diagnosis was known for 85% of non-UK born TB cases notified in 2014.

Of these, 18.7% were diagnosed with TB within one year and 33.7% within four years of entering the UK. Over a third (43.8%) of TB cases in the non UK born were diagnosed ten years or more after entering the UK (Figures 14).

This indicates that most migrants to the region are not arriving with active TB disease and that systematic screening for and treatment of latent TB infection (LTBI) within the first few years after migration, should significantly reduce the number of TB cases in the region.

Figure 14: Non UK born tuberculosis cases by time since entry to the UK, Yorkshire and the Humber, 2014



Source: ETS September 2015

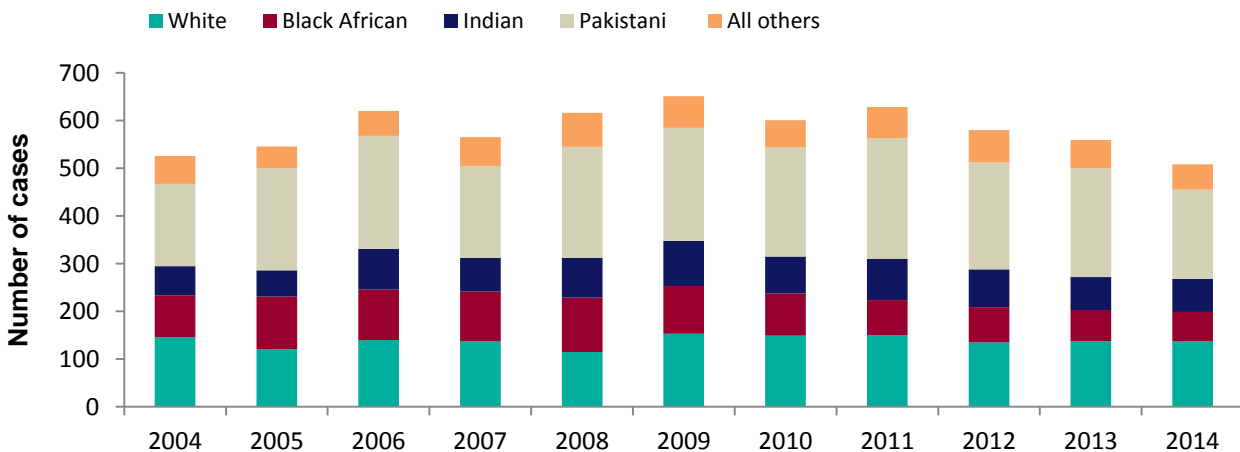
Ethnic origin

Ethnicity was recorded for 96.9% of TB cases notified in 2014.

Thirty-six per cent of TB cases in the region in 2014 were from the Pakistani ethnic group. The next largest proportions were the white ethnic group (26.9%), and the Indian (13.5%) and Black African ethnic group (12.2%), Figure 17.

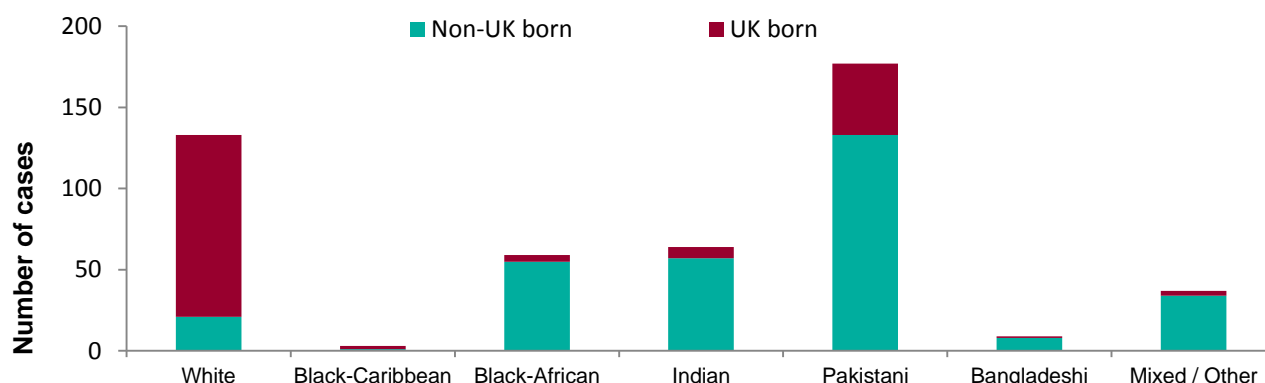
The proportion of TB cases with Indian Sub-continent (ISC) ethnicities (Pakistani, Indian, Bangladeshi), who were UK-born increased from 18% in 2004 to 30.1% in 2014. For Black ethnic groups (Black African, Black Caribbean, Black Other), the proportion that were UK-born decreased from 8.5% in 2004 to 3.4% in 2014. This suggests that while TB in the Black African ethnic groups in the region remains predominately associated with migration; for ISC ethnic groups, acquisition of TB infection in the UK is an increasing concern, Figures 17 and 18.

Figure 15: Tuberculosis case numbers by ethnic group, Yorkshire and Humber, 2004-2014



Source: ETS September 2015

Figure 16: Tuberculosis case numbers by ethnic group and place of birth, Yorkshire and Humber, 2014



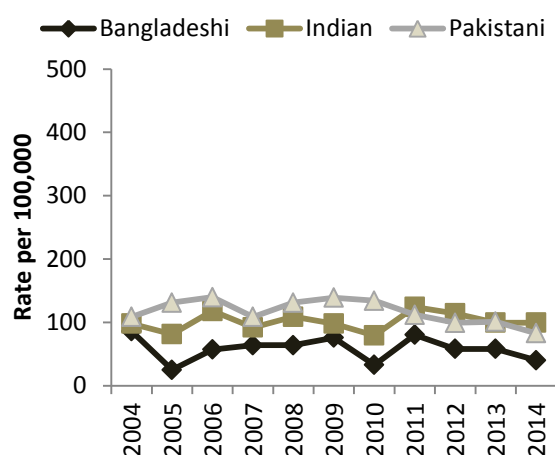
Source: ETS September 2015

The TB incidence rate in the Pakistani ethnic group decreased between 2004 and 2014 from 109 to 83 per 100,000 population.

A less marked decline was observed for other ethnic groups. The incidence in the Indian ethnic group declined from a peak of 124 in 2011 to 100 per 100,000 population in 2014, and the Bangladeshi group declined from 80 in 2011 to 40 per 100,000 population in 2013.

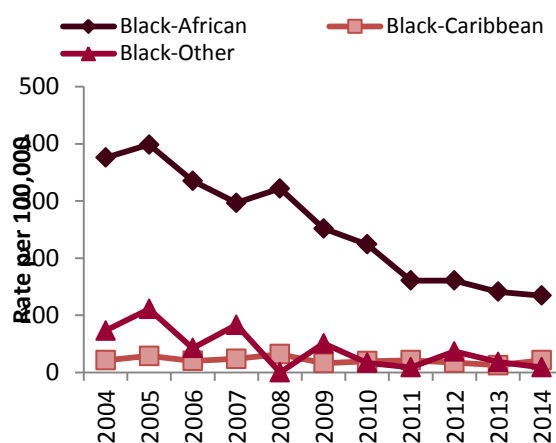
These rates are markedly higher than the rate for the white ethnic group which remained almost unchanged between 2004 (3.1 per 100,000 population) and 2014 (2.9 per 100,000 population). However the TB incidence rate for Black Africans in the region has declined from the peak of 399 per 100,000 population in 2005 to 135 per 100,000 population in 2014 in what appears to be a consistent trend (See Figures 17 to 20). Nationally a reduction in cases from Somalia and Zimbabwe has been observed over the last decade but these trends need to be interpreted in the context of changing migration patterns with a reduction in long term migration from high and very high TB incidence countries, and more recently the introduction of pre-entry screening since autumn 2012, alongside progress in international TB control programmes.

Figure 17: Trend in tuberculosis rates per 100,000 population for Indian sub-continent ethnic groups, Yorkshire and the Humber, 2004-2014



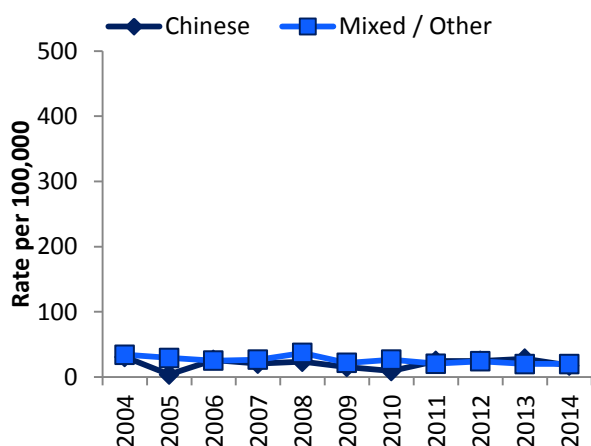
Source: ETS September 2015

Figure 18: Trend in tuberculosis rates per 100,000 population for black ethnic groups, Yorkshire and the Humber, 2004-2014



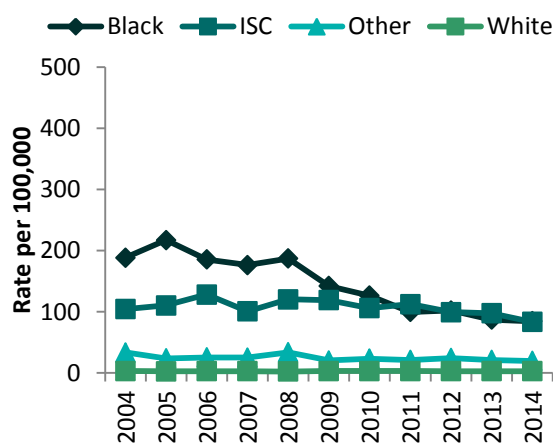
Source: ETS September 2015

Figure 19: Trend in tuberculosis rates per 100,000 population for mixed/other ethnic groups, Yorkshire and the Humber, 2004-2014



Source: ETS September 2015

Figure 20: Trend in tuberculosis rates per 100,000 population for white and all ethnic groups, Yorkshire and the Humber, 2004-2014



Source: ETS September 2015

Risk factors

Information on factors associated with increased risk of TB is collected for all TB cases. The risk factors collected include:

