

Maps

- 1 **Type of statistic** (e.g. rate, proportion)
- 2 **Geographic boundaries**
- 3 **Year of data presented**
- 4 **Rate calculated per x number of people**
- 5 **Optimum values** Low indicates lower values are preferential (high indicates higher values are preferential). Local interpretation maybe required for some indicators.

- 6 **Equal sized quintiles** The number of areas presented on the map are divided equally between the 5 categories with those with the highest values forming the 'Highest' group etc.

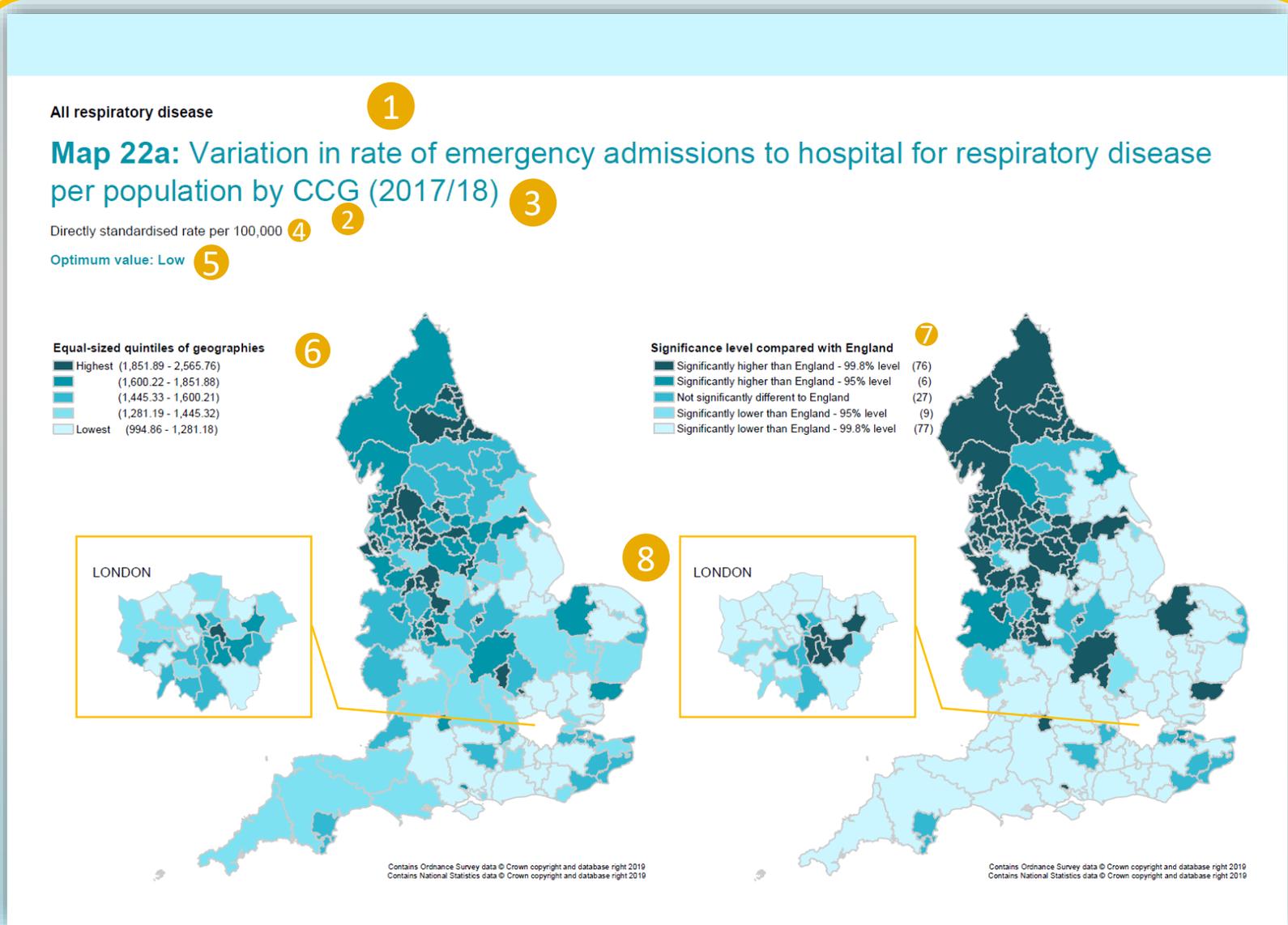
For example, in 2018 there were 195 CCGs, so 39 CCGs are in each category. **Darker** areas have the highest values.

- 7 **Significance level compared with England** The **darkest** and **lightest** shading on map shows CCGs whose confidence intervals do not overlap with the England value.

The second **darkest** and **lightest** colours show areas where the England value falls between the CCG's 95% and 99.8% CI.

The number in brackets indicates the number of CCGs in each category.

- 8 **London** is presented as a separate zoomed in map for clarity.



Chart, box plot and table

- 1 Title shows indicator details including: value type, geography and year.
- 2 The y-axis plots the value and gives details of the value type e.g. rate / proportion and the unit e.g. per 100,000 population.
- 3 The x-axis shows the geography and the number of areas on chart.
- 4 The line shows the England average.

- 5 Each bar represents an area (e.g. a CCG). The height of the bar is relative to the value for that area. Collectively, the bars show the spread of values across England.

- 6 For each indicator, data is presented visually in a time series of box and whisker plots. The box plots show the distribution of data.

The colour of the bar represents how significant the area's value is in relation to England based on the area's confidence interval. Areas utilise the same colours and categories as the maps.

Areas that are significantly higher than England at a 99.8% or 95% level are shown as darker bars whereas those with lower significance to England, at a 99.8% or 95% level, are lighter. The colour in the middle represents areas that are **not significantly different** from England.

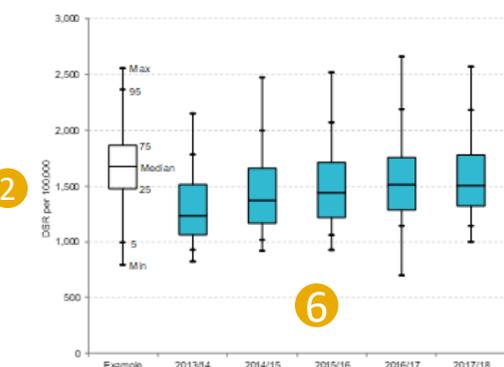
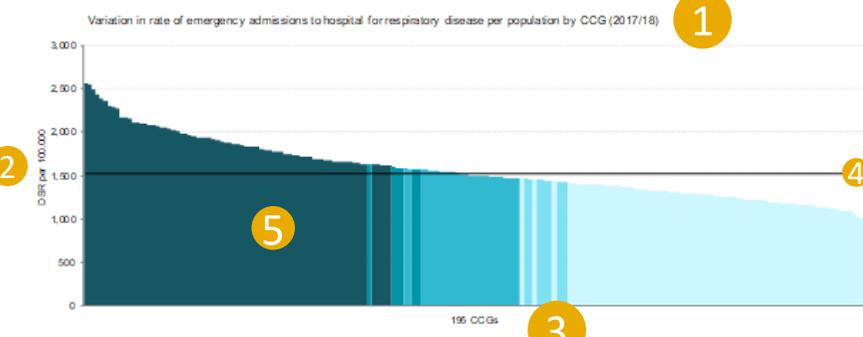
Where the significance bar chart shows little variation across the CCGs, the equal interval map colours have been used.

