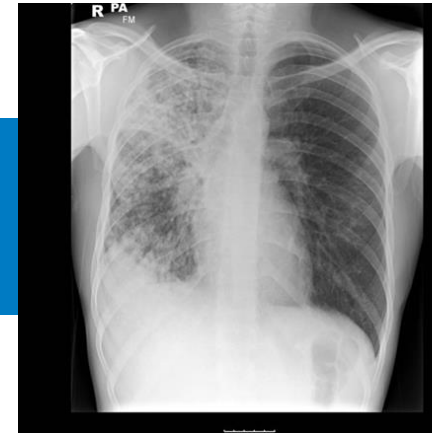




CRI



Epidemiology of TB and Diagnostic Delays



Onn Min Kon

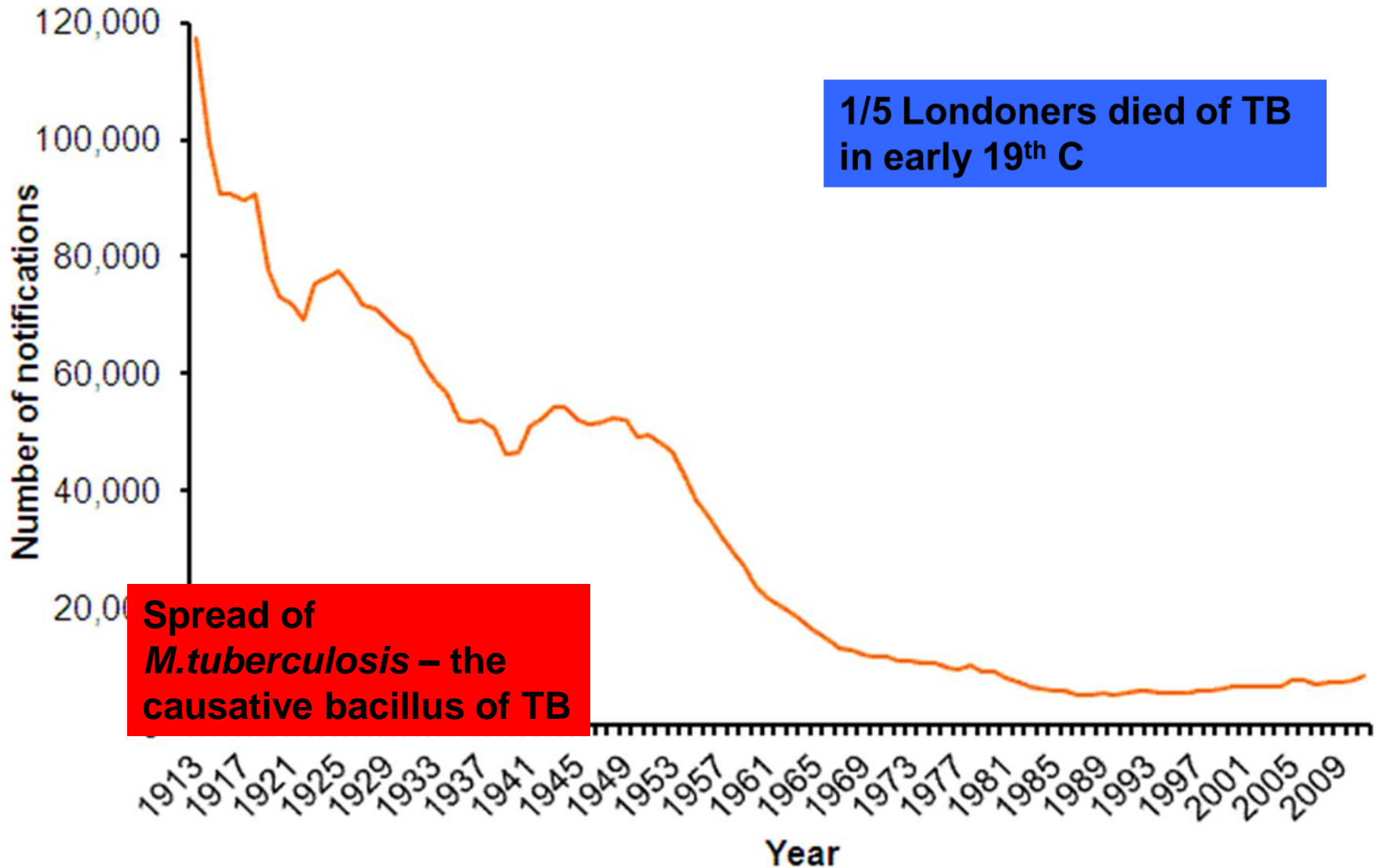
TB Clinics

St Mary's and Hammersmith Hospitals

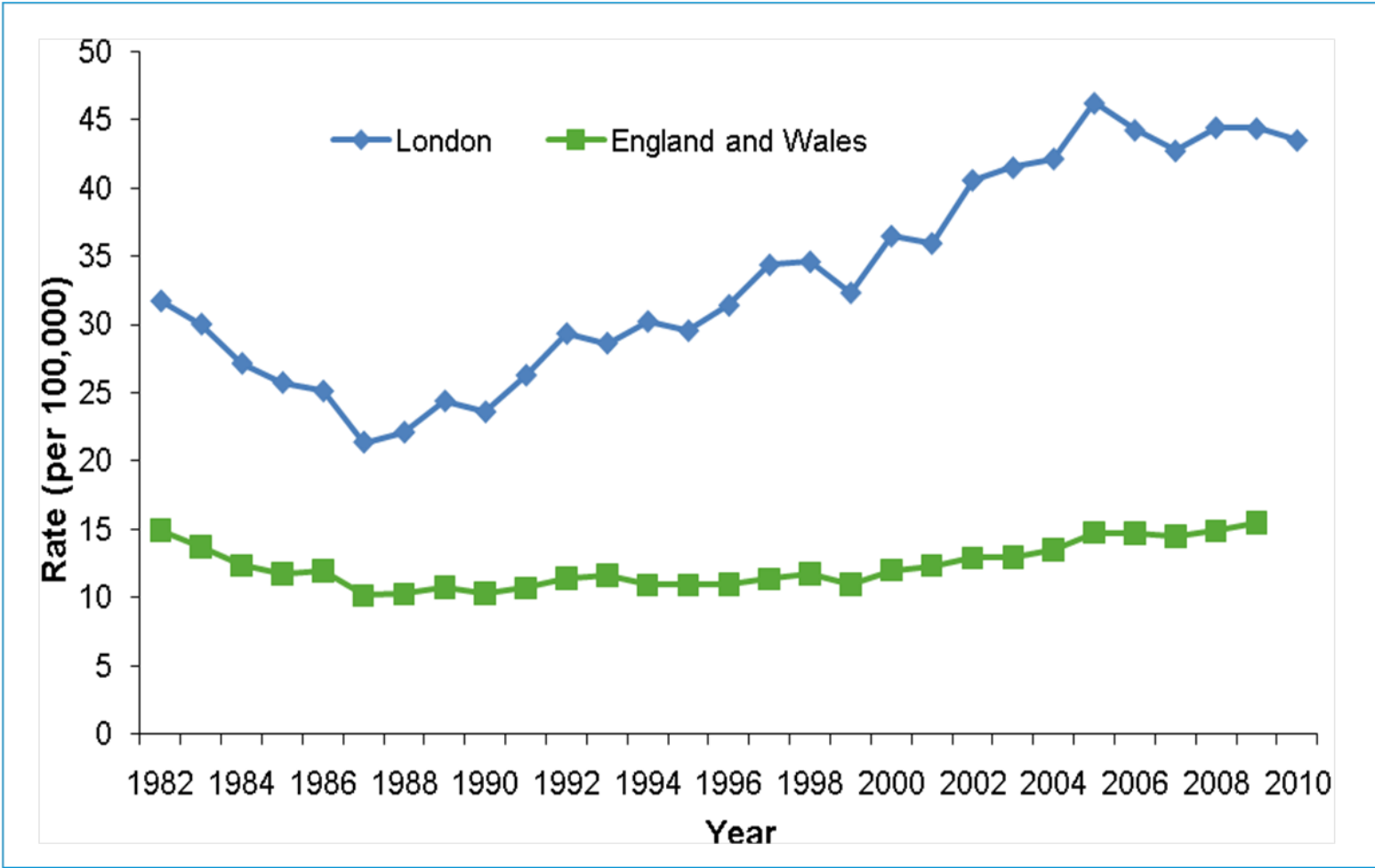
What happens after ‘infection’

- May heal spontaneously
- May develop active disease
 - over weeks and months
 - ‘primary’ TB
- Contained and dormant
 - may reactivate later if debilitated or immunocompromised
 - ‘post-primary’ TB

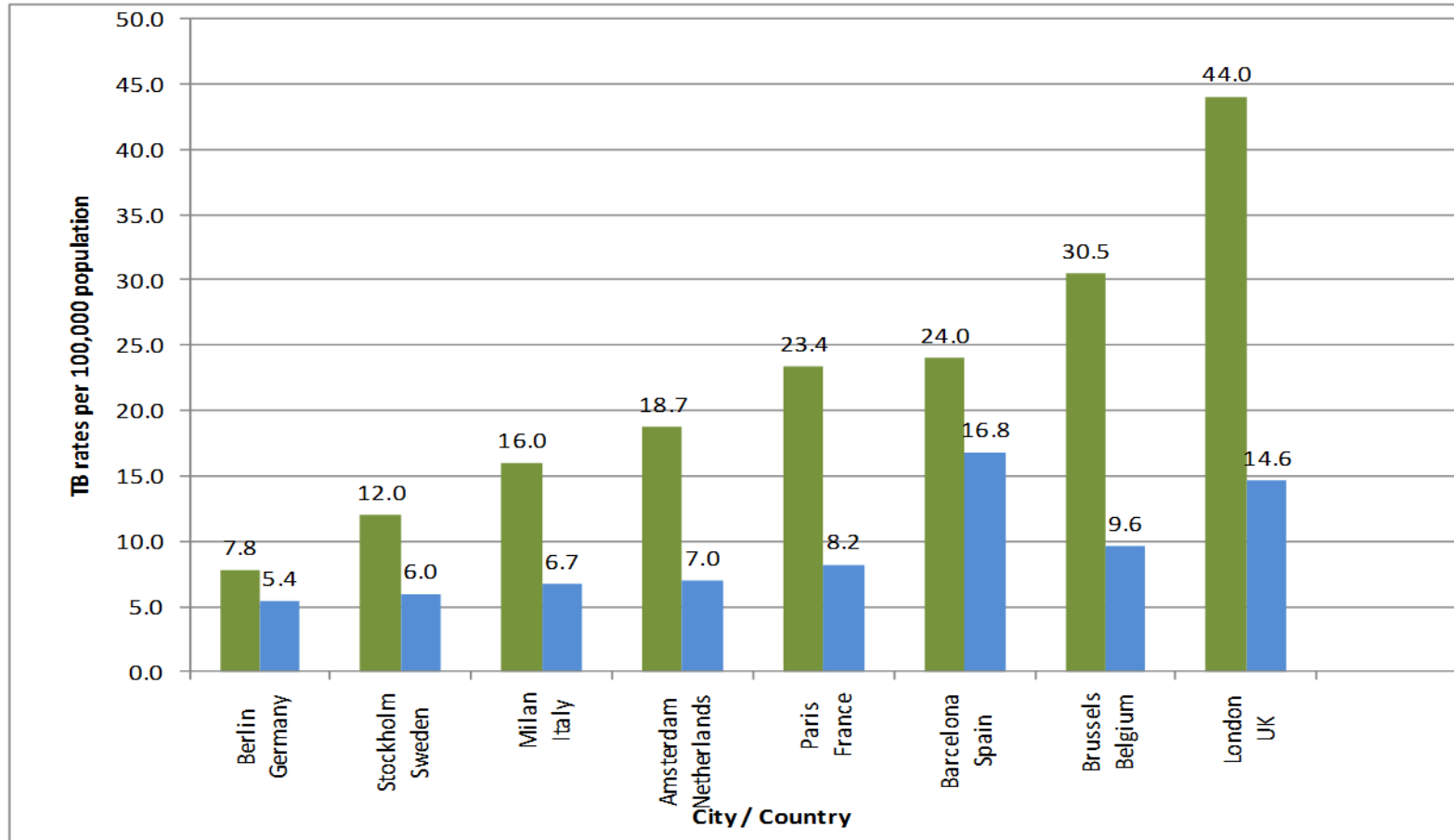
lifetime cumulative risk after ‘infection’ - 10-15%
(1.5% first year/ 5-10% five years)



