Quick user guide

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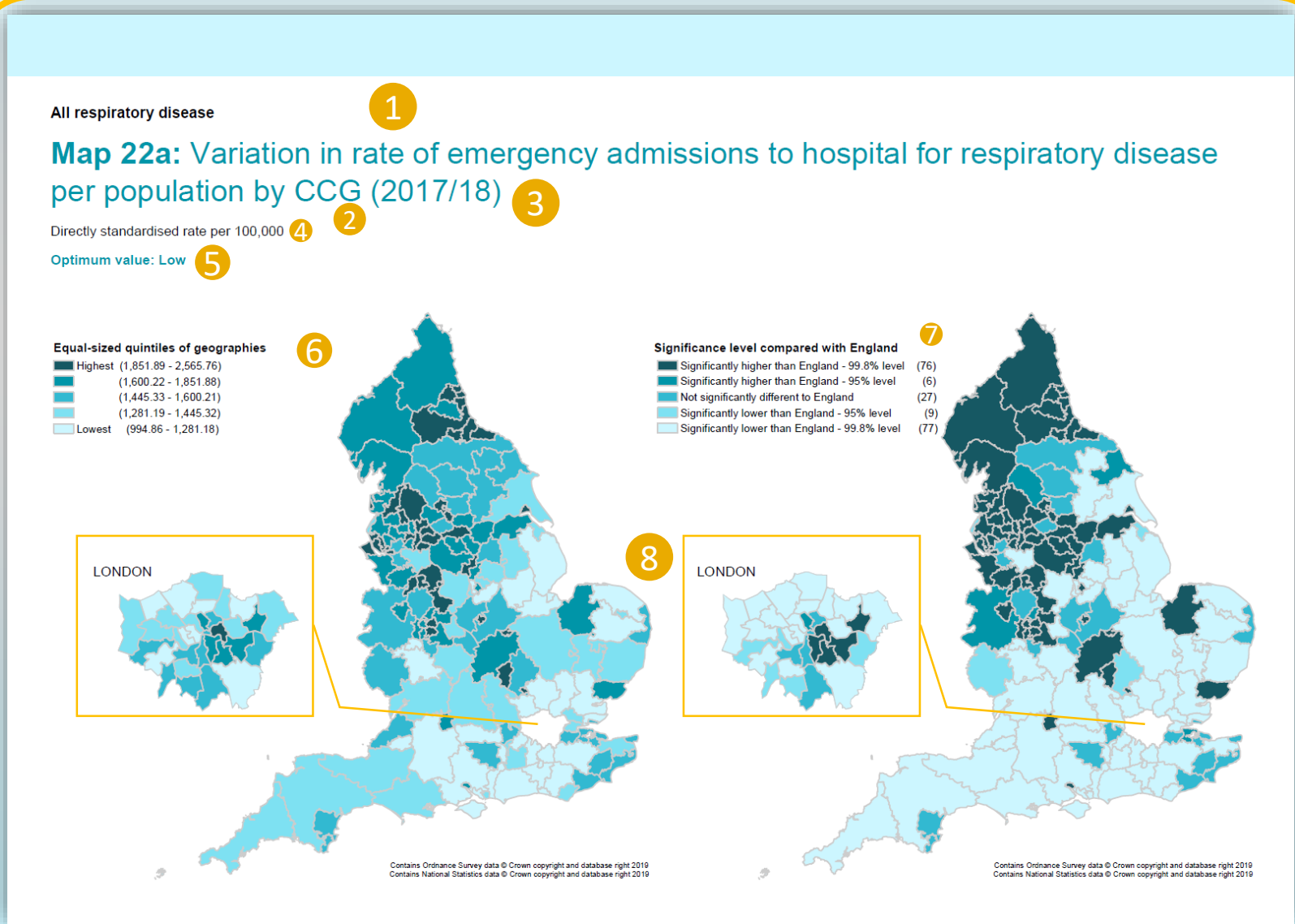
For example, in 2018 there were 195 CCGs, so 39 CCGs are in each category. Darker areas have the highest values.

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.

All respiratory disease

Map 22a: Variation in rate of emergency admissions to hospital for respiratory disease per population by CCG (2017/18)

Directly standardised rate per 100,000

Optimum value: Low

Equal-sized quintiles of geographies
- Highest (1,851.89 - 2,565.76)
- (1,600.22 - 1,851.88)
- (1,445.33 - 1,600.21)
- (1,281.19 - 1,445.32)
- Lowest (994.86 - 1,281.18)

Significance level compared with England
- Significantly higher than England - 99.8% level (76)
- Significantly higher than England - 95% level (6)
- Not significantly different to England (27)
- Significantly lower than England - 95% level (9)
- Significantly lower than England - 99.8% level (77)

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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.

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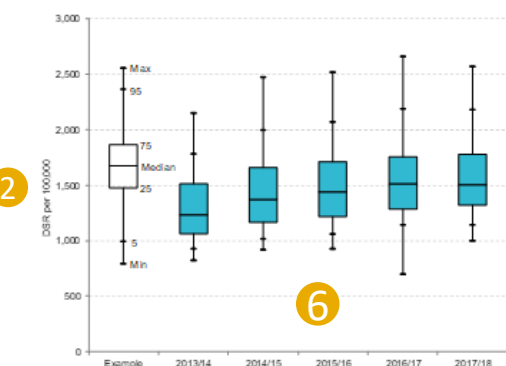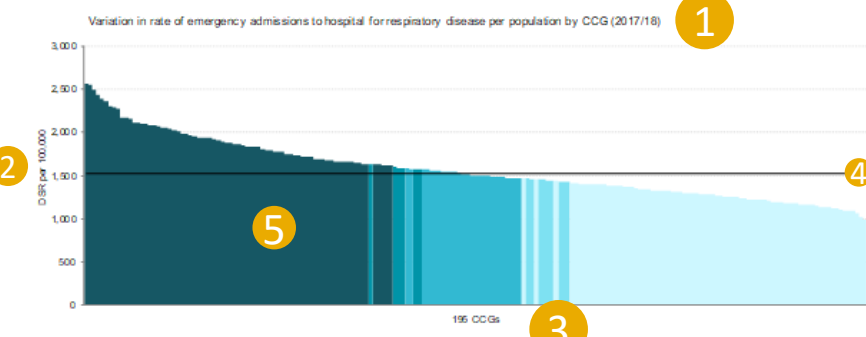
Where the significance bar chart shows little variation across the CCGs, the equal interval map colours have been used.

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 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.

