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Protecting and improving the nation's health

Tuberculosis in the South East

Annual review

Data from 2000 to 2018

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Executive summary

The rate of tuberculosis (TB) in the South East continues to decline by a small amount year-on-year, from a peak in 2011. In 2018, 508 people with TB were notified, a rate of 5.7 per 100,000 population. This was below the England average (8.3 per 100,000 population) and accounted for 11% of the 4,655 notifications in England. Most of the South East has very low rates. In all but 4 upper-tier or unitary authorities (Slough, Reading, Southampton, and Buckinghamshire), rates were below the national average.

The rate of TB among people born outside the UK has more than halved since 2011, although cases among this group still accounted for 67% of all reports. The median time since entry for people born abroad increased to 10 years. India, Pakistan and Nepal remain the most common non-UK countries of birth, accounting for half of those born abroad. Time since entry for people born in these 3 countries increased (longest among those from Pakistan, 27 years, and India, 11 years). People from the next most common countries of birth, Romania and Timor-Leste, were most likely to be recent entrants, entering the UK 2 or less years before notification.

In 2018 there was a further increase in TB among people born in the UK, as in 2017, although the rate in this group remains below the England average. This increased in all health protection team areas other than Thames Valley. The most common ethnic group was white (74% born in the UK), which accounted for a third of all people with TB.

Just over half of people notified in 2018 had pulmonary disease. Pulmonary TB was more common among people born in the UK (73% vs. 47% in those born abroad). In 2018 60% of people with TB had their diagnosis confirmed by culture (75% among those with pulmonary TB). The proportion resistant to one or more first line drug increased to 10% (the highest level since 2000). One in 5 people with culture confirmed disease with a WGS result were clustered within 12 SNPs of at least 1 other individual in England in 2018. People who were born in the UK, and had a social risk factor, were more likely to be clustered with another person.

Almost 1 in 5 (18%) people had one of the key co-morbidities (diabetes, hepatitis B, hepatitis C, chronic renal disease, chronic liver disease and immunosuppression). Diabetes was the most common. Where occupation was reported, 11% of people with TB worked in healthcare.

People with pulmonary TB in the South East had a median delay from symptoms to starting treatment of 81 days, similar to the previous year and 6 days longer than the national average. Delays were longest and increased from 2017 in Surrey and Sussex.

Of the people notified in 2017 who would be expected to receive 6 months standard treatment, (excluding those with rifampicin-resistant, CNS, spinal, miliary or cryptic

disseminated disease) 86% had completed at 12 months. Completion was lowest among people with a social risk factor (73%) and those aged 65 and over (75%). It was also lower among people with a co-morbidity (78%), those born in the UK (80%), men (82%) and those of white (81%) and Indian (83%) ethnicity. Of those with CNS, spinal, military, or cryptic disseminated TB who were notified in 2017, 76% had completed treatment by the last recorded outcome. Overall, 6% of people with rifampicin-sensitive TB notified in 2016 died before completing treatment. TB was known to have contributed to 31% of these (but information was missing for almost half of all deaths). Deaths were most common among people with one of the key co-morbidities (11% died).

More than 1 in 10 people with TB in 2018 experienced a social risk factor, and a third had more than 1. Social risk factors were more common in people born in the UK, men and those of white ethnicity. People with social risk factors were more likely to have infectious TB and less likely to complete treatment. Only 91% of people with TB were offered and received HIV testing, the lowest across England. Children were least likely to be offered a test (although numbers were small), and rates were also lower among adults over 65.

While TB rates remain very low across most of the South East and continue to decline, the rate of decline is small. In addition, increases occurred in cases among people born in the UK and in levels of drug resistance. Issues remain with poor outcomes experienced by people with social risk factors, above average delays from symptom onset to treatment, and the lowest coverage of HIV testing in the country. Continued focus is needed on the diagnosis and management of complex cases, and support of cluster investigations to interrupt ongoing transmission.

Recommendations

South TB control board should continue to prioritise work to improve outcomes for under-served populations.

Cohort review and MDR cohort review continue to play a vital role in quality assurance of TB case and contact management. Identified issues should be escalated to the South TB control board.

PHE and local services should work together to use relatedness data to identify evidence of UK transmission and use as opportunities for prevention.

Opportunities to improve the low coverage of HIV testing and low reporting of sputum smear results should be explored by the TB control board.

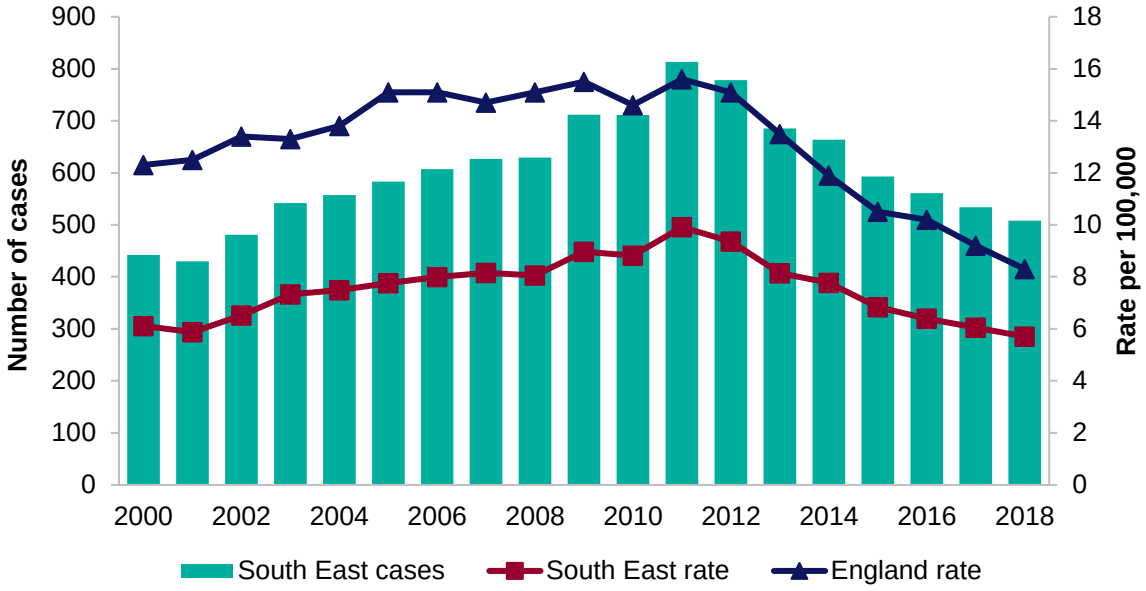
Drug resistance levels, and outcomes for those with isoniazid resistant disease should be closely monitored. Ways to increase culture confirmation rates should be considered to ensure appropriate treatment of all people with TB.

1. TB notifications and incidence

Overall numbers, rates and geographical distribution

In 2018, 508 cases of tuberculosis (TB) were notified among South East of England residents, a rate of 5.7 per 100,000 population. This was a small but continuous year-on-year decline from the peak of 9.9 per 100,000 in 2011 (Figure 1). This was below the England average of 8.3 per 100,000 population, and South East residents accounted for 11% of the 4,655 TB cases in England.

Figure 1: TB case reports and rates, South East, 2000 – 2018



In 2018, rates continued to fall in Surrey and Sussex (by 21% compared to 2017) and in Thames Valley (by 9%), which still had the highest rate in the South East (Figure 2). There were small increases in Kent (7%) and Hampshire and Isle of Wight (3%).

Residents of Slough in Thames Valley experienced the highest burden of TB disease (37 cases, 25 per 100,000) of all upper-tier or unitary authorities, although this was a 14% decrease relative to 2017. At 13 per 100,000 population, the second highest rate was among residents of Reading, also in Thames Valley. This was a 42% decrease from the rate in 2017. In all but 4 upper-tier or unitary authorities (Slough; Reading; Southampton, 28 cases, 11.1 per 100,000; and Buckinghamshire, 49 cases, 9.1 per 100,000), TB notification rates were below the national average of 8.3 per 100,000 population in 2018.

Residents of Slough (30 per 100,000) had the highest 3-year average TB rates among lower-tier local authorities, followed by Rushmoor in Hampshire (22 per 100,000), Reading (18 per 100,000), and Gravesham in Kent (16 per 100,000) (Figure 3).

Figure 2: TB case rates, by Health Protection Team area of residence, South East, 2000 – 2018