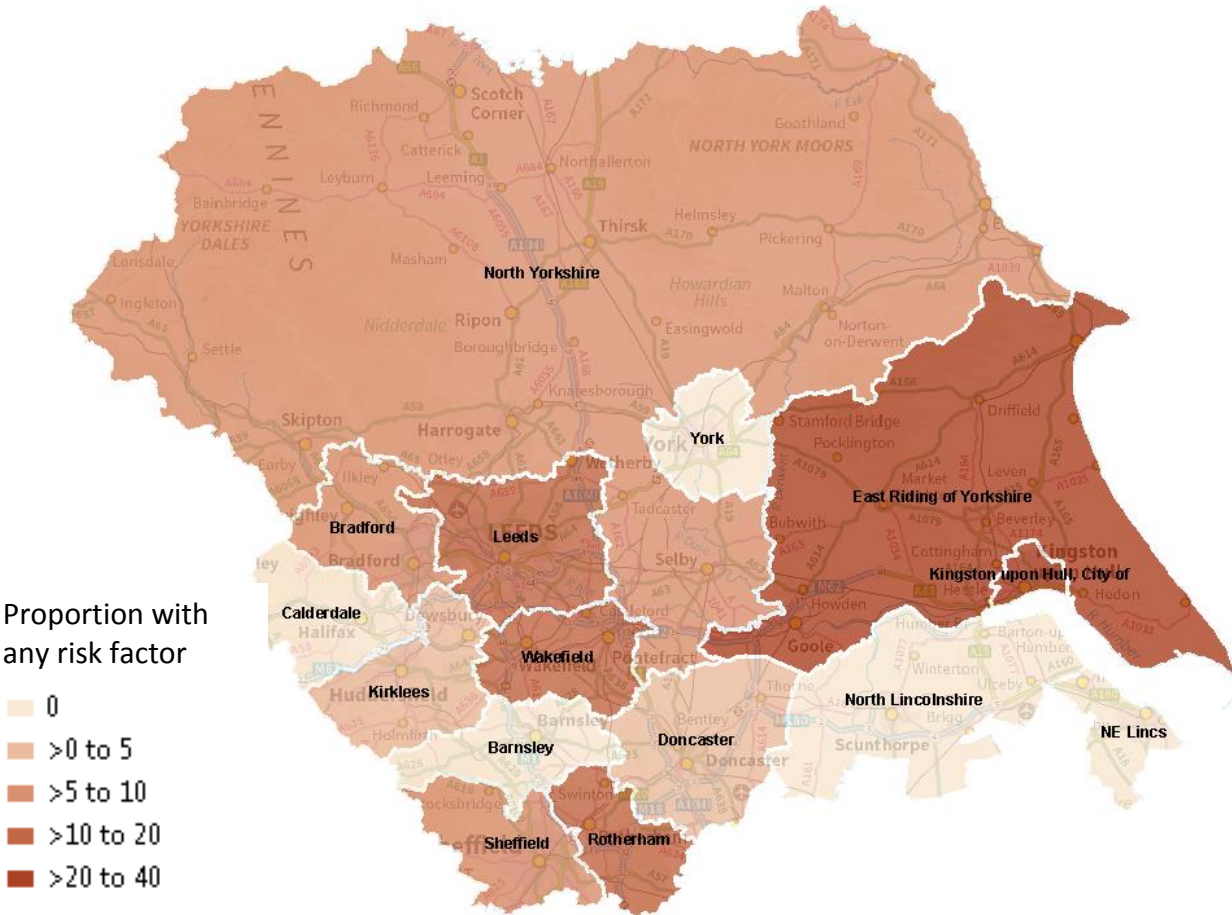
- Previous diagnosis of TB
- Substance misuse – alcohol or drug misuse
- Current or recent history (5years) of homelessness
- Current or recent history (5 years) of imprisonment

Reporting of risk factors associated with TB has improved since their addition to ETS in 2008. A response was recorded for 84% of TB cases reported in the region in 2014.

36/484 (7.4%) of the reported TB cases had a previous diagnosis of TB; 15/477 (3.2%) reported alcohol misuse; 14/478 (2.9%) reported drug misuse; 17/472 (3.6%) reported homelessness; and 18/448 (4.02%) reported imprisonment. As expected, TB patients reporting a previous diagnosis of TB were more likely to be non UK-born, of White, Pakistani, Indian or Bangladeshi ethnicity.

In total, 45/442 (10.1%) of TB cases notified in Yorkshire and the Humber in 2014 were reported as having at least one social risk factor for TB, consistent with the national epidemiology. Cases reporting social risk factors are distributed across the region (Figure 21) which indicates that even in areas with low incidence, TB cases may still present a management challenge as they are still likely to have factors that increase the complexity of case management.

Figure 21: Proportion of tuberculosis cases reporting any risk factor, Yorkshire and the Humber, 2014



Source: ETS September 2015
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Deprivation

The association between TB and deprivation is well established. Using the Index of Multiple Deprivation (IMD)², Table 4 shows the association between TB incidence rates in 2014 and IMD scores in 2015.

The IMD provides a summary measure of relative deprivation at Lower-layer Super Output Area (LSOA) level in England and aims to provide a nationally consistent measure of how deprived an area is, by identifying the degree to which people are disadvantaged based on factors such as low income, unemployment, lack of education, poor health, and crime. Each of the 32,844 LSOAs in England is assigned a score and rank. 602/3317 (18.1%) of the LSOAs in our region were categorised amongst the most deprived 10% of LSOAs in England in 2015³;

Of the region's population, 18.15% live in these most deprived areas. Much of the region's severe deprivation is concentrated within towns and cities such as Kingston-Upon-Hull, Sheffield, Leeds, Bradford, Huddersfield, Dewsbury and Rotherham. Severe deprivation is also to be found around the former coalfields of the region, in the districts of Doncaster, Wakefield and Barnsley.

The areas categorised as highly deprived in the region with very low TB rates (Barnsley and North East Lincolnshire) tend to be areas with very low proportions of their populations made up of migrants from high TB burden countries.

Table 4: Tuberculosis rates by local authority and corresponding local authority deprivation ranking, Yorkshire and the Humber, 2014

Upper Tier Local Authority name	Rate per 100,000 - 2014	Deprivation Rank IN Yorkshire and Humber
Kirklees	20.42	11
Bradford	18.18	2
Sheffield	14.90	7
Leeds	12.13	9
Doncaster	9.86	5
Calderdale	9.16	10
Rotherham	8.46	6
Wakefield	8.15	8
Kingston upon Hull, City of	6.98	1
Barnsley	4.62	4
North Lincolnshire	3.55	12
North East Lincolnshire	3.13	3
East Riding of Yorkshire	2.97	13
North Yorkshire	1.99	14
York	1.47	15

Source: ETS September 2014

² The IMD provides a summary measure of relative deprivation at Lower-layer Super Output Area (LSOA) level in England and aims to provide a nationally consistent measure of how deprived an area is, by identifying the degree to which people are disadvantaged based on factors such as low income, unemployment, lack of education, poor health, and crime. Each of the 32,844 LSOAs in England is assigned a score and rank.

³ Indices of Deprivation 2010. <https://www.gov.uk/government/publications/english-indices-of-deprivation-2010>. Accessed 08/01/2014

Occupation

Thirty-one TB cases in Yorkshire and the Humber in 2014 were known to be health care workers. Twenty-eight cases worked in education. TB cases in these occupations can indicate complexity in case management due to the nature of transmission chains. Forty-four percent of cases were reported as unemployed; a factor with well-recognised associations with some of the life-style risk factors for TB in addition to the correlation between unemployment and deprivation index.

Table 5: Occupational category of TB patients aged 18 to 65, Yorkshire and Humber, 2014

Occupation Category	No of patients*	%
Agricultural / animal care worker	0	0%
Education	28	8%
Health care worker	31	9%
Laboratory / pathology	0	0%
Social service / prison worker	5	1%
Other	136	38%
Unemployed	154	44%

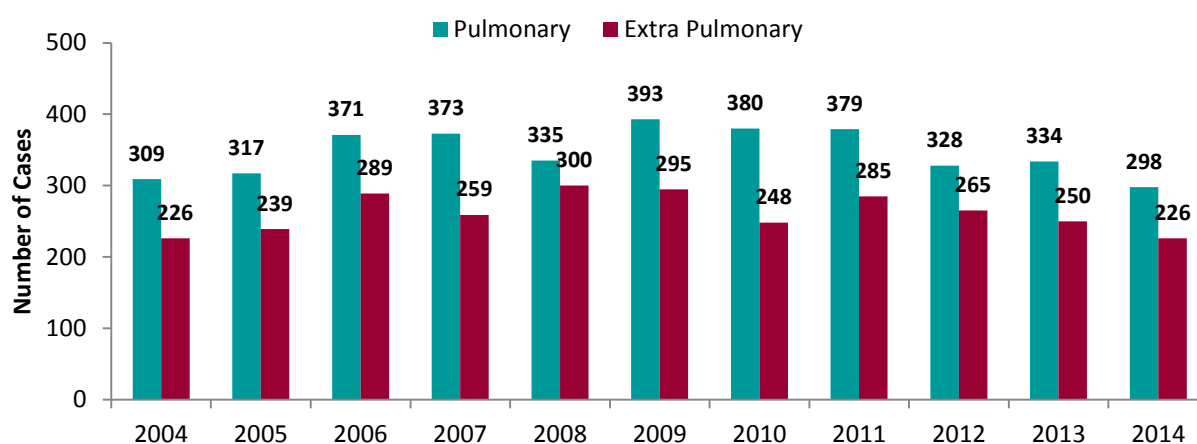
* excludes 39 patients where occupation is unknown

4. Clinical and Microbiological Characteristic

Site of Disease

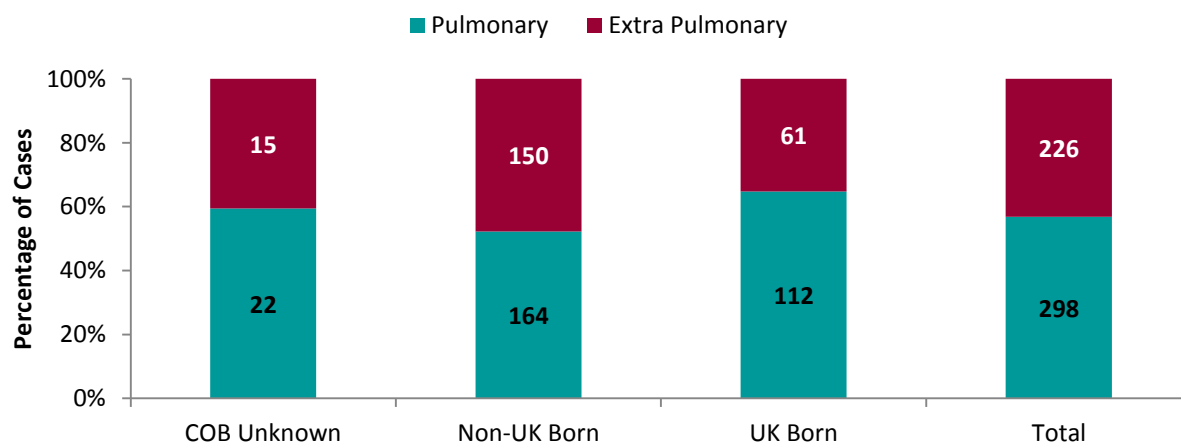
Fifty-seven per cent of TB cases reported in the region in 2014 had pulmonary disease, similar to the proportion nationally (52.9%). The ratio of pulmonary to extra-pulmonary TB cases has been relatively stable in the region in the past decade (Figure 22). In 2014 as in previous years, extra-pulmonary disease was more common in non-UK-born than in UK-born TB cases (Figure 23).