7 **Sections in the chapter**

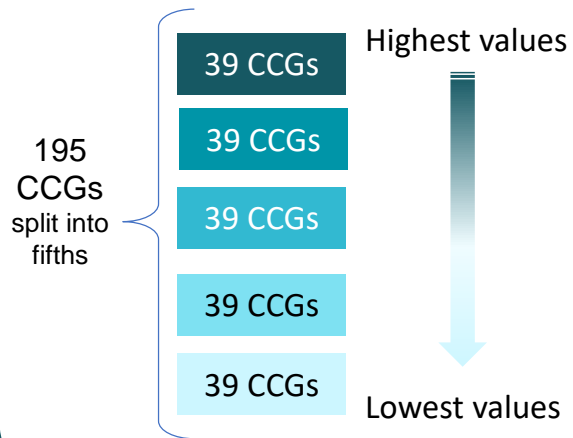**Context** – provides an overview of why the indicator is of public health interest

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

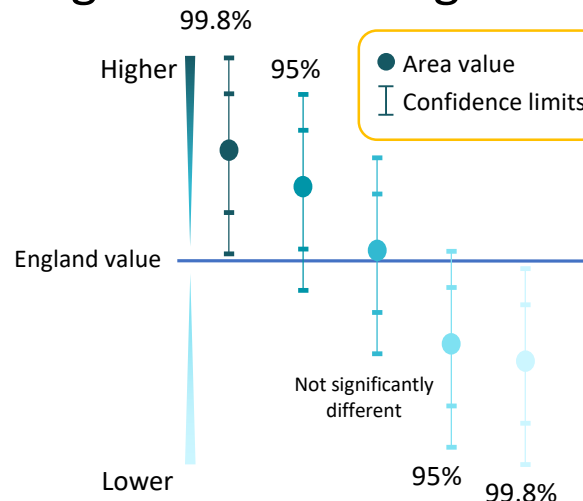**Option for action** – gives suggestions for best practice

Resources – gives links to useful documents

Variation in rate of emergency admissions to hospital for respiratory disease per population by CCG (2017/18)

DSR per 100,000

195 CCGs

DSR per 100,000

		Example	2013/14	2014/15	2015/16	2016/17	2017/18	
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	1439.4	1511.4	1506.4	INCREASING Significant

Context
An emergency admission is an unscheduled...

Magnitude of variation
Map R14: Variation in percentage of admissions to hospital for respiratory disease that were re-admitted as ...within 30 days of discharge by CCG
...latest period ...994.9 to

Options for action
Respiratory admission rates ten... minimise the impact of... England.

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

How were the categories calculated?

Equal-sized quintiles

195 CCGs split into fifths

39 CCGs — Highest values

39 CCGs

39 CCGs

39 CCGs

39 CCGs — Lowest values

Significance to England

99.8%

Higher

95%

- Area value
- ⊥ Confidence limits

England value

Not significantly different

Lower

95%

99.8%

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*.
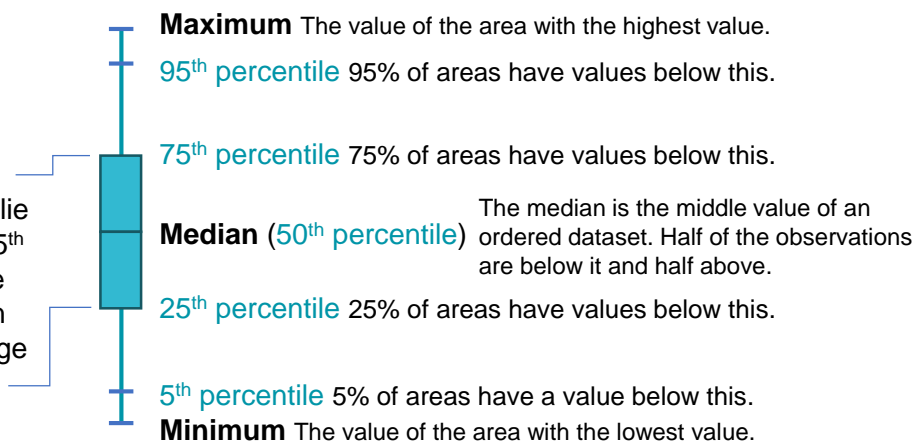
Box & whisker plot

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).

Maximum The value of the area with the highest value.

95th percentile 95% of areas have values below this.

75th percentile 75% of areas have values below this.

Median (50th percentile) The median is the middle value of an ordered dataset. Half of the observations are below it and half above.

25th percentile 25% of areas have values below this.

5th percentile 5% of areas have a value below this.

Minimum The value of the area with the lowest value.

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

Pneumonia – Disease burden

Map 18a: Variation in median length of stay (days) of emergency admissions to hospital for pneumonia by CCG (2017/18)

Optimum value: Low

Median length of stay (days)
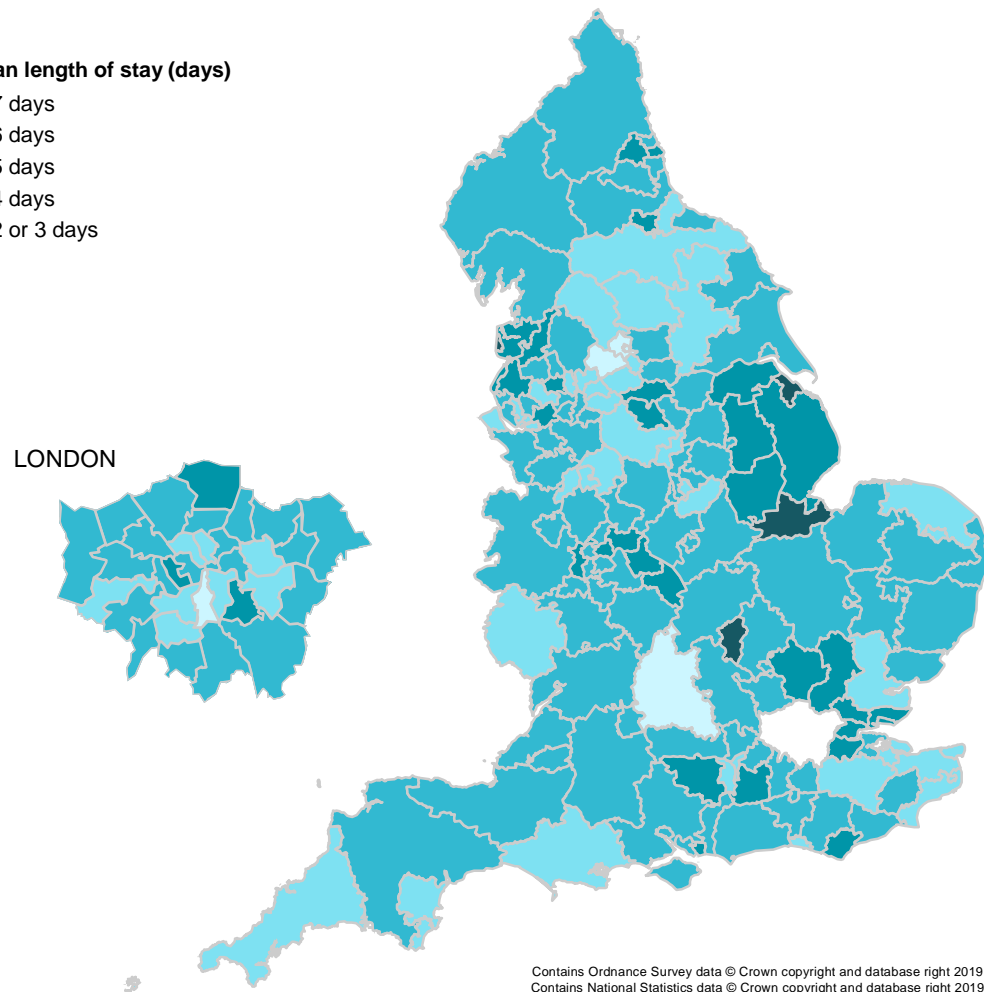
- 7 days
- 6 days
- 5 days
- 4 days
- 2 or 3 days

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Context

The NHS Long Term Plan is committed to reducing the burden from pneumonia. Pneumonia causes a spectrum of illness severity. Most people have low severity illness and are managed at home. About 1 in 5 require hospital management.