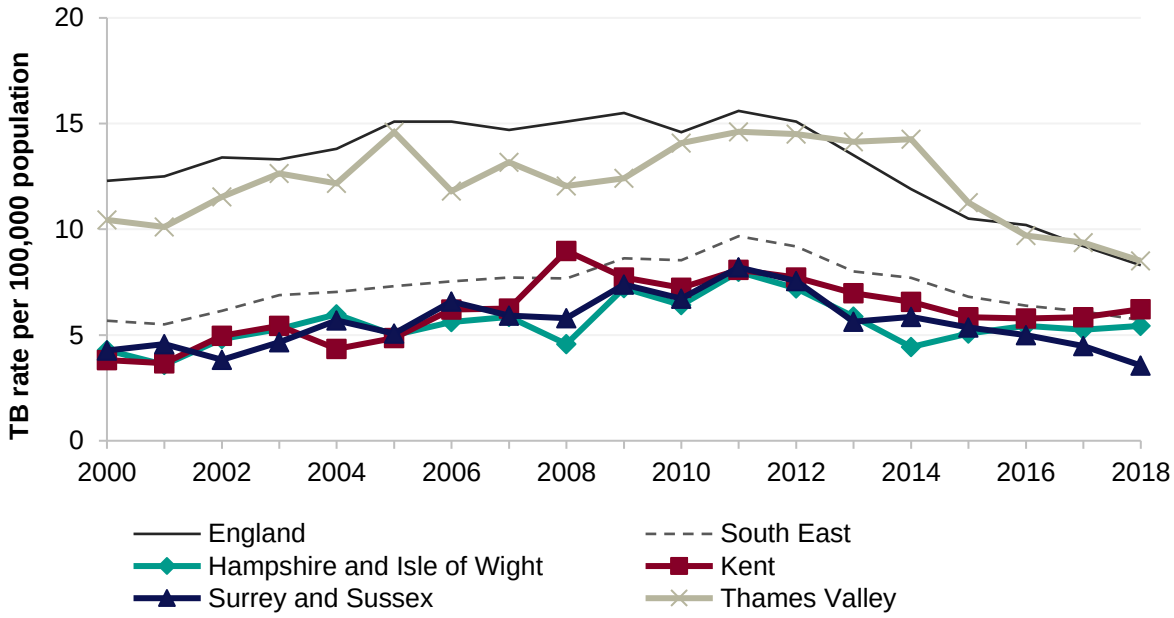
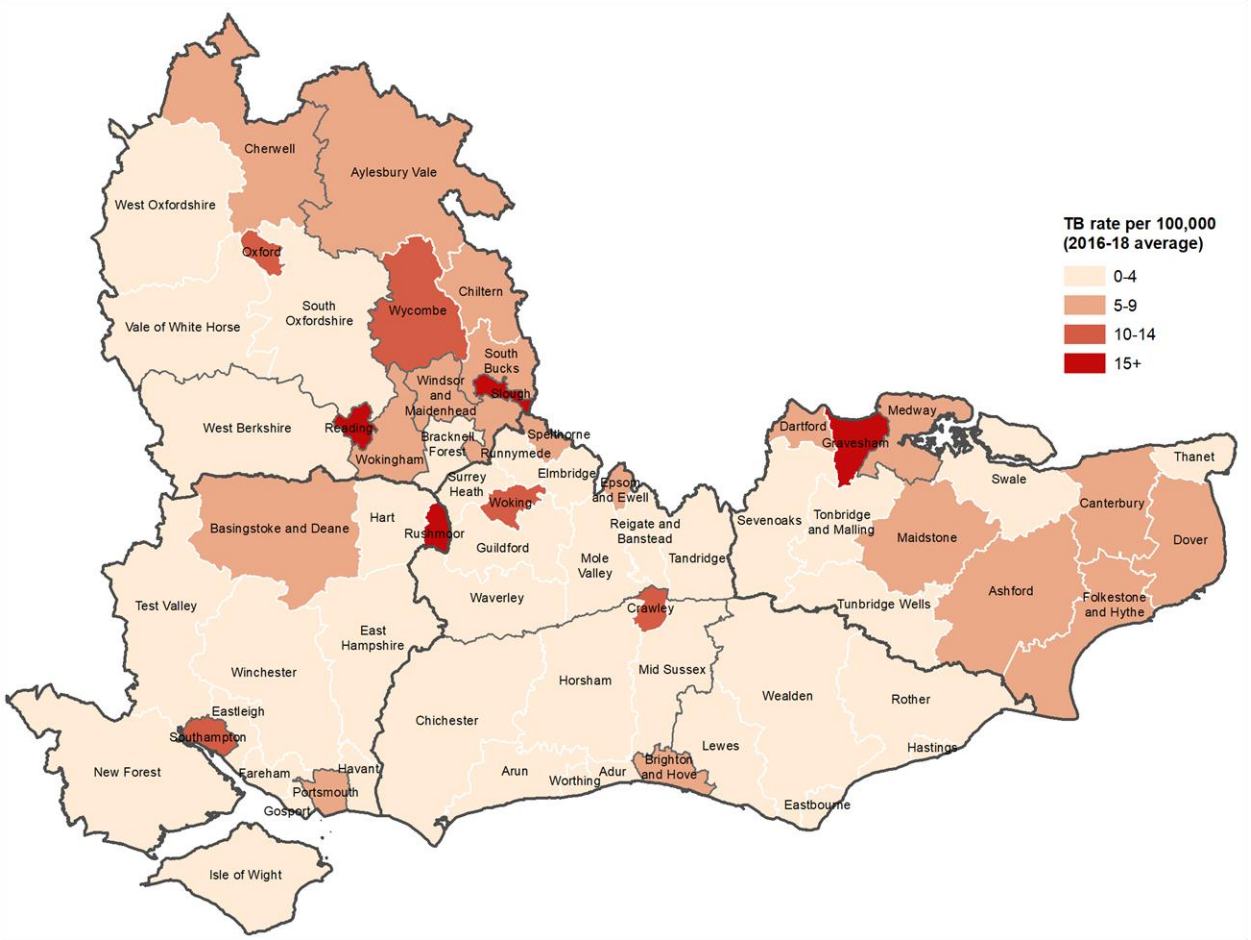


Figure 3: Three-year average TB case rate by lower-tier local authority of residence, South East, 2016-2018



Demographic characteristics

Age and sex

The TB rate remains highest among people aged 15 to 44 years, (Figure 4), although the overall decrease in TB since 2011 has been mostly in this age group. In 2018, 57% (290/508) of people with TB were male. Rates were slightly higher among men than women (7 per 100,000 vs 5 per 100,000). Among both sexes, rates were highest in the 30 to 39-year age group (Figure 5).

Figure 4: TB case rates by age group, South East, 2000 – 2018

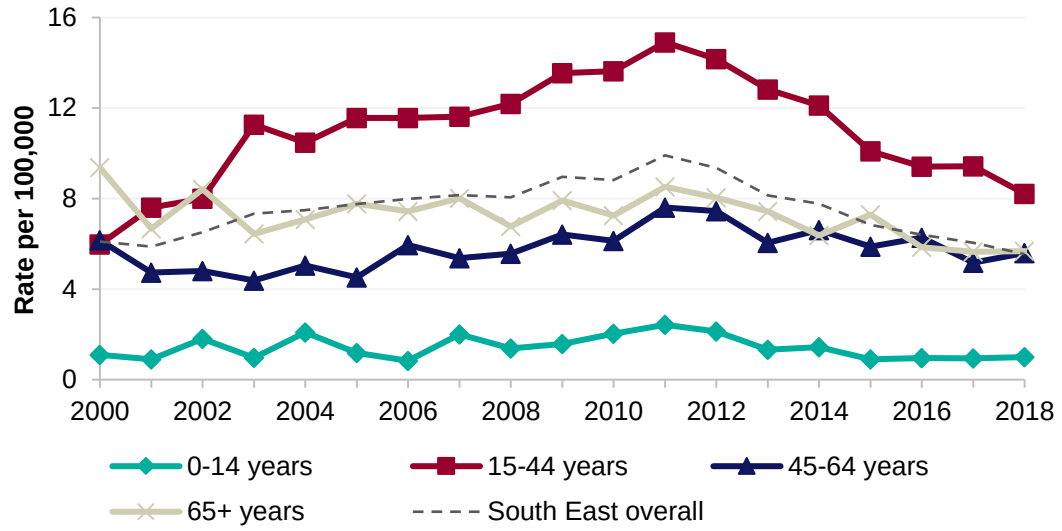
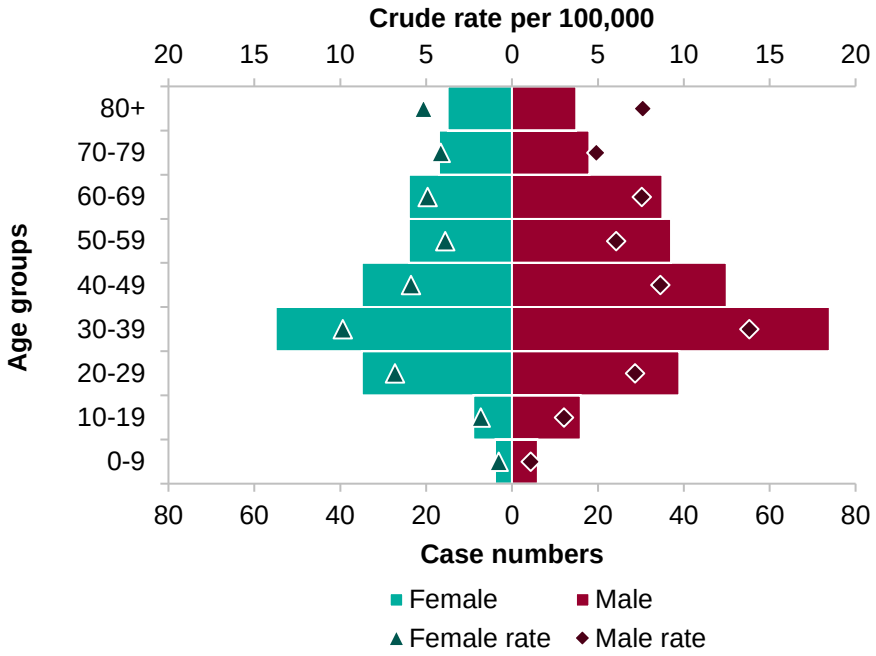


Figure 5: TB case reports and rate by age and sex, South East, 2018



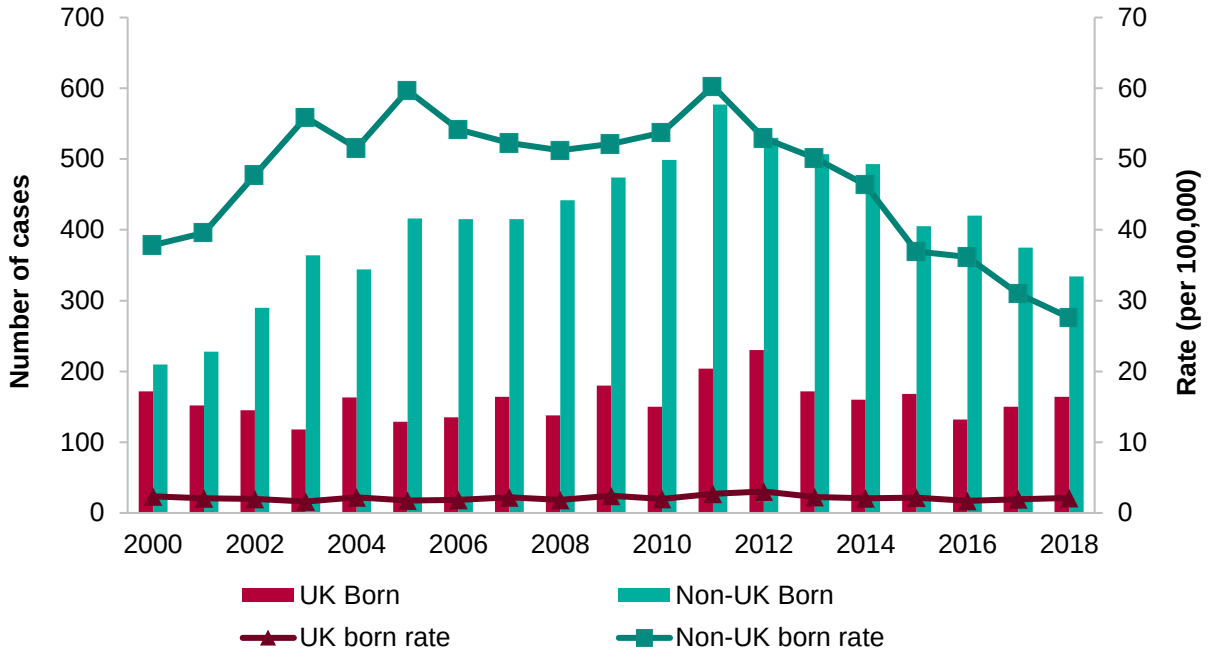
Place of birth and time since entry

In 2018, country of birth was known for 97% of people with TB (495/508). Overall, 67% (334/498) were born outside of the UK, which was smaller than the proportion observed in 2016 (71%).

