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Tuberculosis in Kent, Surrey and Sussex:
Annual review (2013 data)

Data from 1999 to 2013

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Executive summary

In 2013, 277 tuberculosis (TB) cases were reported among Kent, Surrey and Sussex residents, a rate of 6 per 100,000 population. TB numbers and rates in Kent, Surrey and Sussex remain below the national average, and continue to decrease from a peak in 2011. Some local authorities did, however, have rates more than three times the area average.

TB patients in Kent, Surrey and Sussex were more often UK born than elsewhere in the country, although rates in the UK born remain very low at 2.3 per 100,000, while the rate in the non-UK born was 38 per 100,000 in 2013. Numbers of both UK born and non-UK born TB patients fell from 2012 to 2013, but particularly among those who had recently arrived in the UK.

As in recent years, the most common ethnic group of TB patients in Kent, Surrey and Sussex was white, followed by Indian. Numbers of cases among the white and Indian populations fell in 2013, with the only increase in patients of Pakistani ethnicity.

More than one in ten patients had one or more social risk factors, and over half of these were UK born. Multiple issues were common, with 37% reporting two or more factors. Most had pulmonary disease, with a high proportion sputum smear positive.

Information on the time to diagnosis was well completed. The median delay between onset of symptoms and starting treatment was 82 days, and 77 among those with pulmonary disease. Delays were longer among patients aged 50 years or older, and among those born in the UK.

Almost one in five patients were not offered an HIV test or the information not recorded. The UK born, children and those aged 65 years or older were less likely to be offered a test, although this also varied depending where the patients were treated. Among those offered, uptake was high. Information was also poorly completed on BCG vaccination.

A low proportion of patients with pulmonary disease had a sputum smear result (58%). Among those with a result, 59% were sputum smear positive. In 2013, 68% of all cases were confirmed by culture, 78% among pulmonary cases.

Isoniazid resistance was fairly common (8% in 2013), but multi-drug resistance remains rare among patients in Kent, Surrey and Sussex. Those with isoniazid resistant disease had no previous history of TB treatment: over a third were white, 29% of mixed/other ethnicity, and most had pulmonary disease (86%).

In Kent, Surrey and Sussex, 83% of culture confirmed cases have been strain typed with at least 23 loci completed since 2010. In this time period, 190 cases have clustered with at least one other individual within Kent, Surrey and Sussex, making up 68 different clusters, a clustering proportion of 28%. When considering strain typed cases that were part of national clusters, 52% of strain typed cases in Kent, Surrey and Sussex, clustered with at least one other case nationally.

The majority of clusters consist of two individuals. A higher proportion of clustering was observed in children, UK born, and ethnically white individuals. Patients with social risk factors also had a higher proportion of clustering, particularly those reporting alcohol or drug misuse. The Euro-American lineage strain was the most common in Kent, Surrey and Sussex, however, the Beijing strain had the highest proportion of cases clustering. These observations in clustering, however, must be interpreted with caution due to the relatively small number of cases in this area.

According to the revised outcome categories, 78% of patients reported in 2012 with non-CNS, spinal, miliary or cryptic disseminated disease completed treatment within 12 months. Outcomes varied across Kent, Surrey and Sussex, with the lowest levels of treatment completion in Surrey where over a quarter of patients did not have a valid outcome reported.

The most common reason for not completing treatment was death but for 76% of these the relationship between TB and death was not given. The median age of patients who died was 70 years old and nearly half were diagnosed at post-mortem. Older patients and the UK born were more likely to die.

In this report we found that completeness of key variables varied across Kent, Surrey and Sussex, which means important information may not have been available to inform local services. Complete and accurate surveillance data provides the evidence to review case management standards, and identify if opportunities for prevention have been missed.

The data in this report indicates that UK born patients, in particular, were less likely to be offered an HIV test, have longer delays to diagnosis and have worse outcomes than non-UK born patients. UK born patients were also more likely to have social risk factors and have infectious forms of disease.

As overall numbers decline, TB becomes more concentrated in risk groups. This supports the need for services to work collaboratively across the range of health and social care issues that affects these vulnerable populations, to both treat and prevent further cases.

While the low and decreasing TB rate in Kent, Surrey and Sussex is encouraging, TB cases continue to occur that have serious consequences: two deaths occurred in UK born children under five years old in 2013. In both of these TB was only diagnosed at post-mortem. In addition, one in four TB patients in Surrey did not have an outcome recorded.

Recommendations for local NHS and PHE staff include (i) ensuring that accurate information is completed on the PHE Enhanced TB Surveillance system, and (ii) that best case management is followed for all patients, including universal HIV testing, obtaining smear results, and reviewing cases through cohort review to ensure opportunities for prevention, early detection of cases and successful treatment are not missed.

Background

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

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

This annual report provides an update on the recent epidemiology of TB in Kent, Surrey and Sussex residents, including characteristics and distribution of TB cases, trends in anti-tuberculosis drug resistance, clustering of TB cases, and also patient outcomes.

Objectives

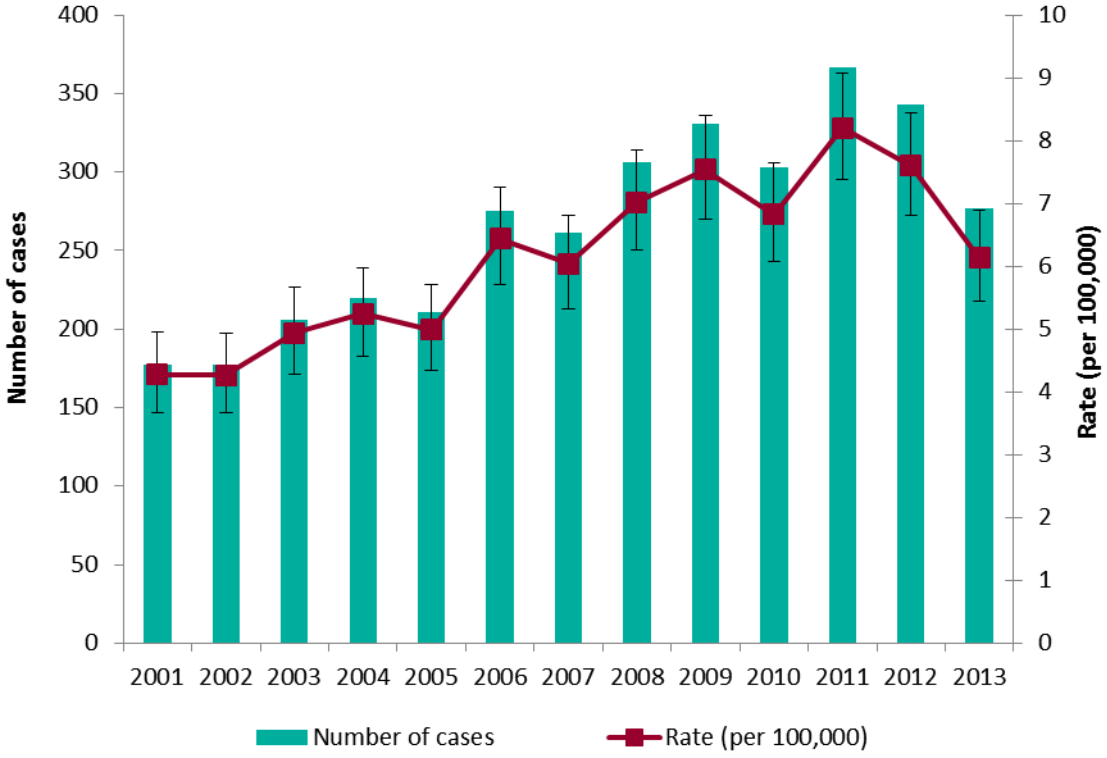
This report describes the recent epidemiology of TB in Kent, Surrey and Sussex. We aim to update public health, clinical and allied colleagues, including clinical commissioning groups, NHS England and local authorities of the latest trends, identify at-risk population groups, and opportunities for interventions and prevention of future cases.

Tuberculosis epidemiology

Overall numbers, rates and geographical distribution

In 2013, 277 tuberculosis (TB) cases were reported among Kent, Surrey and Sussex residents, a rate of 6 per 100,000 population. After increasing steadily over the last decade, this was a further decrease of nearly 20% compared to 2012, down from a peak in 2011 (Figure 1). The TB rate in Kent, Surrey and Sussex remained below the national average of 12 per 100,000.[1]