There were 279,440 finished hospital discharges in 2017/18, of which 19.2% were zero and one day emergency admissions. A small minority (about 5%) of people hospitalised with pneumonia require intensive care management. Pneumonia accounts for about half of all cases of severe sepsis managed on intensive care units

Length of hospital stay is associated with the severity of illness on admission to hospital. Though some deaths are the unavoidable outcome of the natural course of other progressive respiratory, malignant or neurological disease, other deaths may be preventable with appropriate management.
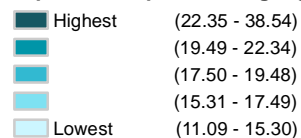
Early treatment with appropriate antimicrobials is associated with improved outcomes.
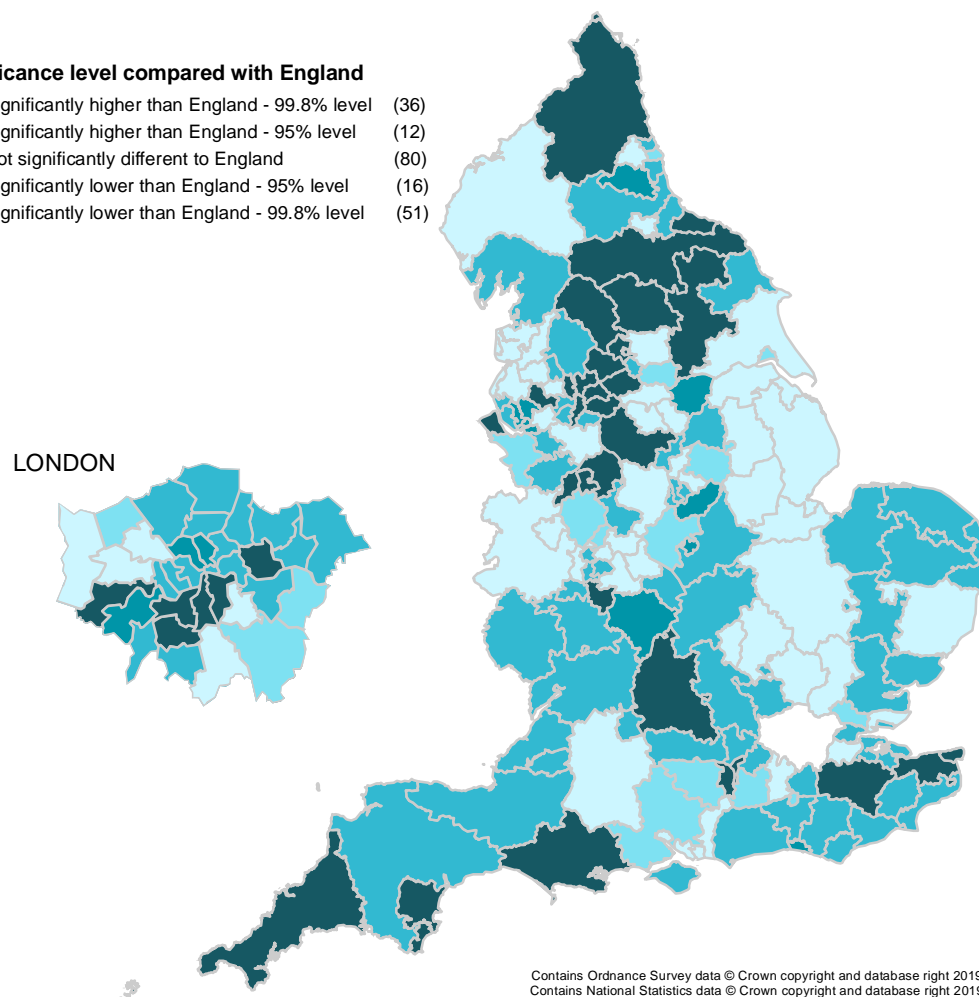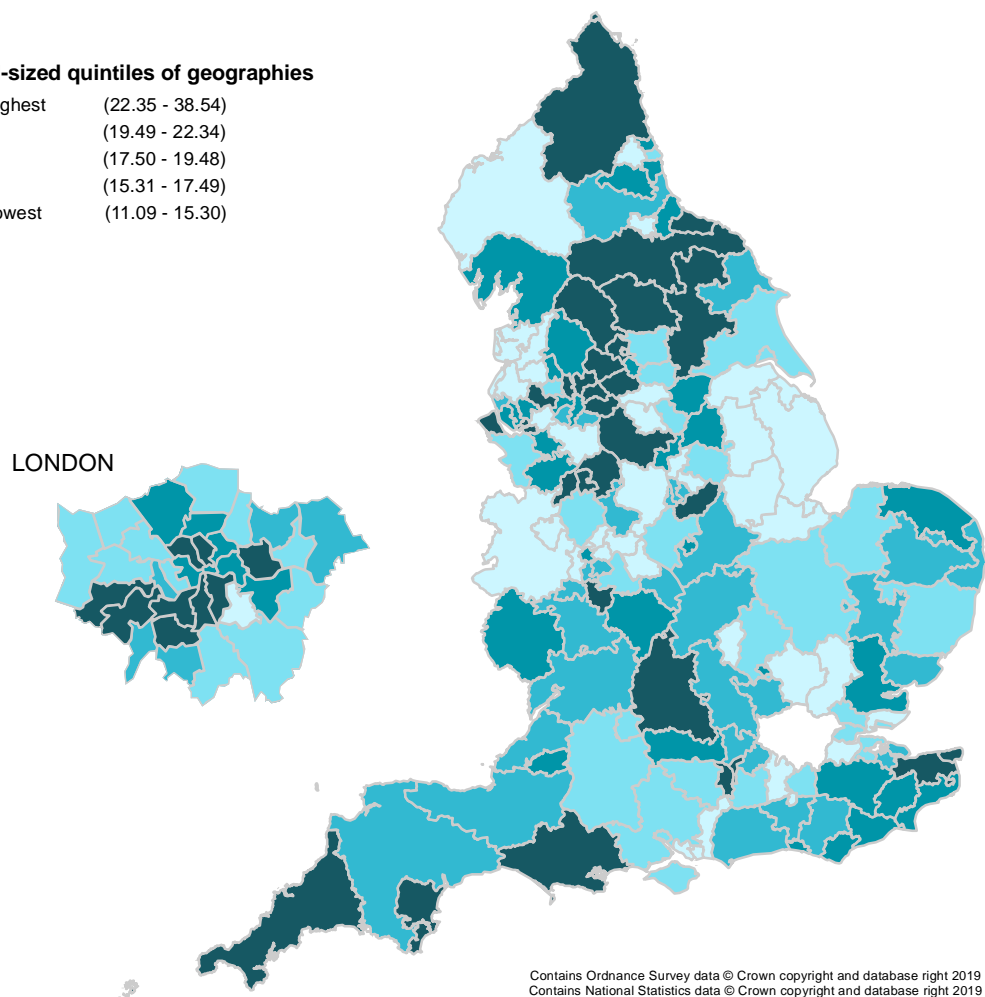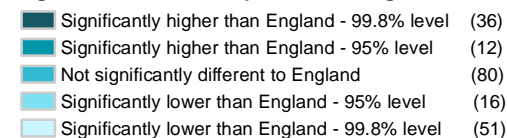
Pneumonia – Disease burden