TB rates in London, 1982-2010

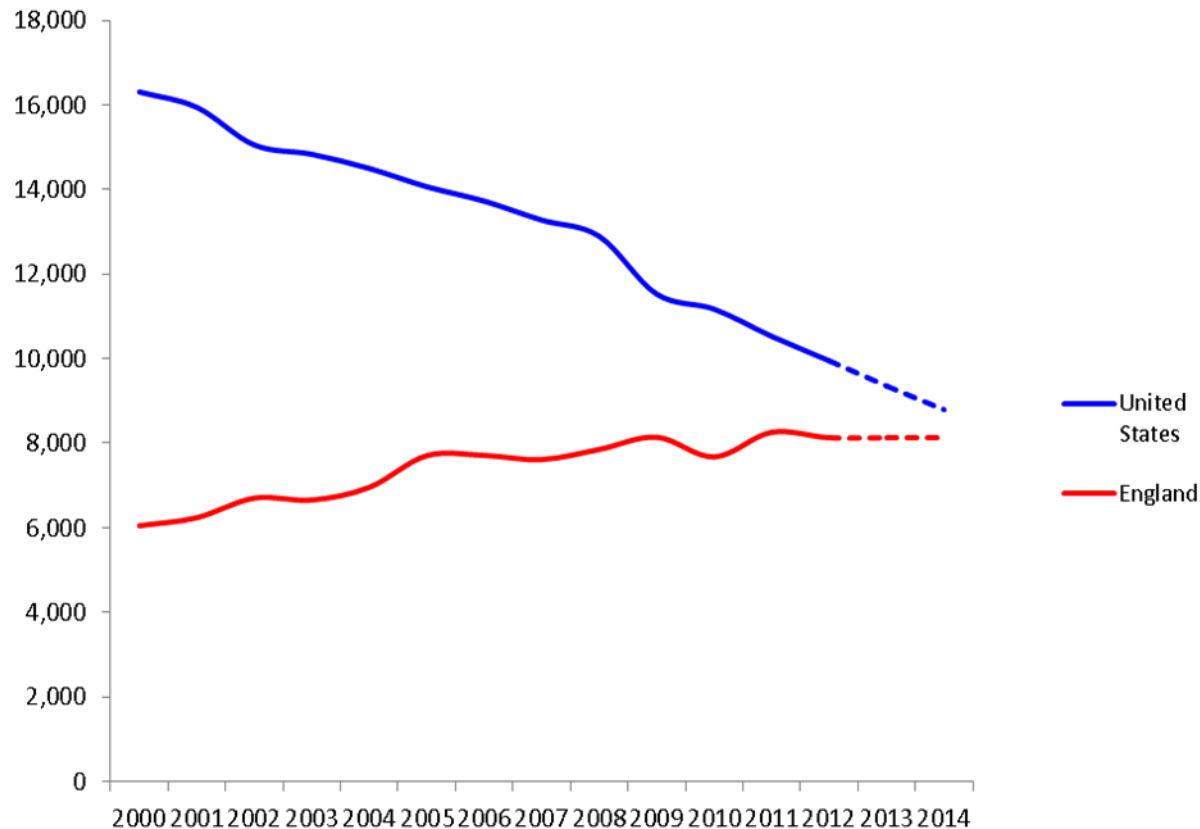


TB incidence in Western Europe, 2009



Collaborative TB Strategy - Consultation

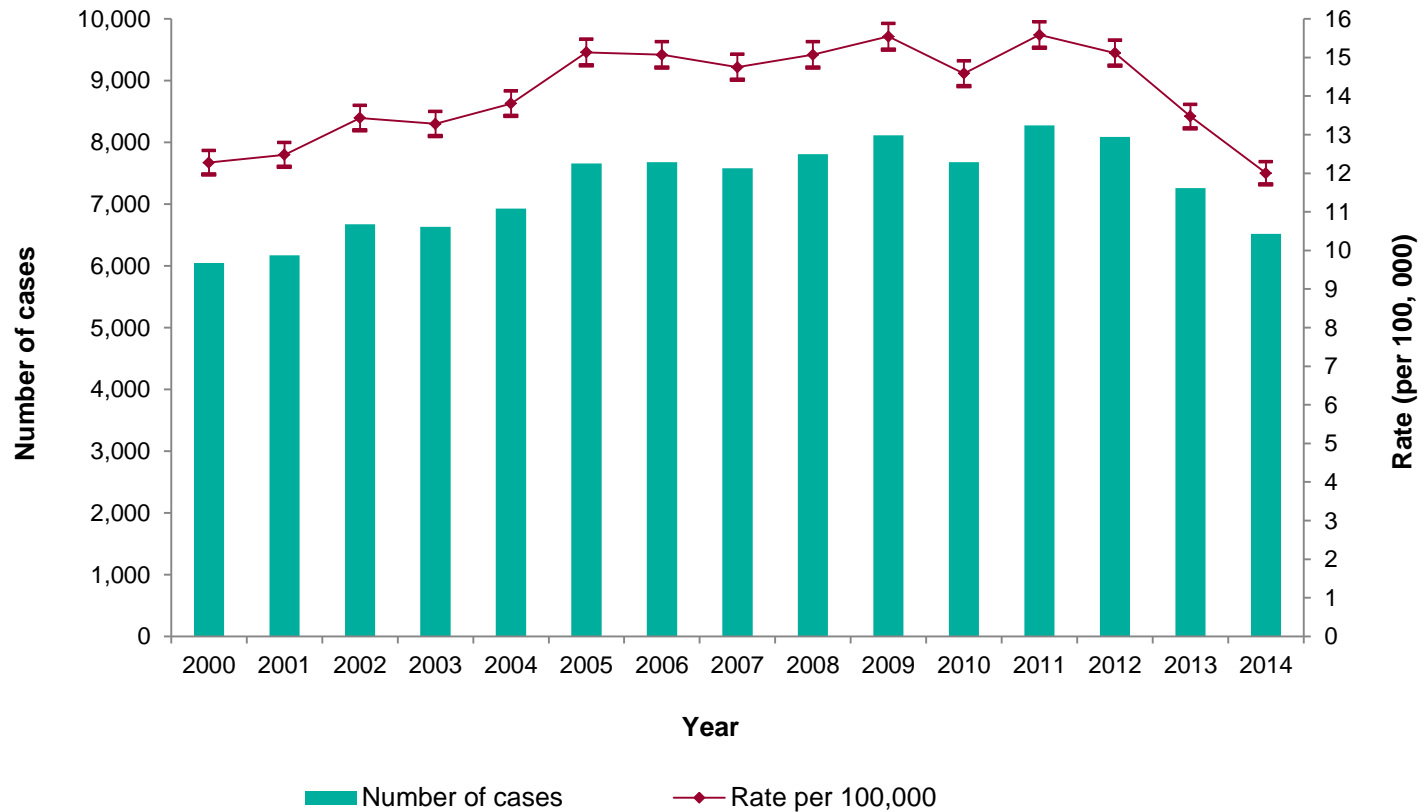
TB trends in England vs USA, 2000-2014



Trends in the annual number of cases of tuberculosis in England compared with the USA. Dotted lines show projected numbers, assuming present annual percentage change continues for 2 more years. (Based on data from Public Health England (UK) and the Centre for Disease Control and Prevention (USA). (Zenner et al 2013))

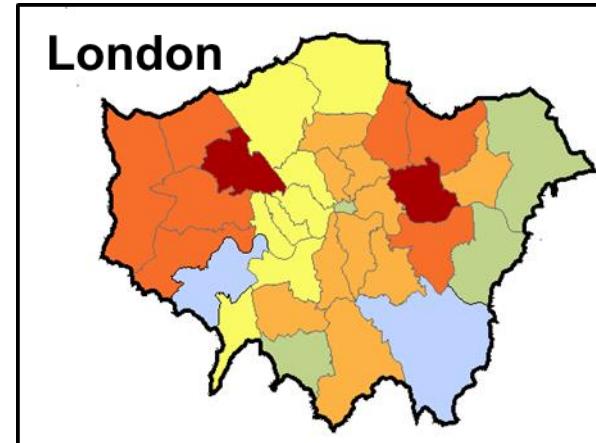
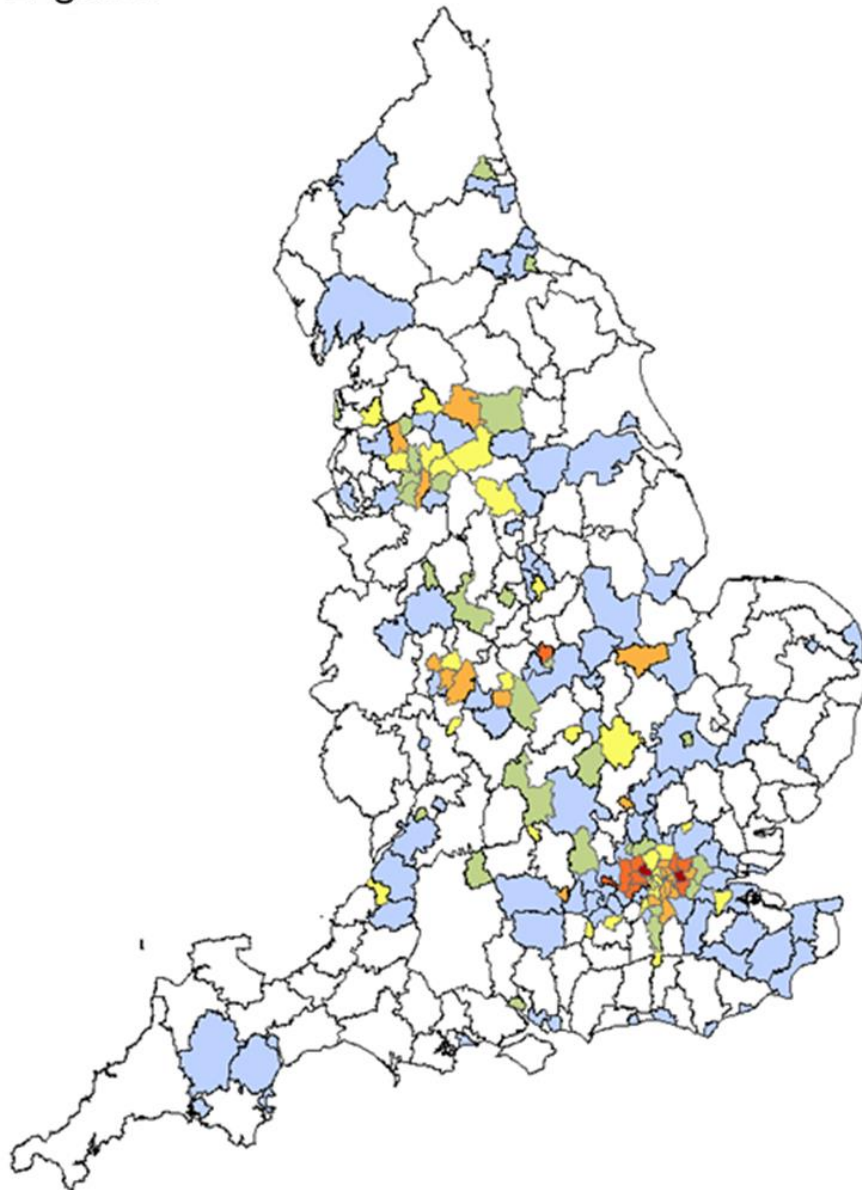


TB case notifications and rates, England, 2000-2014

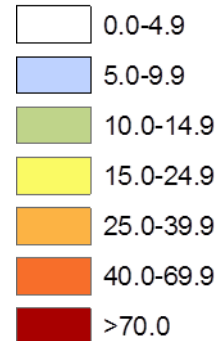




Three-year average TB rates by local authority district, England, 2012-2014



Tuberculosis rate (per 100,000)



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Contains National Statistics data © Crown copyright and database right 2015.