The line inside each box shows the median (the mid-point, so if the 195 CCGs were sorted in order of value, the value halfway between the CCGs in the 97th and 98th position would give the median). The bottom and top of the **teal box** represents the values which 25% and 75% of the areas fall below. 50% of the areas have a value within this range.

The whiskers mark the values at which 5% and 95% of areas fall below. The median and maximum values are also shown.

The time series allows us to see how the median has changed over time, but also whether the gap between the extreme values has changed.

The table accompanying the box and whisker plots shows whether there has been any statistically significant change in the median, or in the degree of variation over time.



Max-Min (Range)	1325.7	1553.5	1590.2	1960.2	1570.9	No significant change
95th-5th percentile	858.1	974.4	1008.7	1044.1	1039.9	WIDENING Significant
75th-25th percentile	454.2	493.9	496.6	474.3	457.9	No significant change
Median	1232.7	1376.6	1439.9	1511.4	1506.4	INCREASING Significant

Context
An emergency admission to hospital for respiratory disease that was not scheduled or planned by the patient or their GP.

Magnitude of variation
Map R14: Variation in percentage of admissions to hospital for respiratory disease that were re-admitted as an emergency admission within 30 days of discharge by CCG

Options for action
Respiratory admission rates tend to be higher in areas with a high level of deprivation. To minimise the impact of respiratory disease on health and well-being in England, it is recommended that local authorities and CCGs work together to reduce the latest period 2014/15 to 2017/18.

Resources
Public Health England. Health profile for England (2017) Chapter 2: major causes of death and how they have changed [Accessed 21 January 2019]
World Health Organization [The ICD-10 Classification of Diseases](#)

- 7 **Sections in the chapter**
Context – provides an overview of why the indicator is of public health interest

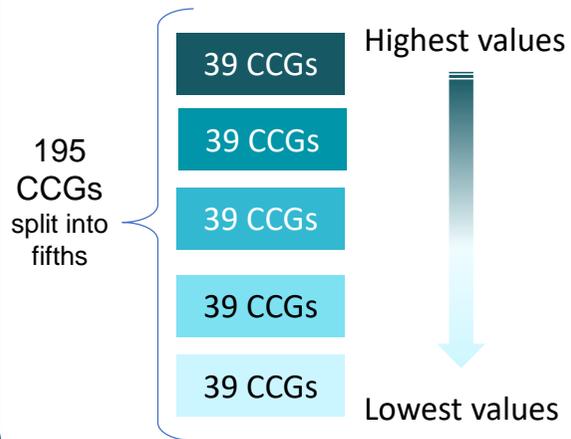
Magnitude of variation – provides commentary in relation to the chart, box plot and table

Option for action – gives suggestions for best practice

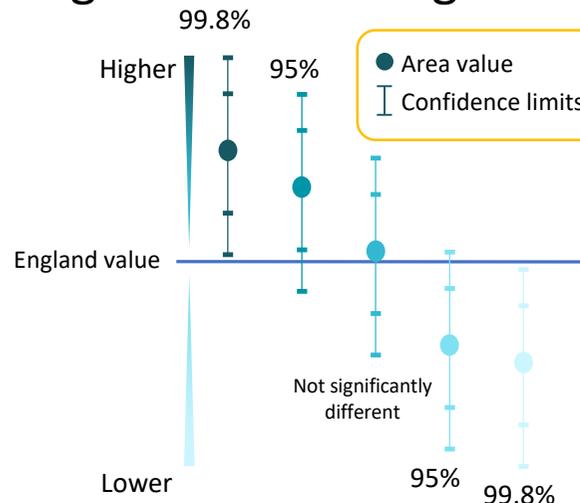
Resources – gives links to useful documents

How were the categories calculated?

Equal-sized quintiles



Significance to England



Confidence intervals give an estimated range in which the true CCG value lies.

Where the CCG's confidence interval does not overlap with the England value, the CCG is classed as being *significantly higher* or *lower than England at a 99.8% level*.

If the England value lies between the 99.8% and 95% CI, this value is classed as being *significantly higher* or *lower than England at a 95% level*.

Where the England value is between the upper and lower 95% CI, the CCG is classed as *not being significantly different from England*.

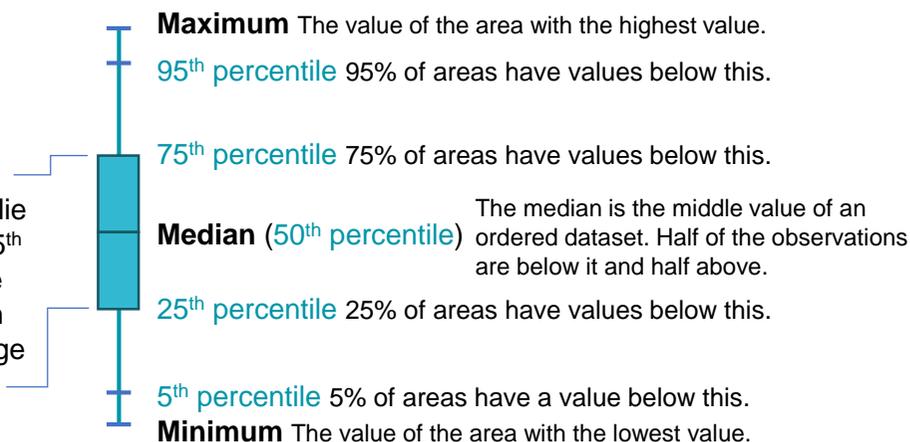
Box & whisker plot

Whiskers

Show the extreme values in the dataset.

Box

50% of the data values lie between the 25th and 75th percentile. The distance between these is known as the inter-quartile range (IQR).