Map 18b: Variation in percentage of zero and one day emergency admissions to hospital for pneumonia by CCG (2017/18)

Optimum value: High

Equal-sized quintiles of geographies

■	Highest	(22.35 - 38.54)
■		(19.49 - 22.34)
■		(17.50 - 19.48)
■		(15.31 - 17.49)
□	Lowest	(11.09 - 15.30)

Significance level compared with England

■	Significantly higher than England - 99.8% level	(36)
■	Significantly higher than England - 95% level	(12)
■	Not significantly different to England	(80)
■	Significantly lower than England - 95% level	(16)
□	Significantly lower than England - 99.8% level	(51)

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Pneumonia – Disease burden

Map 18c: Variation in mortality rate from pneumonia (underlying cause) per population by CCG (2015-2017)
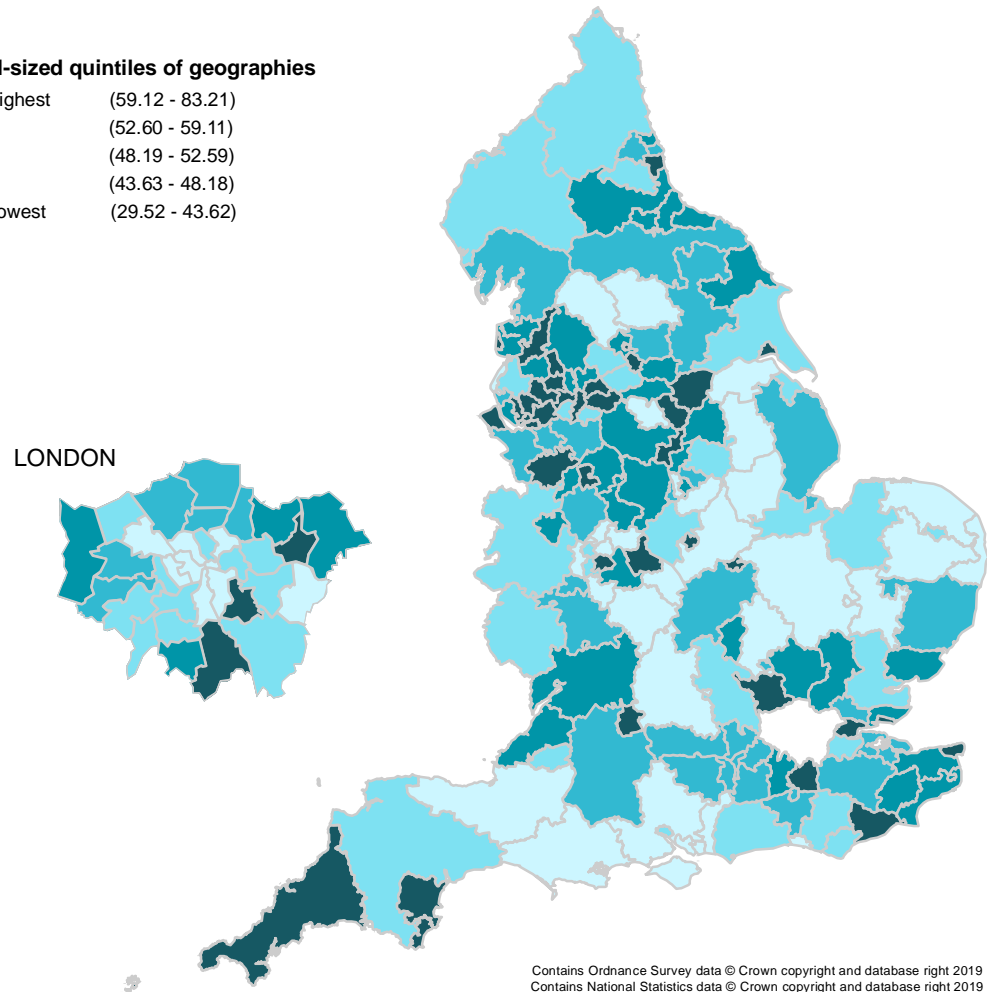
Directly standardised rate per 100,000
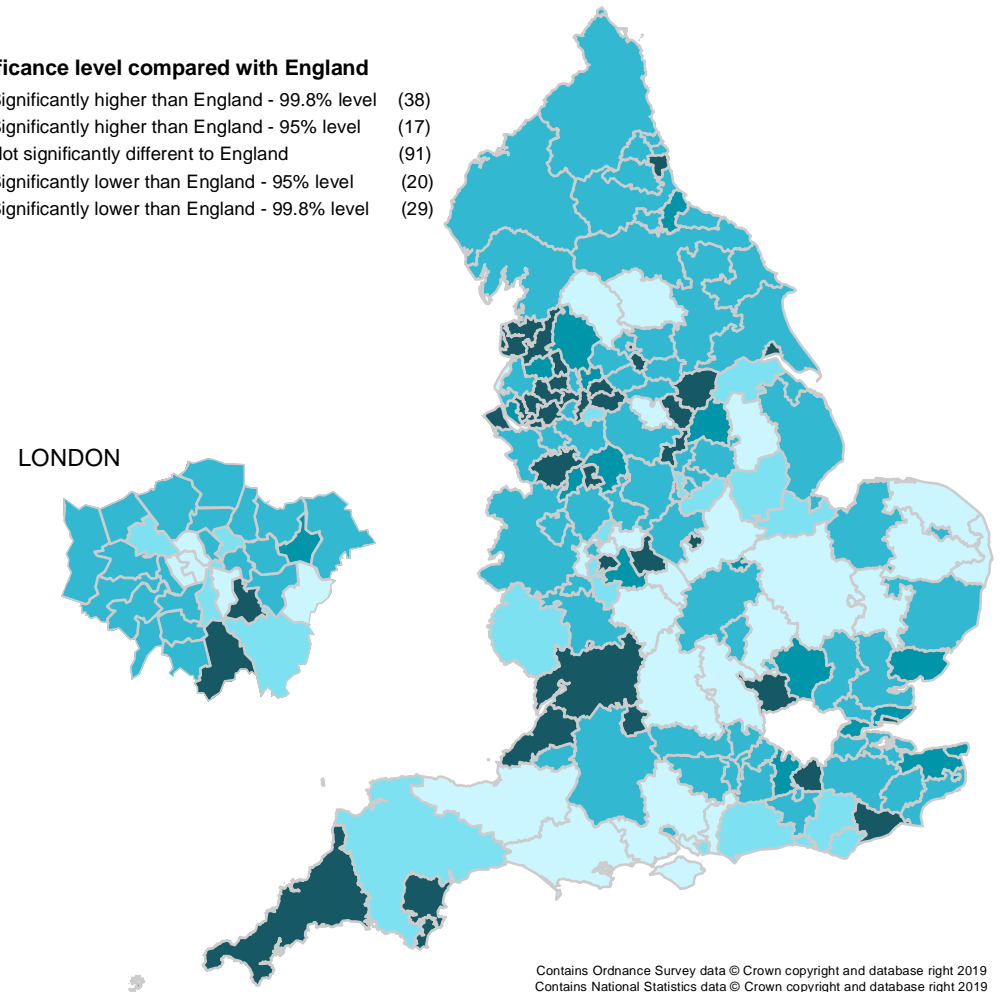
Optimum value: Low