Figure 1: TB case reports and rates, Kent, Surrey and Sussex, 2001 – 2013

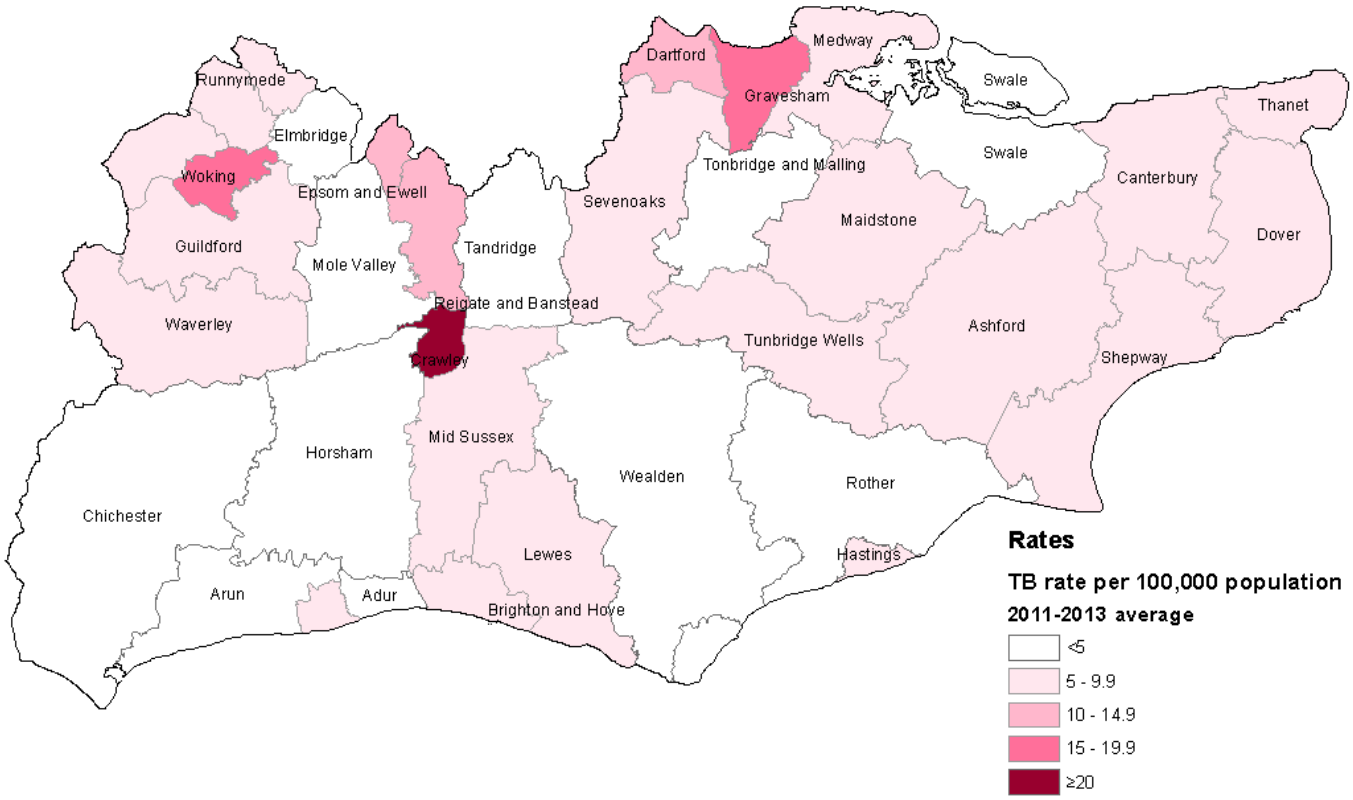


The TB rate was similar across each upper tier local authority in 2013 at between 4 and 8 per 100,000 (Figure 2). The greatest decline in TB rates in 2013 was seen in Brighton and Hove, which in recent years had the highest TB rates in Kent, Surrey and Sussex. A decline was also seen in Surrey, East Sussex and Medway, while rates in Kent stayed fairly constant, and increased slightly in West Sussex. The small numbers involved mean year-on-year changes should be interpreted with caution.

The highest three-year average TB rate was in Crawley local authority in West Sussex (23.2 per 100,000), followed by Gravesham in Kent (19.9 per 100,000) and Woking in Surrey (19.1 per 100,000) (Figure 3).

Figure 2: Annual TB case rates by upper tier local authority, Kent Surrey and Sussex, 2001 – 2013

Figure 3: Three-year average TB case rates by lower tier local authority of residence, Kent Surrey and Sussex, 2011 – 2013

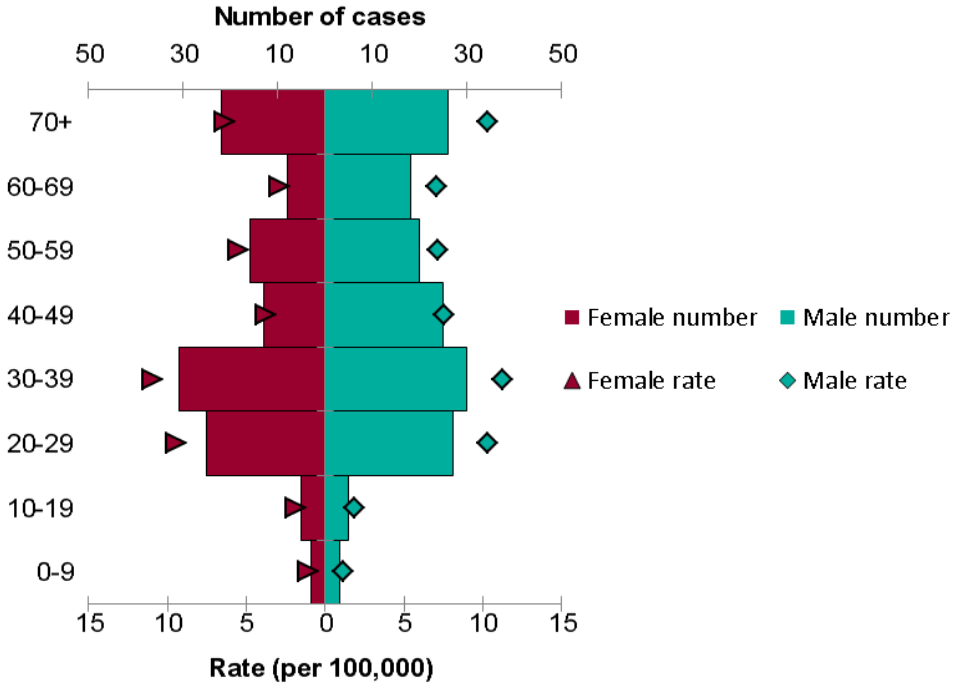


Demographic characteristics

Age and sex

In 2013, 56% of TB patients were male, and rates among males were slightly higher than females (7.0 per 100,000 vs. 5.3 per 100,000 in females). Numbers and rates were similar for males and females in those under 40 years old, but slightly higher among males for those older than 40 (Figure 4).

Figure 4: TB case reports and rates by age and sex, Kent, Surrey and Sussex, 2013



In 2013, eight children aged less than 16 years old were reported, lower than recent years (20 reported in 2012): six were UK born, three of whom were white.

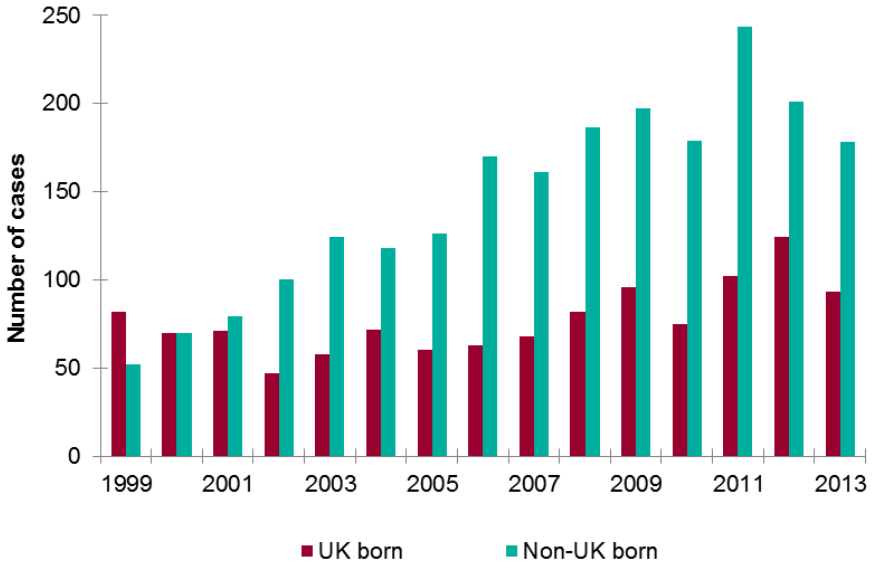
Three children aged less than five years old were diagnosed with TB. All were UK born: two black African, and one of mixed/other ethnicity. All three had extra-pulmonary disease. One had CNS and gastro-intestinal disease (BCG status unknown) and one cryptic disseminated (had BCG vaccination): both of these children died and were diagnosed with TB on post-mortem. The third child was vaccinated, and had extra-thoracic lymph node TB.

Place of birth and time since entry

In 2013, 34% of TB patients were born in the UK, a higher proportion than elsewhere in the country. This varied from 21% in Surrey and West Sussex, to around half of patients in East Sussex and Brighton and Hove. Rates in the UK born remain very low at 2.3 per

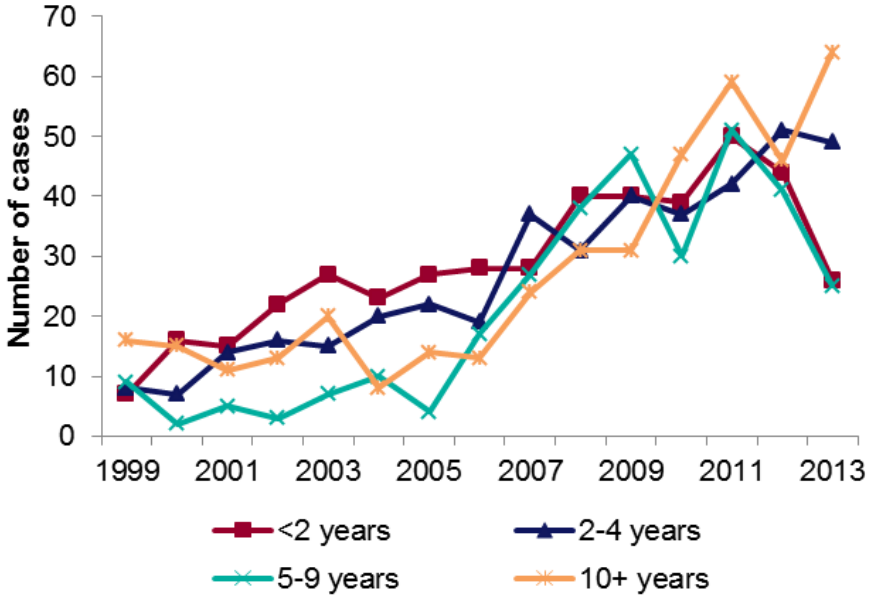
100,000, while the rate in the non-UK born was 38 per 100,000 in 2013. Numbers of both UK born and non-UK born TB patients fell from 2012 to 2013 (Figure 5).