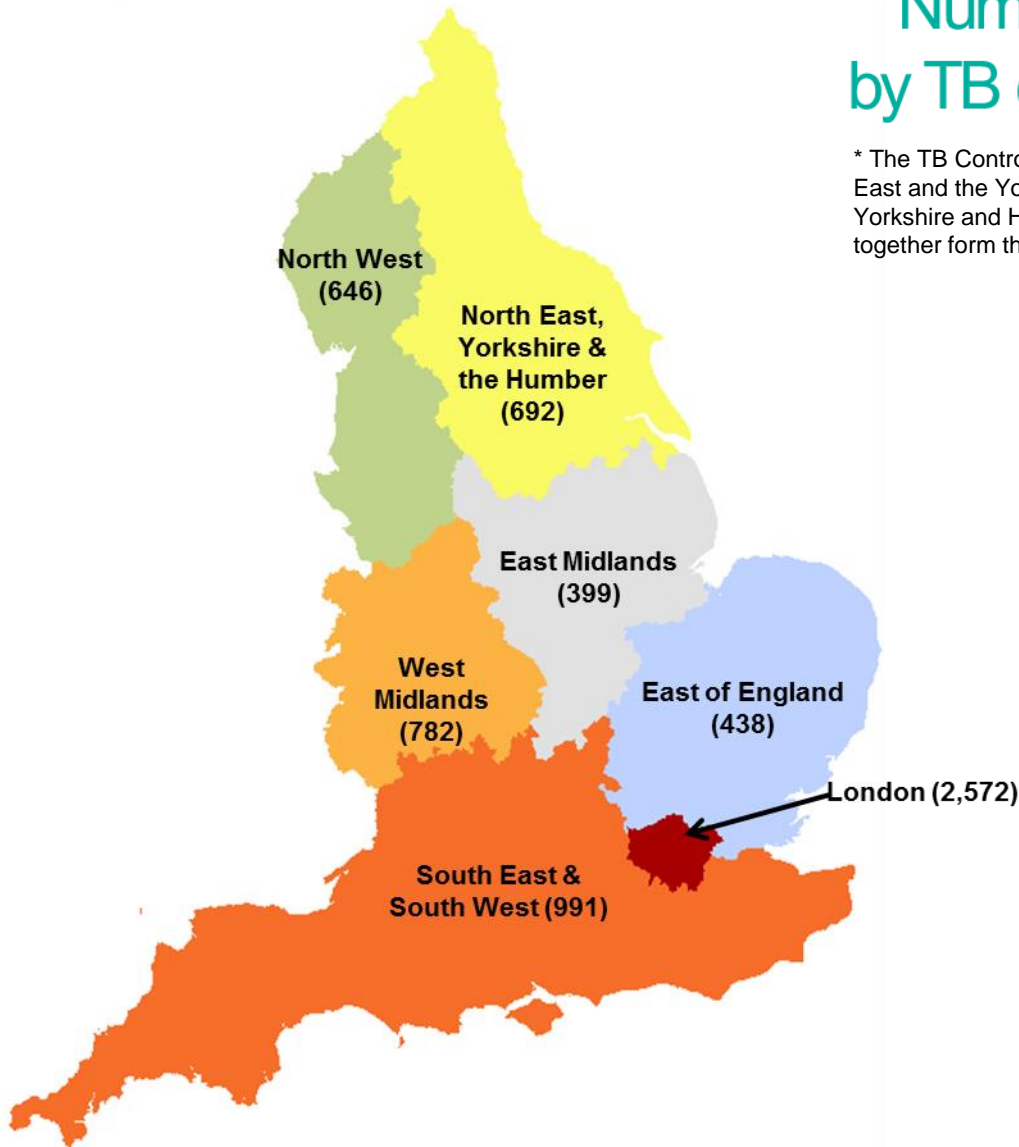
Source: Enhanced Tuberculosis Surveillance (ETS), Office for National Statistics (ONS)
Data extracted: March 2015.

Prepared by: TB Section, National Infection Service, Public Health England

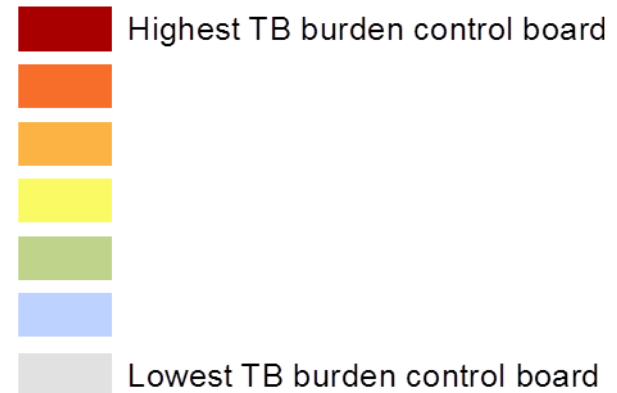


Number of TB case notifications by TB control board*, England, 2014

* The TB Control Boards (TBCBs) are aligned with PHEC boundaries other than North East and the Yorkshire and the Humber PHECs, which together form the North East, Yorkshire and Humber TBCB, and the South East and South West PHECs, which together form the South East and South West TBCB



TB burden



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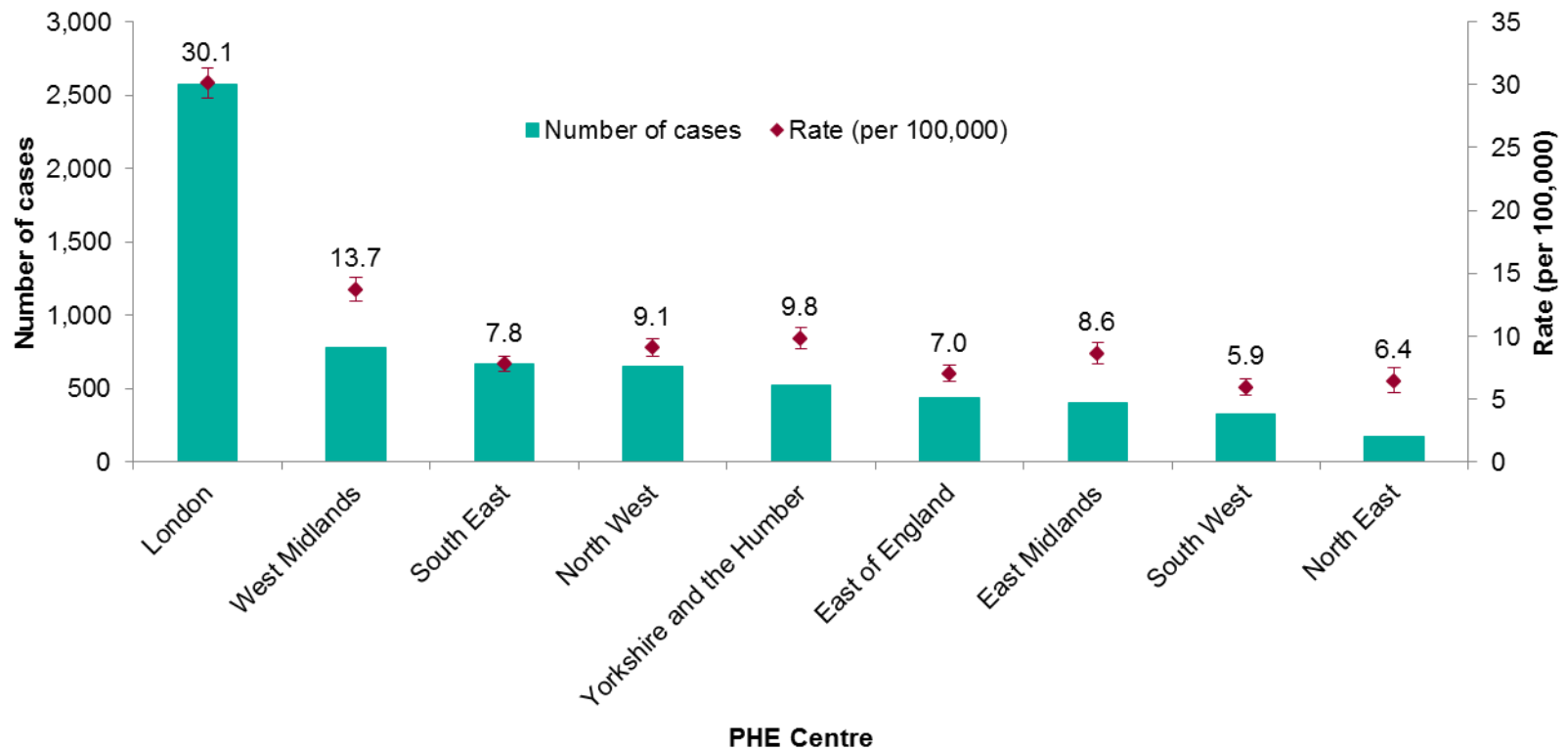
Source: Enhanced Tuberculosis Surveillance (ETS)

Data extracted: March 2015.