This mostly reflected a decrease in the numbers and proportions born abroad in Surrey and Sussex, from 76% (90/119) in 2017 to 56% (55/98). There were smaller decreases in the proportion born abroad in Hampshire and Isle of Wight and in Kent, and an

increase in Thames Valley, although small numbers mean year-on-year changes should be interpreted with caution. In the highest incidence areas of Slough and Reading, more than 85% of people with TB were born outside the UK.

Figure 6: TB case reports and rate by place of birth, South East, 2000 – 2018

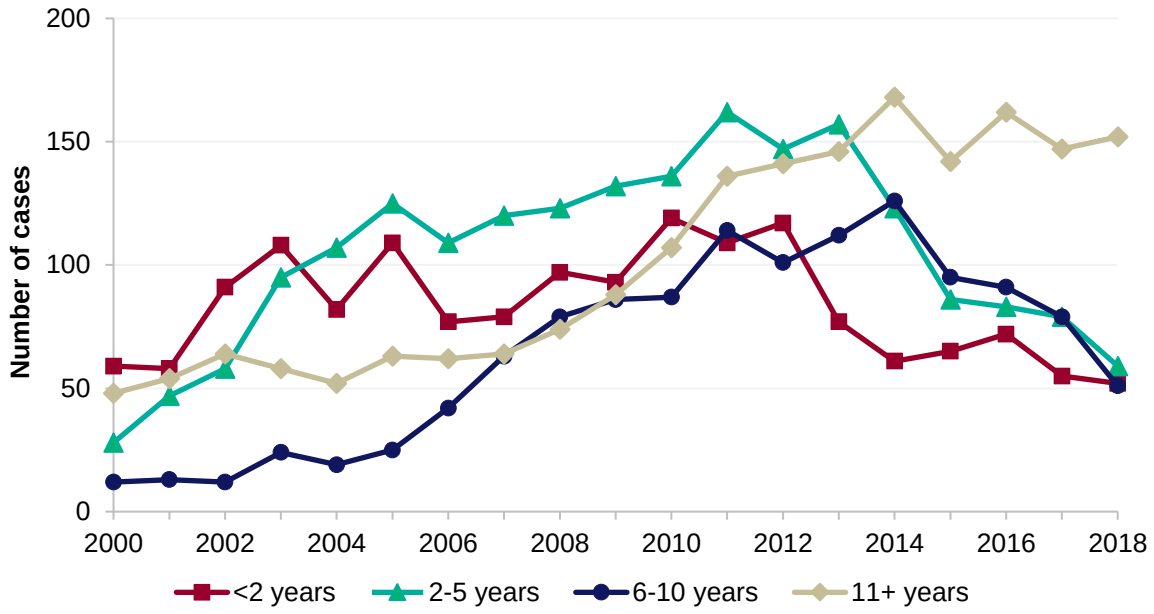


In 2018, the rate of TB among people born outside the UK was 28 per 100,000, the lowest rate observed since 2000 and a 54% decrease since the peak of 60 per 100,000 in 2011.

There were 164 people with TB born in the UK notified in 2018, a rate of 2.1 per 100,000 population, and a 9% increase compared to 2017 but still below the average for England of 2.8 per 100,000. The number of people with TB born in the UK increased in all Health Protection Team areas other than Thames Valley.

Information on the time between entry to the UK and TB notification was available for 94% (314/334) of those born abroad. Numbers of new cases of TB had increased slightly among people who had been in the UK for 11 or more years (152, compared to 147 in 2017, Figure 7). This group accounted for almost half (48%, 152/314) of TB cases among people born abroad.

Figure 7: Time between entry to the UK and TB notification for people born outside the UK, South East, 2000 – 2018



In 2018, country of birth was known for 97% of people with TB (495/508). As in previous years, India, Pakistan and Nepal were the most common (Table 1). Together, these countries were the place of origin of half (50%, 166/331) of people born outside the UK and a third of all people with TB in the South East. The most common countries of birth in the non-UK born general population of South East England in 2017 were India, Poland, and South Africa.[1]

Table 1: Ten most common countries of birth for people with TB and time between entry to the UK and TB notification, South East, 2018

Country of birth	n	% of non-UK born patients	median years since entry (IQR)	
India	89	26.9	11	(4 to 19)
Pakistan	47	14.2	27	(13 to 48)
Nepal	30	9.1	5.5	(3 to 9)
Romania	14	4.2	1	(0 to 4)
Timor-Leste	12	3.6	2	(1 to 4)
Bangladesh	11	3.3	16	(12 to 33)
Poland	10	3.0	7	(2 to 10)
Nigeria	10	3.0	11	(9 to 14)
Philippines	8	2.4	8	(1.5 to 15.5)
Zimbabwe	7	2.1	16	(13 to 7)

[1] Office of National Statistics: www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/internationalmigration/datasets/populationoftheunitedkingdombycountryofbirthandnationality

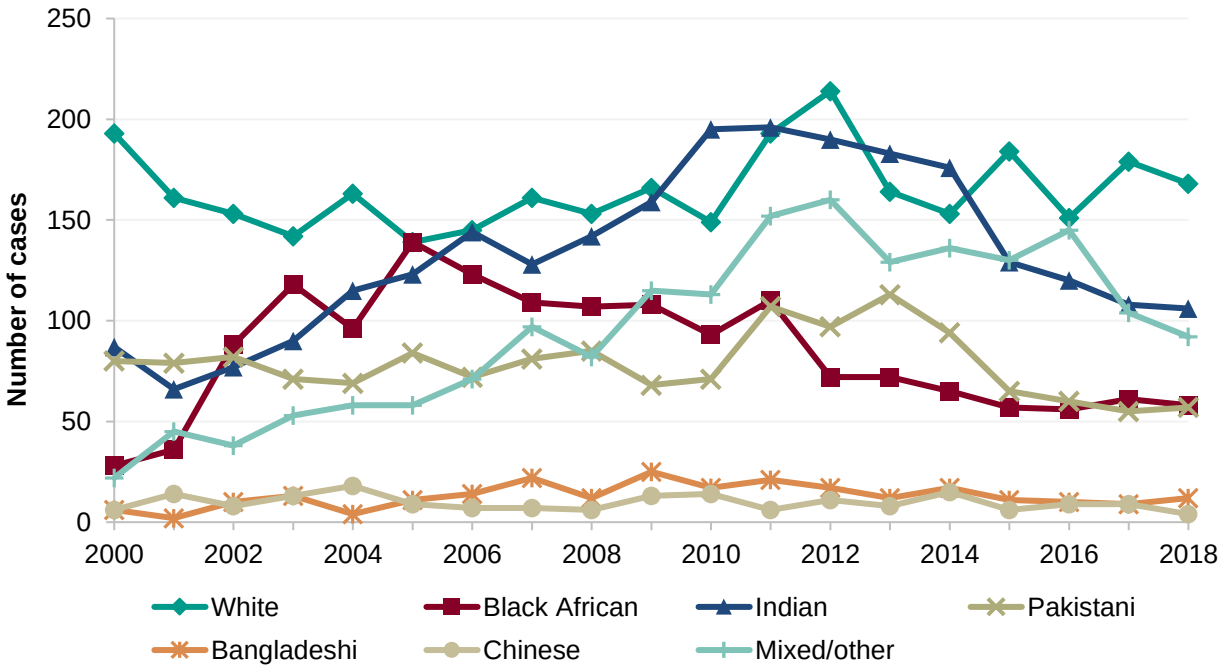
The median time since entry was 10 years (IQR 3-18 years), longer than 8 years (IQR 3-14 years) in 2017. Median time since entry was shortest in Hampshire and Isle of Wight (6 years, IQR 4-15) and Kent (6 years, IQR 3-18), and longer in Surrey and Sussex (11 years, IQR 3-17) and Thames Valley (11 years, IQR 3-21).

Among common countries of birth, people from Romania were most likely to be recent entrants (54%, 7/13 had entered the UK less than a year before diagnosis). People with TB from Timor-Leste also had a median time since entry to notification of just 2 years. Median time since entry increased in India (from 8 to 11 years), Pakistan (14 to 27 years) and Nepal (4 to 5.5 years).

Ethnicity

Data on ethnicity was known for 98% (497/508) of people with TB in 2018. The most common ethnicity overall was white, accounting for a third of all people with TB (34%, 168/497) (Figure 8). Most people with white ethnicity were born in the UK (74%, 121/164); of those born abroad, 75% (32/43) were from Central or Eastern Europe, most commonly Romania or Poland. The second most common ethnic group was Indian (21%, 106/497), the majority of whom were born in India (83%, 88/106).

Figure 8: TB case numbers by ethnic group*, South East, 2000 to 2018



* Cases with mixed/other include those of black other and black Caribbean ethnicity

White was the most common ethnic group in each Health Protection Team area, except Thames Valley, where it was Pakistani (28%, 50/180). Indian was second most common in all areas except Kent, (mixed/other 18%, 21/114). The most common

country of birth for people of mixed/other ethnicity was Nepal in Kent and Hampshire and Isle of Wight, Timor-Leste in Thames Valley and the UK in Surrey and Sussex.

Occupation

Occupation was known for 95% (457/483) of people aged 18 years or older (Table 2). Of these, 34% (155/457) were not working, of whom 57% were retired (88/155). The most common occupation was healthcare (11%), as in 2017 (9%). Most of the healthcare workers with TB were born abroad (78%, 38/49). Most of those involved in education (75%, 24/32) were students, and most were born abroad (67%, 20/30).

Table 2: Occupation of people with TB aged 18 years and older, South East, 2018

Occupation category	n	%
Healthcare worker	50	10.9
Education	32	7.0
Social service/prison worker	<1	<1
Laboratory/pathology	<1	<1
Other	218	47.7
None	155	33.9
Total	**457**	

Clinical characteristics

Site of disease

Just over half (55%, 278/508) of people notified with TB in 2018 had pulmonary disease (Table 3). Pulmonary TB was more common among people born in the UK (73%, 120/164 vs. 47%, 158/334 among people born abroad).

Table 3: Number of people with TB by site of disease, South East, 2018

Site of Disease	n	%
Pulmonary	278	55
Lymph Nodes (extra thoracic)	112	22
Lymph Nodes (intra thoracic)	53	10
Pleural	50	10
Other	43	8
Gastrointestinal/Peritoneal	29	6
Bone/Joint (spine)	13	3
Miliary	13	3
CNS (meningitis)	13	3
(Bone/Join (other - not spine)	9	2
Genitourinary	5	1
Cryptic Disseminated	5	1
CNS (Other - not meningitis)	4	1
Laryngeal	2	0
Total people	**508**	

* People may have disease at more than one site, so the total % will not equal 100%

Previous history of tuberculosis

In 2018, data on previous diagnosis was available for 95% (485/508) of people with TB. As in recent years, a small number (6%, 29/485) were previously diagnosed with TB, and the median time between diagnoses was 10 years (IQR 5-27).