Box plot percentile	CCG rank position (195 CCGs in 2018)
Max	195
95%	Mid value between values of CCGs in ranks 185 and 186
75%	Mid value between values of CCGs in ranks 146 and 147
50% - Median	Mid value between values of CCGs in ranks 97 and 98
25%	Mid value between values of CCGs in ranks 48 and 49
5%	Mid value between values of CCGs in ranks 9 and 10
Min	1

Tuberculosis – Incidence

Map 27: Variation in incidence rate of tuberculosis (TB) per population by CCG (2015-2017)

Crude rate per 100,000

Optimum value: Low

Equal-sized quintiles of geographies

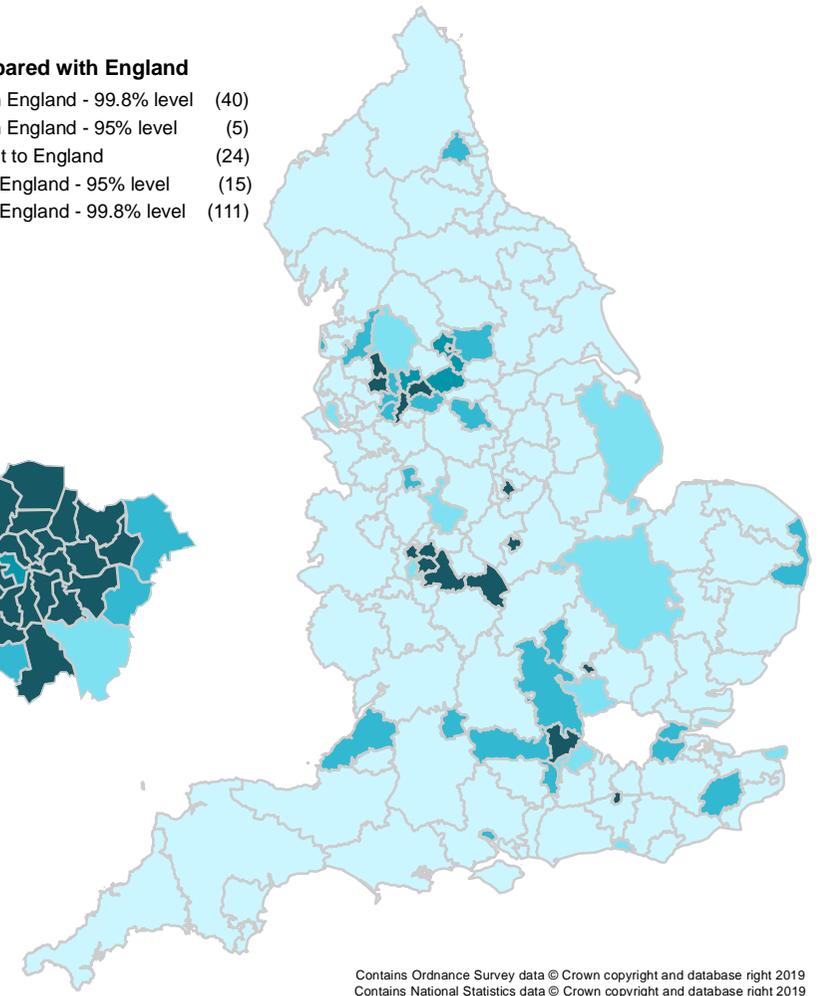
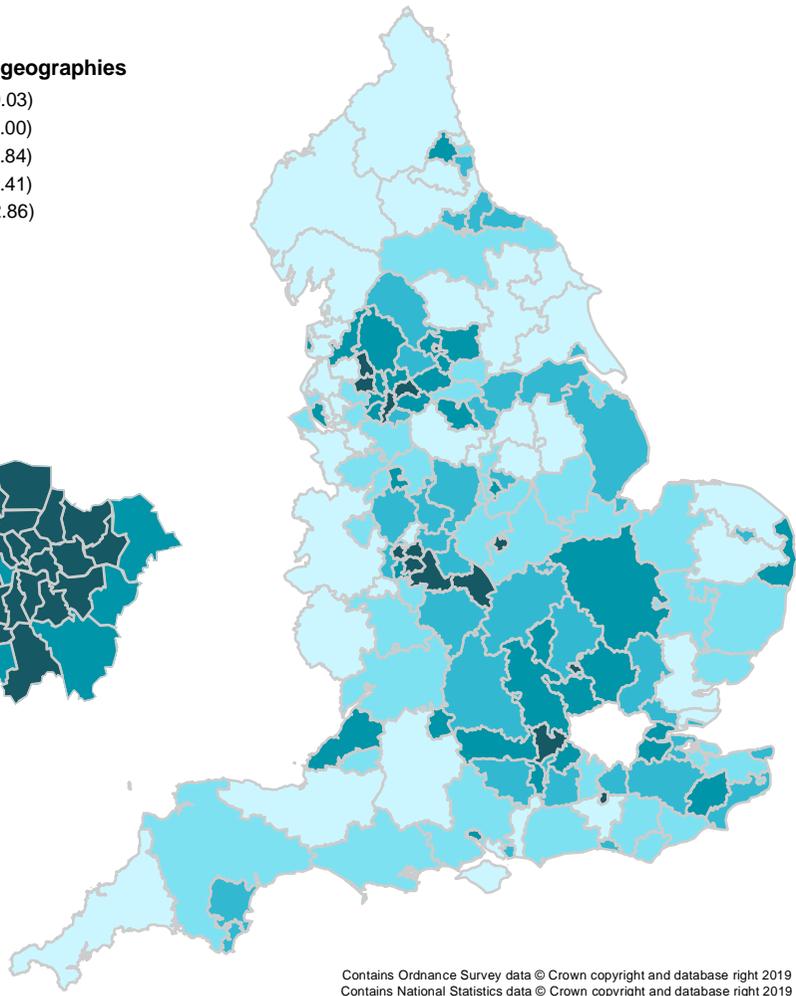
- Highest (15.01 - 59.03)
- (6.85 - 15.00)
- (4.42 - 6.84)
- (2.87 - 4.41)
- Lowest (0.68 - 2.86)