Figure 5: TB case reports by place of birth, Kent Surrey and Sussex, 1999 – 2013



Among those born abroad, the biggest decrease was in individuals who entered the country either very recently (less than two years before diagnosis) or between five and nine years earlier (Figure 6). The numbers of cases in individuals who had been in the country for ten or more years has increased since 1999.

Figure 6: Non-UK born TB case numbers by time since entry, Kent Surrey and Sussex, 1999 – 2013



More than one in three non-UK born TB patients in 2013 were born in India (Table 1). The next most common countries of birth were Pakistan, Nepal (although almost half the number compared to 25 in 2012) and the Philippines.

Table 1: Most common countries of birth of non-UK born TB patients, Kent Surrey and Sussex, 2012 – 2013

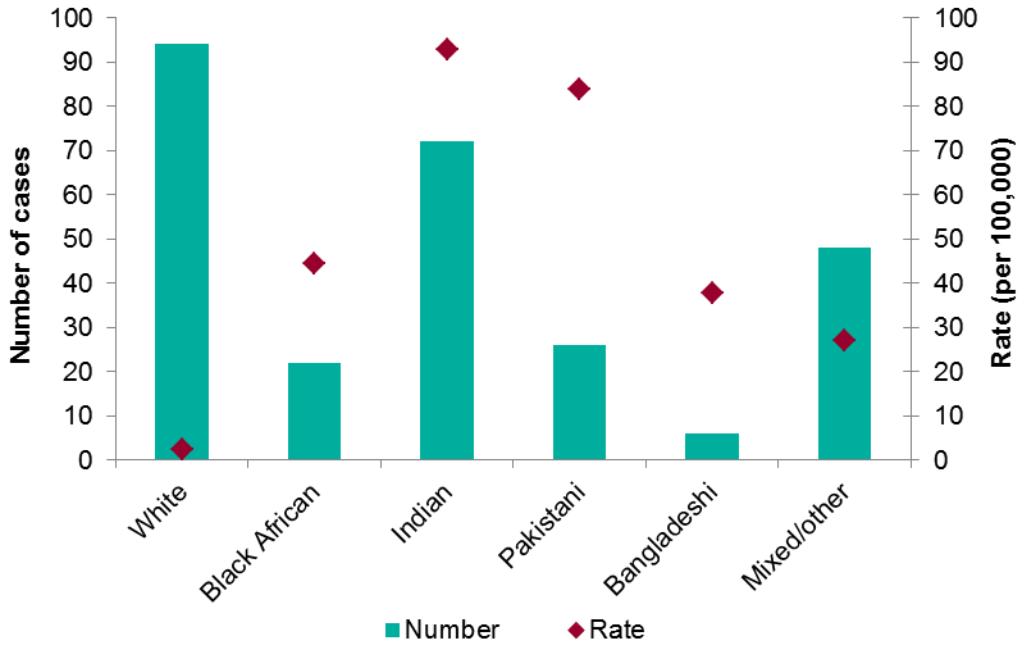
Country of birth	2012 n	2012 % of 199 non-UK born patients	2013 n	2013 % of 176 non-UK born patients
India	57	29	93	36
Pakistan	15	8	22	12
Nepal	25	13	13	7
Philippines	14	4	13	7

Ethnicity

As in recent years, the most common ethnic group of TB patients in Kent, Surrey and Sussex was white, accounting for 35% of cases in 2013, although rates in this population were very low (2.4 per 100,000 population, Figure 7). The majority were born in the UK (87%, 78).

Almost half of patients in East Sussex, Kent and Brighton and Hove were white, compared to 25% or less in Medway, Surrey and West Sussex (Appendix Biv).

Figure 7: TB case reports and rates by ethnic group, Kent Surrey and Sussex, 2013

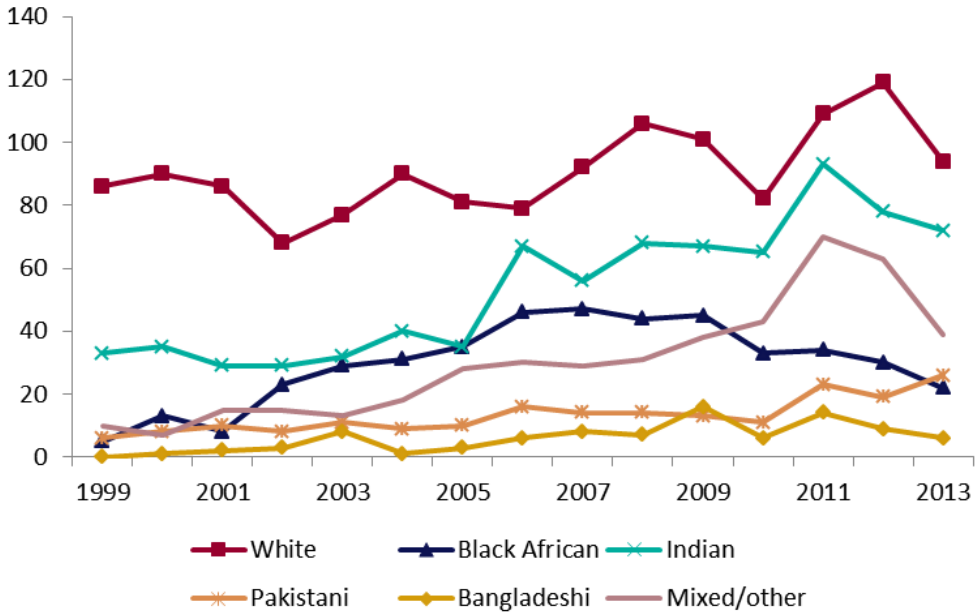


The next most common ethnic group was Indian, accounting for 27% of cases in 2013, and TB rates were highest among this population (93 per 100,000). Almost all of these patients were born outside the UK (94%, 68). The third most common ethnic group was mixed/other (33% of these were born in Nepal and 23% in the Philippines).

While numbers remain low, rates were second highest among the Pakistani population (84 per 100,000), who again were almost all born outside the UK (24, 92%). The next highest rates were among the black African population (44 per 100,000), most of whom were born abroad (85%, 19).

Numbers of cases among the white, Indian, other/mixed, black African and Bangladeshi populations fell in 2013, with the only increase in cases of Pakistani ethnicity (Figure 8).

Figure 8: TB case numbers by ethnic group, Kent Surrey and Sussex, 1999 – 2013



Social risk factors

In 2013, 27 patients were reported as having one or more social risk factor (11% of all patients, and 15% of those where this information was recorded). For each risk factor, 5.3% reported alcohol misuse (14/263), 4.2% imprisonment (11/262), 3.8% reported homelessness (10/266) and 3.1% drug use (8/260).

Multiple issues were common, with 37% reporting two or more factors (10). Over half of all patients with a social risk factor were UK born (59%, 16).

Clinical characteristics

Site of disease

In 2013, 57% of TB patients had pulmonary disease (Table 2). The next most common site was extra-thoracic lymph node TB, accounting for almost a quarter of all cases. Pulmonary disease was more common among the UK born (69%, 64/93 vs. 49%, 87/178) and those with social risk factors: 85% of those with social risk factors had pulmonary disease (23), and 61% of these were sputum smear positive (11).

Table 2: Site of disease of TB patients, Kent Surrey and Sussex, 2013

Site of disease	2013	
	n	%
Pulmonary	157	57
Lymph Node (extra thoracic)	63	23
Pleural	23	8
Other	21	8
IT Lymph Nodes	14	5
Bone/Joint (spine)	13	5
Gastrointestinal/Peritoneal	11	4
Miliary	10	4
Genitourinary	9	3
CNS (meningitis)	6	2
CNS (Other - not meningitis)	4	1
Cryptic Disseminated	3	1
Bone/Joint (other - not spine)	2	1
Laryngeal	1	0.4

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

Previous diagnosis of tuberculosis

In 2013, 6% (17/266) of cases occurred in individuals with a previous history of TB, a similar proportion to recent years.

BCG vaccination

Information on BCG vaccination was available on 70% of cases in 2013 (193), and 75% of these reported being vaccinated (Table 3). Although 100% of TB patients aged under five years old had been vaccinated (among those where this was reported: information was missing for one patient), three UK born children under 16 did not receive a vaccination (and information was unknown for one further child).