Prepared by: TB Section, National Infection Service, Public Health England

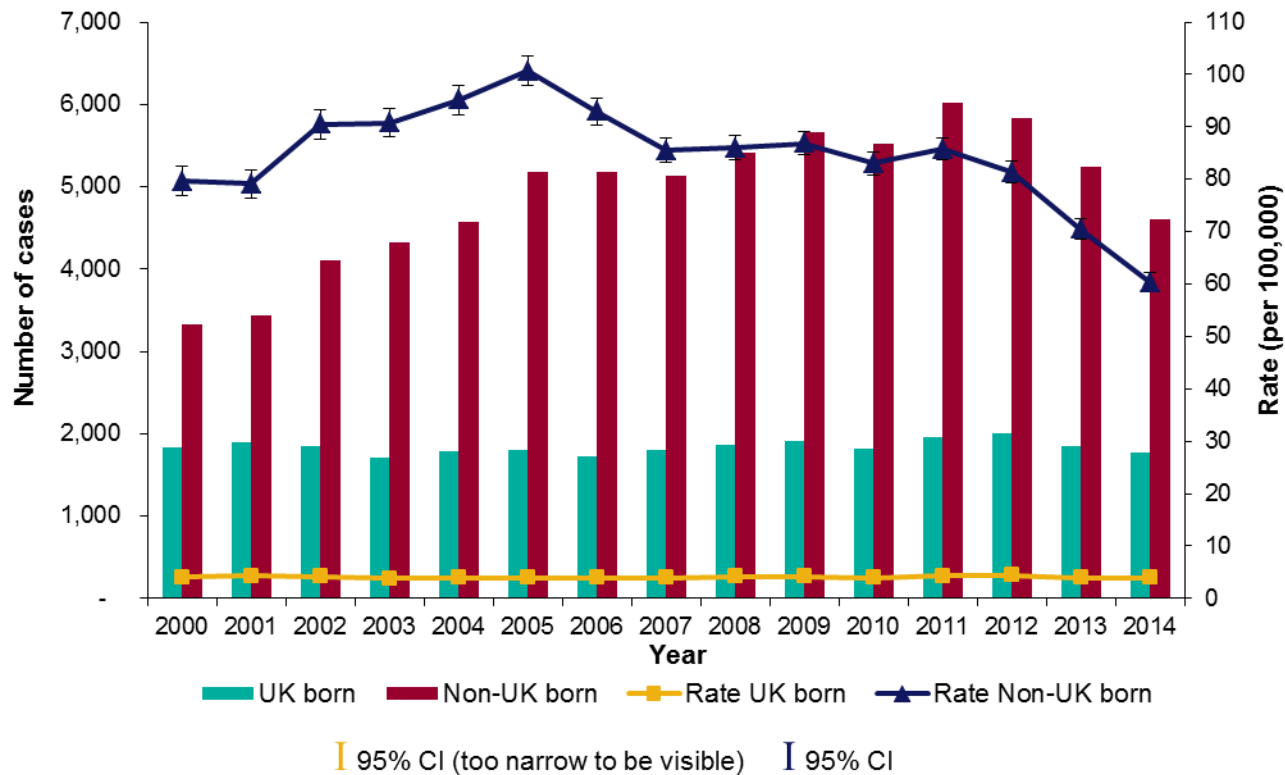


TB case notifications and rates by PHE Centre, England, 2014



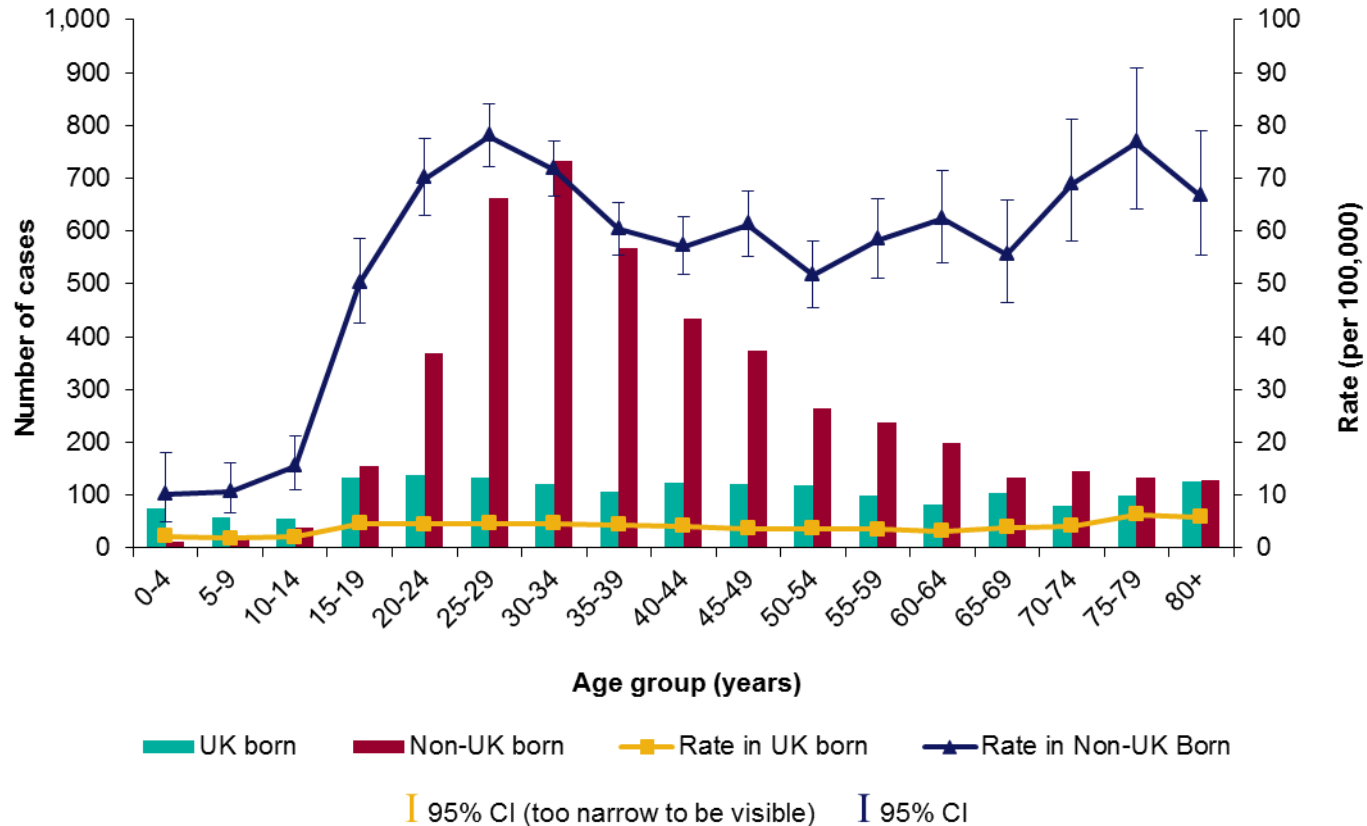


TB case notifications and rates by place of birth, England, 2000-2014





TB case notifications and rates by age group and place of birth, England, 2014



Source: Enhanced Tuberculosis Surveillance (ETS), Labour Force Survey (LFS)
Data extracted: March 2015.
Prepared by: TB Section, National Infection Service, Public Health England



Country of birth and time from UK entry to TB notification, England, 2014

Country of birth	Number of cases	Percentage of cases (%) [*]	Median time in years since entry to UK (IQR)
UK	1,774	28.2	-
India	1,288	20.5	7 (3 - 14)
Pakistan	791	12.6	10 (3 - 25)
Somalia	230	3.7	10 (3 - 14)
Bangladesh	207	3.3	8 (4 - 19)
Nepal	168	2.7	4 (3 - 9)
Nigeria	118	1.9	7 (2 - 17)
Philippines	111	1.8	9 (4 - 13)
Zimbabwe	107	1.7	11 (9 - 12)
Afghanistan	96	1.5	8 (4 - 13)
Romania	88	1.4	1 (0 - 6)
Eritrea	83	1.3	3 (0 - 8)
Kenya	81	1.3	19 (8 - 41)
Sri Lanka	78	1.2	11 (4 - 15)
Poland	70	1.1	6 (2 - 8)
Others (each <1%)	1,007	15.8	8 (3 - 16)
Total*	6,297	100.0	9 (3 - 20)

* Where country of birth was known

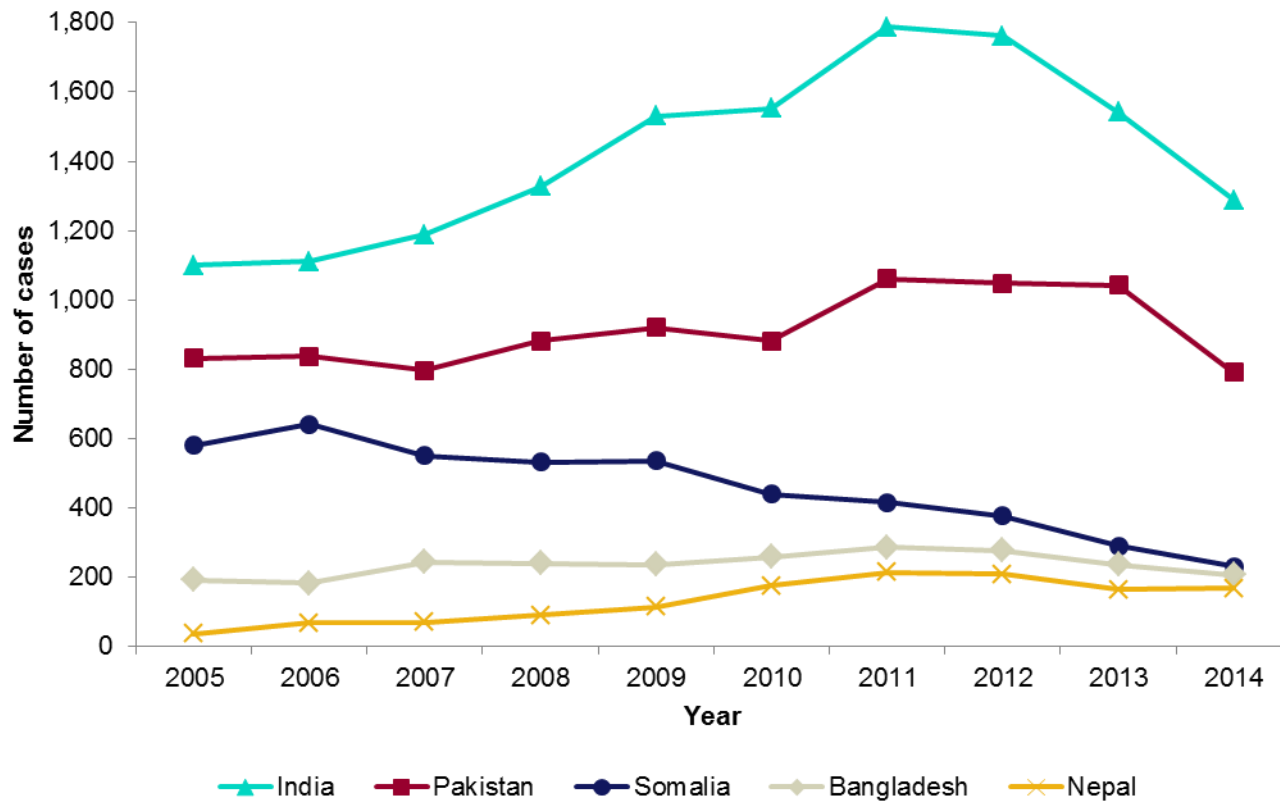
Source: Enhanced Tuberculosis Surveillance (ETS)

Data extracted: March 2015.

Prepared by: TB Section, National Infection Service, Public Health England



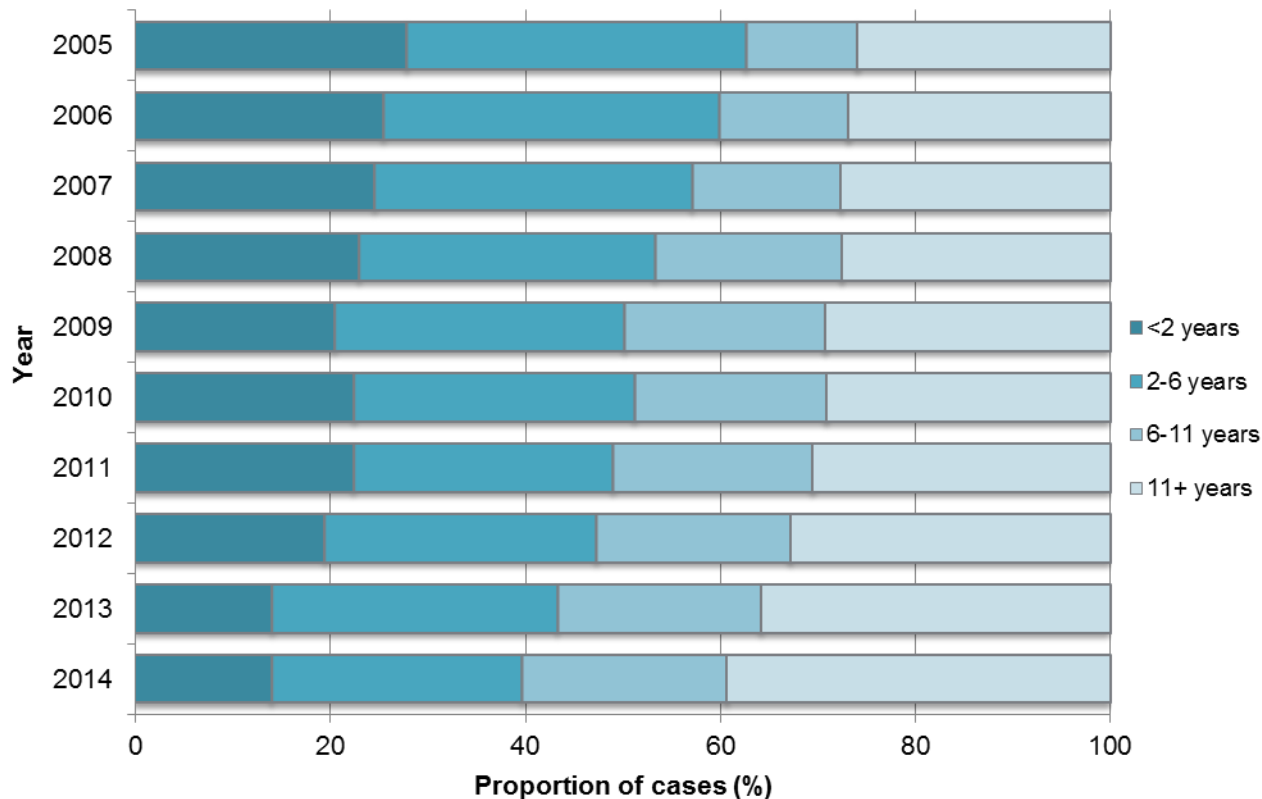
Trend in TB case notifications for top five countries of birth* of non-UK born cases, England, 2005-2014