Figure 22: Tuberculosis cases by site of disease, Yorkshire and the Humber, 2004-2014



Source: ETS September 2015

Figure 23: Tuberculosis cases by site of disease and place of birth, Yorkshire and the Humber, 2014



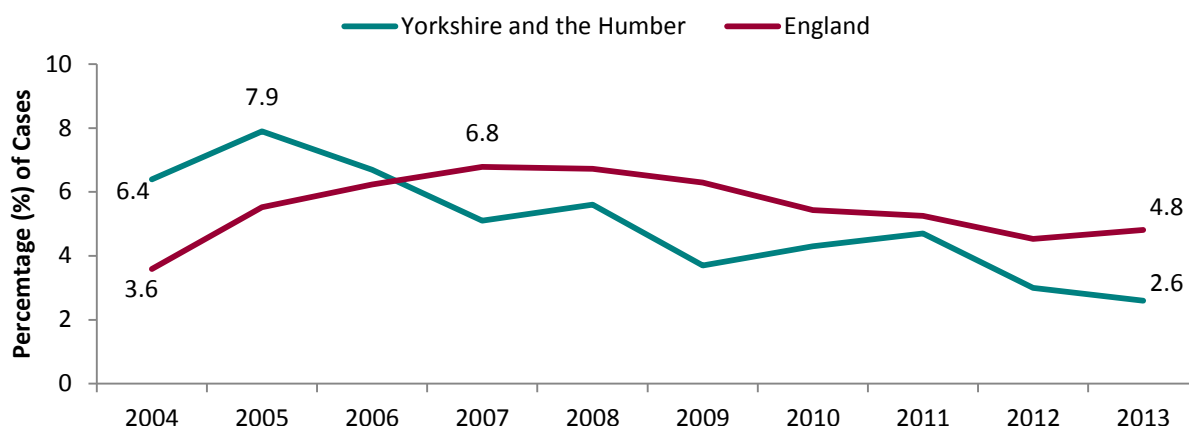
Source: ETS September 2015

Tuberculosis and HIV

The most recent year for which TB-HIV co-infection data is currently available for the region and nationally is 2013. Information on TB and HIV co-infection is obtained by matching 2001-2013 TB case reports for ages 15 and above, to HIV case reports from the national surveillance system SOPHID (Survey of Prevalent HIV Infections Diagnosed), combined with reports of new AIDS diagnoses where TB was reported as the AIDS defining illness. 2014 data will be available later in the year when work to link the records is completed.

TB and HIV co-infection rates nationally declined from the peak of 6.8% in 2007, to 4.8% in 2013. In the Yorkshire and the Humber region, rates of TB and HIV co-infection have also declined from the peak of 7.9% in 2005 to 2.6% in 2013 (Figure 24). Nationally 84% of TB-HIV co-infected patients were non-UK born; the majority were born in Africa.

Figure 24: Proportion of tuberculosis cases aged 15 and over co infected with HIV, Yorkshire and the Humber, 2004-2011



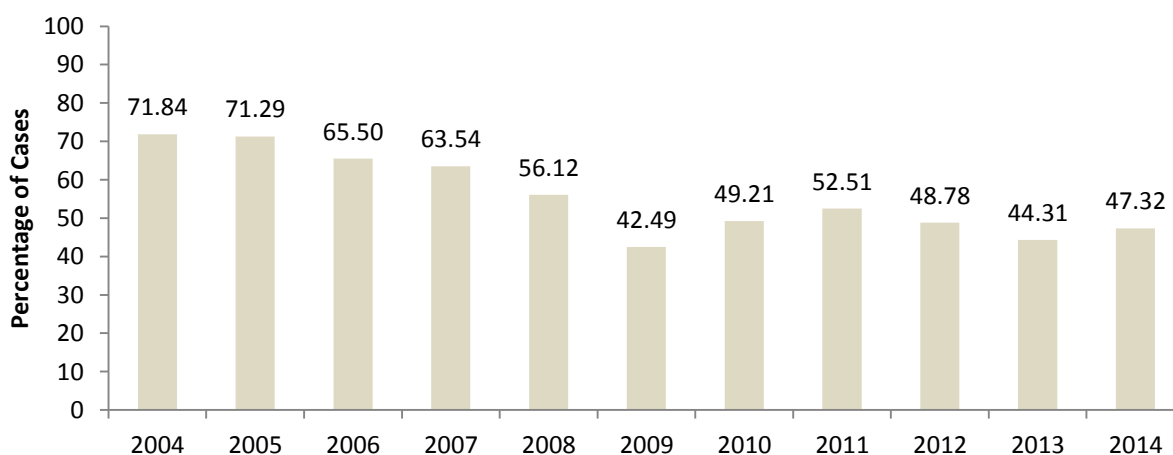
Source: ETS and SOPHID Matching exercise, 2013

Sputum smear status

Sputum smear status is an indicator of TB infectivity and therefore, a marker for potential spread. Sputum smear status was known for only 141/298 (47%) of pulmonary TB cases diagnosed in the region in 2014 (Figure 25). This is a decline from the level achieved in the region in 2005 (71%) and is a cause for concern. The reason for this decline is unclear but might be due in part to increased use of broncho-alveolar lavage for obtaining diagnostic samples for TB patients.

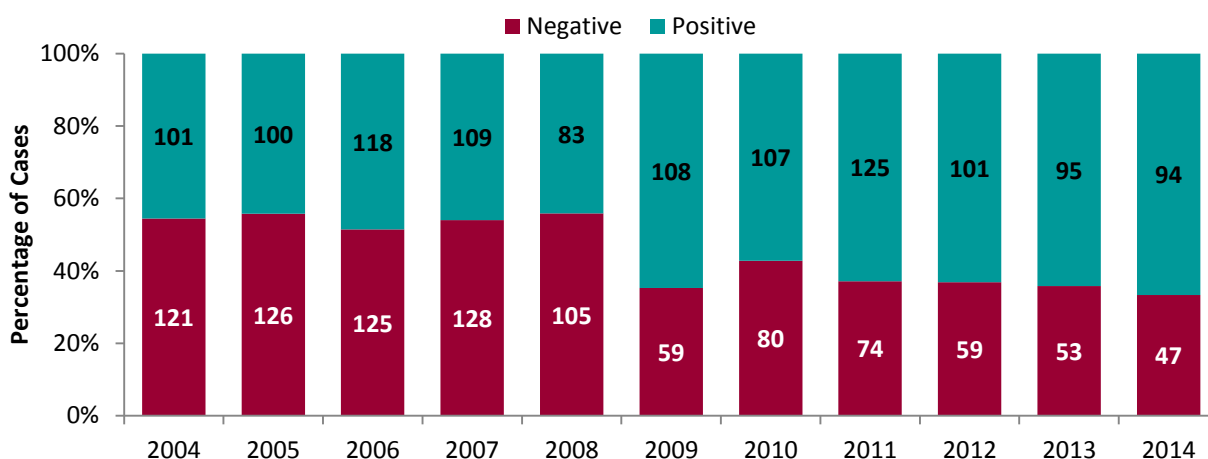
Where sputum smear status was known, 94/141 (66.7%) were sputum smear positive in 2014 compared to 101/222 (45%) in 2004 (Figure 26). The increase in the proportion of sputum samples which are smear positive is of concern and may indicate delays in diagnosis of pulmonary TB.

Figure 25: Proportion of pulmonary tuberculosis cases where sputum smear status known Yorkshire and the Humber, 2004-2014



Source: ETS September 2015

Figure 26: Proportion of sputum positive Tuberculosis cases (where sputum status known), Yorkshire and the Humber, 2004-2014



Source: ETS September 2015

Culture confirmation

Microbiological confirmation through culture remains the gold-standard for TB diagnosis. It enables assessment of drug sensitivities to inform treatment and informs decisions and actions taken to control transmission. It is also essential for genotypic studies of TB in the UK. In 2014, 73.8% of pulmonary cases were microbiologically confirmed, similar to the national figure (72%).

Use of PCR confirmation has increased in recent years and has increased the proportion of microbiologically confirmed pulmonary TB cases in the region by about 2-3 % each year exceeding the 2004 CMO target of 65%(Table 5, Figure 27).t. However, it remains significantly below the European Centre for Disease Prevention and Control target of 80%.

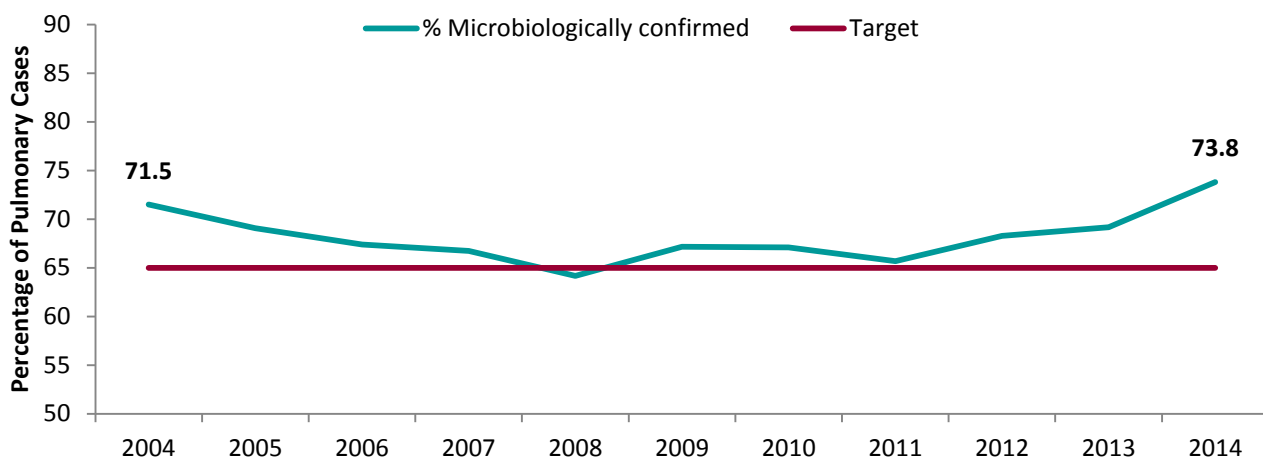
Table 6: Culture confirmed pulmonary tuberculosis cases, Yorkshire and the Humber, 2004-2014

Year	Pulmonary Cases	Culture Confirmed	Total Microbiological Confirmed (Culture OR PCR)	% Microbiologically confirmed
2014	298	220	220	73.8
2013	334	229	231	69.2
2012	328	221	224	68.3
2011	379	247	249	65.7
2010	380	255	255	67.1
2009	393	264	264	67.2
2008	335	213	215	64.2
2007	373	246	249	66.8
2006	371	249	250	67.4
2005	317	218	219	69.1
2004	309	221	221	71.5

* PCR performed at reference laboratory

Source: ETS September 2015

Figure 27: Proportion of pulmonary tuberculosis cases microbiologically* confirmed, Yorkshire and the Humber, 2006-2013



* Culture and PCR
 Source: ETS September 2015

Drug susceptibility

Drug susceptibility tests for Isoniazid and Rifampicin were available for 98% of culture confirmed TB cases in the region in 2014.

Proportions of TB isolates that were Isoniazid or multi-drug resistant peaked in 2004/05 and had been declining until 2011, when there was a slight increase in drug resistance regionally and nationally. In 2014, the proportion of drug resistant strains remained stable with 5.5% of culture confirmed TB cases in Yorkshire and the Humber resistant to Isoniazid and 5.49% resistant to any first line TB drug.

Multi-drug resistance (resistance to Isoniazid and Rifampicin) increased slightly in the region to 2.4% in 2014; and was above the national (England) average of 1.4% (Table 7, Figure 28). Although absolute numbers are small the incremental impact on TB service workload in managing a case of MDR-TB is a considerable pressure.