Hospital inpatient and directly observed therapy

Data on whether people were hospital inpatients at the point of diagnosis was available for 96% (488/508) of people with TB in 2018. A quarter (26%, 128/488) were hospital inpatients at the time of diagnosis. The proportion was higher among men (31%, 87/277) compared to women (19%, 41/211), among adults aged 65 years and older (32%, 29/90), and among children under the age of 15 (50%, 8/16), although numbers in this group remain small. Being an inpatient was more common among those with social risk factors (43%, 21/49 vs. 25%, 96/390 among those without any risk factors). It was also more common for people with one of the key co-morbidities (33%, 16/48 vs. 25%, 112/440 without). People with pulmonary TB were more than twice as likely to be an inpatient (34%, 93/272) than those with extra-pulmonary disease only (16%, 35/216).

Overall, 13% (62/473) of people notified with TB in 2018 were recorded as having received directly observed therapy (DOT) at some point during treatment. More than half of children under the age of 15 (53%, 8/15) and people with social risk factors (53%, 23/43) received DOT. DOT was more common among those with resistance to at least one first-line drug (28%, 8/29, vs 12%, 29/250 among those with fully sensitive TB), and was not used for 3 of the 5 people with multidrug-resistant TB (MDR-TB). DOT

was also twice as common for people born in the UK (23%, 34/148) than those born abroad (9%, 27/317), and among men (18%, 47/267) than women (7%, 15/206).

Comorbidities

Table 4: Co-morbidities among people with TB, South East, 2018

Co-morbidity	n	%	Total
Diabetes	50	10%	486
Hepatitis B	9	2%	415
Hepatitis C	4	1%	418
Chronic liver disease	3	1%	478
Chronic renal disease	11	2%	476
Immunosuppression	28	6%	471

Data on selected key comorbidities, diabetes, hepatitis B and C, chronic liver disease, chronic renal disease, and immunosuppression, has been routinely collected in the South East since 2016. People recorded as having any of these conditions are classified as having a comorbidity. If they are not listed as having any of these, they are classified as having no comorbidity, even if some of the data is missing. This is not the case for individual comorbidities.

In 2018, 18% (93/508) of people with TB were recorded as having at least one co-morbidity. The most common was diabetes, 10% (50/486) of people with TB (Table 4). The prevalence of co-morbidities increased with age, with only 1 reported among children under 15 years, up 36% (35/98) for people aged 65 years and older. People with pulmonary TB were slightly more likely to have a co-morbidity (21%, 59/284) than those with extra-pulmonary disease only (15%, 34/224).

Travel and visitor risk factors

Information on travel to, and visitors received from a country[2] outside the UK, in the 2 years prior to TB diagnosis was known for 79% (401/508) and 73% (370/508) of people notified in 2018, respectively.

A quarter (26%, 103/401) had travelled outside the UK and 11% (41/370) had received a visitor from outside the UK. A third of people born outside the UK had travelled abroad (33%, 86/263). For people born outside the UK where the country of travel or origin of their visitor was known, 72% (73/102) had travelled to their own country of birth, and

[2] Excludes countries in Western Europe, US, Canada, New Zealand and Australia

66% (27/41) had received a visitor from their own country of birth. The most common countries for both travel to and receiving visitors from were India, Pakistan, and Nepal.

2. Laboratory confirmation of TB

Laboratory tests data collection

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

Culture confirmation and speciation

In 2018 in the South East, 60% of people with TB had their diagnosis confirmed by culture (303/508). This was higher among those with pulmonary TB (75%, 213/284 vs. 40%, 90/224 of people with exclusively extra-pulmonary TB).

Of those people with TB who had a positive culture diagnosis, almost all had *Mycobacterium tuberculosis* (97%, 293/303), 8 had *M. africanum*, and 2 had *M. bovis*.

Of the 205 who did not have their diagnosis confirmed by culture, 38 had positive histology, 17 had positive microscopy and 3 had a positive PCR result (1 had both a positive histology and microscopy result). In total, 29% (148) of the 508 people who had TB in 2018, had no recorded laboratory evidence of TB. The proportion without a recorded laboratory result was highest in those under 15 years old (44%, 7/16), with extra-pulmonary TB (43%, 97/224), and those living in Thames Valley (35%, 64/182).

Sputum smear

In 2018, sputum-smear results were known for 65% (185/284) of people with pulmonary TB, similar to recent years. There was little geographical variation with the exception of Kent, where 81% (58/72) of results were recorded in ETS.

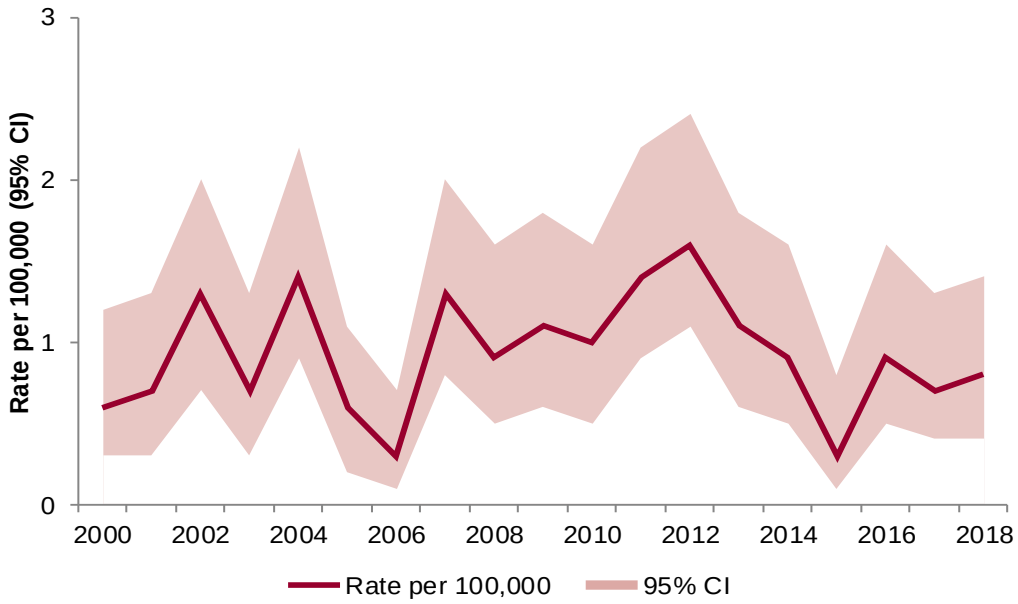
Where known, 58% (78/185) of people with pulmonary TB had sputum smear positive disease.

3. TB transmission

Rate of TB in UK born children

TB in UK born children is used as a proxy indicator for recent TB transmission, since it is likely to be caused by recent exposure. In 2018, the rate of TB in UK born children under 15 years of age in the South East was 0.8 per 100,000 population (95% CI 0.4 to 1.4, 12 cases) lower than the 1.2 per 100,000 in England in 2018. Small numbers mean year on year changes should be interpreted with caution (Figure 9).

Figure 9: Rate of TB in UK born children under 15 years of age, South East, 2000-2018



Whole Genome Sequencing (WGS) of Mycobacterium isolates

In January 2018 PHE began using whole genome sequencing (WGS) for routine TB speciation, drug resistance predictions and relatedness in the South East. People are assigned to a WGS cluster based on an isolate within 12 single nucleotide polymorphisms (SNPs) of another person in England, replacing the MIRU-VNTR[3] typing method used previously. During 2018 PHE South East and the Field Service implemented a process to systematically collect and review TB relatedness information

[3] The National TB Strain Typing Service was established in 2010 to prospectively type TB isolates using 24 loci mycobacterial interspersed repetitive units - variable number tandem repeats (MIRU-VNTR).

to better understand TB transmission in the South East and identify where public health action may be applied to interrupt this.

Characteristics of people with TB in clusters in 2018

Of the 303 people with culture confirmed TB in 2018, 290 (95.7%) had a WGS result that could be used to report relatedness (based on sequencing coverage and quality). Of these 1 in 5 people (60/290) were identified as being within 12 SNPs of another person notified in England in 2018 and featured in 31 12 SNP clusters (Table 5). Note this is a more conservative definition of clustering than is used for routine reporting that includes clustering with all people within 12 SNPs regardless of year of notification. This was lower than the proportion reported for England (25%).

People who were UK born or had one or more social risk factor were more likely to be clustered within 12 SNPs of another individual.

Seventeen percent of people with TB (49/290) were within 5 SNPs of another and 13% (39/290) were within 2 SNPs; two-thirds (39/60) of people with TB in the South East that were clustered were within 2 SNPs of a neighbour in 2018.

Table 5: Number and proportion of people with TB clustered using WGS by SNP distance and characteristics, South East 2018

SNP cut off applied	Clustered		Non-UK born clustered		UK born clustered		Social risk factors[b] clustered		Number of clusters
	n	%	n	%[a]	n	%[a]	n	%[a]	n
2 SNPs	39	13.4	11	5.9	28	28.3	5	18.5	18
5 SNPs	49	16.9	13	7.0	36	36.4	7	25.9	23
12 SNPs	60	20.7	18	9.7	41	41.4	8	29.6	31

a Denominator restricted to those with each characteristic

b One or more of drug use, homelessness, alcohol misuse, prison history

Of the clusters defined as of public health significance (requiring intervention and investigation, for example due to transmission in high risk settings), 10 out of 11 clusters saw cluster growth with new cases diagnosed in 2018.

For most of these, no contextual setting has been identified and are categorised as community clusters. These increased by 16 cases. Growth was also observed in clusters associated with hospitals (2), a nursery, a public house, and a university.

In addition (but not included in figures above), an *M. africanum* cluster associated with homelessness saw 6 new cases among people in the South East added to the cluster in 2018.

4. Delay from onset of symptoms to start of treatment

Time from symptom onset to treatment start for people with pulmonary TB

Overall delay includes time from symptom onset to the people presenting to healthcare, and from the initial presentation to diagnosis and start of TB treatment. Information on delay was available for 92% (260/284) of people with pulmonary TB in 2018. Three people were diagnosed post-mortem. The median time from symptom onset to start of treatment was 81 days (IQR 42-149) (Table 6). This was similar to 2017 and 6 days longer than the median of 75 for England in 2018.