Table 3: Number and proportion of TB cases with BCG vaccination, Kent Surrey and Sussex, 2013

	<5 years old			<16 years old			All ages		
	n	N	%	n	N	%	n	N	%
UK born	2	2	100	2	5	40	37	65	57
Non-UK born	0	0	-	2	2	100	107	128	84
All cases	2	2	100	4	7	57	144	193	75

Time symptomatic

The time between onset of symptoms and starting treatment was available for 89% of patients in 2013 (Table 4): the remaining patients were either asymptomatic at diagnosis, or did not have a date of symptom onset recorded. The median number of days was 82. This was lower among those with pulmonary disease at 77 days.

Table 4: Time between symptom onset and diagnosis*, Kent Surrey and Sussex, 2013

	Median days (IQR)	0-2 months		2-4 months		>4 months		
		n	%	n	%	n	%	N
Extra-pulmonary	**88 (41-170)**	34	30	32	30	41	40	107
Pulmonary	**77 (34-159)**	58	39	40	28	48	33	146
Pulmonary smear positive	**64 (29-123)**	24	45	15	29	14	25	53
All cases	**82 (35-165)**	92	35	72	29	89	36	253

*excluding asymptomatic cases, and those with missing onset dates

Children had the shortest time to starting treatment (median time 34 days, inter-quartile range (IQR) 17-34 for those with pulmonary disease aged under 16 years old). The median time for those with pulmonary disease aged 50 and over was 93 days (IQR 35-166). Those born in the UK had a longer median time to start treatment (85 days for those with pulmonary disease, IQR 40-166) than those born abroad (66, IQR 27-152).

HIV testing

Information on HIV testing was only available for 88% of patients (243/277), and 80% were offered an HIV test or their HIV status was already known (222 patients). Among those offered testing, uptake was high (94%, 209). Almost one in five patients were not offered a test or the information was not recorded (19%, 55).

UK born patients were less likely to be offered a test (72%, 67/93 vs. 87% of non-UK born, 154/178). Of eight children with TB in 2013, only one had an HIV test: four were not offered a test, and for three this was not reported. The offer rate was also lower among those aged 65 years or older, with just 62% offered a test (38/61).

Information on HIV testing also varied by geographical area (Appendix Bvi). Patients in West Sussex and Kent were least likely to have this information completed: this field was missing for 21% of patients in West Sussex, and 13% of patients in Kent and 11% in Surrey. All patients in Brighton and Hove had an HIV test offered and done (or their status already known).

Microbiological information

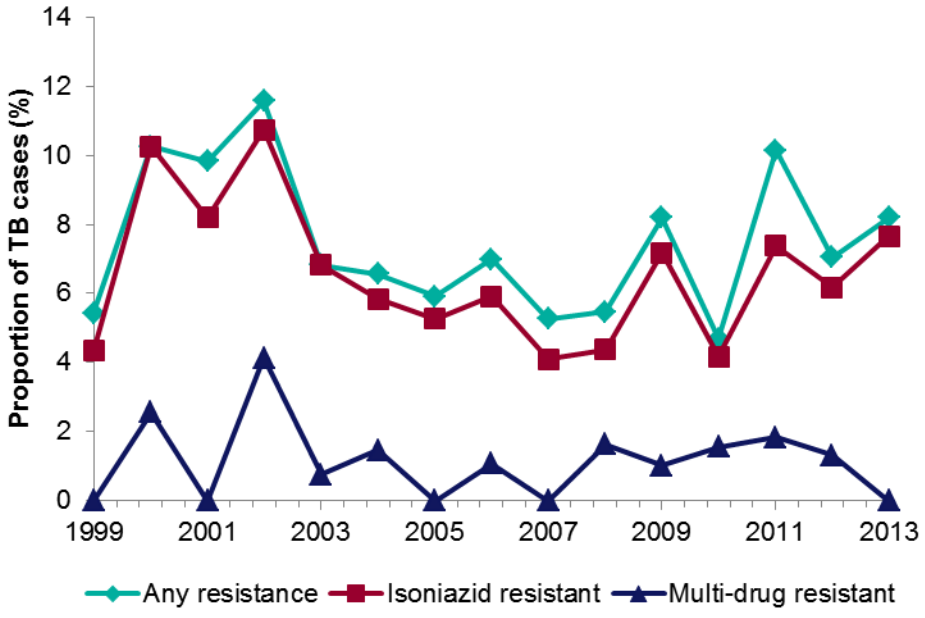
Sputum smear and culture confirmation

Of the 157 pulmonary cases in 2013, little over a half (58%, 91) had a sputum smear result. Of these, 59% (54) were sputum smear positive. In 2013, 68% of all cases were confirmed by culture (187). This increased to 78% (122) among pulmonary cases, among whom 61% (75) had a sputum smear result and of those 63% (47), were sputum smear positive. Just over half (54%) of those with extra-pulmonary disease were culture confirmed (65/120).

Drug resistance

In 2013, 8% (15) of TB cases were resistant to one or more first line drugs: almost all had isoniazid resistance (14) but none had multi-drug resistance (resistant to isoniazid and rifampicin). All of those with isoniazid resistant disease had no previous history of TB treatment. Half were male, and most were aged between 15 and 44 years old (64%, 9/14). Patients were most often white, (36%, 5) or of mixed/other ethnicity (29%, 4), and 36% were UK born (5). Most had pulmonary disease (86%, 12).

Figure 9: Proportion of TB cases with first line drug resistance, Kent Surrey and Sussex, 1999 – 2013



TB clusters identified through molecular strain typing

The PHE National Strain Typing Service was established in January 2010. All TB isolates were typed using 24 loci mycobacterial interspersed repetitive unit-variable number tandem repeats (MIRU-VNTR) at the National Mycobacterium Reference Laboratory (NMRL). Cases with an identical strain pattern are considered clustered.[2] All data shown are for patients reported between 2010 and 2013.

Proportion of cases clustered

Between 2010 and 2013, 830 cases of TB were culture confirmed in Kent, Surrey and Sussex. Of those, 692 (83%) had a MIRU-VNTR profile with at least 23 loci typed (Table 5). There were 190 cases clustered with at least one other individual in Kent, Surrey and Sussex since 2010, a clustering proportion of 28%. These cases made up 68 different molecular clusters. Of note, if cases clustered included individuals who were part of national clusters, there were 362 clustered cases in Kent, Surrey and Sussex, a cluster rate of 52%.

Table 5: Clustering of TB cases in Kent, Surrey and Sussex, 2010 – 2013

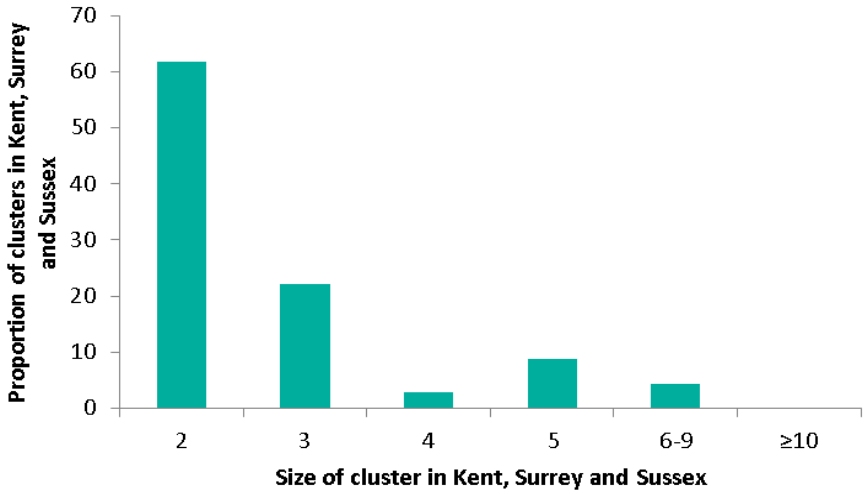
Year	Culture confirmed cases	Strain typed cases*		Cases clustered		Number of clusters
		n	% of culture confirmed	n	% of strain typed	
2010-2013	830	692	83%	190	28	68

* Culture confirmed cases with a MIRU-VNTR profile with at least 23 complete loci

Size of clusters

Of the 68 clusters in Kent, Surrey and Sussex, 62% consisted of two people and 13% contained five or more (Figure 10). The largest cluster comprised of nine cases.

Figure 10: Size of clusters in Kent, Surrey and Sussex, 2010 – 2013



Cluster Lineage

Nearly half of the clustered cases in Kent, Surrey and Sussex had strains of Euro-American lineage, 16% Central Asian, 14% East African Indian, and 14% Beijing. A third of cases infected with the Euro-American lineage were clustered and a little less than a quarter of cases with the Central Asian or East African Indian lineage were in clusters (Table 6). As observed in other regions, cases with the Beijing lineage had the highest proportion of clustering with over half in clusters.

Table 6: Lineage of TB clusters*, Kent, Surrey and Sussex, 2010 – 2013

Lineage	Clustered cases		Number of cases
	n	%	n
Euro American	89	32	276
Central Asian	30	24	123
East African Indian	27	23	120
Beijing	27	60	45
Other*	17	20	84

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

Nearly nine in ten cases with the Beijing strain were part of national clusters. More than half (60%) cluster with at least one case in Kent, Surrey and Sussex. More than two thirds (71%) of the cases were not born in the UK, with 60% having entered the UK more than two years from the time since diagnosis. A third of the cases were of white ethnicity and nearly half (44%) of the cases were of mixed/other ethnicity. Of the mixed/other ethnicities, four in ten were born in Nepal, all of whom were in clusters nationally and 82% clustered with at least one case in Kent, Surrey and Sussex. Three quarters (73%) of cases with the Beijing strain had pulmonary TB, of which 39% had positive sputum smear results (but a third of the pulmonary TB cases did not have a sputum smear result).