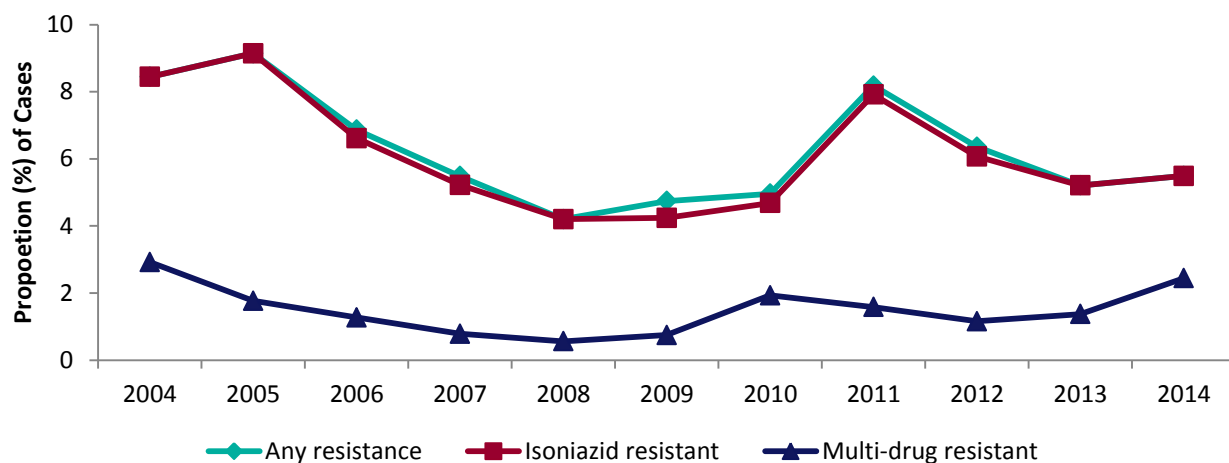
Drug resistance varied with the region of birth. (Figure 29) Nationally the majority of MDR –TB cases were non-UK born; the highest number from Lithuania and India.

Table 7: Proportion of tuberculosis cases with Isoniazid or multi-drug resistance, Yorkshire and the Humber, 2006-2013

Year	INH resistant	INH Target	Any resistance	Multi-drug resistant	MDR Target
2004	8.4	✗	8.44	2.92	✗
2005	9.1	✗	9.14	1.77	✓
2006	6.6	✓	6.87	1.27	✓
2007	5.2	✓	5.48	0.78	✓
2008	4.2	✓	4.20	0.56	✓
2009	4.2	✓	4.74	0.75	✓
2010	4.7	✓	4.96	1.93	✓
2011	7.9	✗	8.18	1.58	✓
2012	6.1	✓	6.36	1.16	✓
2013	5.2	✓	5.21	1.37	✓
2014	5.5	✓	5.49	2.44	✗

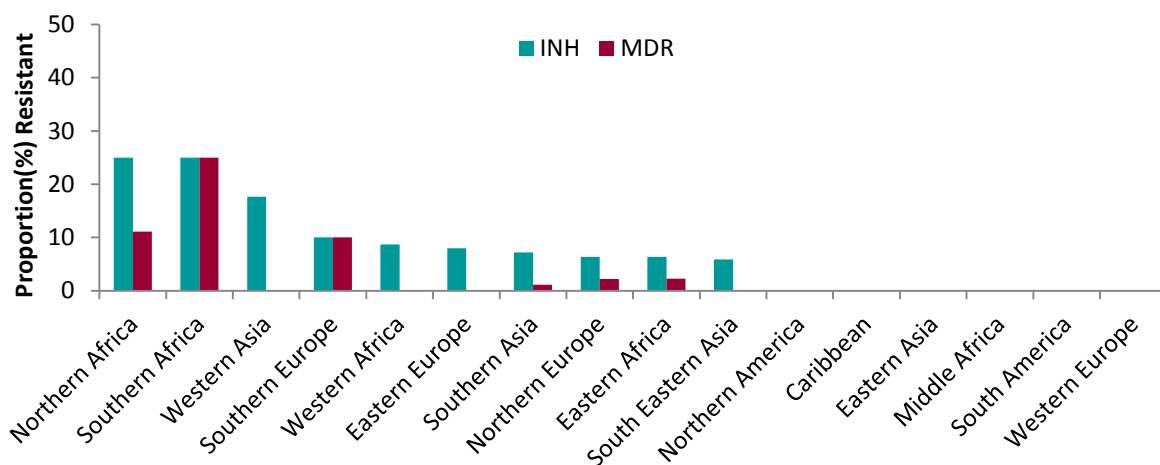
Source: ETS September 2014

Figure 28: Proportion of culture confirmed tuberculosis cases with first-line drug resistance, Yorkshire and Humber 2004-2014



Source: ETS September 2014

Figure 29: Proportion of tuberculosis cases with drug resistance by world region of birth, Yorkshire and the Humber, 2014



Source: ETS September 2015

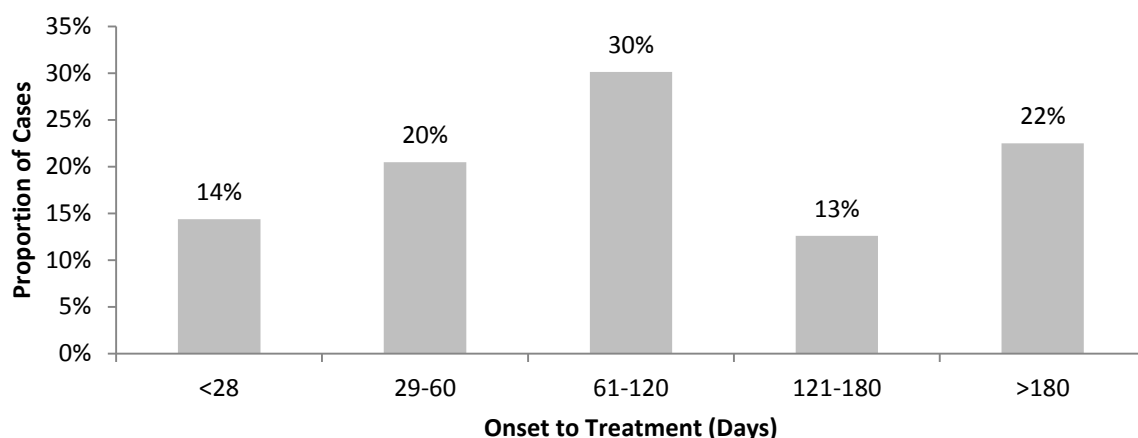
5. TB Case management

Time to diagnosis

Dates of symptom onset and diagnosis were available for 84.9% (445/524) of TB cases diagnosed in 2014, an improvement on the previous year.

Thirty-four per cent (155/445) of TB cases in 2014 started treatment within 60 days (two months) of onset of symptoms (Figure 30). Of concern is the significant proportion of cases, 22% (100/445) commencing treatment over 180 days (6 months) after onset of symptoms.

Figure 30: Tuberculosis case reports by time of onset to treatment start date, Yorkshire and the Humber, 2014



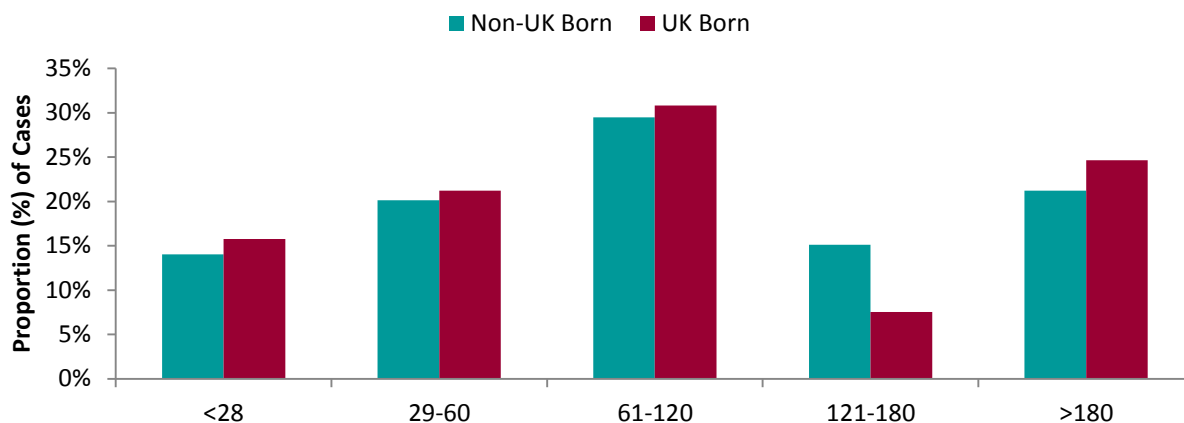
Source: ETS September 2015

There was no difference in time to treatment start date by country of birth. Proportions of UK-born and non-UK born cases were approximately equal for early and late diagnoses⁴ (Figure 31). There was no clear pattern for delays in treatment by ethnic group, (Figure 32).

As expected, delay in treatment was more common for extra-pulmonary than pulmonary disease – 42% of extra-pulmonary TB cases began treatment more than 120 days after onset of symptoms compared to 30% of pulmonary cases (Figure 33).

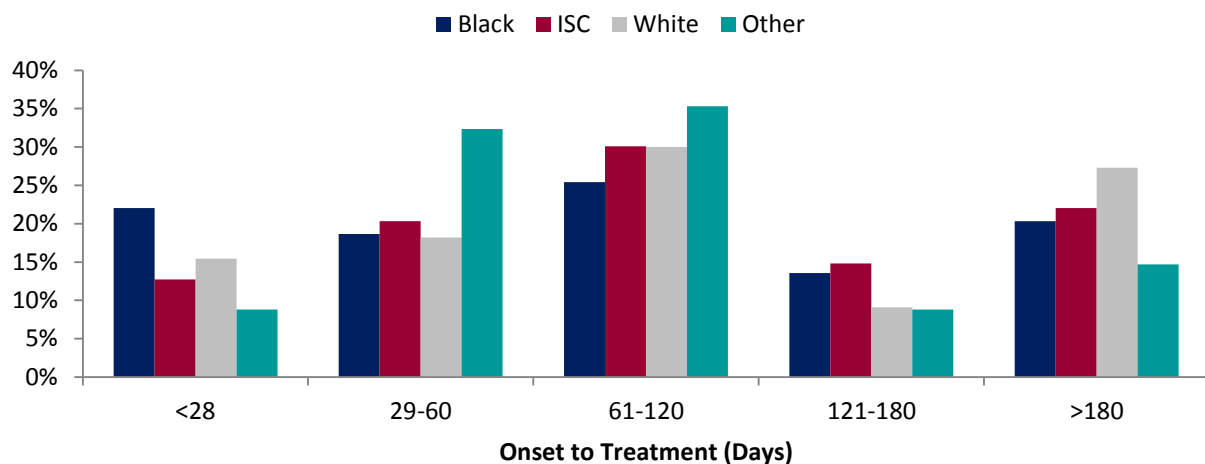
⁴ Early diagnosis: diagnosis made within 28 days of onset of symptoms. Late diagnosis: diagnosis made more than 120 days after onset of symptoms.