Equal-sized quintiles of geographies

■	Highest	(59.12 - 83.21)
■		(52.60 - 59.11)
■		(48.19 - 52.59)
■		(43.63 - 48.18)
■	Lowest	(29.52 - 43.62)

Significance level compared with England

■	Significantly higher than England - 99.8% level	(38)
■	Significantly higher than England - 95% level	(17)
■	Not significantly different to England	(91)
■	Significantly lower than England - 95% level	(20)
■	Significantly lower than England - 99.8% level	(29)

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Pneumonia – Disease burden

Map 18d: Variation in mortality rate from pneumonia (all mentions) per population by CCG (2015-2017)
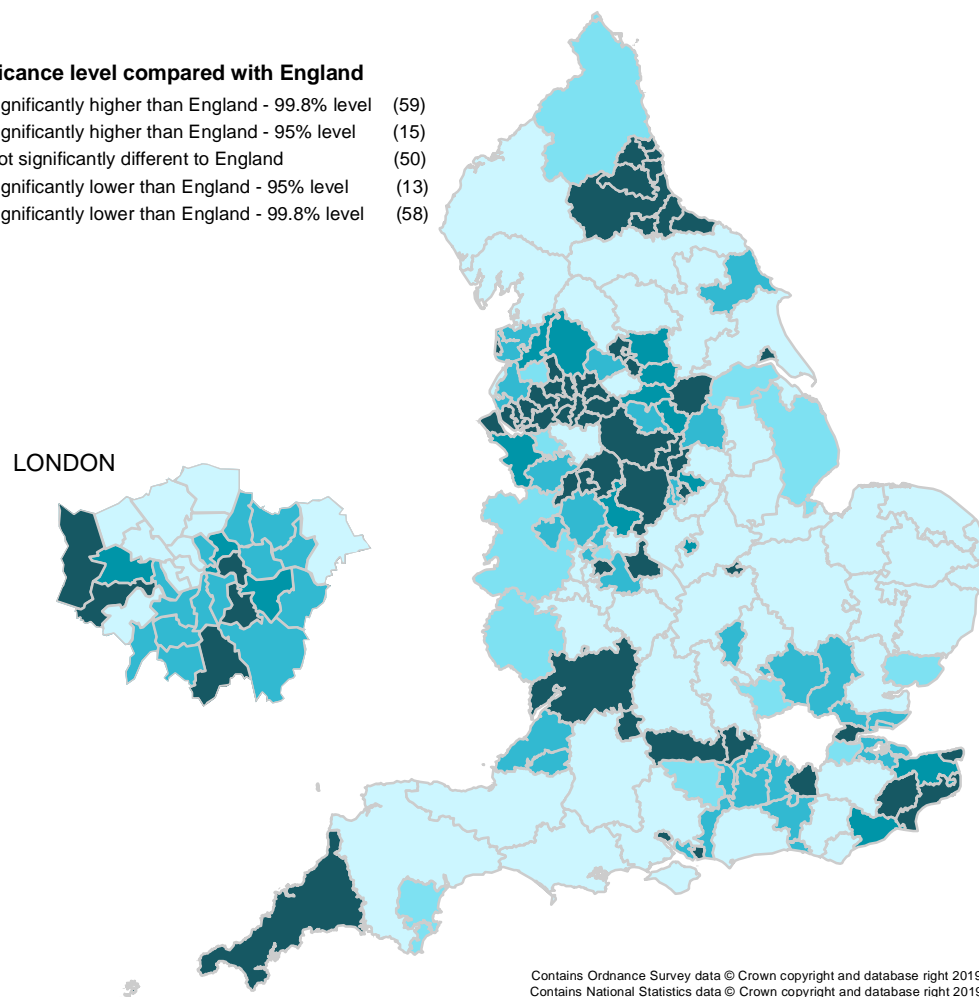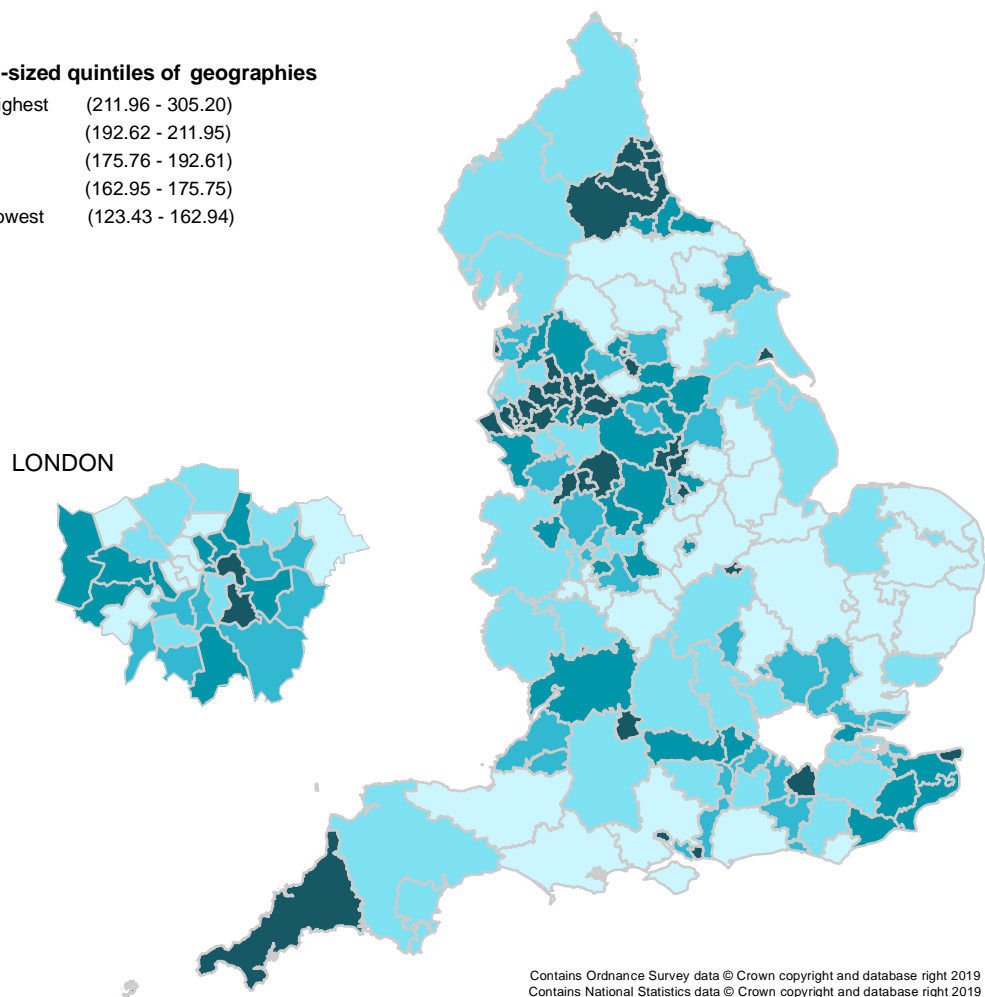
Directly standardised rate per 100,000