* Five most frequent countries of birth in 2014

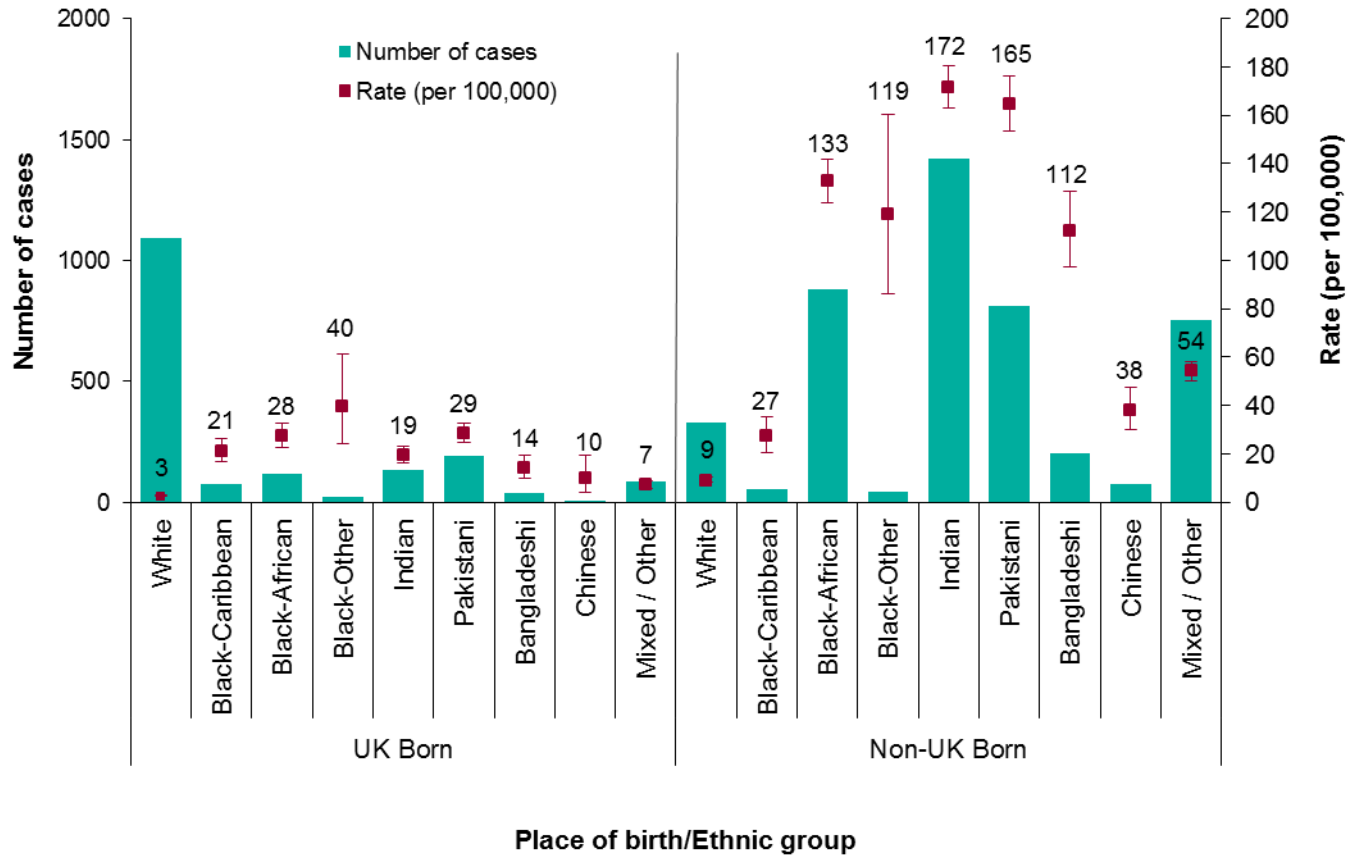


Time between entry to the UK & TB notification for non-UK born cases by year, England, 2005-2014



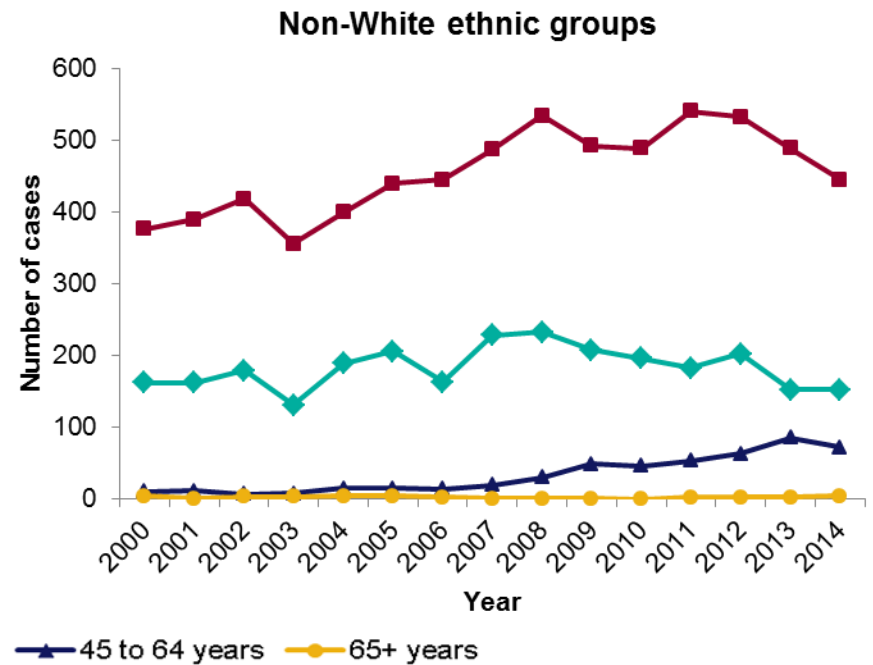
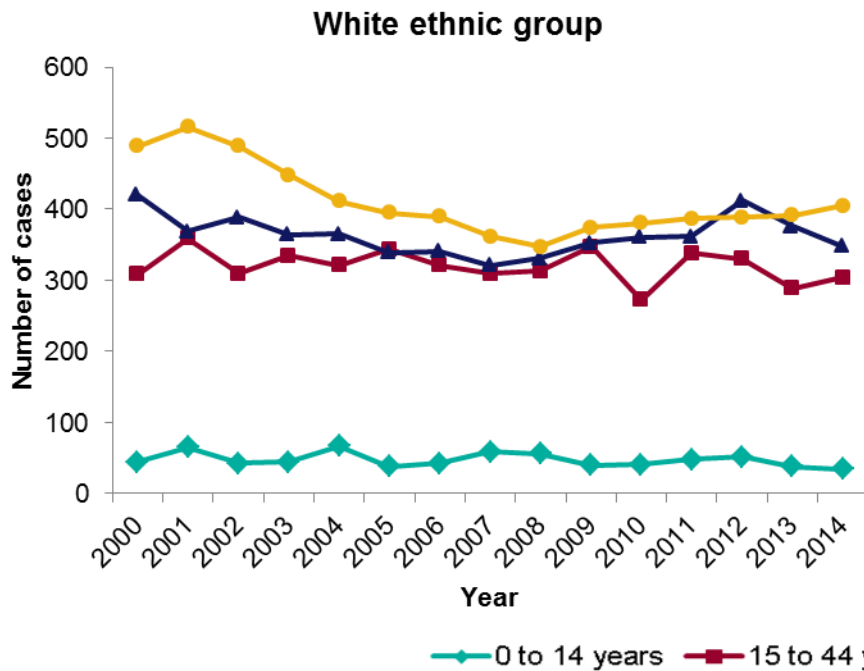


TB case notifications and rates by place of birth and ethnic group, England, 2014





Trend of TB case notifications by age group and ethnic group* in UK born cases, England, 2000-2014



* Cases with Black-Caribbean, Black-African, Black-Other, Indian, Pakistani, Bangladeshi, Chinese and Mixed/Other ethnic groups were grouped as 'non-White'



TB case notifications by site of disease, England, 2014

Site of disease*	Number of cases	Percentage**
Pulmonary	3,434	52.9
Extra-thoracic lymph nodes	1,445	22.3
Intra-thoracic lymph nodes	863	13.3
Unknown extra-pulmonary	638	9.8
Pleural	566	8.7
Other extra-pulmonary	504	7.8
Gastrointestinal	368	5.7
Bone – spine	310	4.8
Miliary	179	2.8
Bone – not spine	168	2.6
CNS – meningitis	148	2.3
Genitourinary	129	2.0
CNS – other	99	1.5
Cryptic disseminated	39	0.6
Laryngeal	16	0.2

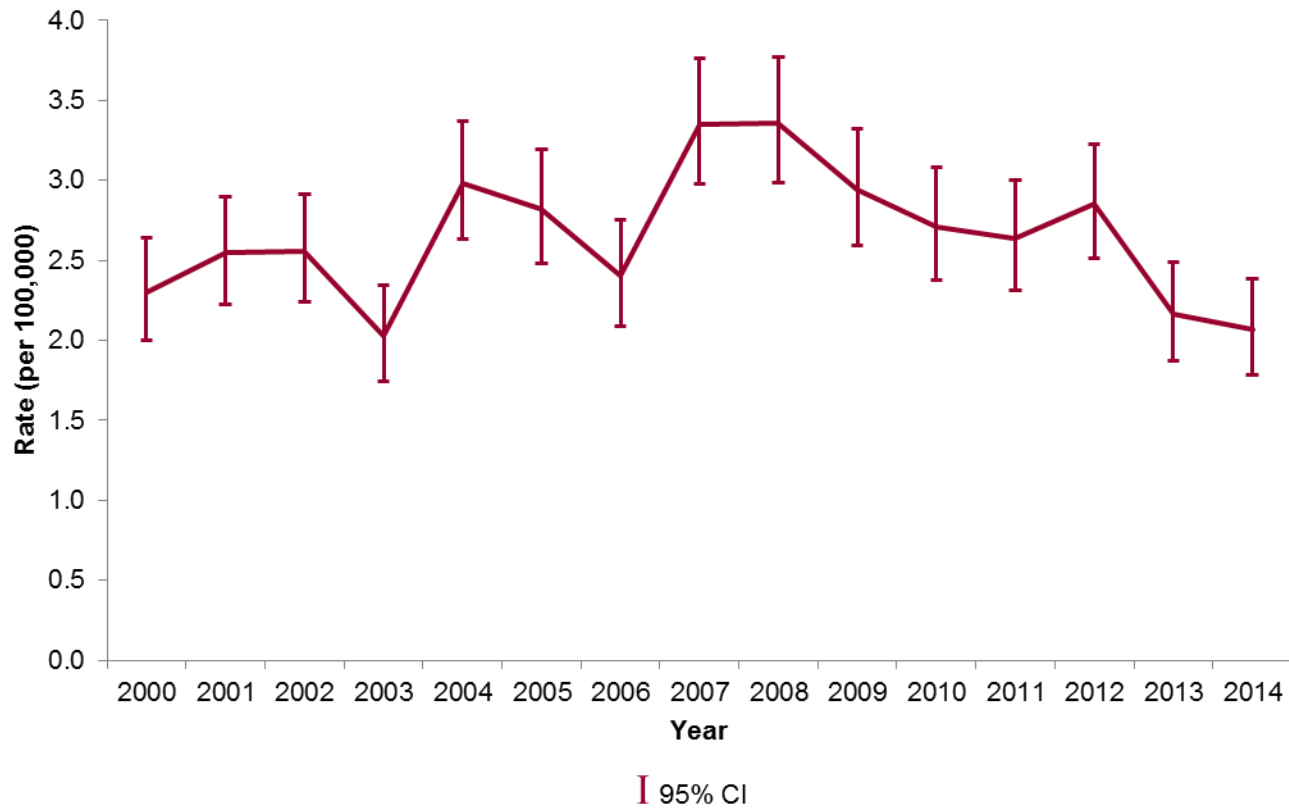
* With or without disease at another site

** Total percentage exceeds 100% due to disease at more than one site

CNS - Central Nervous System



Rate of TB in UK born children (0-14 years old), England, 2000-2014





Number and proportion of cases with unique and clustered MIRU-VNTR strain types, England, 2010-2014