Table 6: Time between symptom onset and treatment start in people with pulmonary TB*, South East, 2013 – 2018

	0-2 months		2-4 months		>4 months				Total
Year	n	%	n	%	n	%	Median days (IQR)		N
2013	119	38	92	29	101	32	74	(38 - 155)	312
2014	98	31	103	33	113	36	87	(52 - 160)	314
2015	103	35	83	28	108	37	91	(45 - 165)	294
2016	103	36	84	30	96	34	84	(44 - 157)	283
2017	112	40	74	27	92	33	80	(39 - 154)	278
2018	98	38	79	30	84	32	81	(42 – 149)	260

* Excluding asymptomatic individuals, and those with missing onset dates

The median delay was longest in Surrey and Sussex (93 days, IQR 66-159), which saw an increase of over 50% from 61 days (IQR 31-130) in 2017. This was followed by Kent (81 days, IQR 43-150). The shortest delays were in Thames Valley (67 days, IQR 33-150) and Hampshire and Isle of Wight (67 days, IQR 34-116). The median delay decreased in these areas compared to 2017.

Characteristics of people with pulmonary TB with a delay from onset of symptoms to treatment of more than 4 months

One in 3 South East residents had a delay of more than 4 months. As in recent years, older adults were more likely than other age groups to experience delays: 44% of adults over the age of 65 experienced a delay longer than 4 months (Table 7).

Other groups who were more likely to experience delays included people born in the UK (37% vs 28% among those born abroad), people with social risk factors (39% vs 33%

among people with no social risk factors), and people with one of the key comorbidities (39%, 22/56 vs 30%, 61/204 among those without).

Table 7: Proportion of people with pulmonary TB with a delay from onset of symptoms to treatment of more than 4 months, by PHE Health Protection Team area, age group, sex, place of birth, and social risk factor, South East, 2018

		Number delayed	Percentage delayed	Total
HPT	**Hampshire and Isle of Wight**	14	24%	59
	Kent	25	37%	68
	Surrey and Sussex	20	54%	37
	Thames Valley	24	32%	76
Age group	**0-14**	0	0%	8
	15-44	34	27%	128
	45-64	25	36%	69
	65+	24	44%	55
Sex	**Female**	32	33%	96
	Male	51	31%	164
Place of birth	**Non-UK-born**	42	28%	149
	UK-born	39	37%	106
Social risk factor	**No**	66	33%	202
	Yes	14	39%	36

5. TB outcomes in drug-sensitive cohort

Drug-sensitive cohort

For the purposes of reporting outcomes for people with TB, the drug-sensitive cohort is defined as all people notified with TB excluding those in the drug-resistant cohort (see Chapter 6). Under this definition, people with TB resistant to isoniazid, ethambutol and/or pyrazinamide but without resistance to rifampicin are included in the drug-sensitive cohort. Outcomes are reported according to year of notification up to and including 2017.

Treatment outcomes for the drug-sensitive cohort are reported separately for:

- chapter headings such as the one shown above, which should be used for main sections, should be styled as ‘PHE Chapter heading’
- people with TB with an expected duration of treatment less than 12 months, outcomes at 12 months are reported - this group excludes individuals with central nervous system (CNS) disease, who would be treated for 12 months. In addition, those with spinal, cryptic disseminated or miliary disease are excluded from this group, as CNS involvement cannot be reliably ruled out for the purposes of reporting
- people with CNS, spinal, cryptic disseminated or miliary disease, the last recorded treatment outcome is reported

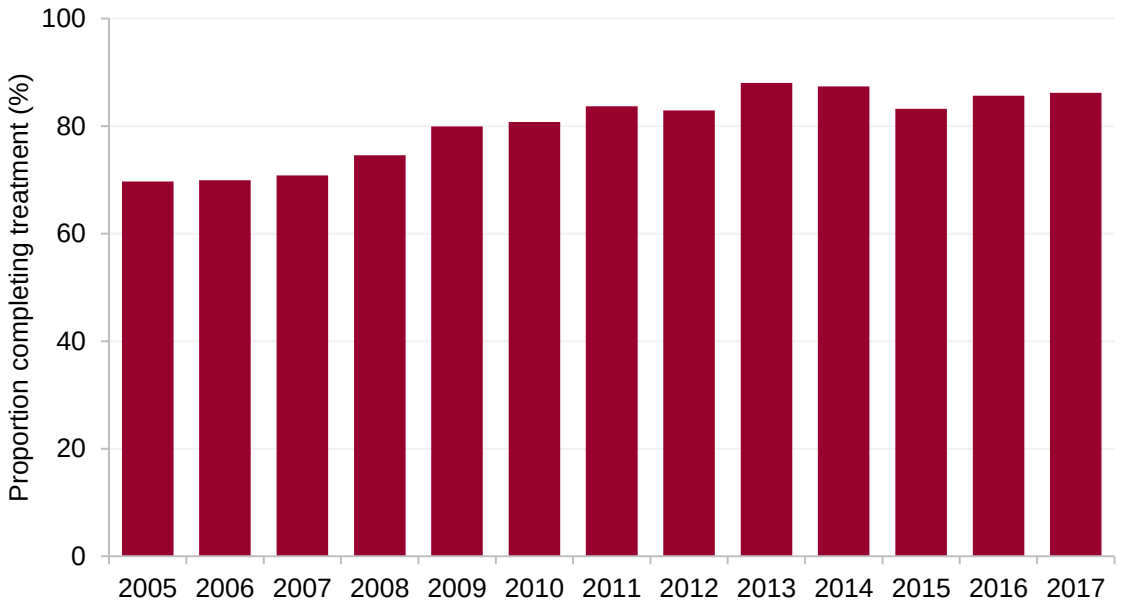
Detailed data on deaths and people lost to follow-up at last recorded outcome are presented for the entire drug-sensitive cohort.

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

The majority (89%, 471/530) of those notified with rifampicin-sensitive TB in 2017 did not have CNS, spinal, miliary or cryptic disseminated disease. Of these, 86% (406) had completed treatment at 12 months, similar to those diagnosed in 2016 (86%, 430/502, Figure 10) and nationally in 2017 (85%). Among the 411 people for whom duration of treatment was known, the median treatment time was 183 days (IQR 175-212).

Treatment completion was similar to the previous year in each area of the South East. It was lowest in Surrey and Sussex (83%, 90/109) and Kent (83%, 79/95), and higher in Thames Valley (89%, 157/176) and Hampshire and Isle of Wight (88%, 80/91).

Figure 10: Proportion completing treatment at 12 months, South East, 2005-2017*



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

The most common reasons for not completing treatment were death (5%, 24/471), loss to follow-up (4%, 17/471), and still being on treatment (3%, 13/471) (Table 8). More information on deaths and loss to follow up is in section 3 of this chapter. Of those still on treatment at 12 months, further information was available for 11 people. Five were on a planned treatment regime that exceeded 12 months (2 due to initial drug resistance), 3 had their treatment changed, and 3 were still on treatment due to treatment interruptions.

Table 8: TB outcome at 12 months for people diagnosed in the South East in 2017*

Outcome	n	%
Treatment completed	406	86.2
Died	24	5.1
Lost to follow-up	17	3.6
Still on treatment	13	2.8
Treatment stopped	8	1.7
Not Evaluated	3	0.6
Total	**471**	

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

Treatment completion was lower among men (82%, 220/267 vs. 91% for women, 186/204) with the most common reason for not completing recorded as death for men (43%, 20/47) and loss to follow-up or still being on treatment for women (28%, 5/18 for each outcome). Treatment completion was lower among people aged 65 and over (75%, 64/86) than in other age groups. By far the most common reason for not completing in this group was death (68%, 15/22).

Treatment completion was lower among those born in the UK (80%, 111/138 vs. 89%, 291/326 among those born abroad). The primary reason for not completing treatment by 12 months amongst UK born people was having died (52%, 14/27), followed by still being on treatment (30%, 8/27). Treatment completion was also lower among people of white (81%, 135/167) and Indian (83%, 74/89) ethnicity, compared to those of mixed/other (91%, 82/90), Pakistani (92%, 46/50), and black-African (94%, 47/50) ethnicities.

Treatment completion was also lower among people who had at least 1 social risk factor in 2017 (73%, 32/44 vs. 89%, 336/378 among those with no social risk factors). In addition, people with one of the key comorbidities were less likely to complete (78%, 69/88 vs. 88%, 337/383). For both groups, the most common reason for not completing treatment was having died (9%, 4/44 and 9%, 4/46, respectively).

People who had isoniazid resistant disease were also less likely to complete within 12 months (67%, 10/15). Most of those who had not completed were still on treatment (4/5).

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

Of the 59 people with CNS, spinal, miliary, or cryptic disseminated TB notified in 2017, 58% had completed treatment at 12 months, similar to recent years (Table 9). The most common reason for not completing was still being on treatment, although by the last recorded outcome 76% (45) had completed, similar to that seen nationally (75%) and only 3% of people (2) were still on treatment. The next most common reason was death (14%), and 5% were lost to follow up. For those who completed treatment, the median treatment time was 357 days (IQR 273-365).

Table 9: TB outcome at 12 months for people with rifampicin-sensitive, CNS, spinal, military, or cryptic disseminated diagnosed in South East in 2016

Outcome at 12 months	n	%
Completed	34	57.6
Died	8	13.6
Lost to follow-up	3	5.1
Still on treatment	13	22.0
Not evaluated	1	1.7
Total	59	

3: Deaths and loss to follow-up in the drug-sensitive cohort

Deaths

Of all people with rifampicin-sensitive disease diagnosed in 2017, 6% (32/530) died before completing treatment, slightly above the national proportion (5.3%). This proportion was highest in Surrey and Sussex (9%, 11/124) and lowest in Hampshire and Isle of Wight (4%, 4/105), although numbers were small. TB was reported to have caused/contributed to 31% of these deaths (10/32); 7 deaths were not related to TB (22%) and information on whether TB was part of the reason for death was not known for almost half (47%). Four people were diagnosed with TB post-mortem and for all of them the influence that TB had on death was unknown. The median age at death was 73 years (IQR 54-84). Deaths overall were more common among those born in the UK (11%, 16/149) compared to those born abroad (3%, 13/372).

Deaths were more common among men (9%, 27/310) than women (2%, 5/220). They were also more common among people with social risk factors (8%, 4/48, compared to 4%, 15/422 among those without), pulmonary TB (9%, 26/302 vs 3%, 6/226), or one of the key comorbidities (11%, 11/102 vs 5%, 21/428).

Of all 10 people who died with TB as a contributing factor, 6 were born in the UK. TB contributed to the death of 4 individuals under the age of 65. These were all people of white ethnicity born in the UK; 3 were men and 2 had social risk factors. All had at least one of the key co-morbidities (1 each of hepatitis B, hepatitis C, chronic liver disease and immunosuppression).