**Optimum Value: Low**

Equal-sized quintiles of geographies

■	Highest	(211.96 - 305.20)
■		(192.62 - 211.95)
■		(175.76 - 192.61)
■		(162.95 - 175.75)
■	Lowest	(123.43 - 162.94)

Significance level compared with England

■	Significantly higher than England - 99.8% level	(59)
■	Significantly higher than England - 95% level	(15)
■	Not significantly different to England	(50)
■	Significantly lower than England - 95% level	(13)
■	Significantly lower than England - 99.8% level	(58)

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Variation in median length of stay (days) of emergency admissions to hospital for pneumonia by CCG (2017/18)

195 CCGs
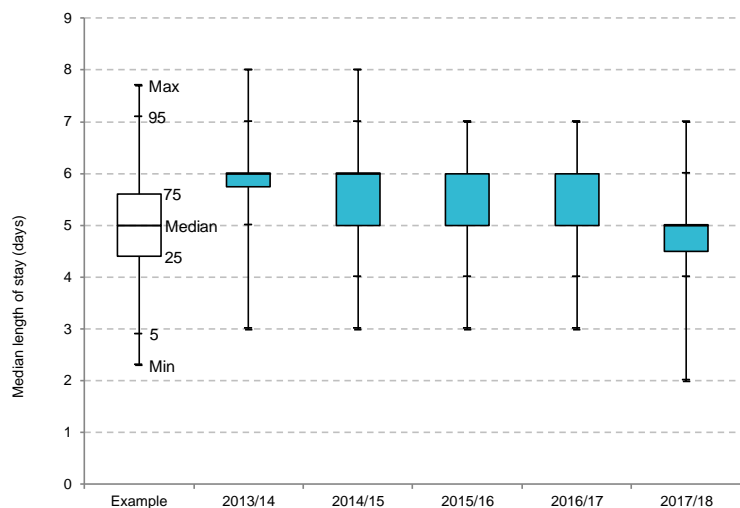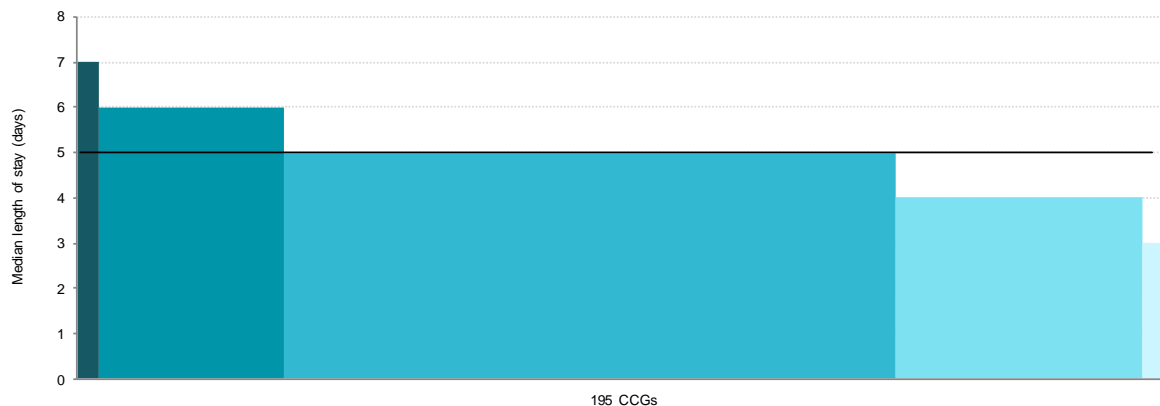
	Example	2013/14	2014/15	2015/16	2016/17	2017/18	
Max-Min (Range)		5.0	5.0	4.0	4.0	5.0	No significant change
95th-5th percentile		2.0	3.0	3.0	3.0	2.0	No significant change
75th-25th percentile		0.3	1.0	1.0	1.0	0.5	No significant change
Median		6.0	6.0	5.0	5.0	5.0	No significant change

Magnitude of variation

Map 18a: Variation in median length of stay (days) of emergency admissions to hospital for pneumonia by CCG (2017/18)

The maps and column chart display the latest period (2017/18), during which CCG values ranged from 2.0 to 7.0 days, which is a 3.5-fold difference between CCGs. The England value for 2017/18 was 5.0 days.

The box plot shows the distribution of CCG values for the period 2013/14 to 2017/18.

There was no significant change in any of the 3 variation measures between 2013/14 and 2017/18.

Map 18b: Variation in percentage of zero and one day emergency admissions to hospital for pneumonia by CCG (2017/18)

The maps and column chart display the latest period (2017/18), during which CCG values ranged from 11.1% to 38.5%, which is a 3.5-fold difference between CCGs. The England value for 2017/18 was 19.2%.

The box plot shows the distribution of CCG values for the period 2013/14 to 2017/18.

Both the 95th to 5th percentile gap and the 75th to 25th percentile gap widened significantly.

The median increased significantly from 15.5 in 2013/14 to 18.5 in 2017/18.

Variation in percentage of zero and one day emergency admissions to hospital for pneumonia by CCG (2017/18)

195 CCGs
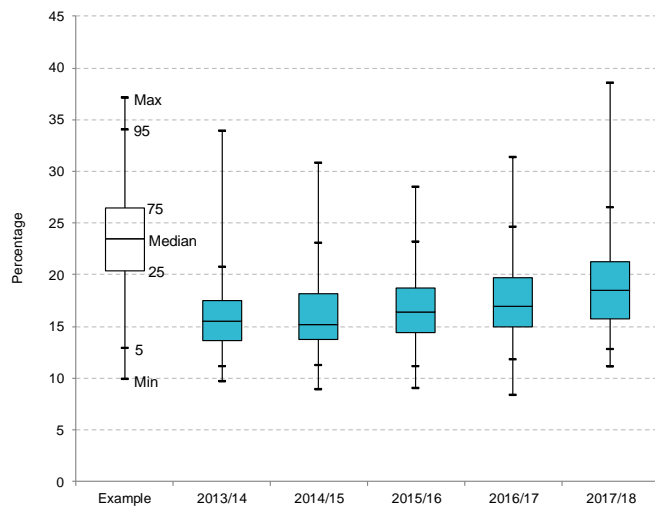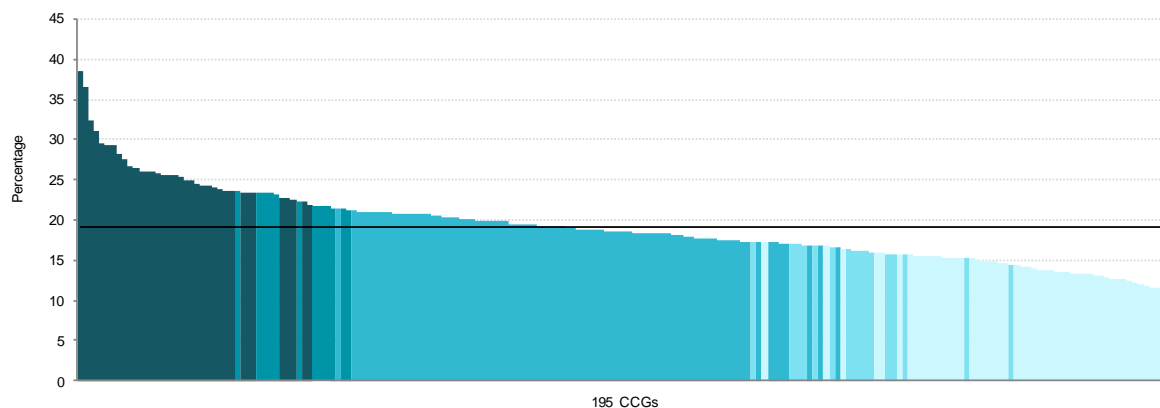
	Example	2013/14	2014/15	2015/16	2016/17	2017/18	
Max-Min (Range)		24.3	21.8	19.5	23.1	27.4	No significant change
95th-5th percentile		9.6	11.9	12.0	12.8	13.8	WIDENING Significant
75th-25th percentile		3.8	4.4	4.3	4.7	5.5	WIDENING Significant
Median		15.5	15.1	16.4	17.0	18.5	INCREASING Significant