Characteristics of cases in clusters

Of the 190 clustered cases, 60% were male and 60% were aged 15 to 44 years. Despite the majority of cases being male, a similar proportion of male and female cases were in clusters (Table 7). Children aged under 15 made up just 3% of all clustered cases but 60% of children were in clusters.

More than a third (39%) of UK born cases were clustered, higher than the proportion clustered in non-UK born cases (22%). Of those non-UK born, 15% were recent entrants (entered within previous two years): of the recent entrants, 17% were in clusters. Those who arrived two to ten years previously had the highest rate of clustering among non-UK born cases (24%).

Table 7: Characteristics of clustered cases, Kent Surrey and Sussex, 2010 – 2013

Characteristic		Number of clustered cases*		Total
		n	%	n
Sex	Male	113	28	400
	Female	75	26	290
Age	0-14 years	6	60	10
	15-44 years	114	27	428
	45-64 years	51	39	132
	≥65 years	19	16	121
Country of birth	UK born	82	39	208
	Non-UK born	95	22	442
Non-UK born years since entry into the UK	<2 years	16	17	92
	2-10 years	50	24	211
	>10 years	15	19	80
Ethnic group	White	85	39	221
	Black African	15	22	68
	Black Caribbean	0	0	2
	Indian	22	15	146
	Pakistani	4	9	44
	Bangladeshi	2	11	18
	Mixed/Other	51	34	152
Clinical characteristics	Pulmonary disease	144	32	454
	Sputum smear positive**	61	36	169
	Previous TB diagnosis	11	33	33

*denominator varies slightly depending on variable completeness

** of pulmonary cases

White individuals comprised nearly half of clustered cases. Nearly four in ten white patients that were strain typed were in clusters. Black Africans accounted for 8% of all clustered cases, however 22% of black African patients were in clusters. The second highest rate of clustering was seen among those of mixed/other ethnic groups, and more than a quarter of these (27%) were born in Nepal.

More than three-quarters (76%) of clustered cases had pulmonary TB; however a third of pulmonary cases were in clusters. Of those with pulmonary TB, only 42% were smear positive. This is likely distorted by the fact that four in ten pulmonary cases were missing sputum smear results. Among cases with a positive smear sample, 36% were in clusters. A third of those with a previous diagnosis were clustered, comprising 6% of all clustered cases.

A fifth of the clustered cases had at least one social risk factor (Table 8): however, half (49%) of the cases with social risk factors were in clusters. In contrast, of the patients without social risk factors a quarter were in clusters.

Table 8: Clustering among patients with social risk factors, Kent Surrey and Sussex, 2010 – 2013

Characteristic		Number of clustered cases		Total
		n	%	n
At least one social risk factor	Yes	37	49	76
	No	120	24	497
History of, or current alcohol misuse	Yes	17	63	27
	No	153	27	580
History of, or current drug misuse	Yes	13	65	20
	No	147	26	576
History of, or current homelessness	Yes	12	44	27
	No	158	27	590
History of, or current imprisonment	Yes	15	44	34
	No	148	27	557

Two-thirds of cases with a history of alcohol or drug misuse were in clusters, yet these individuals only comprise 9% and 7% of all clustered cases, respectively. Conversely, in individuals without history of alcohol or drug misuse, only a quarter were clustered. Cases with a history of imprisonment similarly accounted for 8% of the clustered cases; however 44% were in clusters.

Isoniazid resistance was observed in 9% of clustered cases and multi-drug resistance in 1% (Table 9). Clustering was found in 37% of isoniazid resistant cases and 29% of multi-drug resistant cases (although numbers were small), respectively. Of note, nearly 6 in 10 strain typed isoniazid resistant cases were clustered with at least one other case nationally.

Table 9: Clustering among patients with drug resistance, Kent Surrey and Sussex, 2010 – 2013

Characteristic		Number of clustered cases		Total
		n	%	n
Isoniazid resistant	Yes	17	37	46
	No	172	27	641
Multi-drug resistant	Yes	2	29	7
	No	187	28	680

Treatment outcome

TB patient outcomes are reported in accordance with the revised 2013 World Health Organization (WHO) treatment outcome definitions.[3] Under these, outcome at 12 months is reported for the cohort of patients diagnosed in 2012 with drug (rifampicin) sensitive TB (excluding patients with initial or acquired rifampicin or multi-drug resistance) with expected course of treatment of less than 12 months (cohort 1A below), and separately for those with CNS, spinal, miliary or cryptic disseminated disease (cohort 1B below).

Outcome at 24 months is reported for the cohort (2) of patients diagnosed in 2011 with initial or acquired rifampicin or multi-drug resistance.

The national surveillance team also further revised the outcome data provided by clinics, and where the time between treatment start and end dates was greater than 365 days, any coded as completed within 12 months were reassigned to 'still on treatment at one year', and similarly for 24 and 36 month outcomes. PHE will be working with clinic staff to improve and validate any amendments to outcome data.

1: Outcomes for patients with an expected course of treatment of less than 12 months

In 2012, 343 TB cases were notified, 339 (99%) of whom were not resistant to rifampicin and so included in cohort A with treatment outcome reported at 12 months.

1A: Outcomes for patients with rifampicin sensitive TB: non CNS, spinal, miliary or cryptic disseminated disease

Table 10: Number and proportion completing treatment within 12 months, Kent Surrey and Sussex, 2002 – 2012*

	TB patients		
	n	%	Total
2002	86	54	159
2003	84	44	193
2004	94	47	200
2005	108	57	191
2006	135	56	243
2007	143	61	234
2008	180	67	268
2009	211	74	286
2010	186	69	268
2011	263	81	326
2012	241	78	308

*excludes rifampicin resistant TB, and patients with CNS, spinal, miliary or cryptic disseminated disease

According to the revised outcome categories, 78% of the 308 patients with non-CNS, spinal, miliary or cryptic disseminated disease completed treatment within 12 months, lower than in 2011 but higher than previous years (Table 10).

The most common reason for not completing treatment for patients notified in 2012 was death (6%, Table 11). Of the 17 deaths, the relationship between TB and death was unknown for 13. Among the four where this was reported, TB contributed to just one death and was incidental to three. The median age of patients who died was 70, and seven (41%) were diagnosed at post-mortem.

Table 11: TB outcome at 12 months, Kent Surrey and Sussex, cases diagnosis in 2012*

Outcome at 12 months	n	%
Completed	241	78
Died	17	6
Lost to follow up	13	4
Still on treatment	11	4
Treatment stopped	1	0
Not evaluated	25	8
Total	308	

*excludes rifampicin resistant TB, and patients with CNS, spinal, miliary or cryptic disseminated disease

The next most common reason was loss to follow-up (4%): where known, 89% had left the UK (8/9). This was followed by being still on treatment.

Information on the reason was not available for over half (7) of these (recoded to 'still on treatment' by the national surveillance team), but where known 80% had their treatment changed (4/5), and one was on a planned treatment regimen that exceeded 12 months.

Older patients were less likely to complete: just 65% of those aged 65 years or older completed (37/57), with higher rates of death (19%, 11). Treatment completion was similar among males and females (78%, 129/166 vs. 79%, 112/142).

Treatment completion was 81% among the UK born and those born abroad although those born abroad were more often lost to follow up (6.3%, 11 vs. 0.9%, 1), while the UK born were more likely to die (8.6%, 10 vs. 2.3%, 4).

Outcomes also varied across Kent, Surrey and Sussex, with the lowest levels of treatment completion in Surrey (Table 12). This was because over a quarter of patients did not have a valid outcome reported.

Table 12: TB outcome at 12 months by upper tier local authority, Kent Surrey and Sussex, 2012*

	Completing treatment		Died		Lost to follow up		Still on treatment		Treatment stopped		Not evaluated		Total
	n	%	n	%	n	%	n	%	n	%	n	%	
Brighton and Hove	22	85	1	4	2	8	0	0	0	0	1	4	26
East Sussex	26	81	3	9	1	3	2	6	0	0	0	0	32
Kent	86	83	6	6	5	5	6	6	0	0	0	0	103
Medway	14	100	0	0	0	0	0	0	0	0	0	0	14
Surrey	56	62	4	4	3	3	3	3	0	0	24	27	90
West Sussex	37	86	3	7	2	5	0	0	1	2	0	0	43
Kent, Surrey and Sussex	241	78	17	6	13	4	11	4	1	0	25	8	308

*excludes rifampicin resistant TB, and patients with CNS, spinal, miliary or cryptic disseminated disease

1B: Outcomes for patients with rifampicin sensitive TB with CNS, spinal, miliary or cryptic disseminated disease

Just under half of the 31 patients with CNS spinal, miliary or cryptic disseminated disease completed treatment within 12 months (Table 13). Patients were commonly (39%) still on treatment. Where known, three had their treatment changed and two were on planned treatment for more than 12 months (over half, 7, were recoded to ‘still on treatment’ by the national surveillance team so additional information on reason was missing).