Loss to follow up

Similar to previous years, 4% (20/530) of people with rifampicin-sensitive TB notified in 2017 were lost to follow-up within 12 months. Of those, all whose country of birth was known were born abroad. Where known, most of those lost to follow-up had left the UK (81%, 13/16). There was no great variation in proportion lost to follow-up was between sexes, Health Protection Team area, or social risk factor status.

In addition, treatment was reported as stopped for 8 people. Of these, 6 had further information which showed they should have been reported as lost to follow-up.

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

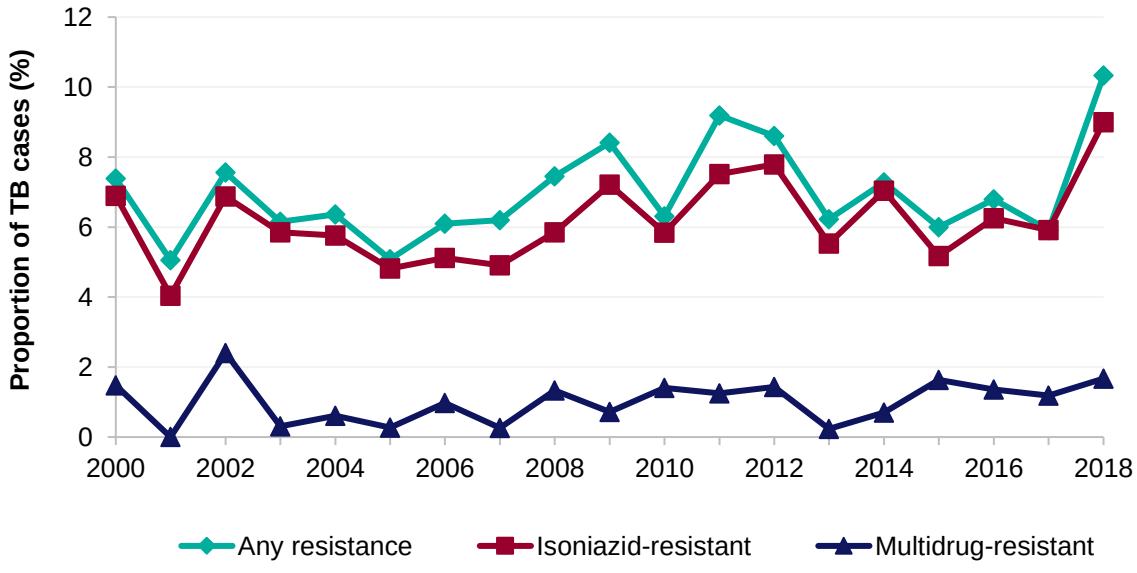
Drug resistance

Anti-TB antibiotic drugs are a large family and resistance may occur to 1 or more of these antibiotics and may be in complex combinations. A distinction is made between first, second and third-line TB antibiotic drugs depending upon their clinical effectiveness. First-line drugs include isoniazid, rifampicin, pyrazinamide and ethambutol. Second-line drugs are injectable agents (for example amikacin, capreomycin, kanamycin), fluoroquinolones (such as moxifloxacin, ofloxacin, ciprofloxacin) and other oral bacteriostatic agents. MDR-TB cases are initially resistant to at least isoniazid and rifampicin. Extensively drug-resistant TB cases (XDR-TB) are initially MDR and resistant to at least 1 injectable agent and at least 1 fluoroquinolone.

Overall initial drug resistance and geographical distribution

In 2018, resistance profiles were available for 99% (300/303) of culture-confirmed TB cases. The proportion of cases resistant to at least 1 first-line drug among people with culture-confirmed TB was 10% (31/300), the highest recorded since 2000 and almost twice as high as in 2017 (6%, 20/338) (Figure 11).

Figure 11: Proportion of TB cases with initial first-line drug resistance, South East, 2000-2018



Most people with resistance to a first-line drug had resistance to isoniazid (87%, 27/31). Of the 4 people who did not have resistance to isoniazid, 3 had resistance to pyrazinamide, and 1 had resistance to ethambutol.

Resistance to any first-line drug was most common in Hampshire and Isle of Wight (13%, 8/60) and least common in Thames Valley (7%, 6/90).

Characteristics of people with drug-resistant TB

Any first-line drug resistance

In 2018, drug resistance was more common among women (15%, 17/117) than men (8%, 14/183), and slightly more common among people aged 15 to 44 (13%, 22/165) than among other age groups (7%, 9/135).

A higher proportion of people born outside the UK had drug-resistant disease (12%, 23/190 vs 8%, 8/103 of those born in the UK). Among common countries of birth, resistance occurred most frequently among people from Nepal (25%, 4/16), Romania (17%, 2/12) and India (12%, 5/41).

Drug resistance was more prevalent among people with pulmonary TB (11%, 24/211) compared to those with extra-pulmonary TB only (8%, 7/89), and among people with a social risk factor (14%, 4/28) compared to those without (10%, 25/241).

Multidrug-resistance (MDR) and extensively drug-resistant (XDR) TB

Small numbers mean the following information should be interpreted with caution. In 2018 there were 5 people with MDR-TB (resistance to isoniazid and rifampicin), 2% of the 303 culture-confirmed cases of TB among South East residents. Three were also resistant to ethambutol, 1 of whom had XDR-TB, with additional resistance to amikacin, capreomycin, kanamycin, moxifloxacin, ofloxacin, and prothionamide.

Ages ranged from 20 to 42 years, 3 were female, and all were born abroad: 3 in South Asia, of which 2 in Nepal. Their time since entry to the UK ranged from 1 to 11 years. Three lived in Hampshire and Isle of Wight, 1 in Surrey and Sussex, and 1 in Kent. The person with XDR-TB had previously been treated for TB. None were reported as having any social risk factor.

TB outcome at 24 months for people with rifampicin-resistant disease

Of the 6 people in the rifampicin-resistant TB cohort notified in 2016, 5 had completed treatment at 24 months. At the last known outcome, the remaining person was recorded as lost to follow-up.

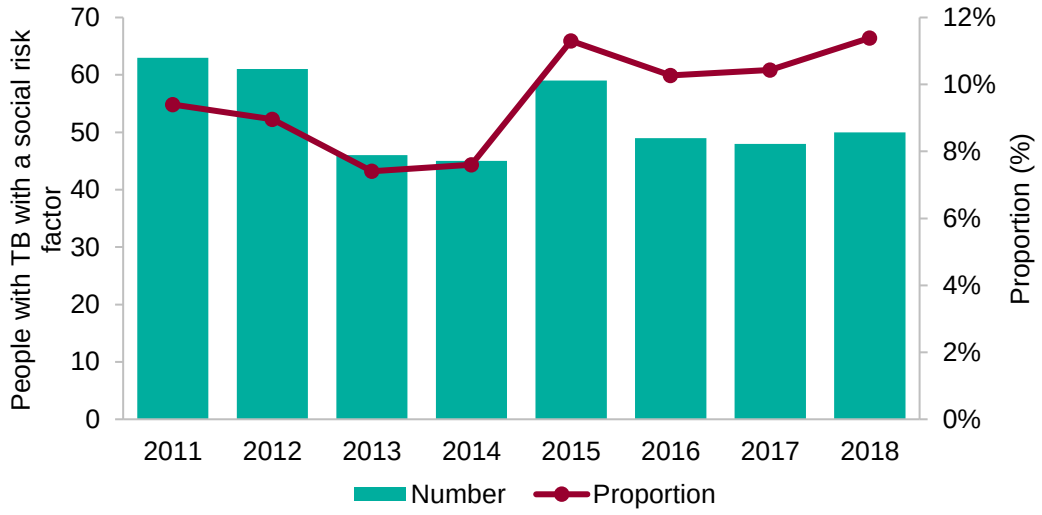
7. TB in under-served populations

Social risk factors

In this chapter, social risk factors (defined as current or previous history of homelessness, drug use or imprisonment, or current alcohol misuse) are described for people with TB aged 15 years or over.

In 2018, 11% (50/439) of people with TB resident in the South East who were aged 15 years or older had at least 1 social risk factor (Figure 12). Of those with at least 1 social risk factor, 32% (16/50) experienced multiple. The most common social risk factor was alcohol misuse (5%, 21/462), followed by homelessness (4%, 20/467), drug misuse (4%, 17/458) and history of imprisonment (3%, 15/447).

Figure 12: Social risk factors among people with TB, South East, 2011 – 2018



Geographic differences in the prevalence of social risk factors were small. As in 2017, social risk factors were more common among people in Kent (13%, 13/99) and Hampshire and Isle of Wight (13%, 12/93). In Kent, that level was lower than what was seen in recent years, with social risk factors reported for around 1 in 5 people between 2015 and 2017. There were small increases in the prevalence of social risk factors in Surrey and Sussex (12%, 10/86) and Thames Valley (9%, 15/161).

Social risk factors were more common among people born in the UK (20%, 28/142) than those born abroad (8%, 22/293), among men (16%, 40/247) than among women (5%, 10/192), and among people of white ethnicity (16%, 23/146) than people of other ethnicities (9%, 27/270). Social risk factors were also more prevalent among people with pulmonary TB (16%, 40/247) than those with exclusively extra-pulmonary disease (5%, 10/192).

People with TB who experienced social risk factors were more likely to have infectious disease (defined as having sputum-smear positive pulmonary TB): 44% (22/50), compared to those with no social risk factors (19%, 73/389). They were also less likely to complete treatment within 12 months (Table 10).