Significance level compared with England

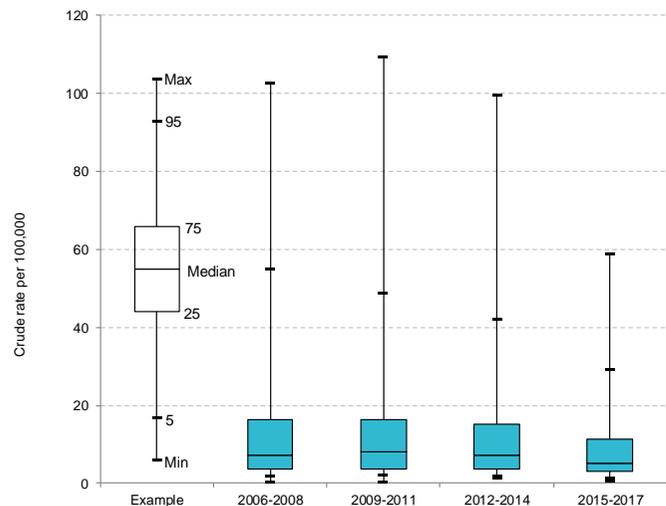
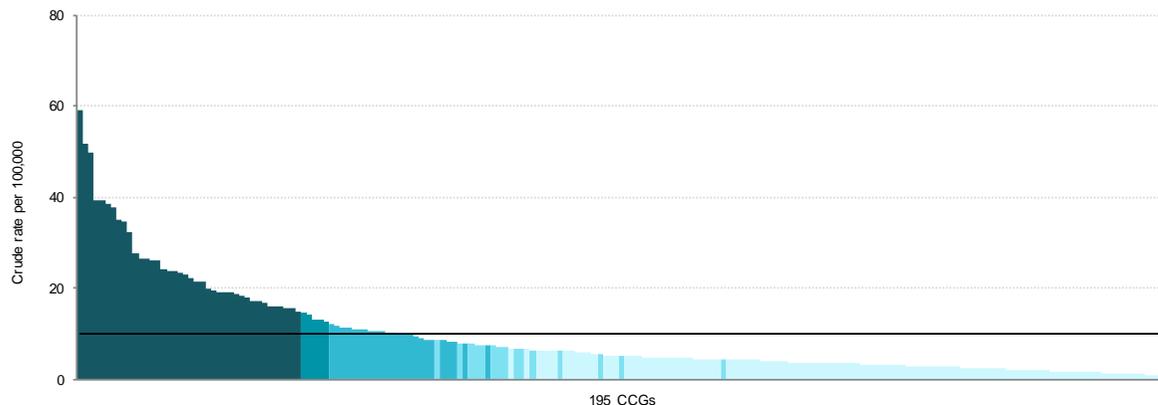
- Significantly higher than England - 99.8% level (40)
- Significantly higher than England - 95% level (5)
- Not significantly different to England (24)
- Significantly lower than England - 95% level (15)
- Significantly lower than England - 99.8% level (111)

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Variation in incidence rate of tuberculosis (TB) per population by CCG (2015-2017)



Max-Min (Range)		102.2	108.9	98.3	58.4	No significant change
95th-5th percentile		53.1	46.9	40.2	27.7	NARROWING Significant
75th-25th percentile		12.9	12.8	11.3	8.2	No significant change
Median		7.2	8.0	7.2	5.2	No significant change

Context

Following major declines during most of the 20th century, in England the incidence of tuberculosis (TB) increased from the late 1980s to a peak of 15.6 per 100,000 population in 2011. The incidence has since declined to a rate of 9.2 per 100,000 population in 2017, which is the lowest incidence in England since the start of enhanced TB surveillance in 2000. For the first time, England is considered to be a low incidence country under current World Health Organisation (WHO) definitions (under 10 people diagnosed with TB per 100,000 population).

Despite these decreases, TB incidence in England is higher than many other Western European countries, and more than 3 times higher than in the USA. Because of this, and in line with a global push to improve TB control, Public Health England (PHE) has made reducing TB incidence one of its key priorities, and together with NHS England published the 'Collaborative Tuberculosis Strategy for England 2015-2020' (see 'Resources'). The strategy seeks to address some of the variation in TB by providing a 10 point plan to improve TB control and reduce the incidence of TB year on year (Box 27.1). Many comparable countries have achieved consistent reductions in TB through similar concerted approaches to prevention, treatment and control.

Box 27.1: The 10 areas for action in in England's TB Strategy

1. improve access to services and ensure early diagnosis
2. provide universal access to high quality diagnostics
3. improve treatment and care services
4. ensure comprehensive contact tracing
5. improve BCG Vaccination uptake
6. reduce drug-resistant TB
7. tackle TB in under-served populations
8. systematically implement new entrant latent TB (LTBI) screening
9. strengthen surveillance and monitoring
10. ensure an appropriate workforce to deliver TB control

Magnitude of variation**Map 27: Variation in incidence rate of tuberculosis (TB) per population by CCG (2015-2017)**

The maps and column chart display the latest period (2015 to 2017), during which CCG values ranged from 0.7 to 59.0 per 100,000 population, which is an 87.2-fold difference between CCGs. The England value for 2015 to 2017 was 9.9 per 100,000 population.

The box plot shows the distribution of CCG values for the period 2006-2008 to 2015-2017.

The 95th to 5th percentile gap narrowed significantly.

TB is particularly concentrated in large urban areas and in the most-deprived populations. In 2017, 66.7% of all people notified with TB were resident in the 40% most-deprived communities.

Variations in the risk of TB depend on differences in the risks of:

- exposure to TB
- progressing from TB infection to active TB disease once infected

People at increased risk of having been exposed to TB include:

- those born in countries with a high burden of TB - people born outside the UK accounted for 71% of TB notifications in England in 2017 and the majority of these (84%) had lived in the UK for at least 2 years prior to notification
- ethnic minority groups born in the UK who have frequent contact with high TB-burden countries - in 2017, the rate of TB was highest in the black, Pakistani and Indian ethnic groups, with rates between 16 and 20 times higher than in the UK born white population
- those with certain social risk factors - in 2017, 12.6% of people notified with TB had a social risk factor. Social risk factors for TB include current or a history of homelessness, imprisonment, drug misuse, or current alcohol
- those living in overcrowded accommodation, especially when combined with one of the other factors above

People at increased risk of progressing from TB infection to active disease include:

- those with immunosuppression, HIV (even when not immunosuppressed) or diabetes
- babies and young children
- smokers
- people with poor nutrition
- people with drug or alcohol use problems

Options for action

Local stakeholders, including local authorities, CCGs, NHS service providers, PHE health protection teams and the third sector, need to work through local Health and Wellbeing Boards and their TB Control Boards (TBCBs):

- to develop a local TB control plan based on the ten evidence-based areas for action (Box 26.1) of the Collaborative TB Strategy (see 'Resources')
- to ensure appropriate commissioning, delivery and monitoring of TB services
- TBCBs and their partners are encouraged to use the Resource 'Tackling TB in Under-Served Populations' to take appropriate local action and better meet the needs of Under-Served Populations (USPs) (see 'Resources')
- TBCBs and partners to work to provide more integrated services for USPs
- local authorities are encouraged to use 'Tackling TB - local government's public health role', a joint publication from PHE and the Local Government Association to help support USPs with TB (see 'Resources')

In addition, CCGs are encouraged to use the National TB Service Specification and Clinical Policy to commission and monitor local TB service. This is particularly important in localities with the highest rates of TB.

Through collaborative working, and the use of existing accountability arrangements, local TBCBs are encouraged to work with providers and commissioners of clinical care and public services to collectively deliver better TB control.