Figure 31: Proportion of tuberculosis case reports by time from onset to treatment start date and country of birth, Yorkshire and the Humber, 2014



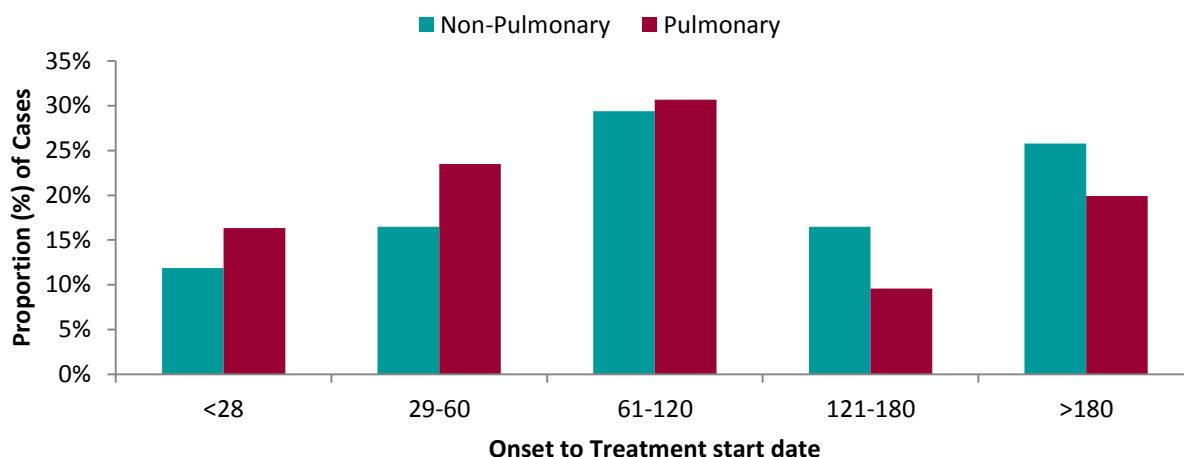
Source: ETS September 2015

Figure 32: Tuberculosis case reports by time from onset to treatment start date and ethnic group, Yorkshire and the Humber, 2014



Source: ETS September 2015

Figure 33: Tuberculosis case reports by time from onset to treatment start date and site of disease, Yorkshire and the Humber, 2014



Source: ETS September 2015

Use of Directly Observed Therapy (DOT)

After drug-sensitivity, the most important factor affecting TB treatment outcome is treatment adherence. Non-adherence to TB treatment results in onward transmission, increased morbidity and mortality and the emergence of drug resistant strains. Directly Observed Therapy (DOT) is a well-recognised option for improving treatment adherence and is recommended by the World Health Organisation and NICE. DOT should be considered for TB patients with active disease who have a past history of poor adherence to treatment, a past history of active TB, a history of homelessness or substance misuse, major psychiatric, memory or cognitive disorders, or have multi-drug-resistant TB.

DOT is resource intensive and figures below suggest that DOT is not being applied in many situations where national guidance recommends it should be used. Only 33% of TB patients across the region in 2013 with risk factors indicating the need for DOT received this treatment (Table 8). Whilst these risk factors for poor adherence may be more nuanced and require local clinical assessment the use of DOT remains low across the region and has declined from 2012. This disparity between those with adherence risk factors and the use of DOT is observed in both low and high burden areas although the underlying reasons may differ.

Table 8: Tuberculosis cases reporting at least one social risk factor and DOT Status, by local authority, Yorkshire and the Humber, 2013

Local Authority	Total cases with at least one risk factor	DOT Status Reported (for cases with a risk factor)		Cases with Risk Factor on DOT	
Barnsley	0	0	N/A	0	N/A
Bradford	8	7	88%	2	25%
Calderdale	0	0	N/A	0	N/A
Doncaster	1	1	100%	0	0%
East Riding of Yorkshire	4	3	75%	3	75%
Hull	4	4	100%	3	75%
Kirklees	3	3	100%	1	N/A
Leeds	10	9	90%	4	40%
North East Lincolnshire	0	0	N/A	0	N/A
North Lincolnshire	0	0	N/A	0	N/A
North Yorkshire	1	1	100%	0	0%
Rotherham	3	2	67%	0	0%
Sheffield	6	4	67%	1	17%
Wakefield	5	3	60%	1	20%
York	0	0	N/A	0	N/A
Yorkshire & the Humber	45	37	82%	15	33%

Source: ETS September 2015

6. Treatment Outcome Monitoring

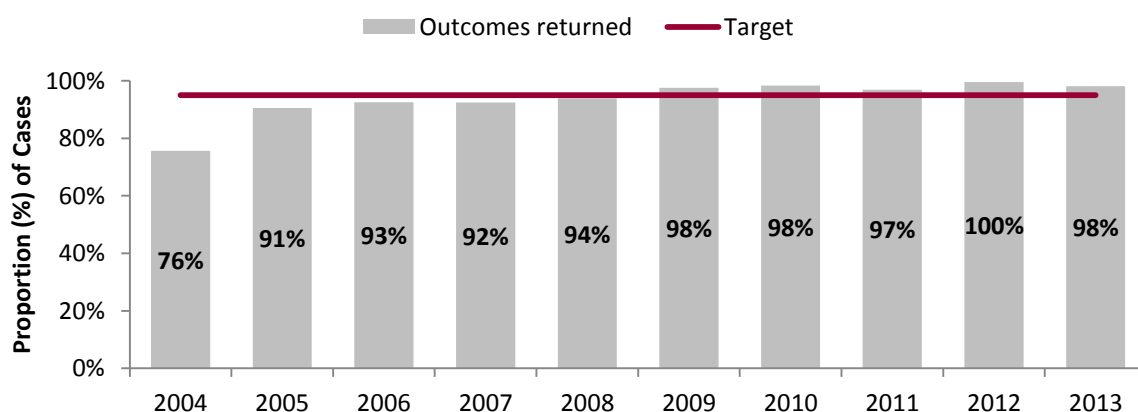
Treatment outcome for TB cases diagnosed in 2013

Treatment outcome reports were received for 98% of cases diagnosed in 2013, compared to 76% of cases diagnosed in 2004 (Figure 34).

Definitions for the various treatment outcomes are contained in Appendix 4. Definitions have been updated in line with the revised 2013 World Health Organization (WHO) TB outcome definitions. Additional data validation has been conducted nationally this year, using data on the date of treatment start and the date of treatment completion to validate duration of treatment. It is important to note that TB outcomes reported using the updated cohort definitions and validation methods will not be directly comparable with outcome data presented in previous reports. Within this report, treatment outcomes for all cases notified from 20 03-2012 have been calculated using these new definitions, so that trends can be monitored.

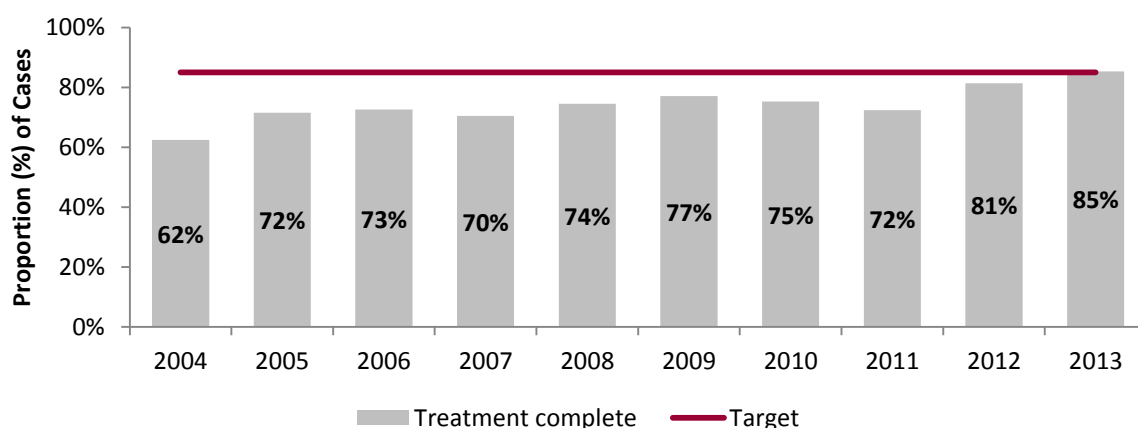
The proportion of TB cases completing treatment within 12 months of notification increased in the region from 62% for TB cases diagnosed in 2004 to 85% for cases diagnosed in 2013 (Figure 35). This is in line with the national treatment completion rate of 85%, and the CMO target of 85%.

Figure 34: Proportion of tuberculosis cases diagnosed 2004-2013 that have a treatment outcome reported by twelve months, Yorkshire and the Humber



Source: ETS September 2015

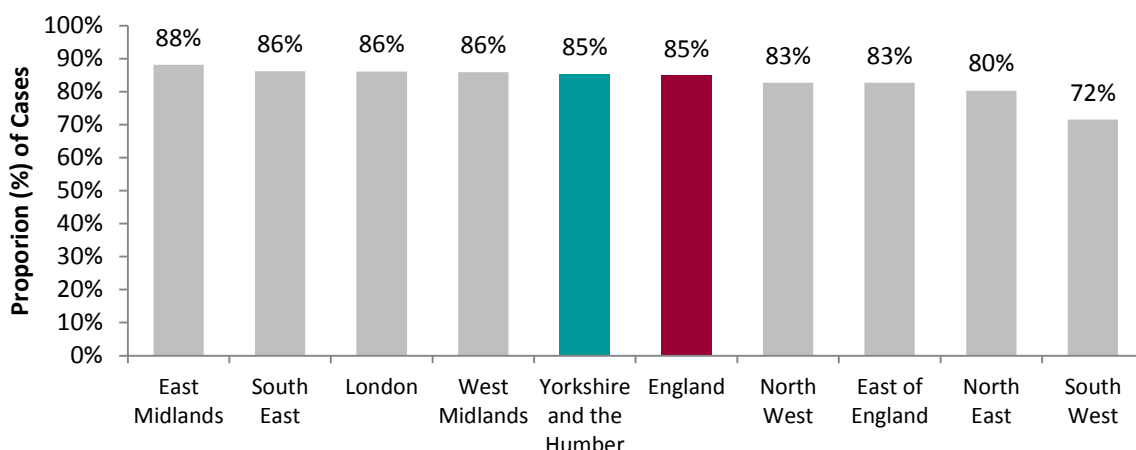
Figure 35 Proportion of tuberculosis cases that complete treatment by twelve months*, Yorkshire and the Humber, 2004-2013



Source: ETS September 2015

* Drug sensitive cases where expected course of treatment < 12 month

Figure 36: Proportion of tuberculosis cases* diagnosed in 2013 that complete treatment in twelve months, by Public Health England Centre, 2013



Source: ETS September 2015

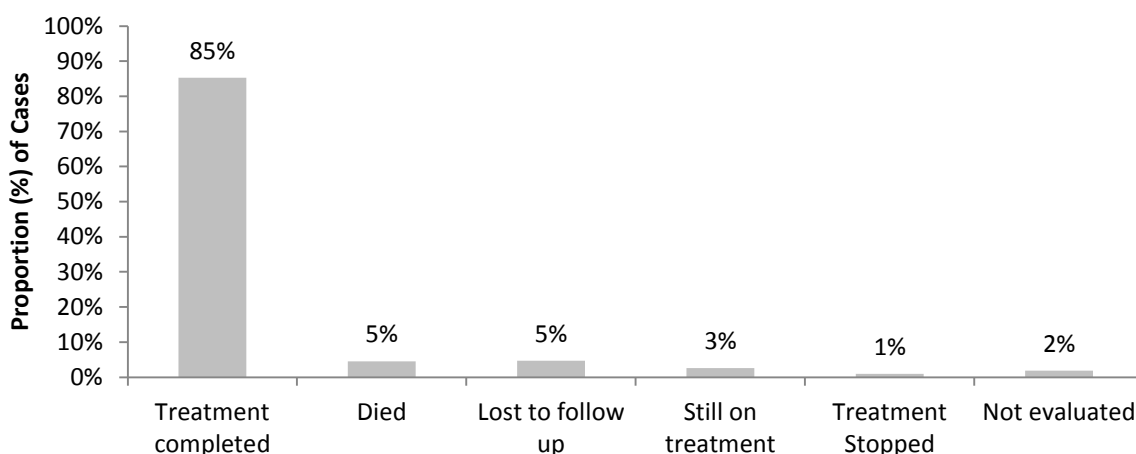
* Completion rates in Fig 42 have been adjusted nationally to exclude MDR-TB and RMP-resistant TB cases

TB treatment outcome – lost to follow-up and still in treatment

The proportion of patients reported as still on treatment or lost to follow up is now lower in the Yorkshire and the Humber region than the national average. Of the TB cases diagnosed in 2013, 7.3% were reported as still on treatment or lost to follow up compared to the national proportion of 8.81%. Some patients still on treatment at 12 months had experienced interruption of treatment for various reasons leading to an extension of the treatment time. TB treatment was also stopped for a small number of patients due to clinical reasons such as intolerance of the treatment regimen. Those with complex disease and known resistance to anti-tuberculous drugs requiring longer treatment periods are excluded from this analysis.