Table 10: Treatment outcome at 12 months for people with drug-sensitive TB and at least one social risk factor, South East, 2017*

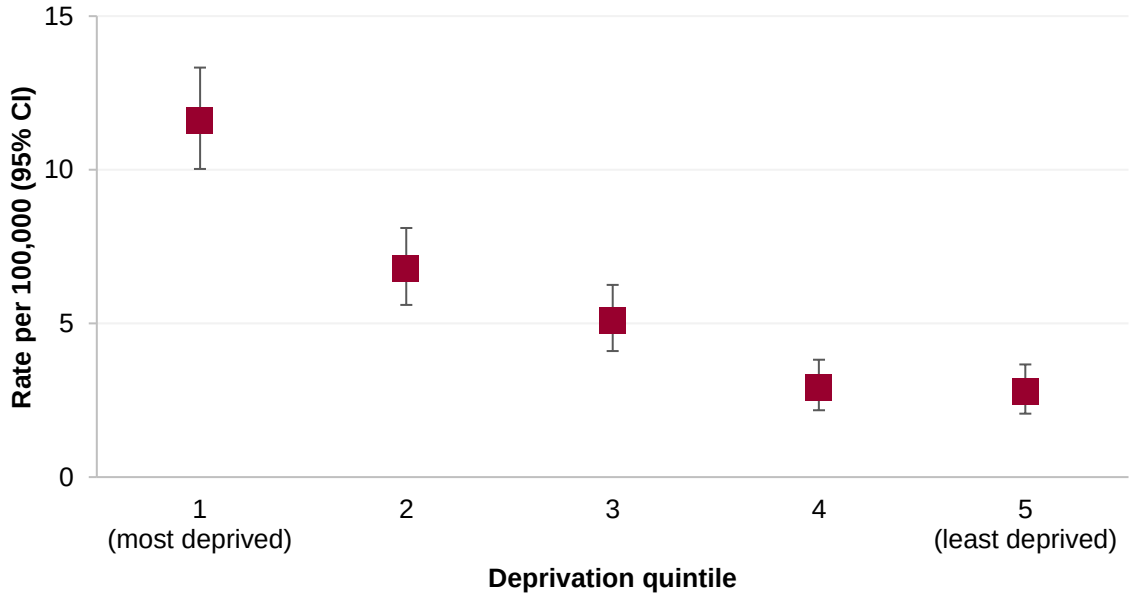
	n	%
Treatment completed	32	72.7
Died	4	9.0
Lost to follow-up	3	6.8
Still on treatment	2	4.6
Treatment stopped	2	4.6
Not evaluated	1	2.3
Total	**44**	**100**

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

Deprivation

Deprivation was assessed using the 2015 Index of Multiple Deprivation. In 2018, 39% (197/508) of all people with TB were resident in the most deprived quintile of the South East, and a further 23% (118/508) were resident in the second most deprived quintile (Figure 13). Rates were also highest in these 2 quintiles (11.6 and 6.8 per 100,000 of the population, respectively). The 2 least deprived quintiles accounted for only 10% of people with TB each.

Figure 13: TB case rate by deprivation, South East, 2018



8. TB-HIV co-infection and HIV testing of people with TB

HIV testing

Of the 508 people with TB notified in 2018, HIV status was already known for 26 and a further 3 were diagnosed with TB post-mortem. Of the remaining 479, information on HIV testing was available for 97% (465). Of these, 91% (422/465) were offered and received testing; the lowest across England (national average of 95%). A further 3% (15) were offered but did not receive testing, and 1% (6) refused testing. 5% (22) were not offered testing, which is higher than the proportion nationally of 3%.

More than half of children under the age of 15 were not offered an HIV test (58%, 7/12). HIV tests were offered less often to people aged 65 older (91%, 83/91), compared to other adult age groups (98%, 355/362). People born in the UK were also offered tests less often (91%, 136/149) than people born abroad (98%, 303/309). There was no clear difference in proportions offered testing in different areas across the South East.

TB-HIV co-infection rates

The latest available information on TB-HIV co-infection for notified adults 15 years and older, estimated that 2.4% (12) of people with TB in the South East in 2018 were co-infected with HIV, similar to the national proportion of 2.7%.[4] This was the lowest proportion recorded in the South East, and a reduction of more than 80% since a high of 12.9% in 2003.

Nationally, decreases in HIV co-infection have occurred primarily in the 25-34 and 35-44-year age groups, with an increase in median age of people with co-infection increasing from 34 (IQR 30 to 41) in 2001 to 46 (IQR 38-51) in 2018.

[4] Tuberculosis in England: 2018 (presenting data to end of 2017), Public Health England, prepared by: Tuberculosis Unit, National Infection Service
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/742782/TB_Annual_Report_2018.pdf

Discussion

The South East of England remains a low incidence area for TB, below the average for England. While case numbers continue to reduce from the peak in 2011, the rate of decline is slower than elsewhere in the country. The rate among people born abroad has halved over this time, and most people notified with TB who were born elsewhere had been in the UK for a long period of time. However, in the last 2 years small increases have occurred in TB cases among UK born residents.

An increased proportion of people with TB had drug resistant disease, in particular isoniazid mono-resistance. This will require close monitoring, to ensure appropriate treatment without leading to further multi-drug resistant disease.

People with TB in the South East frequently had other medical concerns: almost 1 in 5 had one of the key co-morbidities collected in surveillance, with diabetes the most common. These people were more likely to die before completing treatment.

In addition, 1 in 10 people with TB had one or more social risk factor across the South East. People with social risk factors were more likely to have infectious disease, be clustered with another individual in England – which suggests they were more likely to have been infected recently within the UK, and less likely to complete treatment. These therefore remain a group of particular public health concern needing additional focus by TB control programmes.

Delays between symptom onset and starting treatment remain above the national average for people living in the South East. This was due to increases in delays in Surrey and Sussex, with delays reducing in other parts of the South East over this time.

Only 91% of people with TB were offered and received HIV testing in the South East, the lowest for any PHE Centre in England. Tests were less likely to be done on children and older adults.

While TB rates remain very low across most of the South East and continue to decline, the rate of decline is small. In addition, increases have occurred in cases among people born in the UK and in levels of drug resistance. Issues remain with poor outcomes experienced by people with social risk factors, above average delays from symptom onset to treatment, and the lowest coverage of HIV testing in the country.

Continued focus is needed by TB services to diagnose and manage complex cases successfully through treatment, and support cluster investigations to interrupt ongoing transmission.

Recommendations

South TB control board should continue to prioritise work to improve outcomes for under-served populations.

Cohort review and MDR cohort review continue to play a vital role in quality assurance of TB case and contact management. Identified issues should be escalated to the South TB control board.

PHE and local services should work together to use relatedness data to identify evidence of UK transmission and use as opportunities for prevention.

Opportunities to improve the low coverage of HIV testing and low reporting of sputum smear results should be explored by the TB control board.

Drug resistance levels, and outcomes for those with isoniazid resistant disease should be closely monitored. Ways to increase culture confirmation rates should be considered to ensure appropriate treatment of all people with TB.

Appendix A: Notes on the report

About the Field Service

The Field Service (FS) supports PHE Centres and partner organisations through the application of epidemiological methods to inform public health action. It does this 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 FS network, excellence and innovation is encouraged, we foster academic collaborations and take active part and lead in research, development and training.

Intended audience

This report is for use by healthcare professionals who diagnose and/or care for people with TB, commissioners involved in planning and financing TB services, public health professionals working to improve TB control and the health of at-risk populations, researchers with an interest in TB, and government and non-governmental organisations working in the field of TB. In particular this report is for the use of the South TB Control Board and local TB networks and health protection forums.

Aim of report

This report describes the recent epidemiology of TB in the South East. It includes local trends, areas and population groups with a high burden of disease, and detail on the care of people with TB.

Further TB information

The national report of TB in England www.gov.uk/government/publications/tuberculosis-in-england-annual-report.

Official Statistic for TB www.gov.uk/government/collections/tuberculosis-and-other-mycobacterial-diseases-diagnosis-screening-management-and-data.

TB Strategy Monitoring Indicators Collaborative TB Strategy for England 2015-2020 www.gov.uk/government/uploads/system/uploads/attachment_data/file/403231/Collaborative_TB_Strategy_for_England_2015_2020_.pdf).

TB indicators at Upper Tier Local Authority and Clinical Commissioning Group level http://fingertips.phe.org.uk/profile/tb-monitoring

Appendix B: Description of data sources and definitions

Data sources

This report is based on TB case notifications made to the PHE Enhanced TB Surveillance system (ETS) in England to the end of 2018. This information is updated annually to take into account denotifications (if the person was found not to have TB), late notifications and other updates. The data presented in this report supersedes data in previous reports.

Diagnostic laboratories serving acute hospitals are the first place in which TB infection-related samples are received and processed within the pathway of clinical diagnosis and management of suspected TB. Results for microscopy, polymerase chain reaction (PCR), histology and culture are collected in ETS. The National Mycobacterium Reference Service (NMRS) receives these diagnostic materials and undertake characterisation using culture and molecular diagnostic methods to define species of *Mycobacterium*, TB antibiotic (drug) susceptibility and organism relatedness.

Definitions

BCG	Bacillus Calmette-Guérin vaccination
CI	Confidence interval
CCG	Clinical Commissioning Group
Cluster	Two or more people notified within the time period of analysis caused by indistinguishable strains, with at least 23 complete MIRU-VNTR loci
CNS	Central nervous system
Cohort review	The systematic review of all people with TB notified by a TB service in a 3-4-month period, looking at standard outcomes in terms of care and contacts tracing
Cryptic disseminated TB	Systemic illness without localising features
DOT	Directly observed treatment

Drug	In the context of TB control, a drug is an anti-TB antibiotic
Drug-resistant cohort	The drug-resistant cohort includes any people with rifampicin-resistant TB (initial or acquired), including MDR-TB (initial or acquired), as well as those without culture confirmation treated with an MDR-TB regimen
Drug-sensitive cohort	The drug-sensitive cohort excludes all people with rifampicin-resistant TB (initial or acquired) including MDR-TB (initial or acquired), and non-culture confirmed treated with an MDR-TB regimen
DST	Drug sensitivity testing, based on phenotypic analysis of cultured TB isolates
ETS	Enhanced TB surveillance system
First-line drug resistance	First-line anti-TB antibiotic drug resistance is defined as resistance to at least one of the first-line antibiotics (isoniazid, rifampicin, ethambutol, pyrazinamide)
HAART	Highly active antiretroviral therapy
IGRA	Interferon-gamma release assay – blood test for TB infection which does not differentiate between active disease and LTBI
IMD 2015	The Index of Multiple Deprivation 2010 rank for each LSOA, based on deprivation score assigned, relative to other LSOAs
IQR	Interquartile range
LSOA	Lower super output area (geographic definition)
LTBI	Latent TB infection
MDR	Multidrug-resistance: cases initially resistant to at least isoniazid and rifampicin
Miliary TB	TB infection spread via the bloodstream to all parts of the body
MIRU-VNTR	Mycobacterial Interspersed Repetitive Unit-Variable Number Tandem Repeats
PCR	Polymerase chain reaction

Post-mortem diagnosis	A post-mortem diagnosis is defined as where TB was not suspected before death, but a TB diagnosis was made at post-mortem, with pathological and/or microbiological findings consistent with active TB that would have warranted anti-TB treatment if discovered before death
Pulmonary TB	A pulmonary case is defined as involving the lungs and/or tracheobronchial tree, with or without extra-pulmonary TB diagnosis. In this report, in line with the WHO's recommendation and international reporting definitions, miliary TB is classified as pulmonary TB due to the presence of lesions in the lungs
Second-line drugs	Second-line drugs include injectable agents (e.g. amikacin, capreomycin, kanamycin), fluoroquinolones (e.g. moxifloxacin, ofloxacin, ciprofloxacin) and other oral bacteriostatic agents.
SNP	Single nucleotide polymorphism – mutation of one base pair in the genome of an *M. tuberculosis complex* isolate
TB	Tuberculosis
UTLA	Upper tier local authority (geographic definition)
VOT	Video observed therapy
WGS	Whole genome sequencing
XDR	Extensive drug resistance: cases initially MDR and resistant to at least one injectable agent (amikacin, capreomycin or kanamycin) and at least one fluoroquinolone (moxifloxacin, ofloxacin or ciprofloxacin)

Treatment outcome

Information on outcomes were reported for all people notified in the previous year, excluding those with known rifampicin-resistant disease: outcomes for these were reported at 24 months. Definitions for outcome are based on World Health Organization (WHO) and European definitions but adapted to the UK context. In this report, all data was obtained from the ETS matched dataset provided in August 2018.