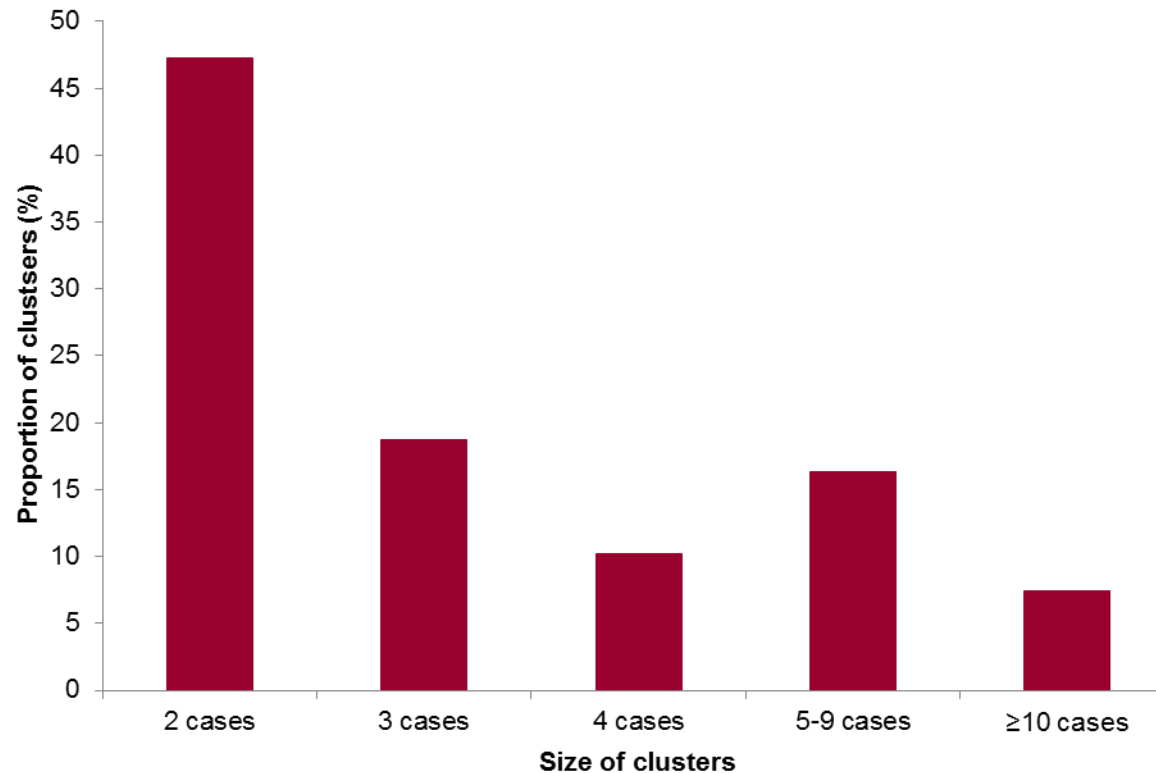
Year	Notified cases		Culture confirmed cases		Strain typed cases (≥23 loci)		Unique cases		Clustered cases *		New clusters (per year) **
	n		n	%	n	%	n	%	n	%	n
2010	7,677		4,609	60.0	3,229	70.1	1,391	43.1	1,838	56.9	366
2011	8,276		5,029	60.8	4,267	84.8	1,846	43.3	2,421	56.7	536
2012	8,086		4,895	60.5	4,301	87.9	1,754	40.8	2,547	59.2	534
2013	7,257		4,390	60.5	3,656	83.3	1,526	41.7	2,130	58.3	401
2014	6,520		3,914	60.0	3,319	84.8	1,512	45.6	1,807	54.4	408
Total	37,816		22,837	60.4	18,772	82.2	8,029	42.8	10,743	57.2	2,245

* Clustered in time period (2010-2014), clustered cases notified in year

** A new cluster forms at the point when a second case is notified with the same MIRU-VNTR strain type as an existing case



Proportion of MIRU-VNTR clusters by size, England, 2010-2014





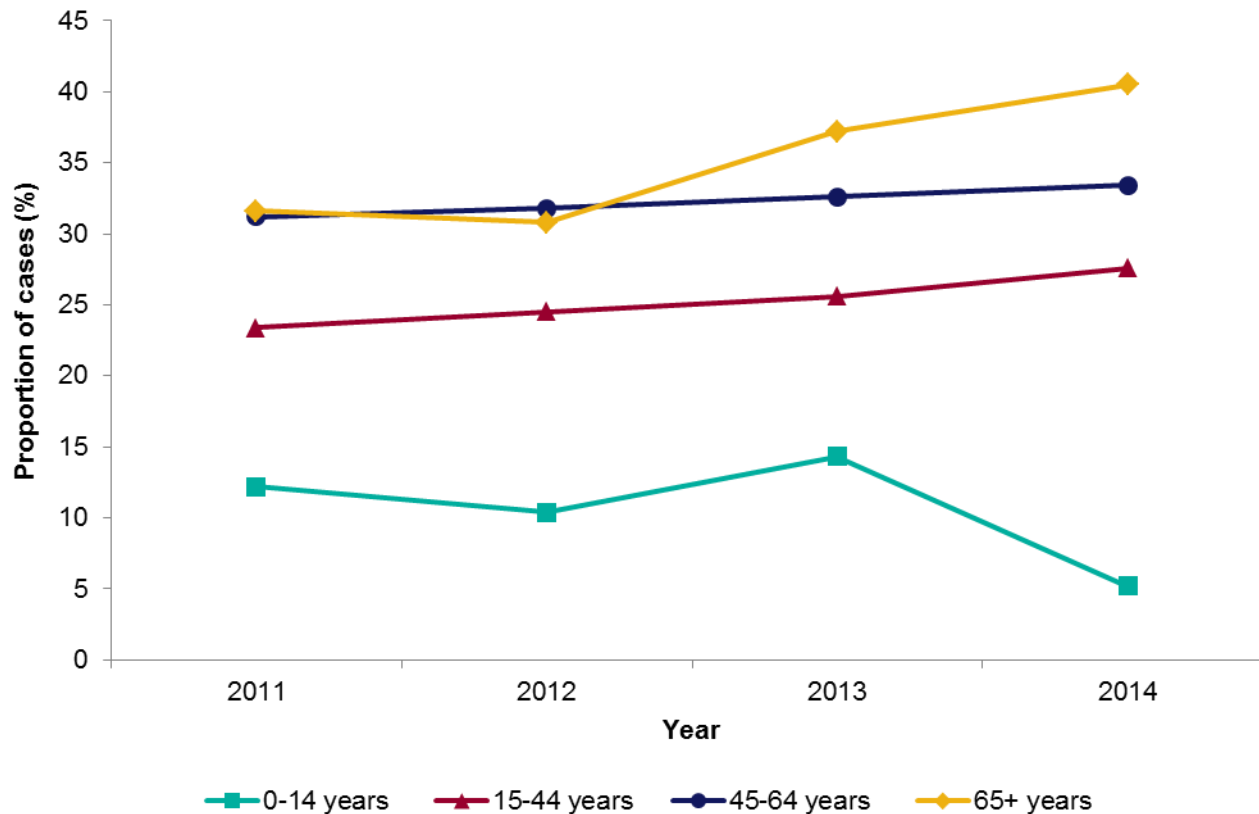
Number and proportion of pulmonary TB cases by delay from symptom onset to treatment start, England, 2011-2014

Year	0-2 months		2-4 months		>4 months		Total*
	n	%	n	%	n	%	n
2011	1,317	45.0	856	29.3	753	25.7	2,926
2012	1,369	44.0	925	29.8	814	26.2	3,108
2013	1,222	41.2	900	30.4	841	28.4	2,963
2014	1,137	39.5	868	30.2	870	30.3	2,875

* The number of pulmonary cases with time between onset of symptoms to start of TB treatment available, excluding those diagnosed post-mortem and those that were known to not start treatment

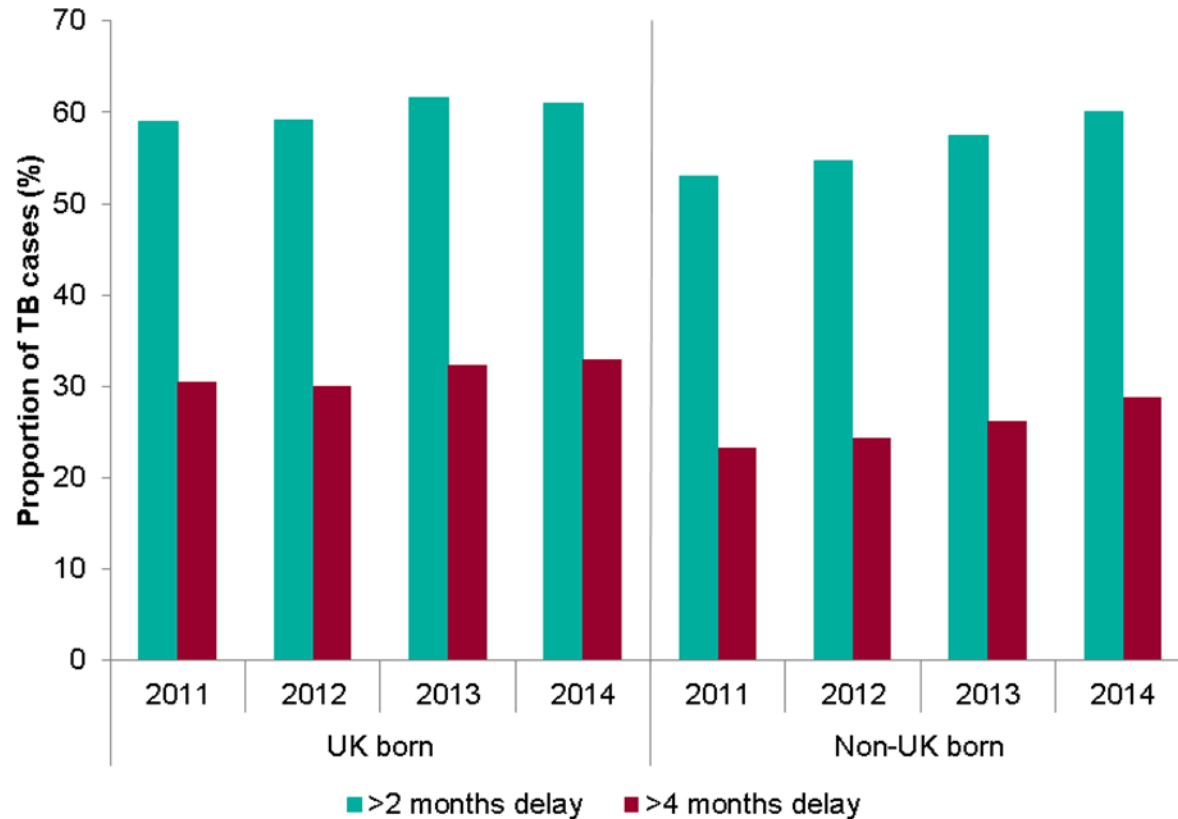


Proportion of pulmonary cases with a delay from symptom onset to treatment start of >4 months by age group, England, 2011-2014



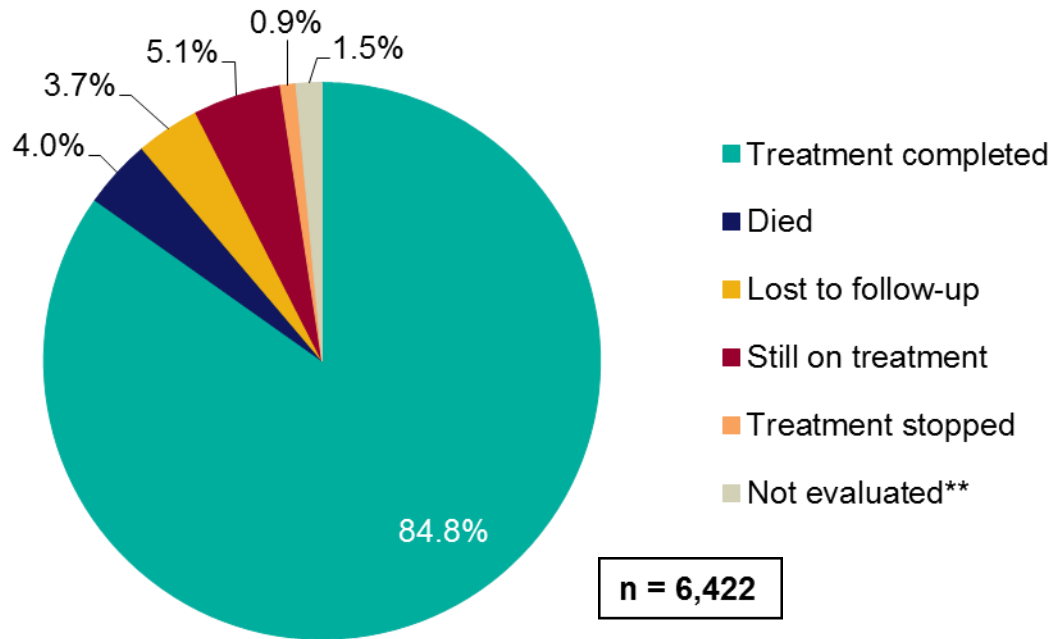


Proportion of cases with a delay from symptom onset to treatment start by place of birth, England, 2011-2014