Table 13: TB outcome at 12 months for patients with CNS, spinal, miliary or cryptic disseminated disease, Kent Surrey and Sussex, 2012*

Outcome at 12 months	n	%
Completed	15	48
Died	3	10
Lost to follow up	0	0
Still on treatment	12	39
Treatment stopped	0	0
Not evaluated	1	3
Total	31	

*excludes rifampicin resistant TB

The next most common reason was death. TB caused or contributed to one death, but the relationship unknown for four patients. The median age at death was 85 years old, and two were diagnosed at post-mortem.

Older patients had worse outcomes (25% died before completing treatment, 9/36) but there was no difference in the proportion completing between males and females. UK

born patients had worse outcomes (38% completed, 16/42 vs. 50%, 159/318), and were more likely to die (14%, 6 vs. 4%, 14).

2: TB outcome at 24 months for patients with rifampicin resistant disease

In 2011, six TB patients were initially rifampicin resistant at start of treatment. Eight had previously been treated for TB (21%). Four of these were multi-drug resistant, and none extensively-drug resistant (XDR).

At 12 months, all six were still on treatment. At 24 months, four had completed treatment (67%) and two were still on treatment.

Difference between original and revised 12 month outcomes:

Outcomes for patients reported between 2002 and 2012 were revised, and a number originally reported as completing within 12 months were reassigned to another category, particularly to ‘still on treatment’ if treatment start and end dates suggested patients were treated for longer than 365 days (or 730 for 24 month outcomes). Further work is required to determine if this interpretation is correct, and PHE will be working with clinics to establish this.

Of the 308 patients with non CNS, spinal, miliary or cryptic disseminated disease, 80% were reported as having completed treatment within 12 months by the clinics, but after revisions based on treatment dates this was reduced to 78%. Most of these outcomes were recoded to ‘still on treatment at 12 months’, which increased to 4% (11) of patients from the original clinic data of just 1% (4).

Among patients with CNS, spinal, miliary or cryptic disseminated disease, again a number of patients who were reported to have completed treatment within 12 months were recoded to ‘still in treatment’ (six out of 21).

Discussion

Numbers and rates of TB in Kent, Surrey and Sussex remain low and below the national average. After increasing steadily over the past decade, there was a further decrease in the numbers and rate of TB down from a peak in 2011. This decrease was seen among both UK born and non-UK born populations.

While most patients were born abroad (and rates highest among the Indian and Pakistani populations), a higher proportion of cases occurred in white UK born individuals than elsewhere in the UK. The decrease in numbers of patients who were very recent entrants to the UK (arrived within previous two years) may be a result of the roll out of pre-entry screening for TB by chest x-ray in all high incidence countries from autumn 2012.[4]

HIV testing was not offered, or not recorded as offered, to one in five TB patients in Kent, Surrey and Sussex in 2013. Some patient groups including the UK born, children and those aged over 65 years old, as well as those in certain geographical areas were less likely to be offered a test, or have this information recorded. This was well recorded in some areas, however, such as Brighton and Hove, where all TB patients in 2013 had an HIV test offered and done (or their status was already known). UK guidance recommends all TB patients should be offered a test, regardless of age or ethnicity or where they are resident.[5]

Information on symptom onset was well completed, and identified longer delays were experienced by UK born patients. Delays in diagnosis in low incidence areas such as Kent, Surrey and Sussex, particularly among the UK born population, may be due to a low index of suspicion among healthcare workers. UK born patients were also more likely to have social risk factors, resulting in poorer recognition of symptoms and difficulties accessing healthcare. Delays in diagnosis lead to worse outcomes for the patient and increased risk of transmission to others.

A very low proportion of pulmonary cases had a sputum smear result, just over half. This is an important indication of infectiousness, and should be done on all patients where possible.

Nearly three in ten strain typed cases were found to cluster with one other case in Kent Surrey and Sussex. If including individuals that were part of national clusters, half of the strain typed cases in the region cluster with at least one other individual nationally. The majority of clusters consist of only two people and the largest cluster in the region consists of nine people.

The Euro-American lineage was the predominant strain in the region, however, like other regions, there was a higher proportion of cases clustered if infection was caused by the Beijing strain. Of those infected with the Beijing strain in Kent, Surrey and Sussex, nine out of ten clustered with at least one case nationally.

Higher proportions of clustering were observed in children, the UK born, and ethnically white TB patients in Kent, Surrey and Sussex. Patients with social risk factors, particularly alcohol or drug misuse, had a higher proportion of clustering than those without these factors. These observations should be interpreted with caution due to the relatively small number of cases.

Treatment completion at 12 months among patients with rifampicin sensitive and non-CNS, spinal, miliary or cryptic disseminated disease was below average for the UK, with a high proportion of patients missing an outcome report. The most commonly reported reason for not completing was death, but information on the relationship between TB and death was poorly completed. This information is important to determine if these deaths were preventable.

While the low and decreasing TB rate in Kent Surrey and Sussex is encouraging, TB cases continue to occur that have serious consequences: two deaths occurred in UK born children under five in 2013. In both of these, TB was only diagnosed at post-mortem. There may have been missed opportunities for prevention with BCG vaccination, although the numbers involved were very small and reported information was not complete. The relationship between TB and death was also not completed – although the serious forms of the disease in such young children were very likely to have caused or contributed heavily towards death in these instances.

As overall numbers decline, TB also becomes more concentrated in risk groups. In Kent, Surrey and Sussex these groups were also more often infectious and likely to be clustered. This supports the need for services to work collaboratively across the range of health and social care issues that affect these vulnerable populations, to both treat and prevent further cases.

Conclusion and recommendations

This report updates the latest epidemiology of TB in Kent, Surrey and Sussex, describing those populations at increased risk of disease. This evidence can help services implement the basic elements of TB control, namely prompt identification of active cases of disease, supporting patients to successfully complete treatment, and preventing new cases of disease occurring, through good case management and robust contact tracing. The information will also be useful to target resources effectively.

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

1. Ensure relevant information is completed accurately on the PHE Enhanced TB Surveillance system.

2. Healthcare staff should offer universal HIV testing for all those diagnosed with tuberculosis, and ensure where possible tests are done, in line with national guidance.[5]

3. Increase proportion of pulmonary patients with a sputum smear result to better inform local prevention activity.

4. Report treatment outcome for all patients, and review reasons why completion is low in some areas.

5. Use cohort review as an opportunity to review local incidents, such as the deaths in young children, to ensure opportunities to prevent such events happening again are not missed.

6. Refer to NICE guidance[6] and the Royal College of Nursing guidance on TB case management as best practice.[7]

PHE and NHS England will shortly publish the Collaborative TB Strategy for England 2015 to 2020, which sets out the improvements that need to be achieved across ten key areas to bring about a sustained decline in TB in England.

References

1. Tuberculosis in the UK: 2014 report. Public Health England, September 2014. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/360335/TB_Annual_report__4_0_300914.pdf

2. Public Health England. TB Strain Typing Cluster Investigation Handbook, 3rd Edition, February 2014. http://webarchive.nationalarchives.gov.uk/20140714084352/http://www.hpa.org.uk/webc/HPAwebFile/HPAweb_C/1317140774833

3. World Health Organization. Definitions and reporting framework for tuberculosis – 2013 revision. WHO 2013. http://apps.who.int/iris/bitstream/10665/79199/1/9789241505345_eng.pdf

4. Public Health England. UK pre-entry tuberculosis screening brief report 2013. PHE London, November 2013 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/328468/TB_preentry_screening_brief_report_2013.pdf

5. British HIV Association. UK National Guidelines for HIV Testing. September 2008 http://www.bhiva.org/documents/guidelines/testing/glineshivtest08.pdf

6. National Institute of Health and Clinical Excellence. Tuberculosis - full guideline [Internet]. NICE. 2011. http://www.nice.org.uk/guidance/cg117/resources/cg117-tuberculosis-full-guideline3

7. Royal College of Nursing. Tuberculosis case management and cohort review. RCN 2012. http://www.rcn.org.uk/__data/assets/pdf_file/0010/439129/004204.pdf

Appendix A: Description of data sources and definitions

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

Treatment outcome
Information on treatment outcomes is reported for all cases reported in the previous year, excluding those with known rifampicin resistant disease: treatment outcomes for these cases are reported at 24 months. Definitions for treatment outcome are based on World Health Organization and European definitions, but adapted to the UK context. In this report, all data was obtained from the ETS matched dataset provided in August 2014.

The national surveillance team also further revised the treatment outcome data provided by clinics, and where the time between treatment start and end dates was greater than 365 days, any coded as ‘completed within 12 months’ were reassigned to ‘still on treatment at one year’, and similarly for 24 and 36 month outcomes.

Proportions
All proportions in this report are calculated among cases with 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. For prevalence data (proportions) a binomial distribution was assumed.

Rates
Tuberculosis rates by geographical area (PHE Centre and local authority), age, sex and place of birth were calculated using ONS mid-year population estimates.

Tuberculosis rates by ethnicity were calculated using ONS experimental statistics, and should be interpreted with caution http://www.ons.gov.uk/ons/about-ons/business-transparency/freedom-of-information/what-can-i-request/previous-foi-requests/people-and-places/mid-2010-population-estimates-by-ethnic-group/index.html

Cluster definitions

Strain typing was performed at the TB reference laboratories using 24 MIRU-VNTR profiling. Analysis was undertaken on strain type clusters defined as two or more people with TB caused by indistinguishable strains, with at least 23 complete VNTR loci. Analysis of clustering in Kent, Surrey and Sussex was carried out on cases that clustered in Kent, Surrey and Sussex and notified between 2010 and 2013.