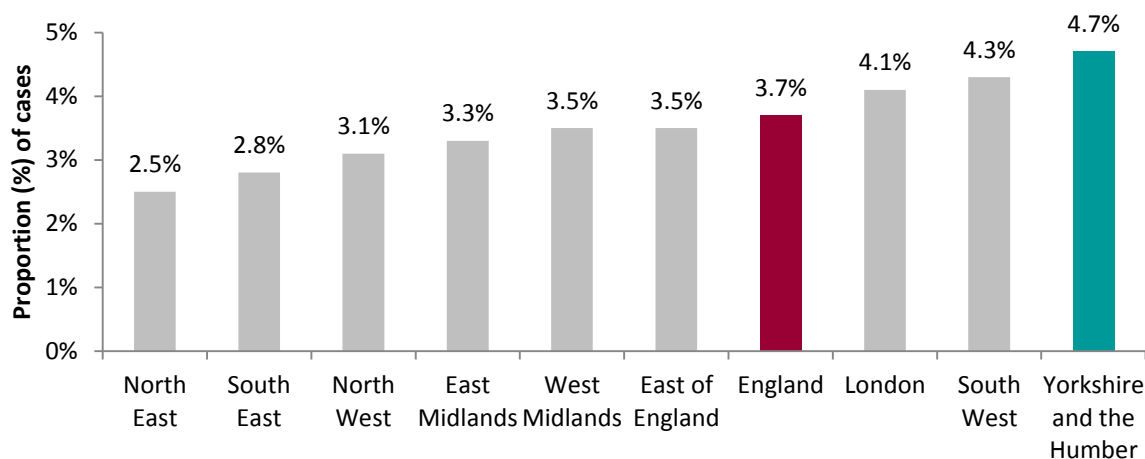
Of TB patients diagnosed in 2013 in the region, 4.7% were reported as lost to follow up 12 months later, an increase from the previous year (4.1%) and above the England proportion of 3.7% (Figure 44).

Figure 37: Tuberculosis cases by treatment outcome for cases diagnosed in 2013, Yorkshire and the Humber



Source: ETS September 2015

Figure 38: Proportion of tuberculosis cases diagnosed in 2013 that reported being lost to follow up as a treatment outcome by twelve months, by PHE Centre



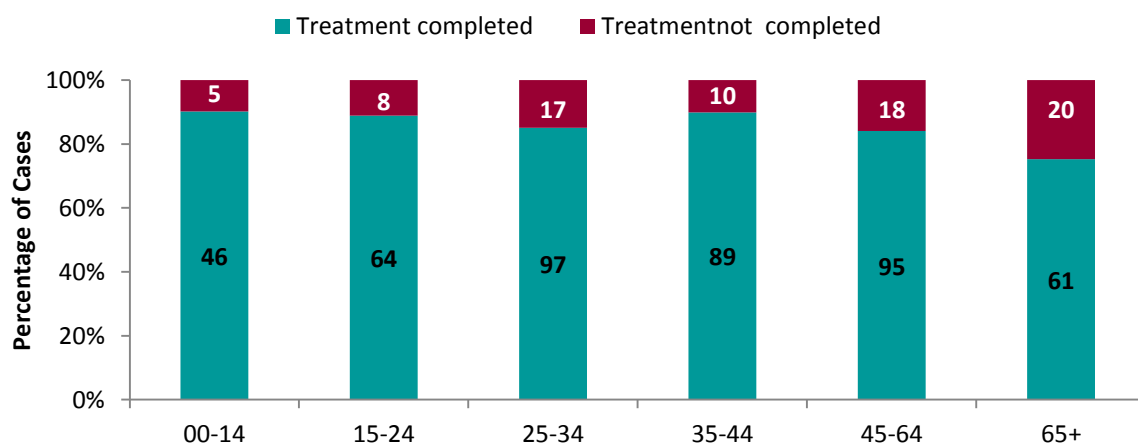
Source: ETS September 2015

The proportion of patients completing treatment within 12 months was lowest in the 65+ age group (Figure 39). Death was the most commonly reported reason for failing to complete treatment in the 65+ age groups while loss to follow up was most commonly reported in the 25-34 age group (Figure 40).

A higher proportion of UK born than non-UK born TB patients completed treatment within 12 months – 88% compared to 85% (figure 41). An audit of TB treatment outcome in West Yorkshire suggested that a significant proportion of non-UK born TB patients reported as lost to follow up had left the country before treatment was completed⁴.

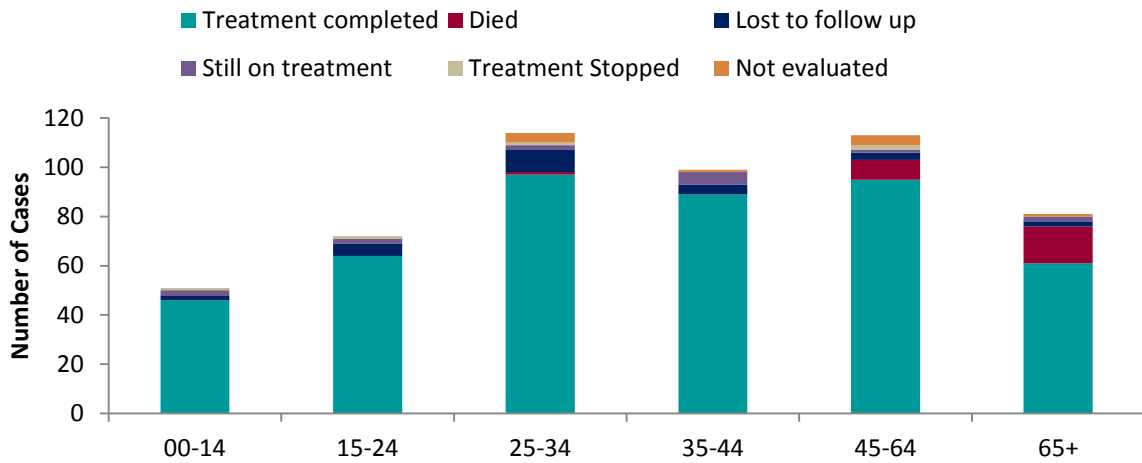
Treatment completion rates also varied by ethnicity of the TB patient with the lowest treatment completion rates reported in the white ethnic group – 79%, and highest completion rates in the ISC ethnic group – 89% (Figure 42). This is partly explained by the age profile of the white TB patients who tend to be older and die from other causes before treatment is completed. This is also due to the slightly higher proportion of white TB patients with risk factors associated with poor treatment adherence such as substance misuse.

Figure 39: Proportion of tuberculosis cases diagnosed in 2013 by treatment outcome and age group, Yorkshire and the Humber



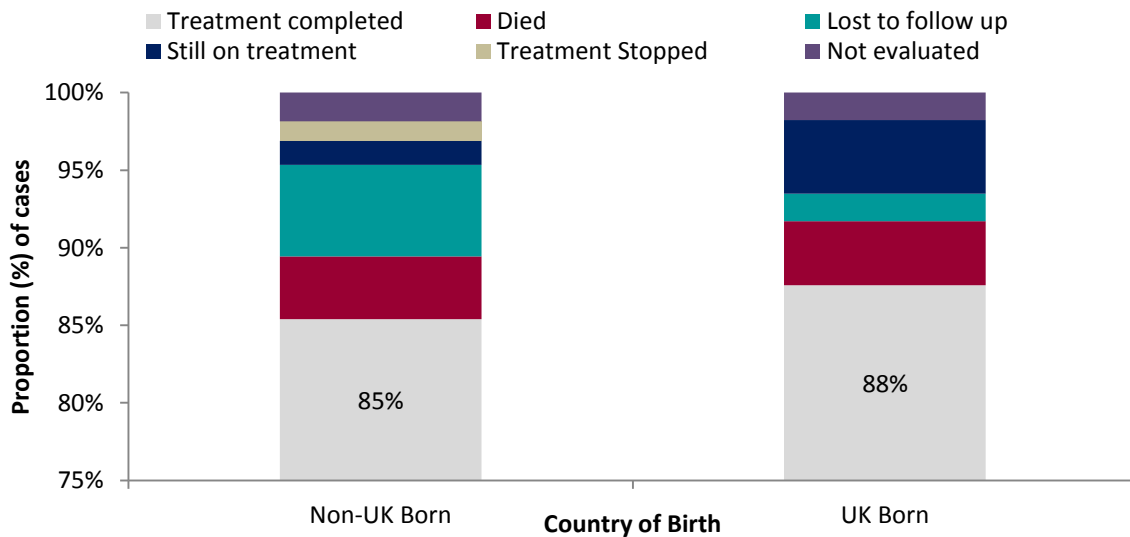
Source: ETS September 2015

Figure 40: Number of tuberculosis cases diagnosed in 2013 by age group and reason for not completing treatment, Yorkshire and the Humber



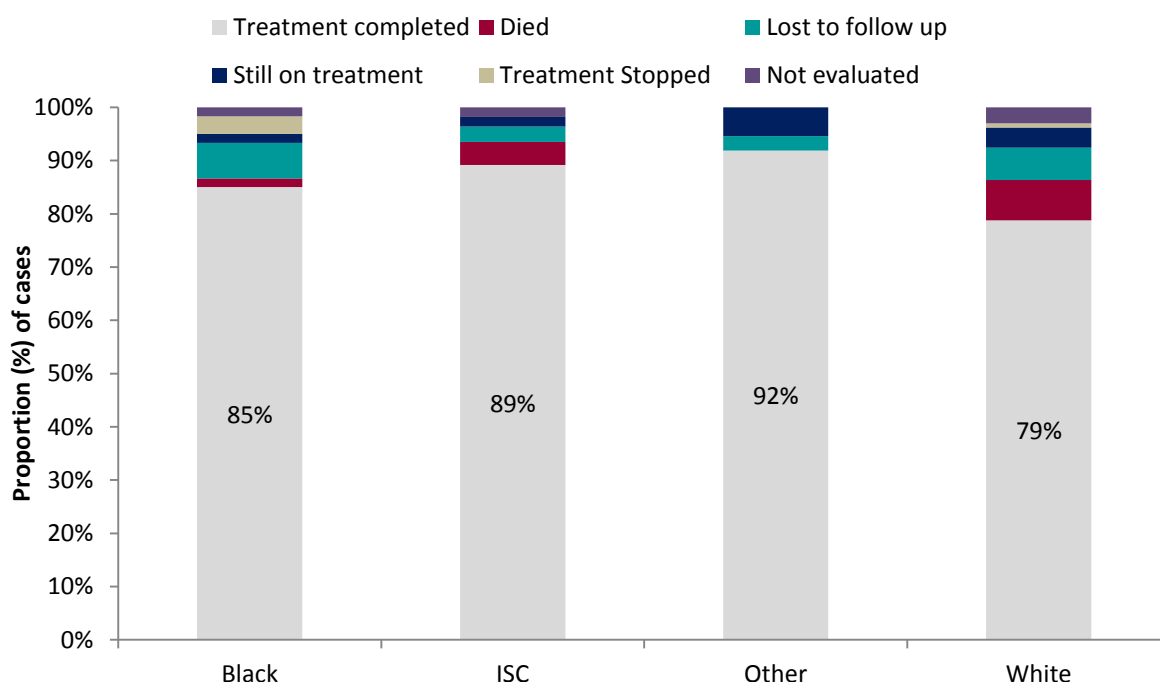
Source: ETS September 2015

Figure 41: Proportion of tuberculosis cases diagnosed in 2013 by treatment outcome and country of birth, Yorkshire and the Humber



Source: ETS September 2015

Figure 42: Proportion of tuberculosis cases diagnosed in 2013 by treatment outcome and ethnicity, Yorkshire and the Humber



Source: ETS September 2015

TB treatment outcome – death

Death (jointly with lost to follow up) was the most commonly reported reason for not completing treatment in the region (Figure 37).