Resources

Local Government Association (2018) [Tackling Tuberculosis – Local government's public health role](#) [Accessed 31 January 2019]

NHS England [Tuberculosis strategy for England 2015-2020](#) [Accessed 29 July 2019]

NHS England National TB Service Specification and Clinical Policy. Soon to be available at [Tuberculosis strategy for England 2015-2020](#) [Accessed 29 July 2019] Until then people should contact england.tbprogramme@nhs.net for copies

National Institute for Health and Care Excellence (2016) [Tuberculosis \(NICE guideline \[NG33\]\)](#) [Accessed 31 January 2019]

National Institute for Health and Care Excellence [Tuberculosis overview - NICE Pathway](#) [Accessed 31 January 2019]

Public Health England and NHS England (2015) [Collaborative Tuberculosis Strategy for England 2015 to 2020](#) [Accessed 31 January 2019]

Public Health England (2018) [Reports of cases of tuberculosis to enhanced tuberculosis surveillance systems: UK, 2000 to 2017](#) Official Statistics [Accessed 31 January 2019]

Public Health England (2019) [Tackling Tuberculosis in under-served populations: A resource for TB Control Boards and their partners](#) [Accessed 31 January 2019]

Public Health England (2018) [Tuberculosis in England annual reports](#) [Accessed 31 January 2019]

Public Health England [TB Strategy Monitoring Indicators](#) Interactive web tool with local information about the key TB monitoring indicators [Accessed 31 January 2019]

Tuberculosis – Treatment

Map 28a: Variation in percentage of people with pulmonary tuberculosis (TB) who started treatment within four months of symptom onset by CCG (2017)

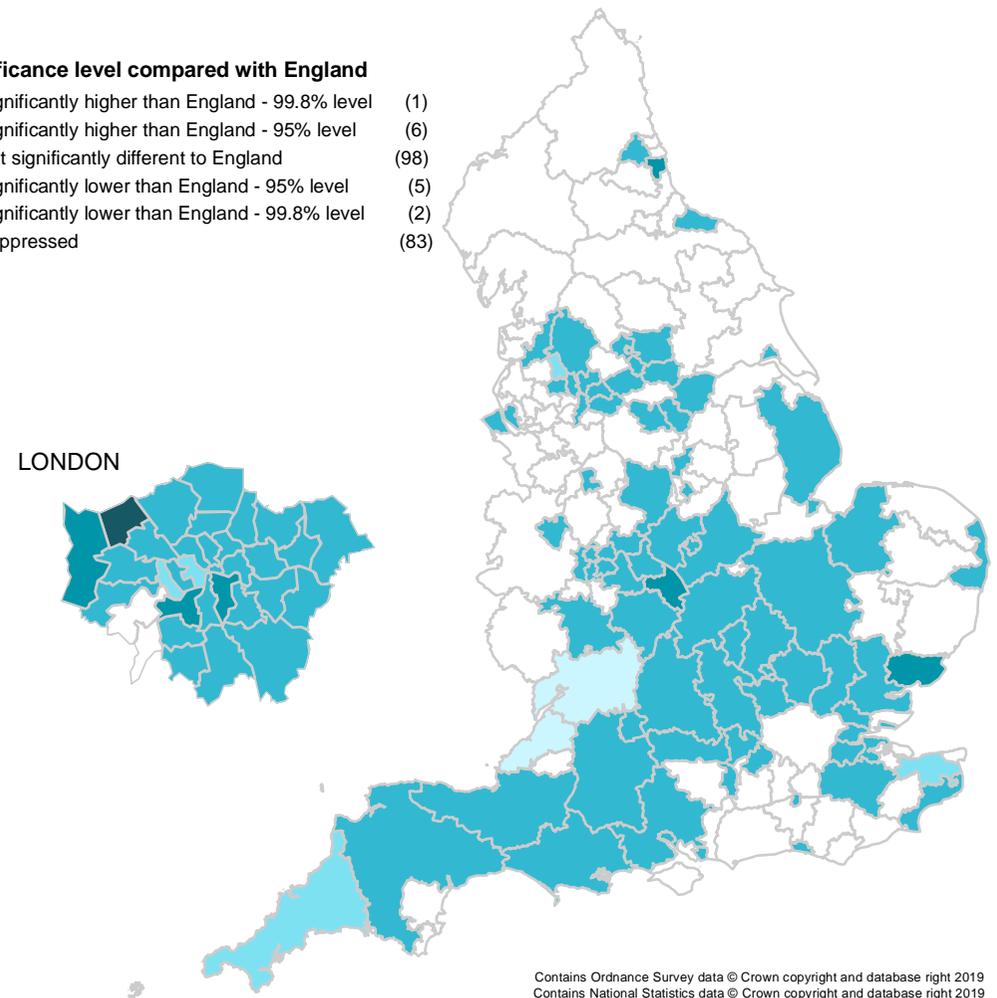
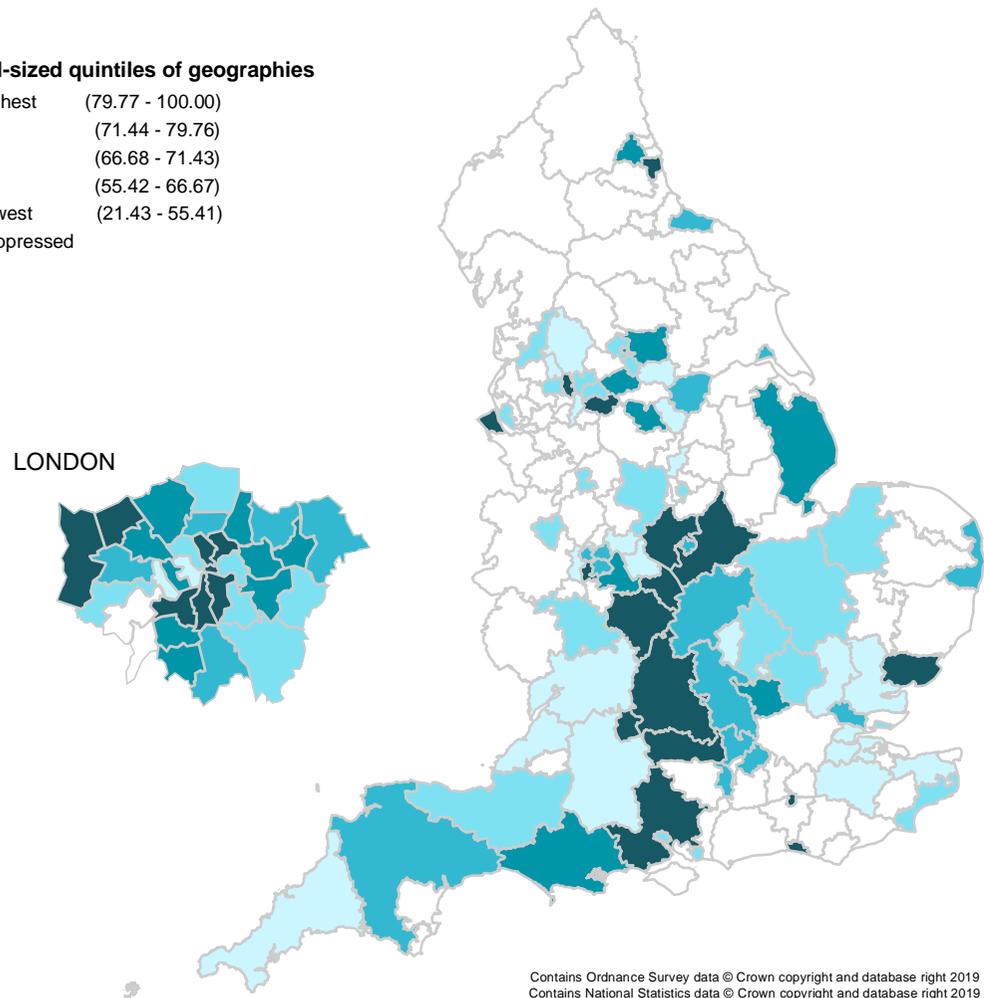
Optimum value: High