Appendix B: TB among Kent, Surrey and Sussex residents

Table Bi: Number of TB patients by upper tier local authority of residence, Kent Surrey and Sussex, 2001 – 2013

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Brighton and Hove	24	6	3	14	15	15	30	28	35	23	24	31	15
East Sussex	28	25	13	21	15	16	12	17	27	20	25	34	21
Kent	37	66	66	62	65	86	86	129	111	104	112	114	106
Medway	21	13	20	9	14	16	18	22	20	20	28	20	16
Surrey	33	28	60	62	64	79	57	72	89	85	101	98	57
West Sussex	34	39	44	52	38	63	58	38	49	51	77	46	62
Kent, Surrey and Sussex	**177**	**177**	**206**	**220**	**211**	**275**	**261**	**306**	**331**	**303**	**367**	**343**	**277**

Table Bii: Rate* of TB by upper tier local authority of residence, Kent Surrey and Sussex, 2001 – 2013

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Brighton and Hove	10	2	1	6	6	6	12	11	13	9	9	11	5
East Sussex	6	5	3	4	3	3	2	3	5	4	5	6	4
Kent	3	5	5	5	5	6	6	9	8	7	8	8	7
Medway	8	5	8	4	6	6	7	9	8	8	11	7	6
Surrey	3	3	6	6	6	7	5	7	8	8	9	9	5
West Sussex	5	5	6	7	5	8	7	5	6	6	10	6	8
Kent, Surrey and Sussex	4	4	5	5	5	6	6	7	8	7	8	8	6

*rates calculated using ONS mid-year population estimates

Table Biii: Number and proportion of UK born TB patients by upper tier local authority of residence, Kent Surrey and Sussex, 2013

	UK born		Total
	n	%	
Brighton and Hove	8	53	15
East Sussex	10	48	21
Kent	44	42	106
Medway	6	38	16
Surrey	12	21	57
West Sussex	13	21	62
Kent, Surrey and Sussex	93	34	277

Table Biv: Number and proportion of TB patients by ethnic group and upper tier local authority of residence, Kent Surrey and Sussex, 2013

	White		Black African		Indian		Pakistani		Bangladeshi		Other		Total
	n	%	n	%	n	%	n	%	n	%	n	%	
Brighton and Hove	6	40	1	7	4	27	0	0	1	7	3	20	15
East Sussex	10	48	2	10	3	14	1	5	1	25	4	19	21
Kent	46	43	5	5	28	26	3	3	1	5	22	21	106
Medway	4	25	3	19	3	19	3	19	0	0	3	19	16
Surrey	14	25	5	9	15	26	12	21	1	25	4	7	57
West Sussex	14	23	6	10	19	31	7	11	2	17	12	19	62
Kent, Surrey and Sussex	94	35	22	8	72	27	26	10	6	13	48	18	268

Table Bv: Social risk factors among TB patients by upper tier local authority of residence, Kent Surrey and Sussex, 2013

	Any social risk factor		Where reported	Total patients
	n	% of where reported		
Brighton and Hove	1	7	15	15
East Sussex	2	10	20	21
Kent	14	14	97	106
Medway	0	0	15	16
Surrey	3	6	53	57
West Sussex	7	13	56	62
Kent, Surrey and Sussex	27	15	183	277

Table Bvi: Offer and uptake of HIV test among TB patients by upper tier local authority of residence, Kent Surrey and Sussex, 2013

	HIV status known		Not offered		Offered and:						Missing		Total
					Done		Not done		Refused				
	n	%	n	%	n	%	n	%	n	%	n	%	
Brighton and Hove	2	13	0	0	13	87	0	0	0	0	0	0	15
East Sussex	1	5	3	14	15	71	0	0	1	5	1	5	21
Kent	2	2	12	11	70	66	3	3	5	5	14	13	106
Medway	1	6	2	13	13	81	0	0	0	0	0	0	16
Surrey	0	0	2	4	48	84	1	2	0	0	6	11	57
West Sussex	1	2	2	3	43	69	1	2	2	3	13	21	62
Kent, Surrey and Sussex	7	3	21	8	202	73	5	2	8	3	34	12	277

Table Bvii: Number and proportion of patients with isoniazid resistant TB by upper tier local authority of residence, Kent Surrey and Sussex, 2013

	Isoniazid resistant		Total*
	n	%	
Brighton and Hove	3	27	11
East Sussex	1	7	14
Kent	1	1	67
Medway	3	27	11
Surrey	2	6	31
West Sussex	4	8	49
Kent, Surrey and Sussex	14	8	183

*total patients with culture confirmed disease and drug susceptibility testing results

Appendix C: All TB patients notified by Kent Surrey and Sussex hospitals

Table Ci: Number of all TB cases and pulmonary cases notified by Kent Surrey and Sussex hospitals, 2010 – 2013

	2010		2011		2012		2013	
	Total	*Pul*	Total	*Pul*	Total	*Pul*	Total	*Pul*
Buckland Hospital	0	-	1	*1*	0	-	0	-
Conquest Hospital	3	*3*	12	*8*	11	*4*	5	*4*
Crawley Hospital	22	*9*	30	*13*	18	*14*	34	*19*
Darent Valley Hospital	28	*11*	39	*17*	40	*24*	39	*22*
East Surrey Hospital	11	*7*	3	*2*	17	*10*	8	*2*
Eastbourne District General Hospital	8	*4*	10	*6*	8	*5*	7	*4*
Epsom General Hospital	4	*3*	5	*2*	0	-	0	-
Frimley Park Hospital	37	*27*	43	*30*	48	*30*	27	*18*
Kent & Canterbury Hospital	35	*18*	42	*28*	36	*26*	34	*25*
Kent & Sussex Hospital	6	*4*	8	*6*	11	*7*	0	-
Maidstone District General Hospital	10	*8*	7	*4*	15	*9*	14	*6*
Medway Maritime Hospital	25	*15*	25	*14*	20	*12*	20	*12*
Pembury Hospital	0	-	0	-	0	-	9	*7*
Princess Royal Hospital [West Sussex]	0	-	11	*6*	4	*3*	3	*2*
Queen Elizabeth The Queen Mother Hospital	5	*3*	2	*2*	2	*2*	3	*3*
Queen Victoria Hospital [East Grinstead]	1	*0*	0	-	0	-	0	-
Royal Surrey County Hospital	11	*7*	16	*7*	15	*6*	2	*0*
Royal Sussex County Hospital	34	*20*	36	*14*	40	*27*	27	*17*
Royal Victoria Hospital [Folkestone]	0	-	1	*0*	3	*1*	1	*1*
St Peter's Hospital [Chertsey]	32	*20*	43	*22*	27	*12*	37	*17*
St Richard's Hospital	11	*6*	7	*1*	10	*7*	2	*2*
William Harvey Hospital	6	*5*	9	*6*	10	*7*	2	*0*
Worthing Hospital	8	*5*	14	*9*	10	*7*	16	*11*
Private Clinics	4	*2*	1	*0*	1	*0*	0	-
Kent, Surrey and Sussex	301	*177*	365	*198*	346	*213*	290	*172*

Table Cii: HIV testing (offered and uptake) among all TB notifications by Kent Surrey and Sussex hospitals, 2013

	2013 Total notifs	Offered And Done	Offered But Refused	Offered But Not Done	HIV Status Already Known	Not Offered	Null	Test offered (or status known)	Test done (or status known)
Conquest Hospital	5	4	0	0	0	0	1	80%	80%
Crawley Hospital	34	30	0	0	1	2	1	91%	91%
Darent Valley Hospital	39	32	3	2	0	2	0	95%	82%
East Surrey Hospital	8	6	0	1	0	0	1	88%	75%
Eastbourne District General Hospital	7	3	1	0	0	3	0	57%	43%
Frimley Park Hospital	27	26	0	0	0	1	0	96%	96%
Kent & Canterbury Hospital	34	16	0	1	0	4	13	50%	47%
Maidstone District General Hospital	14	10	0	0	0	4	0	71%	71%
Medway Maritime Hospital	20	17	0	0	2	1	0	95%	95%
Pembury Hospital	9	9	0	0	0	0	0	100%	100%
Princess Royal Hospital [West Sussex]	3	0	1	0	0	0	2	33%	0%
Queen Elizabeth The Queen Mother Hospital	3	0	0	1	0	1	1	33%	0%
Royal Surrey County Hospital	2	0	0	0	0	0	2	0%	0%
Royal Sussex County Hospital	27	24	0	0	3	0	0	100%	100%
Royal Victoria Hospital [Folkestone]	1	0	1	0	0	0	0	100%	0%
St Peter's Hospital [Chertsey]	37	30	0	0	2	1	4	86%	86%
St Richard's Hospital	2	1	1	0	0	0	0	100%	50%
William Harvey Hospital	2	1	1	0	0	0	0	100%	50%
Worthing Hospital	16	5	0	1	0	1	9	38%	31%
Kent, Surrey and Sussex	290	214	8	6	8	20	34	81%	77%

Table Ciii: Social risk factors* among all TB notifications by Kent Surrey and Sussex hospitals, 2009 – 2012