TB outcome at 12 months for drug sensitive cases with expected treatment duration <12 months*, England, 2013

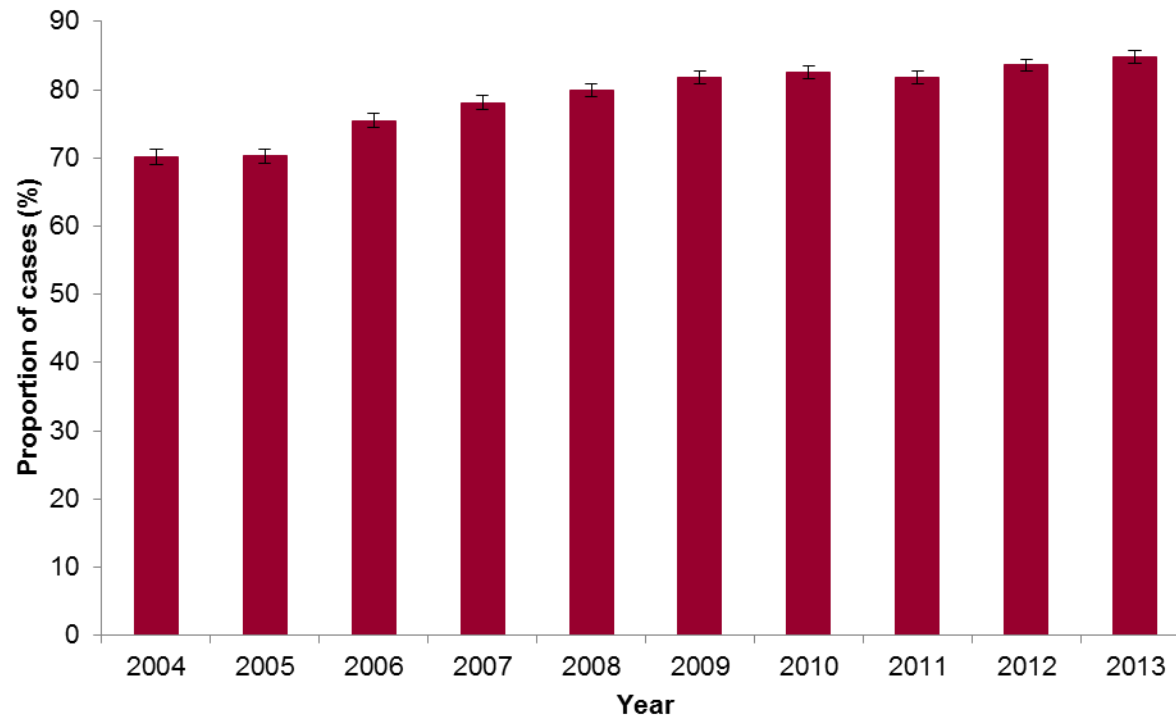


* Excludes initial and amplified to rifampicin resistant TB and MDR-TB cases and MDR-TB treated cases and those with CNS, spinal, miliary or cryptic disseminated TB

** Not evaluated includes missing, unknown and transferred out



Treatment completion at 12 months for drug sensitive TB cases with expected treatment duration <12 months*, England, 2004-2013

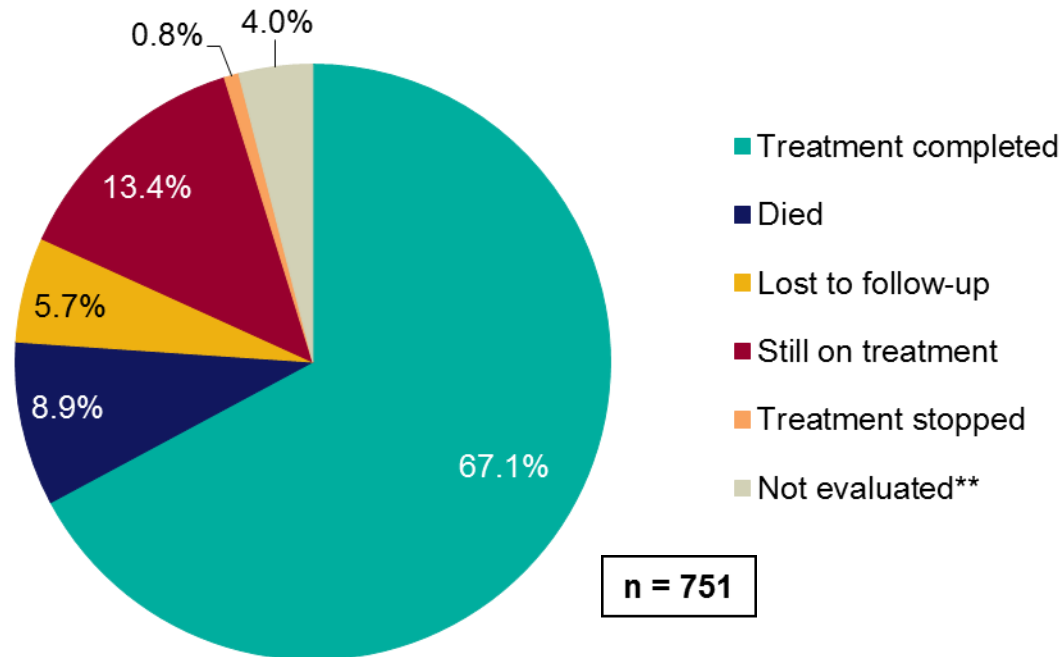


I 95% CI

* 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



Last recorded TB outcome for drug sensitive cohort with CNS, spinal, military or cryptic disseminated* TB, England, 2013

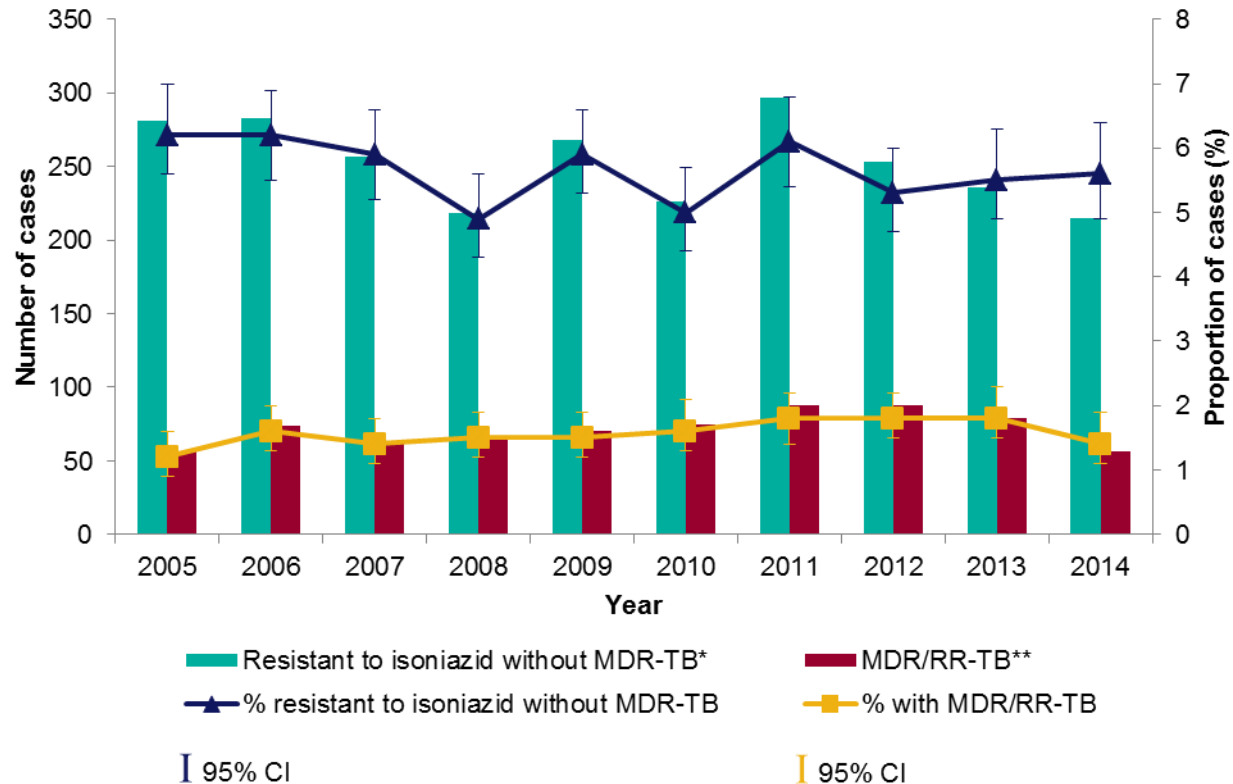


* Excludes initial and amplified to rifampicin resistant TB and MDR-TB cases and MDR-TB treatment cases and only includes drug sensitive TB cases with CNS, spinal, military or cryptic disseminated TB

** Not evaluated includes missing, unknown and transferred out



Number and proportion of TB cases with initial drug resistance, England, 2005-2014



* Culture confirmed cases with DST results for at least isoniazid and rifampicin resistant to isoniazid without MDR-TB

** Culture confirmed cases with DST results for at least isoniazid and rifampicin resistant to rifampicin, including those with MDR-TB



Number and proportion of TB cases with drug resistance by age group, England, 2014

Age group (years)	Resistant to isoniazid without MDR-TB cases*		MDR/RR-TB cases**		Total cases#
	n	%	n	%	n
0-4	0	0.0	0	0.0	12
5-14	2	4.3	0	0.0	46
15-24	31	5.6	9	1.6	558
25-34	62	5.7	24 [§]	2.2	1,088
35-44	51	6.8	11 [§]	1.5	746
45-54	33	6.3	7	1.3	525
55-64	20	5.9	4	1.2	339
65+	16	2.8	1	0.2	575
Total	215	5.5	56	1.4	3,889

* Culture confirmed cases with DST results for at least isoniazid and rifampicin who are resistant to isoniazid without MDR-TB

** Culture confirmed cases with DST results for at least isoniazid and rifampicin who are resistant to rifampicin, including those with MDR-TB

All culture confirmed cases with DST results for at least isoniazid and rifampicin

§ Three cases aged 25-34 and one case aged 35-44 were resistant to rifampicin without MDR-TB



Most frequent countries of birth of TB cases with drug resistance, England, 2014

Country of birth*	Total cases**	Resistant to isoniazid without MDR-TB cases #		MDR/RR-TB cases\$	
	n	n	%	n	%
UK	967	52	5.4	6	0.6
India	780	40	5.1	10 [^]	1.3
Pakistan	469	27	5.8	3	0.6
Somalia	129	10	7.8	0	0.0
Philippines	75	7	9.3	2	2.7
Afghanistan	59	7	11.9	1	1.7
Bangladesh	107	7	6.5	0	0.0
Nepal	113	6	5.3	2	1.8
Lithuania	46	5	10.9	11	23.9
Eritrea	53	5	9.4	0	0.0
Nigeria	81	4	4.9	3 [^]	3.7
Zimbabwe	69	2	2.9	3	4.3
Ethiopia	27	1	3.7	3	11.1
Latvia	15	1	6.7	3	20.0

* Top 14 countries of birth for cases resistant to isoniazid without MDR and MDR/RR-TB cases in 2014.

** Culture confirmed cases with DST results for at least isoniazid and rifampicin

Culture confirmed cases with DST results for at least isoniazid and rifampicin who are resistant to isoniazid without MDR-TB

\$ Culture confirmed cases with DST results for at least isoniazid and rifampicin who are resistant to rifampicin, including those with MDR-TB

[^] Two cases from Nigeria and one case from India were resistant to rifampicin without MDR-TB

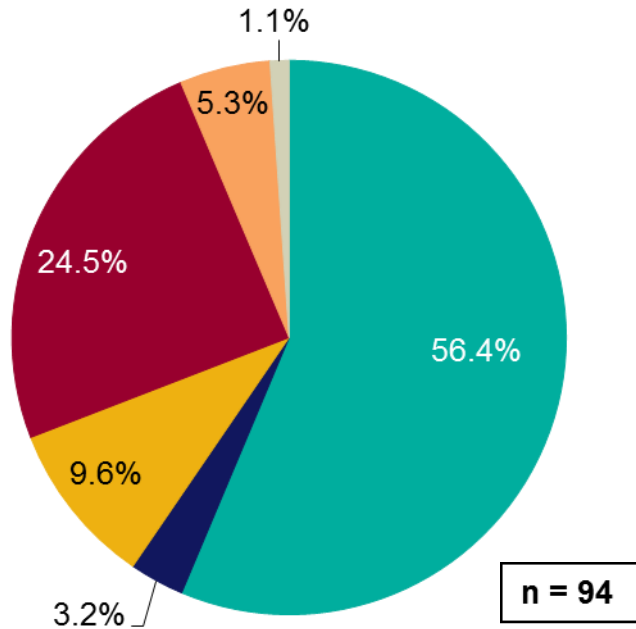
Source: Enhanced Tuberculosis Surveillance (ETS)

Data extracted: March 2015.