Map 18c: Variation in mortality rate from pneumonia (underlying cause) per population by CCG (2015-2017)

The maps and column chart display the latest period (2015 to 2017), during which CCG values ranged from 29.5 to 83.2 per 100,000 population, which is a 2.8-fold difference between CCGs. The England value for 2015 to 2017 was 50.5 per 100,000 population.

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

The 75th to 25th percentile gap narrowed significantly.

The median decreased significantly from 74.1 in 2006 to 2008 to 50.5 in 2015 to 2017.

Map 18d: Variation in mortality rate from pneumonia (all mentions) per population by CCG (2015-2017)

The maps and column chart display the latest period (2015 to 2017), during which CCG values ranged from 123.4 to 305.2 per 100,000 population, which is a 2.5-fold difference between CCGs. The England value for 2015 to 2017 was 183.2 per 100,000 population.

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

Both the 95th to 5th percentile gap and the 75th to 25th percentile gap narrowed significantly.

The median decreased significantly from 266.5 in 2006 to 2008 to 185.2 in 2015 to 2017.

Some of the observed variation might be explained by differences in the diagnostic coding of pneumonia.

Variation in mortality rate from pneumonia (underlying cause) per population by CCG (2015-2017)

195 CCGs
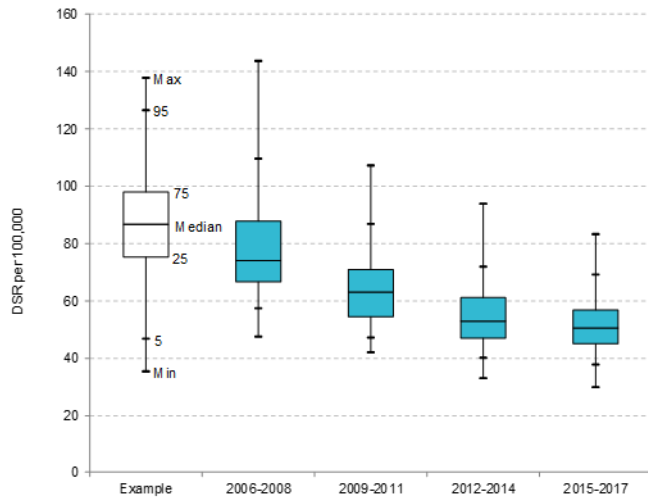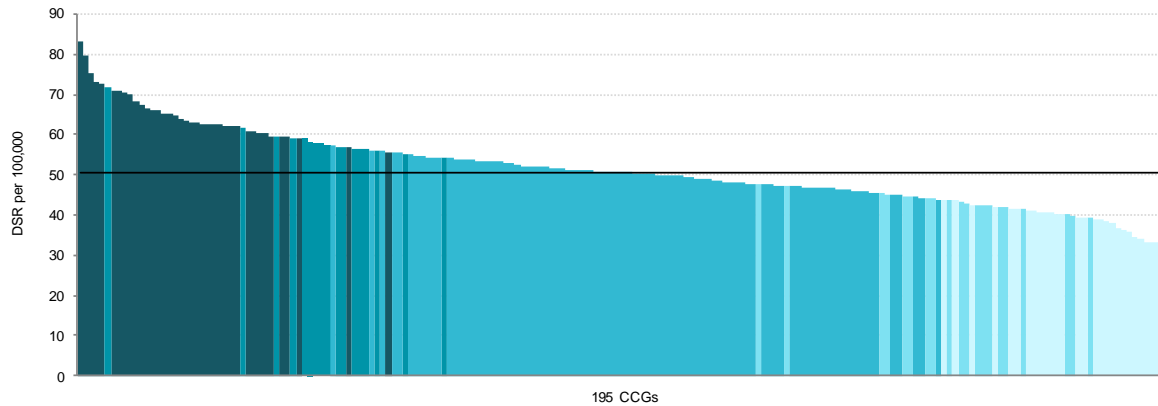
|	Example	2006-2008	2009-2011	2012-2014	2015-2017	
Max-Min (Range)		96.1	65.2	60.8	53.7	No significant change
95th-5th percentile		52.1	39.8	31.8	31.2	No significant change
75th-25th percentile		21.2	16.3	13.9	11.7	NARROWING Significant
Median		74.1	62.9	53.0	50.5	DECREASING Significant

True variation in observed outcomes may be due to:

a) population-related factors:

- case-mix; including age of population, prevalence of comorbid illnesses
- health-seeking behaviour (illness severity at first presentation)

b) healthcare-related factors:

- speed of access to care; including accurate diagnosis and appropriate treatment
- availability of healthcare resources; emergency care crowding, intensive care unit support

c) adherence to evidence-based clinical guidelines

Options for action

When planning service improvement or development to reduce the length of hospital stay and mortality from pneumonia, commissioners, clinicians and service providers need to:

- compare local outcomes against national benchmarks; participate in national audit
- adopt quality standards in pneumonia management
- adhere to national clinical management guidelines
- use pneumonia care bundles to support management where appropriate
- address the primary prevention of pneumonia; including smoking cessation services and vaccination initiatives

Variation in mortality rate from pneumonia (all mentions) per population by CCG (2015-2017)