Equal-sized quintiles of geographies

- Highest (79.77 - 100.00)
- (71.44 - 79.76)
- (66.68 - 71.43)
- (55.42 - 66.67)
- Lowest (21.43 - 55.41)
- Suppressed

Significance level compared with England

- Significantly higher than England - 99.8% level (1)
- Significantly higher than England - 95% level (6)
- Not significantly different to England (98)
- Significantly lower than England - 95% level (5)
- Significantly lower than England - 99.8% level (2)
- Suppressed (83)



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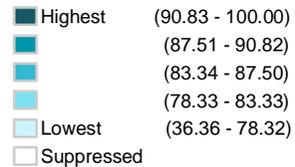
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Tuberculosis – Treatment

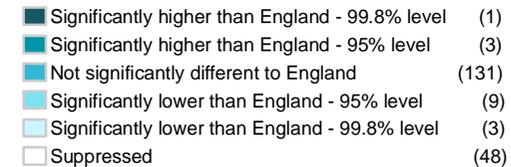
Map 28b: Variation in percentage of people with drug-sensitive tuberculosis (TB) who completed a full course of treatment within 12 months of treatment onset by CCG (2016)

Optimum value - High

Equal-sized quintiles of geographies

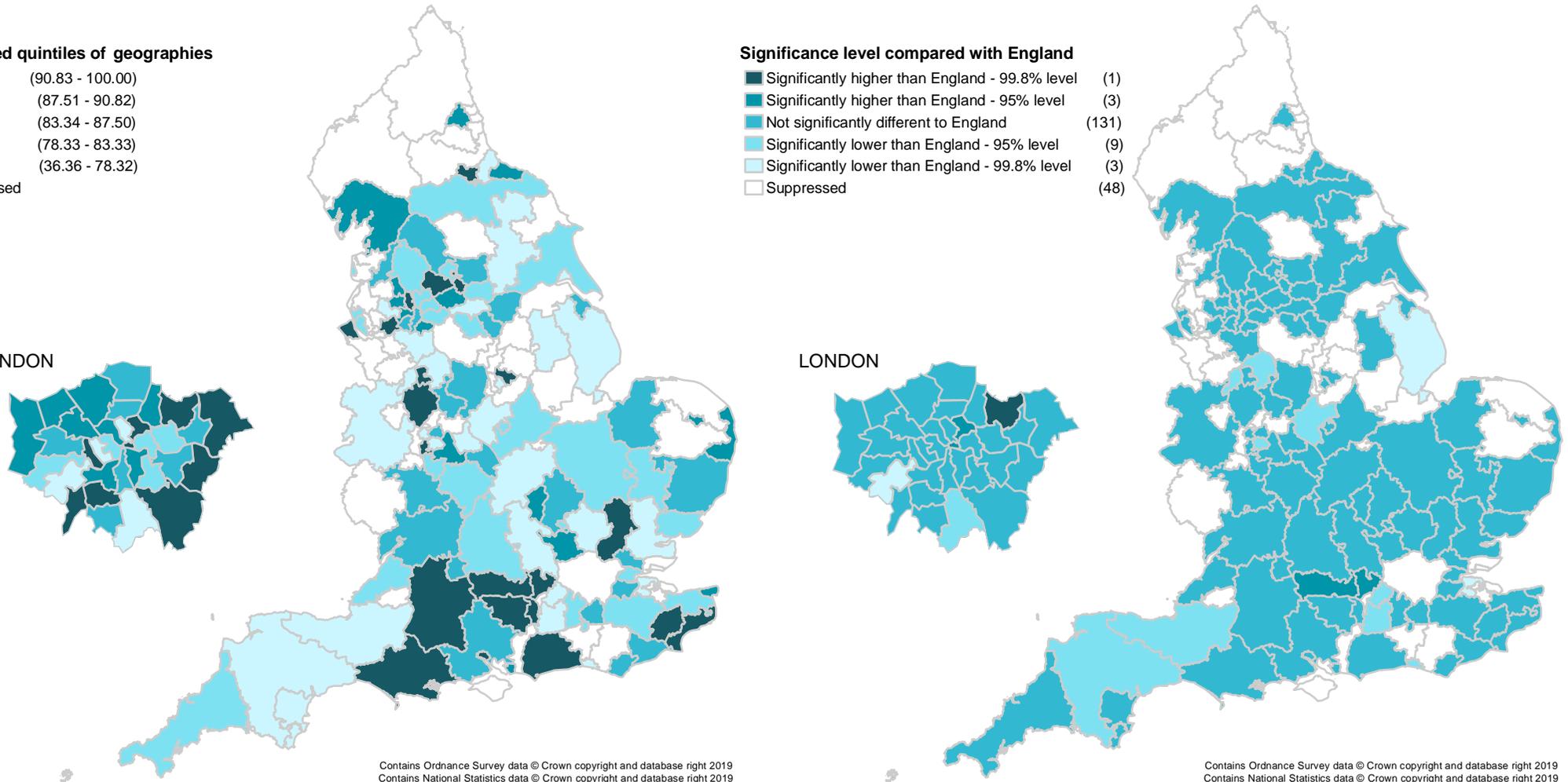


Significance level compared with England

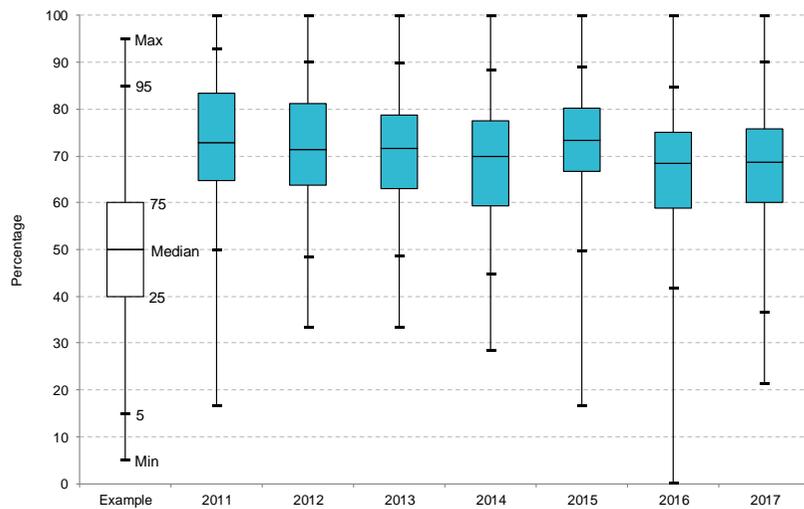
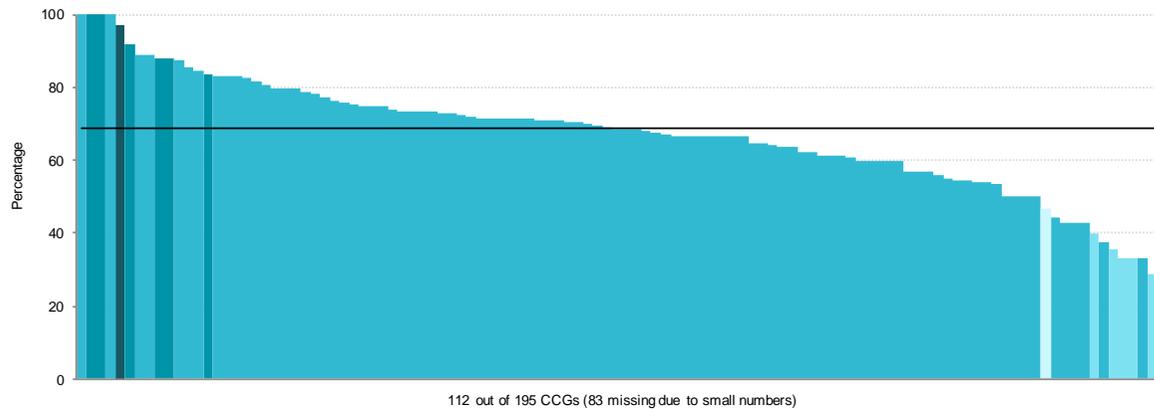


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Variation in percentage of people with pulmonary tuberculosis (TB) who started treatment within four months of symptom onset by CCG (2017)



Max-Min (Range)		83.3	66.7	66.7	71.4	83.3	100.0	78.6	No significant change
95th-5th percentile		43.2	41.8	41.3	43.8	39.3	43.2	53.5	No significant change
75th-25th percentile		18.6	17.3	15.7	18.2	13.5	16.2	15.7	No significant change
Median		72.7	71.4	71.7	70.0	73.3	68.4	68.8	No significant change

Context

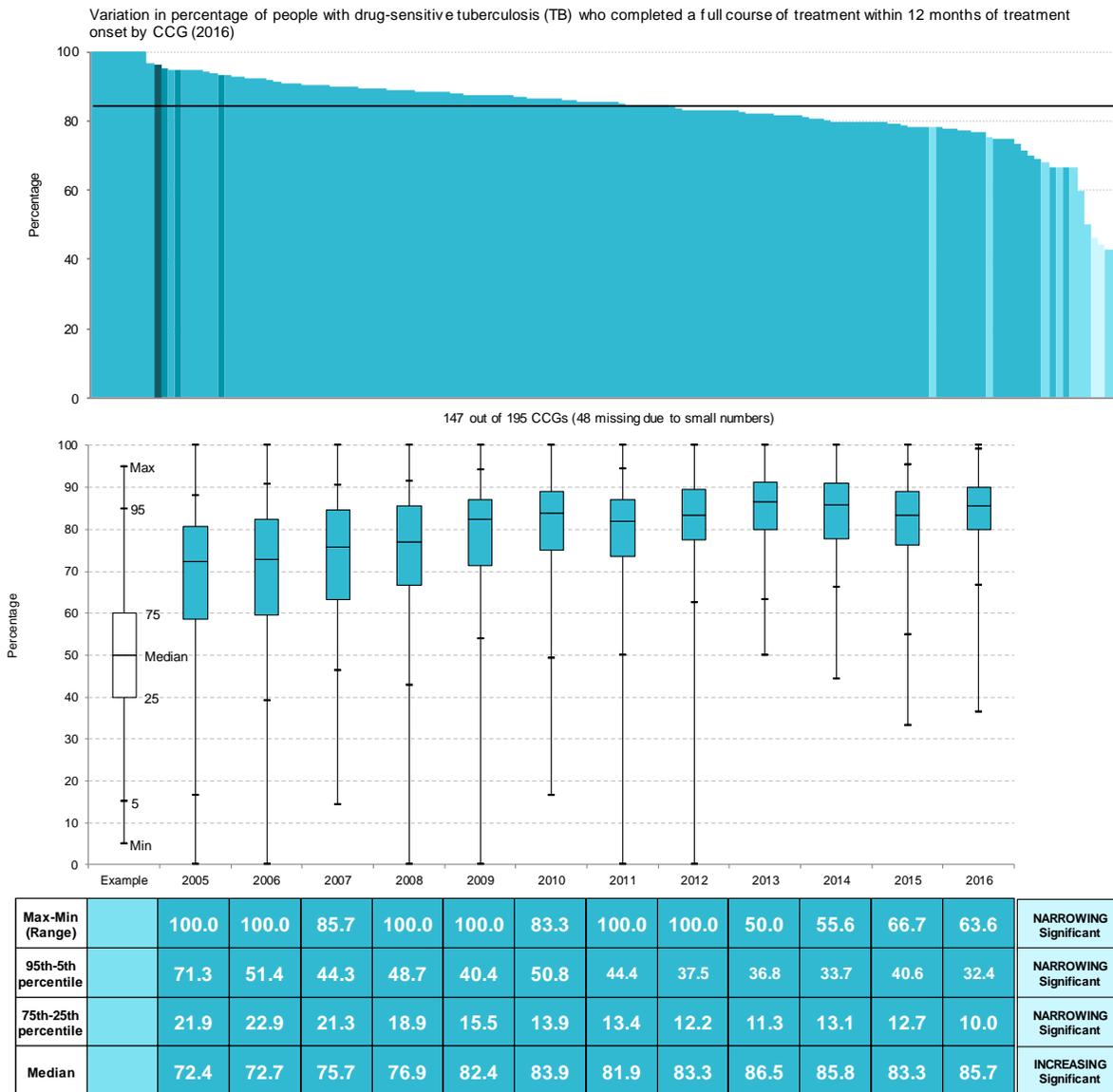
Prompt diagnosis of tuberculosis (TB) and completion of a full course of treatment are crucial:

- to ensure a favourable outcome for individual patients
- to prevent ongoing transmission

In the UK, everyone is entitled to free treatment for TB, irrespective of their immigration status. TB is curable; however, if left untreated or if treated inappropriately, the disease can be fatal. Without treatment, one-third of all pulmonary TB cases die. People who experience delays in starting treatment or those who do not complete their course of treatment can develop drug-resistance, long-term health problems, and remain infectious for prolonged periods of time, presenting an infection risk to others.

Standard anti-TB treatment involves a combination of different antibiotics for a minimum of 6 months. Treatment can be either self-administered or supported specifically through directly observed therapy (DOT), which works best as part of a range of supportive measures tailored to each person's needs. The care package should include education and counselling, incentives, enablers and psycho-social care to address housing need, substance misuse, and other problems likely to complicate recovery.

Patients with social risk factors, such as homelessness or a history of imprisonment, and drug or alcohol use, have poorer treatment outcomes at 12 months. High levels of treatment completion have been achieved in the most complex patients living in very difficult circumstances with the provision of enhanced multidisciplinary support services.



Magnitude of variation

Map 28a: Variation in percentage of people with pulmonary tuberculosis (TB) who started treatment within four months of symptom onset by CCG (2017)

The maps and column chart display the latest period (2017), during which CCG values ranged from 21.4% to 100.0%, which is a 4.7-fold difference between CCGs. The England value for 2017 was 68.8%.

The box plot shows the distribution of CCG values for the period 2011 to 2017.

There was no significant change in any of the 3 variation measures between 2011 and 2017.

Late diagnosis may be caused either by delays in presentation to health services or in the diagnostic processes. The observed variation in delays to diagnosis and start of treatment may be due to:

- low levels of symptom awareness in some populations
- higher levels of TB-related stigma among certain populations (particularly under-served populations and new entrants)
- reluctance of some populations to engage with health services
- lack of TB awareness among some health professionals

Map 28b: Variation in percentage of people with drug-sensitive tuberculosis (TB) who completed a full course of treatment within 12 months of treatment onset by CCG (2016)

The maps and column chart display the latest period (2016), during which CCG values ranged from 36.4% to 100.0%,

which is a 2.8-fold difference between CCGs. The England value for 2016 was 84.4%.

The box plot shows the distribution of CCG values for the period 2005 to 2016.

There has been significant narrowing of all 3 measures of variation.

The median increased significantly from 72.4% in 2005 to 85.7% in 2016.

The reasons for the degree of variation observed include differences in the numbers of people who:

- die while being treated – a higher proportion of people who die are older
- are lost to follow-up (either in the UK or abroad)
- are still on treatment due to treatment interruptions or side-effects
- have social risk factors

Other factors that may contribute to the degree of variation include differences in:

- the structure and quality of TB services across England and access to these
- the provision of specialist TB services, TB clinical nurse specialists and outreach/DOT workers to support patients with complex medical or social needs enabling them to complete treatment
- access to or participation in a TB clinical network to support expert review of complex cases
- access to specialist unit co-supervision

Options for action

As part of the Collaborative TB Strategy for England 2015-2020 (see 'Resources'), local authorities, public health leaders, the NHS, clinical commissioners and the third sector need:

- to work with their local TB Control Board, Public Health England and NHS England to review services in their local area against the National TB Service Specification and Clinical Policy to identify gaps and take appropriate action with key partners
- to develop plans to address gaps in the provision of high quality universal clinical, public health and social care services for TB, based on NICE guidance (see 'Resources')
- TB commissioners, in both CCGs and local authorities, to ensure appropriate access to services, treatment and support to enable patients, particularly under-served populations, to complete treatment

Alongside this the National TB Programme needs to raise awareness of TB and its treatment in groups-at-risk through a selective awareness raising campaign, for example people from TB endemic countries or the homeless.

In addition, local partners may consider a local needs assessment would be helpful; in areas of high need, it is important to ensure that TB is part of the Joint Strategic Needs Assessment (JSNA).

Local authority overview and scrutiny committees and Health and Wellbeing Boards have a role in the oversight of TB control, including treatment completion rates. To achieve high levels of treatment completion, local authorities need to provide assistance in supporting a person's social needs, for example, accommodation for patients who are homeless, travel to clinics, and nutrition.

In localities where there may be underserved populations:

- public health, healthcare and other professionals should follow NICE guidelines NG33 (see 'Resources')
- NHS and other commissioners need to consider ways of reaching these populations, such as the approach developed by the University College London Hospital "Find & Treat" service (see 'Resources')

Resources

Local Government Association (2018) [Tackling Tuberculosis - Local government's public health role](#) [Accessed 31 January 2019]

NHS England [Tuberculosis strategy for England 2015-2020](#) [Accessed 29 July 2019]

NHS England National TB Service Specification and Clinical Policy. Soon to be available at [Tuberculosis strategy for](#)

[England 2015-2020](#) [Accessed 29 July 2019] Until then people should contact england.tbprogramme@nhs.net for copies.

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Public Health England (2018) [Reports of cases of tuberculosis to enhanced tuberculosis surveillance systems: UK, 2000 to 2017](#) Official Statistics [Accessed 31 January 2019]

Public Health England (2019) [Tackling Tuberculosis in under-served populations: A resource for TB Control Boards and their partners](#) [Accessed 31 January 2019]

Public Health England (2018) [Tuberculosis in England annual reports](#) [Accessed 31 January 2019]

Public Health England [TB Strategy Monitoring Indicators](#) Interactive web tool with local information about the key TB monitoring indicators [Accessed 31 January 2019]

Royal College of Nursing [Public health - topics: Tuberculosis](#) [Accessed 31 January 2019]

TB Alert [The Truth about TB](#) Professional awareness and education resources [Accessed 31 January 2019]

Case studies:

National Institute for Health and Care Excellence Shared learning database (2012) [Identifying and managing tuberculosis \(TB\) among hard-to-reach groups - The prison setting with a high incidence of TB](#) The Royal Free Hospital [Accessed 7 February 2019]

University College London Hospital (UCLH) TB research network [Find & Treat service](#) London. [Accessed 7 February 2019]