Proportions

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

Confidence intervals

A 95% confidence interval for incidence was obtained using the relevant procedure in Stata, assuming a Poisson distribution.

Population denominator

TB rates by geographical area, age, sex and place of birth were calculated using ONS mid-year population estimates. TB rates by ethnic group were calculated using population estimates from the Labour Force Survey [www.esds.ac.uk/findingData/qlfs.asp]. This is based on a population sample, so estimates are liable to sampling errors, particularly for small population subgroups, and should be interpreted with caution.

Appendix C: TB among South East residents

Table Ci: TB case numbers by upper tier local authority of residence, South East 2000-2018

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Hampshire	34	30	41	42	51	38	47	54	37	66	67	79	67	53	44	58	59	57	65
Isle of Wight	0	7	3	1	1	3	0	7	1	3	3	6	7	2	3	1	3	1	2
Portsmouth	24	12	15	16	23	20	23	23	23	30	24	16	23	19	10	17	11	12	13
Southampton	18	15	27	36	33	30	33	24	24	36	27	51	41	39	29	23	34	34	28
Hampshire & Isle of Wight	76	64	86	95	108	91	103	108	85	135	121	152	138	113	86	99	107	104	108
Kent	47	37	66	67	61	65	86	86	129	111	104	112	115	107	101	91	94	96	97
Medway	13	21	13	20	9	14	16	18	22	20	20	28	20	16	16	14	12	11	18
Kent & Medway	60	58	79	87	70	79	102	104	151	131	124	140	135	123	117	105	106	107	115
Brighton and Hove	17	24	6	3	14	15	15	30	28	35	22	23	31	15	22	24	19	15	19
East Sussex	13	28	25	13	20	15	16	12	17	27	24	25	34	20	25	23	21	16	11
Surrey	42	31	28	60	61	64	79	57	72	88	86	100	98	57	77	67	62	62	44
West Sussex	37	34	39	44	52	38	63	58	38	49	51	77	46	64	41	38	45	35	29
Surrey & Sussex	109	117	98	120	147	132	173	157	155	199	183	225	209	156	165	152	147	128	103
Bracknell Forest	8	4	4	6	4	10	4	6	7	9	12	10	10	6	14	7	3	5	7
Buckinghamshire	42	38	51	47	32	40	41	37	34	30	48	52	54	45	39	42	52	44	49
Oxfordshire	36	33	26	43	64	60	52	75	53	56	60	71	70	64	74	51	38	40	42
Reading	29	30	41	39	34	59	44	55	60	57	59	52	43	66	64	37	27	38	22
Slough	56	64	68	73	71	75	62	54	59	61	72	85	84	78	58	71	54	43	37
West Berkshire	6	5	8	4	9	11	3	10	5	11	7	6	9	11	7	5	6	8	6
Windsor and Maidenhead	11	12	11	15	7	17	8	9	11	13	9	10	12	9	21	7	10	14	12
Wokingham	9	5	9	13	11	9	15	12	9	10	16	10	14	12	19	17	16	7	7
Thames Valley	197	191	218	240	232	281	229	258	238	247	283	296	296	291	296	237	206	199	182
South East	442	430	481	542	557	583	607	627	629	712	711	813	778	683	664	593	566	538	508

Table Cii: TB rate* per 100,000 by local authority of residence, South East, 2000-2018

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Hampshire	2.7	2.4	3.3	3.4	4.1	3.0	3.7	4.2	2.9	5.1	5.1	6.0	5.0	4.0	3.3	4.3	4.3	4.2	4.7
Isle of Wight	0.0	5.3	2.2	0.7	0.7	2.2	0.0	5.1	0.7	2.2	2.2	4.3	5.0	1.4	2.2	0.7	2.1	0.7	1.4
Portsmouth	12.8	6.4	8.0	8.4	11.9	10.2	11.7	11.8	11.7	15.1	11.8	7.8	11.1	9.2	4.8	8.1	5.2	5.6	6.0
Southampton	8.3	6.8	12.2	16.2	14.8	13.2	14.6	10.6	10.5	15.7	11.6	21.6	17.2	16.3	12.0	9.3	13.6	13.5	11.1
Hampshire & Isle of Wight	4.3	3.6	4.8	5.3	6.0	5.0	5.6	5.9	4.6	7.2	6.4	8.0	7.2	5.9	4.4	5.1	5.4	5.3	5.4
Kent	3.5	2.8	4.9	5.0	4.5	4.7	6.2	6.1	9.1	7.7	7.2	7.6	7.8	7.2	6.7	6.0	6.0	6.2	6.2
Medway	5.2	8.4	5.2	8.0	3.6	5.6	6.3	7.0	8.5	7.7	7.6	10.6	7.5	5.9	5.9	5.1	4.3	4.0	6.5
Kent & Medway	3.8	3.7	5.0	5.4	4.3	4.9	6.2	6.3	9.0	7.7	7.2	8.1	7.7	7.0	6.6	5.8	5.8	5.8	6.2
Brighton and Hove	6.8	9.6	2.4	1.2	5.6	5.9	5.9	11.6	10.7	13.2	8.2	8.4	11.2	5.4	7.8	8.4	6.6	5.6	6.5
East Sussex	2.6	5.7	5.0	2.6	4.0	2.9	3.1	2.3	3.3	5.2	4.6	4.7	6.4	3.7	4.6	4.2	3.6	2.9	2.0
Surrey	4.0	2.9	2.6	5.6	5.7	6.0	7.3	5.2	6.5	7.9	7.6	8.8	8.6	4.9	6.6	5.7	5.2	5.2	3.7
West Sussex	4.9	4.5	5.2	5.8	6.8	4.9	8.1	7.4	4.8	6.2	6.3	9.5	5.6	7.9	4.9	4.5	5.0	4.1	3.4
Surrey & Sussex	4.3	4.6	3.8	4.7	5.7	5.1	6.6	5.9	5.8	7.4	6.7	8.2	7.6	5.6	5.9	5.4	5.0	4.5	3.6
Bracknell Forest	7.3	3.6	3.7	5.5	3.7	9.1	3.6	5.4	6.3	8.0	10.6	8.8	8.7	5.1	11.9	5.9	2.5	4.2	5.8
Buckinghamshire	8.8	7.9	10.7	9.8	6.6	8.2	8.4	7.5	6.8	6.0	9.5	10.3	10.6	8.7	7.5	8.0	9.8	8.2	9.1
Oxfordshire	5.9	5.4	4.3	7.0	10.3	9.6	8.2	11.8	8.3	8.7	9.2	10.8	10.6	9.6	11.1	7.4	5.6	5.9	6.1
Reading	20.2	20.7	28.5	27.1	23.5	40.2	29.7	36.7	39.6	37.4	38.2	33.5	27.4	41.6	39.9	22.9	16.6	23.3	13.5
Slough	46.8	53.1	56.2	60.4	58.8	61.0	49.5	42.2	44.9	45.3	52.2	60.4	59.2	54.7	40.2	48.6	35.9	28.9	24.8
West Berkshire	4.2	3.5	5.6	2.8	6.2	7.5	2.0	6.7	3.3	7.2	4.5	3.9	5.8	7.0	4.5	3.2	3.8	5.0	3.8
Windsor and Maidenhead	8.2	9.0	8.2	11.2	5.2	12.5	5.8	6.4	7.8	9.1	6.3	6.9	8.2	6.2	14.2	4.7	6.7	9.3	8.0
Wokingham	6.0	3.3	6.0	8.7	7.4	6.0	10.0	7.9	5.9	6.5	10.3	6.5	8.9	7.6	11.9	10.5	9.8	4.2	4.2
Thames Valley	10.5	10.1	11.5	12.6	12.2	14.6	11.8	13.2	12.0	12.4	14.1	14.6	14.5	14.1	14.3	11.3	9.7	9.4	8.5
South East	**5.7**	**5.5**	**6.1**	**6.9**	**7.0**	**7.3**	**7.5**	**7.7**	**7.7**	**8.6**	**8.5**	**9.7**	**9.2**	**8.0**	**7.7**	**6.8**	**6.4**	**6.1**	**5.7**

*Rates calculated using ONS mid-year population estimates

Table Ciii: TB case numbers and rate* by age and sex, South East, 2018

Age Group	Female		Male	
	n	rate	n	rate
0-9	4	0.8	6	1.1
10-19	9	1.8	16	3.0
20-29	35	6.8	39	7.2
30-39	55	9.8	74	13.8
40-49	35	5.9	50	8.6
50-59	24	3.9	37	6.1
60-69	24	4.9	35	7.6
70-79	17	4.1	18	4.9
80+	15	5.2	15	7.6

*Rates calculated using ONS mid-year population estimates

Table Civ: Drug resistance among people with culture confirmed TB*, South East, 2000-2018

	Any resistance		Isoniazid resistance		Multidrug resistance		Total*
	n	%	n	%	n	%	
2000	15	7.4	14	6.9	3	1.5	203
2001	10	5.1	8	4.0	0	0.0	198
2002	22	7.6	20	6.9	7	2.4	291
2003	20	6.2	19	5.8	1	0.3	325
2004	21	6.4	19	5.8	2	0.6	330
2005	19	5.1	18	4.8	1	0.3	374
2006	25	6.1	21	5.1	4	1.0	410
2007	24	6.2	19	4.9	1	0.3	387
2008	28	7.4	22	5.9	5	1.3	376
2009	35	8.4	30	7.2	3	0.7	416
2010	27	6.3	25	5.8	6	1.4	428
2011	44	9.2	36	7.5	6	1.3	479
2012	42	8.6	38	7.8	7	1.4	488
2013	27	6.2	24	5.5	1	0.2	434
2014	31	7.3	30	7.0	3	0.7	426
2015	22	6.0	19	5.2	6	1.6	367
2016	25	6.8	23	6.3	5	1.4	368
2017	20	5.9	20	5.9	4	1.2	338
2018	31	10.3	27	9.0	5	1.7	300

*Culture confirmed cases with drug susceptibility testing results for at least isoniazid and rifampicin