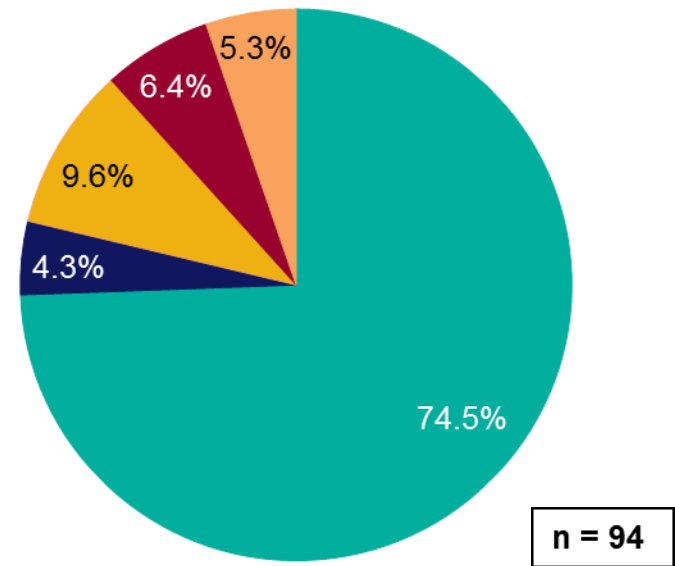
Prepared by: TB Section, National Infection Service, Public Health England



TB outcome at 24 months for drug resistant cohort, England, 2012*



Last recorded TB outcome for entire drug resistant cohort, England, 2012*



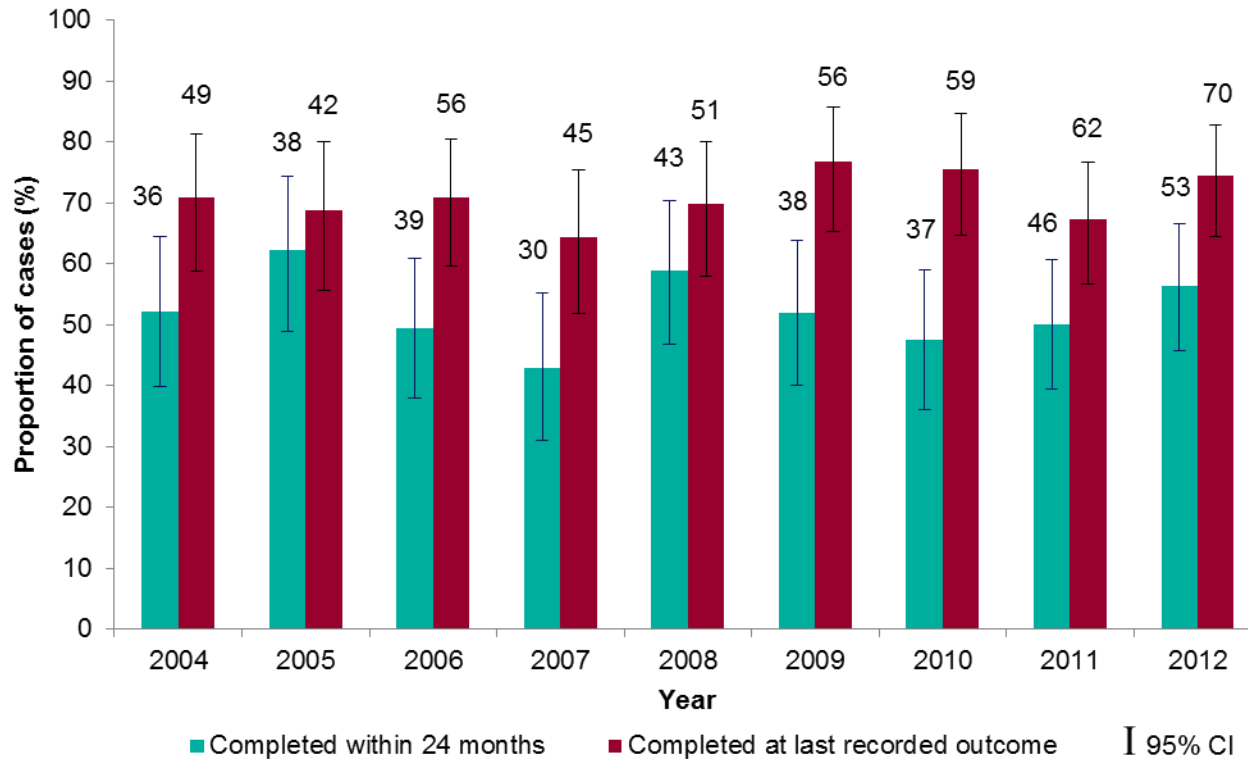
■ Treatment completed ■ Died ■ Lost to follow up ■ Still on treatment ■ Treatment stopped ■ Not evaluated**

* Includes initial and amplified MDR/RR-TB and MDR-TB treatment cases only

** Not evaluated includes missing, unknown and transferred out



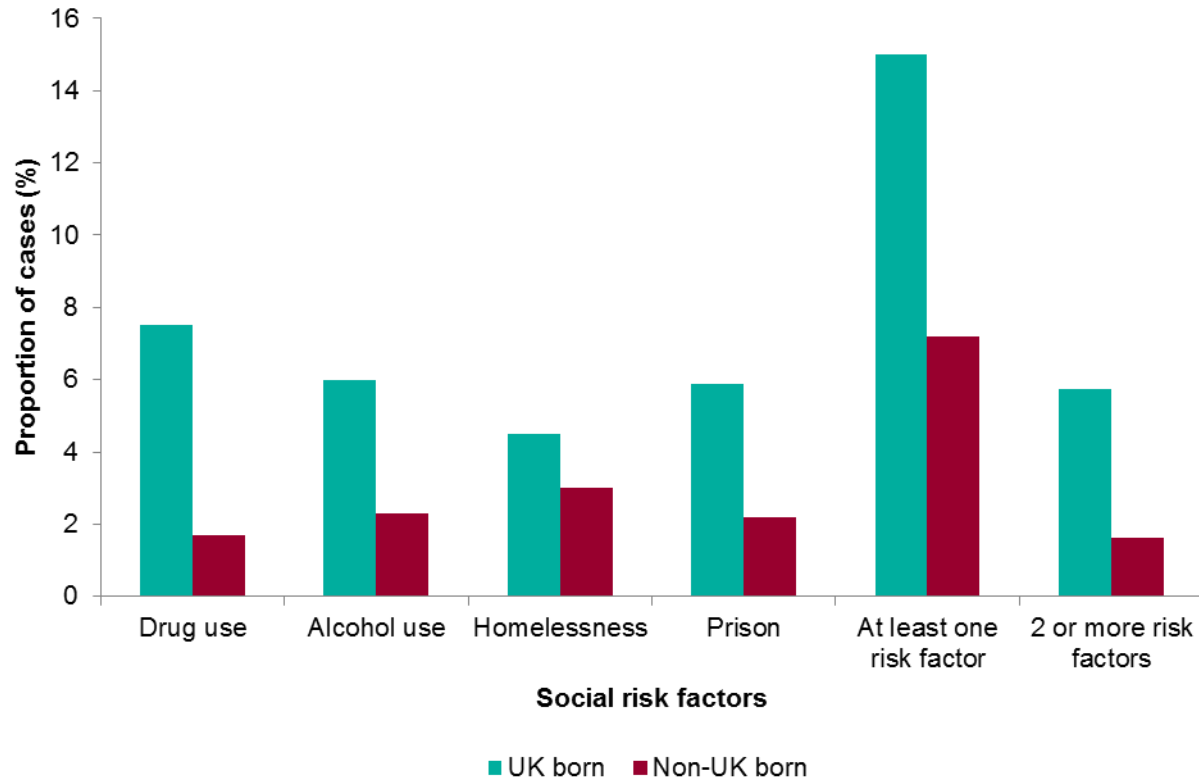
Treatment completion for drug resistant TB cases, England, 2004-2012*



* Includes initial and amplified MDR/RR-TB and MDR-TB treatment cases only
Data labels display the number of cases completing treatment



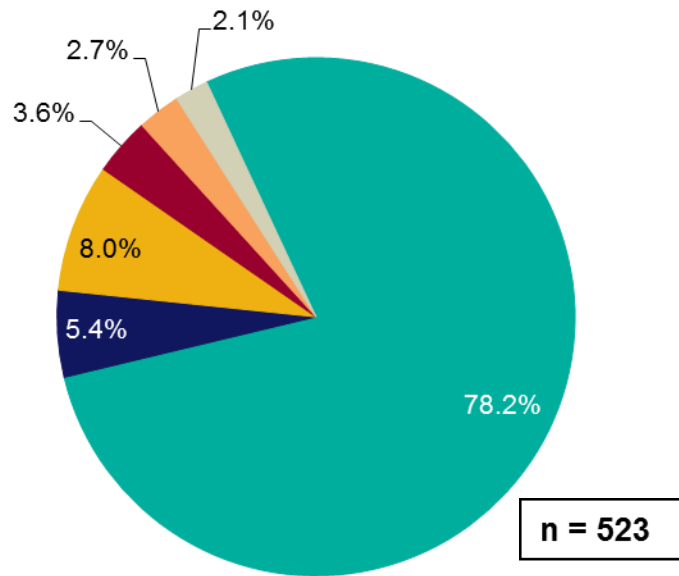
Proportion of TB cases with a social risk factor by place of birth, England, 2014



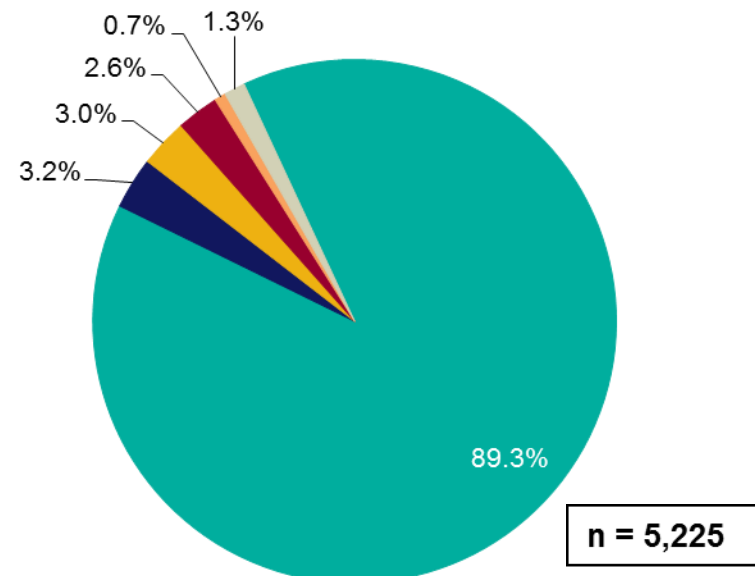


Last recorded TB outcome for entire drug sensitive cohort by social risk factor*, England, 2013

At least one social risk factor



No social risk factor



■ Treatment completed
 ■ Died
 ■ Lost to follow-up
 ■ Still on treatment
 ■ Treatment stopped
 ■ Not evaluated**

* 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

Summary

- Clinical suspicion key
 - ‘great mimicker’
 - epidemiology more sensitive than symptoms (or plain CXR)
- Epidemiology - young non UK born versus caucasian elderly UK born
- Pulmonary/ extrapulmonary presentations – chest radiology
- Radiology ‘normal’ symptomatic cases need assessing
- Refer to local TB clinic
- Latent TB screening
 - Contact screening
 - New Entrant Screening