	2010		2011		2012		2013
	n	%	n	%	n	%	n
Buckland Hospital	-	-	0	-	-	-	-
Conquest Hospital	1	33%	4	33%	1	9%	0
Crawley Hospital	1	5%	2	7%	3	17%	7
Darent Valley Hospital	1	4%	1	3%	4	10%	2
East Surrey Hospital	0	-	0	-	4	24%	1
Eastbourne District General Hospital	1	13%	0	-	1	13%	1
Epsom General Hospital	1	25%	0	-	-	-	-
Frimley Park Hospital	3	8%	2	5%	1	2%	0
Kent & Canterbury Hospital	2	6%	8	19%	2	6%	11
Kent & Sussex Hospital	0	-	1	13%	0	-	-
Maidstone District General Hospital	0	-	0	-	1	7%	0
Medway Maritime Hospital	2	8%	3	12%	2	10%	1
Pembury Hospital	-	-	-	-	-	-	0
Princess Royal Hospital [West Sussex]	-	-	1	9%	0	-	0
Queen Elizabeth The Queen Mother Hospital	0	-	1	50%	0	-	1
Queen Victoria Hospital [East Grinstead]	0	-	-	-	-	-	-
Royal Surrey County Hospital	0	-	0	-	0	-	0
Royal Sussex County Hospital	3	9%	3	8%	3	8%	3
Royal Victoria Hospital [Folkestone]	-	-	0	-	0	-	0
St Peter's Hospital [Chertsey]	0	-	0	-	1	4%	0
St Richard's Hospital	4	36%	0	-	0	-	0
William Harvey Hospital	0	-	2	22%	2	20%	0
Worthing Hospital	1	13%	2	14%	1	10%	1
Private Clinics	0	-	0	-	0	-	-
Kent, Surrey and Sussex	20	7%	30	8%	26	8%	28

* social risk factors include homelessness, imprisonment, alcohol and drug misuse.

Proportions calculated among all notified patients.

Table Civ: Drug resistance among all TB notifications by Kent Surrey and Sussex hospitals, 2013

	Any drug resistance*		Isoniazid resistant		Multi-drug resistant		Total **
	n	%	n	%	n	%	
Conquest Hospital	0	-	0	-	0	-	4
Crawley Hospital	0	-	0	-	0	-	28
Darent Valley Hospital	1	5%	0	-	0	-	22
East Surrey Hospital	0	-	0	-	0	-	7
Eastbourne District General Hospital	0	-	0	-	0	-	3
Frimley Park Hospital	2	10%	2	10%	0	-	21
Kent & Canterbury Hospital	0	-	0	-	0	-	28
Maidstone District General Hospital	1	17%	1	17%	0	-	6
Medway Maritime Hospital	3	21%	3	21%	0	-	14
Pembury Hospital	0	-	0	-	0	-	4
Princess Royal Hospital [West Sussex]	0	-	0	-	0	-	3
Queen Elizabeth The Queen Mother Hospital	0	-	0	-	0	-	3
Royal Surrey County Hospital	0	-	0	-	0	-	2
Royal Sussex County Hospital	5	25%	5	25%	0	-	20
Royal Victoria Hospital [Folkestone]	0	-	0	-	0	-	1
St Peter's Hospital [Chertsey]	1	8%	1	8%	0	-	13
St Richard's Hospital	1	50%	1	50%	0	-	2
William Harvey Hospital	0	-	0	-	0	-	1
Worthing Hospital	1	11%	1	11%	0	-	9
Kent, Surrey and Sussex	15	7%	14	7%	0	-	215

*First line drugs are isoniazid, rifampicin, ethambutol and pyrazinamide

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

Table Cv: TB patient outcome at 12 months of all rifampicin sensitive, non-CNS, miliary, spinal or cryptic disseminated TB notifications by Kent Surrey and Sussex hospitals, 2012

	2012 Total Notifs	Treatment completed	Still on treatment	Died	Lost to follow up	Treatment stopped	Not Evaluated
Conquest Hospital	11	73%	0%	18%	9%	0%	0%
Crawley Hospital	18	83%	0%	6%	11%	0%	0%
Darent Valley Hospital	35	91%	6%	3%	0%	0%	0%
East Surrey Hospital	15	73%	0%	7%	0%	0%	20%
Eastbourne District General Hospital	8	75%	13%	13%	0%	0%	0%
Frimley Park Hospital	45	91%	0%	0%	0%	2%	7%
Kent & Canterbury Hospital	35	80%	3%	6%	11%	0%	0%
Kent & Sussex Hospital	9	67%	11%	11%	11%	0%	0%
Maidstone District General Hospital	13	100%	0%	0%	0%	0%	0%
Medway Maritime Hospital	16	100%	0%	0%	0%	0%	0%
Princess Royal Hospital [West Sussex]	3	100%	0%	0%	0%	0%	0%
Queen Elizabeth The Queen Mother Hospital	2	50%	50%	0%	0%	0%	0%
Royal Surrey County Hospital	15	0%	0%	0%	7%	0%	93%
Royal Sussex County Hospital	35	86%	3%	6%	6%	0%	0%
Royal Victoria Hospital [Folkestone]	2	50%	50%	0%	0%	0%	0%
St Peter's Hospital [Chertsey]	23	91%	0%	0%	9%	0%	0%
St Richard's Hospital	8	100%	0%	0%	0%	0%	0%
William Harvey Hospital	10	80%	0%	20%	0%	0%	0%
Worthing Hospital	10	80%	0%	10%	0%	10%	0%
Private Clinics	1	0%	0%	0%	0%	0%	100%
Kent, Surrey and Sussex	314	82%	3%	4%	4%	1%	7%

Treatment status is collected one year after notification, shown are notifications for 2012 with outcomes collected one year later in 2013.

Table Cvi: TB patient outcome at 12 months of all rifampicin sensitive, CNS, miliary, spinal or cryptic disseminated TB notifications by Kent Surrey and Sussex hospitals, 2012

	2012 Total Notifs	Treatment completed	Still on treatment	Died	Lost to follow up	Treatment stopped	Not Evaluated
Conquest Hospital	0	-	-	-	-	-	-
Crawley Hospital	0	-	-	-	-	-	-
Darent Valley Hospital	5	80%	20%	0%	0%	0%	0%
East Surrey Hospital	2	50%	50%	0%	0%	0%	0%
Eastbourne District General Hospital	0	-	-	-	-	-	-
Frimley Park Hospital	1	100%	0%	0%	0%	0%	0%
Kent & Canterbury Hospital	1	0%	0%	100%	0%	0%	0%
Kent & Sussex Hospital	2	50%	50%	0%	0%	0%	0%
Maidstone District General Hospital	1	0%	100%	0%	0%	0%	0%
Medway Maritime Hospital	3	33%	67%	0%	0%	0%	0%
Princess Royal Hospital [West Sussex]	1	0%	100%	0%	0%	0%	0%
Queen Elizabeth The Queen Mother Hospital	0	-	-	-	-	-	-
Royal Surrey County Hospital	0	-	-	-	-	-	-
Royal Sussex County Hospital	4	25%	50%	25%	0%	0%	0%
Royal Victoria Hospital [Folkestone]	1	100%	0%	0%	0%	0%	0%
St Peter's Hospital [Chertsey]	4	25%	25%	25%	0%	0%	25%
St Richard's Hospital	2	100%	0%	0%	0%	0%	0%
William Harvey Hospital	0	-	-	-	-	-	-
Worthing Hospital	0	-	-	-	-	-	-
Private Clinics	0	-	-	-	-	-	-
Kent, Surrey and Sussex	27	48%	37%	11%	0%	0%	4%

Table Cvii: TB patient outcome at 12 months of all rifampicin resistant TB notifications by Kent Surrey and Sussex hospitals, 2011

	2011 Total Notifs	Treatment completed	Still on treatment	Died	Lost to follow up	Treatment stopped	Not Evaluated
Buckland Hospital	0	-	-	-	-	-	-
Conquest Hospital	0	-	-	-	-	-	-
Crawley Hospital	0	-	-	-	-	-	-
Darent Valley Hospital	2	50%	50%	0%	0%	0%	0%
East Surrey Hospital	0	-	-	-	-	-	-
Eastbourne District General Hospital	0	-	-	-	-	-	-
Epsom General Hospital	0	-	-	-	-	-	-
Frimley Park Hospital	1	100%	0%	0%	0%	0%	0%
Kent & Canterbury Hospital	0	-	-	-	-	-	-
Kent & Sussex Hospital	0	-	-	-	-	-	-
Maidstone District General Hospital	0	-	-	-	-	-	-
Medway Maritime Hospital	0	-	-	-	-	-	-
Princess Royal Hospital [West Sussex]	0	-	-	-	-	-	-
Queen Elizabeth The Queen Mother Hospital	0	-	-	-	-	-	-
Royal Surrey County Hospital	0	-	-	-	-	-	-
Royal Sussex County Hospital	1	0%	100%	0%	0%	0%	0%
Royal Victoria Hospital [Folkestone]	0	-	-	-	-	-	-
St Peter's Hospital [Chertsey]	1	100%	0%	0%	0%	0%	0%
St Richard's Hospital	0	-	-	-	-	-	-
William Harvey Hospital	0	-	-	-	-	-	-
Worthing Hospital	0	-	-	-	-	-	-
Private Clinics	0	-	-	-	-	-	-
Kent, Surrey and Sussex	5	60%	40%	0%	0%	0%	0%