The median age of TB patients who were notified in 2013 and died before or whilst on treatment was 69 years.

TB was reported as a contributor or primary cause of death in 17.8% of TB cases who died. This has declined since 2004 when TB was reported as the cause or contributor to death in 58.3% of TB cases who died within 12 months of diagnosis. However, it should be noted that numbers are small and the proportion of deaths where the role of TB was reported as unknown was very high, 60.7% in 2013 (Table 9).

Table 9: Number of deaths per year and proportion of total cases and relationship of death outcome to tuberculosis, Yorkshire and the Humber, 2004-2013 diagnoses

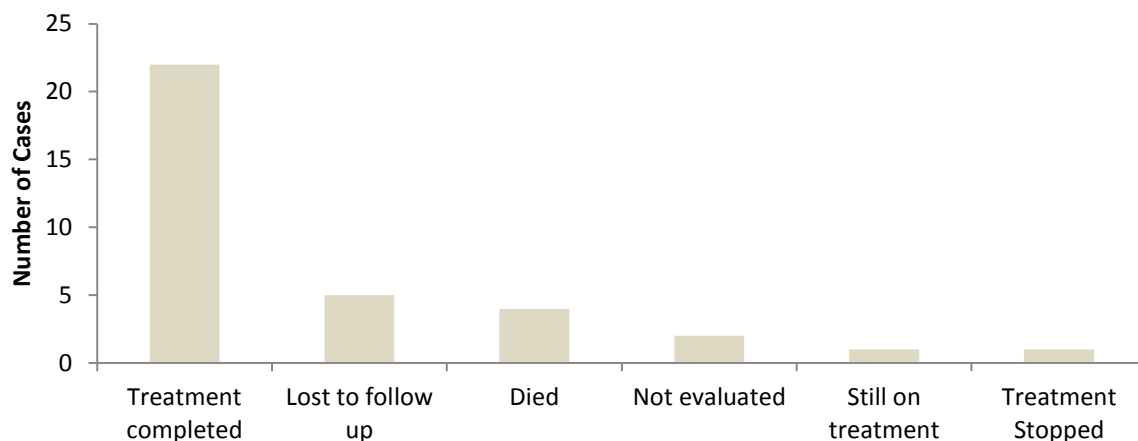
Year	Number of Cases	Number of Deaths	Proportion of total cases	Average age	Relationship of TB To Death			
					TB Caused Death	TB contributed to death	TB incidental to death	Unknown
2013	584	28	5%	68.7	0	5	6	17
2012	593	31	5%	74.2	3	8	6	14
2011	664	47	7%	67.1	4	8	11	24
2010	628	46	7%	69.4	7	7	13	19
2009	688	44	6%	65.8	8	8	14	14
2008	635	40	6%	65.7	3	11	12	14
2007	632	41	6%	64.2	3	10	8	20
2006	660	43	7%	67.4	5	12	8	18
2005	556	38	7%	66.1	8	10	10	10
2004	535	36	7%	72.8	9	12	8	7

Source: ETS September 2014

Treatment outcomes and social risk factors

Of the 36 TB cases with one or more risk factors reported in 2013 who were expected to complete treatment within 12 months, outcome was known for 94.4% (34/36), 64.7% (22/34) had completed treatment within 12 months of diagnosis and 35.3% (12/34) had not. The most common reasons for not completing treatment in this group were lost to follow up 14% (5/34) and death 11.7% (4/34) (Figure 43).

Figure 43: Treatment outcome at 12 months for tuberculosis cases diagnosed in 2013 with at least one social risk factor, Yorkshire and the Humber



Source: ETS September 2015

Treatment outcome at 24 months

Of the 45 cases notified in 2012 that reported still being on treatment at 12 months, 38 (84%) had completed treatment 24 months after diagnosis. Three stopped treatment (6.6%), two (4.4%) were still receiving treatment, and two (4.4%) cases were lost to follow up.

7. Standards for Tuberculosis Surveillance

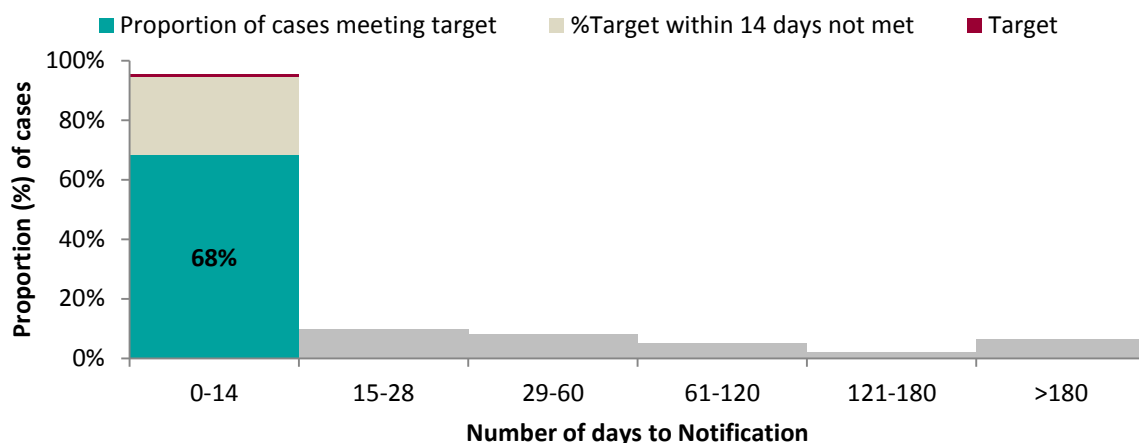
Time from diagnosis to notification

Standards for TB surveillances are set out in Department of Health guidance for England⁵. The guidance identifies key surveillance variables and reporting times and includes the following surveillance standards:

- At least 95% of cases should be reported within two weeks of diagnosis or decision to treat with a full course of anti-TB drugs.
- At least 95% of reported cases should include complete data for the key variables. The key variables are: name, date of birth, sex, ethnic group, born/not born in the UK, postcode, date of notification, previous TB treatment, site of disease (pulmonary/extra-pulmonary); and for pulmonary cases, sputum smear status.

The time from diagnosis to notification could be calculated for 500/524 (95%) of TB cases notified in 2014. 68% of the cases in 2014 were reported within two weeks of diagnosis, below the target of 95% but showing a continuing improvement on previous years. There were very long delays in reporting some cases with 6% of cases reported more than six months after diagnosis.

Figure 44: Days from tuberculosis diagnosis to notification, Yorkshire and the Humber, 2014



Source: ETS September 2014

Completeness of ETS data

Across the region, completeness of reporting of the key variables listed below was not as good as in previous years. Many variables failed to reach the 95% completeness target (Table 10).

The reporting of postcode, ethnicity and country of birth achieved the target. The region also achieved a 98.1% return for the treatment outcome forms, with 86.9% of cases reported as completing their treatment. Overall data completion is consistent with last year although the reporting of the presence or absence of a prison history has reduced. Reporting of BCG status and culture confirmation status is poor.

⁵ Department of Health. Tuberculosis prevention and treatment: a toolkit for planning, commissioning and delivering high-quality services in England. 2007. London, Department of Health.

Table 10: Completeness of key information in TB Notifications, Yorkshire and the Humber 2014 (n = 524)

Variable	2014 Essential Data	2014 % Complete	2013 % Complete
Total Cases	524	N/A	584
Postcode	524	100.0%	99.8%
ethnic group	508	96.9%	95.7%
UK or Non UK Born	487	92.9%	93.0%
*COB where Non UK Born	305	97.1%	98.6%
*Year of Entry where Non UK Born	267	85.0%	92.5%
BCG Yes/No	291	55.5%	62.5%
Previously Diagnosis yes/no	484	92.4%	94.3%
Alcohol Yes/No	477	91.0%	93.3%
Drug Yes/No	478	91.2%	92.5%
Homelessness Yes/No	472	90.1%	91.4%
Prison Yes/No	448	85.5%	87.0%
***<28 days Diagnosis to Notification	392	78.4%	76.4%
****Pulmonary Cases Culture Confirmed	220	73.8%	68.6%
*****TOM Submitted	520	98.1%	99.6%
*****Treatment Complete	452	86.9%	81.6%

Source: ETS September 2014

*314 Non UK Born Cases

***of 500 where date of onset and case report date known

****of 298 Pulmonary Cases

***** of 584 2013 cases

8. Appendix

Additional local authority data

Table 11: Tuberculosis numbers and rates per 100,000 by local authority of residence, Yorkshire and the Humber, 2004-2014

Local Authority	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2004 - 2014
Barnsley	10	4	11	6	6	3	8	12	3	5	11	
	4.52	1.80	4.90	2.65	2.63	1.31	3.48	5.18	1.28	2.12	4.62	
Bradford	110	158	185	170	171	205	172	173	171	155	96	
	22.7	32.2	37.3	33.9	33.7	40.0	33.2	33.1	32.6	29.4	18.18	
Calderdale	18	24	23	23	22	30	25	20	20	22	19	
	9.23	12.23	11.63	11.54	10.95	14.85	12.31	9.80	9.74	10.66	9.16	
Doncaster	18	15	16	20	9	11	22	22	21	19	30	
	6.19	5.13	5.44	6.75	3.02	3.66	7.30	7.27	6.94	6.26	9.86	
East Riding of Yorkshire	10	5	13	5	10	7	2	15	6	4	10	
	3.08	1.53	3.96	1.51	3.01	2.10	0.60	4.48	1.79	1.19	2.97	
Hull	14	7	17	15	12	9	19	24	25	16	18	
	5.5	2.7	6.7	5.9	4.7	3.5	7.4	9.4	9.7	6.2	6.98	
Kirklees	69	80	76	85	101	104	103	123	87	74	88	
	17.36	19.96	18.80	20.83	24.53	25.07	24.62	29.08	20.45	17.28	20.42	
Leeds	113	104	147	101	151	125	117	113	84	114	93	
	15.6	14.1	20.0	13.7	20.4	16.8	15.7	15.1	11.1	15.0	12.13	
North East Lincolnshire	0	3	4	8	7	3	7	7	1	2	5	
	0.00	1.89	2.52	5.04	4.41	1.89	4.40	4.38	0.63	1.25	3.13	
North Lincolnshire	3	1	7	6	17	35	7	13	19	15	6	
	1.90	0.63	4.34	3.69	10.33	21.14	4.20	7.76	11.28	8.89	3.55	
North Yorkshire	20	13	18	17	10	20	18	13	13	17	12	
	3.45	2.23	3.06	2.88	1.68	3.35	3.00	2.16	2.16	2.82	1.99	
Rotherham	28	26	18	21	14	26	20	19	30	13	22	
	11.12	10.29	7.10	8.26	5.48	10.14	7.79	7.37	11.61	5.03	8.46	
Sheffield	90	85	96	129	74	77	84	89	91	95	84	
	17.32	16.17	18.19	24.34	13.86	14.30	15.42	16.13	16.33	16.96	14.90	
Wakefield	27	23	20	15	18	23	20	15	17	22	27	
	8.49	7.22	6.24	4.66	5.57	7.09	6.14	4.60	5.19	6.67	8.15	
York	5	8	9	11	13	10	4	6	5	11	3	
	2.68	4.25	4.76	5.80	6.81	5.20	2.05	3.03	2.50	5.43	1.47	
Yorkshire and the Humber	535	556	660	632	635	688	628	664	593	584	524	
	10.57	10.88	12.86	12.24	12.21	13.17	11.95	12.56	11.15	10.94	9.78	

Source: ETS September 2014

Table 12: Tuberculosis cases by age group, gender, ethnic group and site of disease Yorkshire and the Humber, 2004-2014

Age Group	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
00-14	36	40	35	42	44	41	40	62	52	53	21
15-24	75	95	92	93	91	134	93	85	89	76	65
25-34	141	145	170	175	193	166	131	161	147	135	123
35-44	69	85	100	106	98	109	101	111	92	114	94
45-64	105	95	129	109	119	129	154	140	122	119	120
65+	109	96	133	107	89	109	109	105	91	87	101
Unknown	0	0	1	0	1	0	0	0	0	0	0
Sex	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Female	232	262	301	282	305	314	277	303	266	236	227
Male	302	292	355	348	330	364	341	355	327	348	297
Unknown	1	2	4	2	0	10	10	6	0	0	0
Ethnic Group	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Black	96	122	113	115	122	108	96	80	82	70	68
ISC	246	273	332	275	328	355	316	357	316	310	265
Other	38	30	35	38	51	35	40	41	47	41	38
White	146	121	140	137	115	153	149	150	135	138	137
Unknown	9	10	40	67	19	37	27	36	13	25	16
Site	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
No	226	239	289	259	300	295	248	285	265	250	226
Yes	309	317	371	373	335	393	380	379	328	334	298

Source: ETS September 2014

***Table 13: Tuberculosis cases by detailed site of disease, Yorkshire and the Humber, 2004-2014**

Site	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Pulmonary	309	317	371	373	335	393	380	379	328	334	298
Bone/Spine	13	22	30	24	22	31	19	33	27	23	17
Bone/Other	4	14	17	19	15	17	13	18	13	13	6
CNS Meningitis	5	12	11	13	12	14	10	10	4	7	6
CNS Other	7	9	10	9	7	20	9	13	10	15	7
Cryptic	9	5	9	3	3	1	3	4	1	2	3
Gastrointestinal	31	33	44	39	35	35	36	44	37	34	29
Genitourinary	21	14	8	19	24	16	21	14	16	11	9
Intra-Thoracic Lymph Nodes	68	56	68	66	95	109	101	105	111	90	69
Lymph Node	99	116	136	118	156	151	135	143	129	136	101
Laryngeal	1	1	2	1	4	2			2	2	
Miliary	15	12	27	16	21	24	21	16	19	11	11
Pleural	52	43	59	57	56	46	36	57	49	41	51
Extra pulmonary other	44	45	53	48	48	49	39	47	43	32	43
Extra Pulmonary Unknown	49	65	44	76	87	95	60	72	67	53	44
Unknown			9	15	2	4	3	6		9	8
Other Extra Pulmonary site	44	43	49	40	46	35	26	37	34	29	39

Source: ETS September 2014

*Multiple sites of disease can be recorded

Table 14: Treatment outcome forms returned by local authority, Yorkshire and the Humber, for cases diagnosed in 2004 and 2013

Local Authority	Total Cases 2004*	Outcomes returned	% Outcomes Returned	Target	Total Cases 2013*	Outcomes returned	% Outcomes Returned	Target
Barnsley	10	10	100%	●	5	5	100%	●
Bradford	101	99	98%	●	142	141	99%	●
Calderdale	15	15	100%	●	18	18	100%	●
Doncaster	18	18	100%	●	17	17	100%	●
East Riding of Yorkshire	10	9	90%	●	4	4	100%	●
Kingston upon Hull, City of	14	13	93%	●	13	12	92%	●
Kirklees	64	43	67%	●	61	60	98%	●
Leeds	95	90	95%	●	100	96	96%	●
North East Lincolnshire	0	0	n/a	n/a	2	2	100%	●
North Lincolnshire	3	2	67%	●	15	15	100%	●
North Yorkshire	19	19	100%	●	17	17	100%	●
Rotherham	27	22	81%	●	13	12	92%	●
Sheffield	81	21	26%	●	92	91	99%	●
Wakefield	23	2	9%	●	20	19	95%	●
York	5	4	80%	●	11	11	100%	●
Yorkshire and the Humber	485	367	76%	●	530	520	98%	●

Target met >=95%	●
Close to achieving target 90% -94.9%	●
Target not met <90%	●

Source: ETS September 2014

Table 15: Treatment completion by local authority, Yorkshire and the Humber, for patients diagnosed in 2004 and 2013

Local Authority	Total Cases 2004*	Treatment completed	% Complete	Target	Total Cases 2013*	Treatment completed	% Complete	Target
Barnsley	10	8	80%	●	5	4	80%	●
Bradford	99	85	86%	●	141	126	89%	●
Calderdale	15	13	87%	●	18	16	89%	●
Doncaster	18	14	78%	●	17	16	94%	●
East Riding of Yorkshire	9	5	56%	●	4	4	100%	●
Kingston upon Hull, City of	13	10	77%	●	12	12	100%	●
Kirklees	43	36	84%	●	60	55	92%	●
Leeds	90	78	87%	●	96	81	84%	●
North East Lincolnshire	0	0	n/a	n/a	2	2	100%	●
North Lincolnshire	2	2	100%	●	15	14	93%	●
North Yorkshire	19	12	63%	●	17	15	88%	●
Rotherham	22	15	68%	●	12	10	83%	●
Sheffield	21	20	95%	●	91	71	78%	●
Wakefield	2	1	50%	●	19	16	84%	●
York	4	4	100%	●	11	10	91%	●
Yorkshire and the Humber	367	303	83%	●	520	452	87%	●

*where outcomes are known

Target met >=85%	●
Close to achieving target 80% -84.9%	●
Target not met <80%	●

Source: ETS September 2014

Table 16: Treatment outcomes by local authority, Yorkshire and the Humber, cases diagnosed in 2013

Local Authority	Total Cases 2013*	Treatment completed	% Complete	Died	Lost to follow up	Not evaluated	Still on treatment	Treatment Stopped
Barnsley	5	4	80%	0	0	0	0	1
Bradford	141	126	89%	6	4	1	5	0
Calderdale	18	16	89%	2	0	0	0	0
Doncaster	17	16	94%	1	0	0	0	0
East Riding of Yorkshire	4	4	100%	0	0	0	0	0
Kingston upon Hull, City of	12	12	100%	0	0	1	0	0
Kirklees	60	55	92%	1	1	1	2	1
Leeds	96	81	84%	8	5	4	1	1
North East Lincolnshire	2	2	100%	0	0	0	0	0
North Lincolnshire	15	14	93%	0	1	0	0	0
North Yorkshire	17	15	88%	2	0	0	0	0
Rotherham	12	10	83%	0	1	1	1	0
Sheffield	91	71	78%	2	13	1	3	2
Wakefield	19	16	84%	2	0	1	1	0
York	11	10	91%	0	0	0	1	0

*Where outcome is known and treatment completion is expected <12 months

Source: ETS September 2014

Additional regional data

Definitions Case definitions

The following cases are reported through ETS:

Culture-confirmed case due to *M. tuberculosis* complex infection (including *M. tuberculosis*, *M. bovis* and *M. africanum*).

Other than culture-confirmed case: In the absence of culture confirmation, a case that meets the following criteria:

A clinician's judgement that the patient's clinical and/or radiological signs and/or symptoms are compatible with tuberculosis, and

A clinician's decision to treat the patient with a full course of anti-tuberculosis treatment.

Persons receiving preventive chemoprophylaxis are not reported through ETS. Cases subsequently found not to be tuberculosis are denotified.

Ethnic group

The classification of ethnic group is based on the definitions used by the Office for National statistics (ONS).

Extra-pulmonary tuberculosis

TB disease in any part of the body other than the lungs (for example, the kidney or lymph nodes)

Index of Multiple Deprivation (IMD)

This index combines a number of indicators, chosen to cover a range of economic, social and housing issues, into a single deprivation score at Lower Super Output Area level, of which there are 32,482 in England.

Multi-drug resistant tuberculosis

Multi-drug resistance (MDR) is defined as resistance to at least Isoniazid and Rifampicin (with or without resistance to other drugs).

Planned course of treatment definitions

Standard short course of treatment: A standard short-course treatment of two months of Isoniazid, Rifampicin, Ethambutol and Pyrazinamide plus four months of Isoniazid and Rifampicin [2(RHZE)4(RH)].

Directly observed therapy: Treatment under Directly Observed Therapy (DOT). This entails someone supervising the intake of drugs by the patient to ensure adherence to treatment and that the drugs are taken in the right combination and for the correct duration.

Pulmonary tuberculosis

A pulmonary case is defined as a case with tuberculosis involving the lungs and/or tracheo-bronchial tree, with or without an extra-pulmonary tuberculosis diagnosis.

Social risk factor definitions

Alcohol misuse/abuse: Based on clinical judgement, alcohol misuse or abuse considered likely to affect the patient's ability to adhere to the prescribed tuberculosis treatment regimen in the absence of DOT.

Note on changes to TB outcome definitions

In line with the revised 2013 World Health Organization (WHO) TB outcome definitions, for the purposes of TB outcome reporting the drug sensitive cohort is defined as all TB cases, excluding those with rifampicin resistant TB or MDR-TB (initial or amplified), or non-culture confirmed cases treated as MDR-TB.

In this report, treatment outcomes for drug sensitive TB cases are reported for the following groups: Cases with an expected duration of treatment less than 12 months, this group excludes cases with CNS disease who have an expected duration of treatment of 12 months. In addition, those with spinal, cryptic disseminated or miliary disease are excluded from this group, as CNS involvement cannot be reliably ruled out for the purposes of reporting.

Data on deaths and loss to follow up at last recorded outcome are presented for the entire drug sensitive cohort.

Additional data validation has been conducted this year, using data on the date of treatment start and the date of treatment completion to validate duration of treatment.

TB outcomes reported using these new cohort definitions and validation methods will not be directly comparable with outcome data presented in previous reports. Within this report, treatment outcomes for all cases notified from 20 03-2012 have been calculated using these new definitions, so that trends can be monitored.

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