195 CCGs
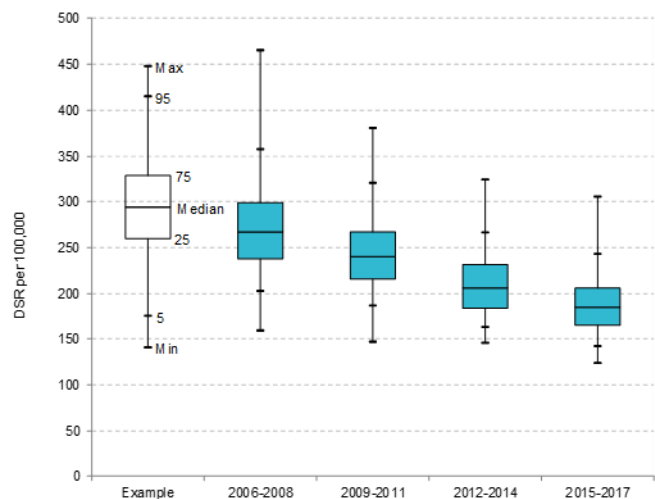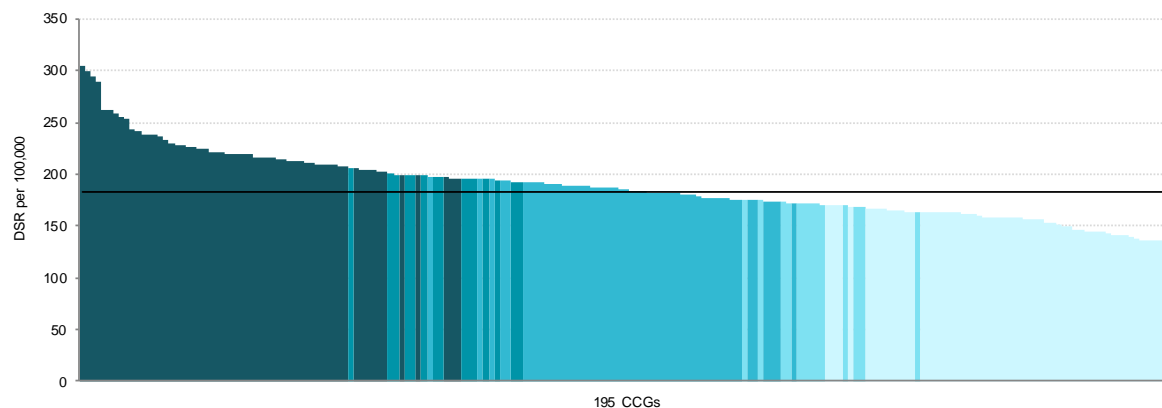
	Example	2006-2008	2009-2011	2012-2014	2015-2017	
Max-Min (Range)		306.1	233.2	178.8	181.8	No significant change
95th-5th percentile		155.6	133.2	103.9	100.8	NARROWING Significant
75th-25th percentile		60.7	51.4	47.1	41.3	NARROWING Significant
Median		266.5	240.7	205.3	185.2	DECREASING Significant

Resources

British Thoracic Society (2017) Care Bundle for Community Acquired Pneumonia [Accessed 26 July 2019]

Daniel P, Woodhead M, Welham S and others (2016) Mortality reduction in adult community-acquired pneumonia in the UK (2009-2014): results from the British Thoracic Society audit programme Thorax 71(11):1061-1063 [Accessed 5 March 2019]

Lim W, Smith D, Wise M and others (2015) British Thoracic Society community acquired pneumonia guideline and the NICE pneumonia guideline: how they fit together Thorax 70(7):698-700 [Accessed 5 March 2019]

National Institute for Health and Care Excellence (2014) Pneumonia in adults: diagnosis and management (NICE clinical guideline [CG191]) [Accessed 5 March 2019]

National Institute for Health and Care Excellence (2016) Pneumonia in adults (NICE quality standard [QS110]) [Accessed 5 March 2019]

Pneumonia – Hospital admissions

Map 19: Variation in rate of emergency admissions to hospital for pneumonia per population by CCG (2017/18)

Directly standardised rate per 100,000

Optimum value: Low

Equal-sized quintiles of geographies

■	Highest	(545.76 - 821.23)
■		(493.42 - 545.75)
■		(443.35 - 493.41)
■		(392.52 - 443.34)
■	Lowest	(299.37 - 392.51)

Significance level compared with England
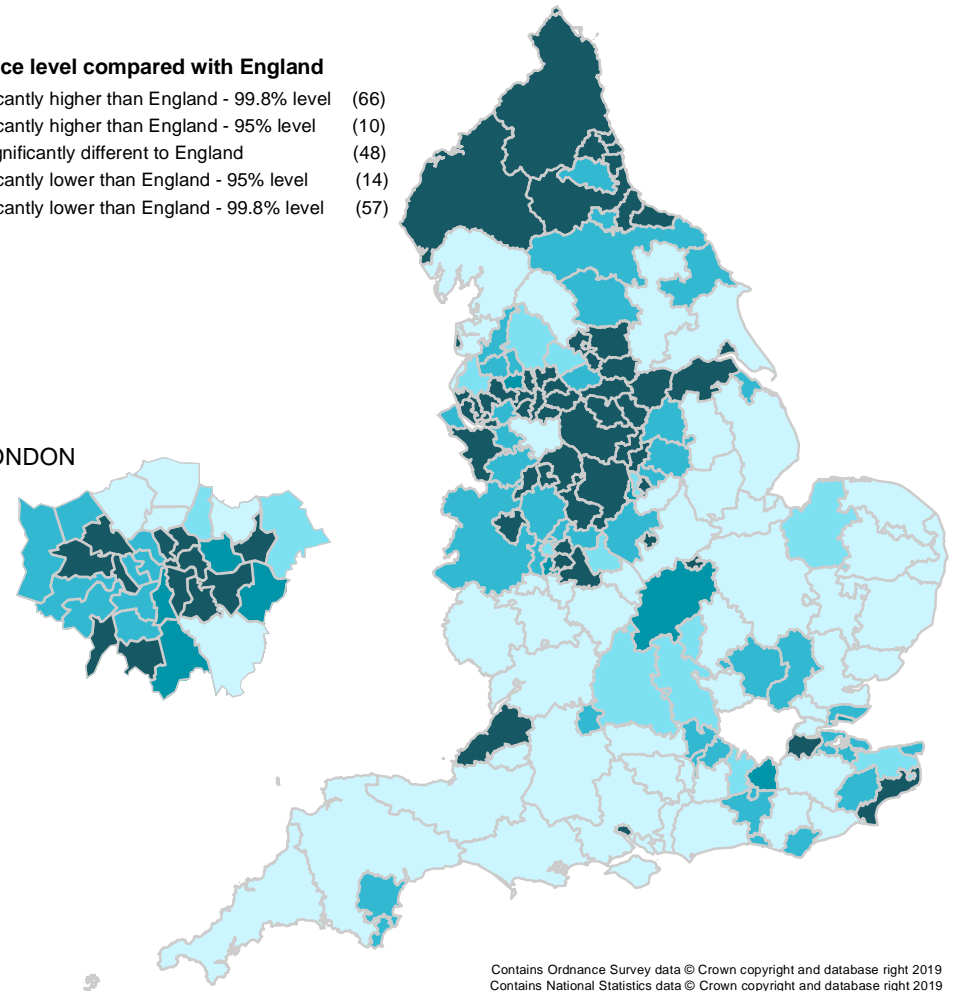
|		
■	Significantly higher than England - 99.8% level	(66)
■	Significantly higher than England - 95% level	(10)
■	Not significantly different to England	(48)
■	Significantly lower than England - 95% level	(14)
■	Significantly lower than England - 99.8% level	(57)

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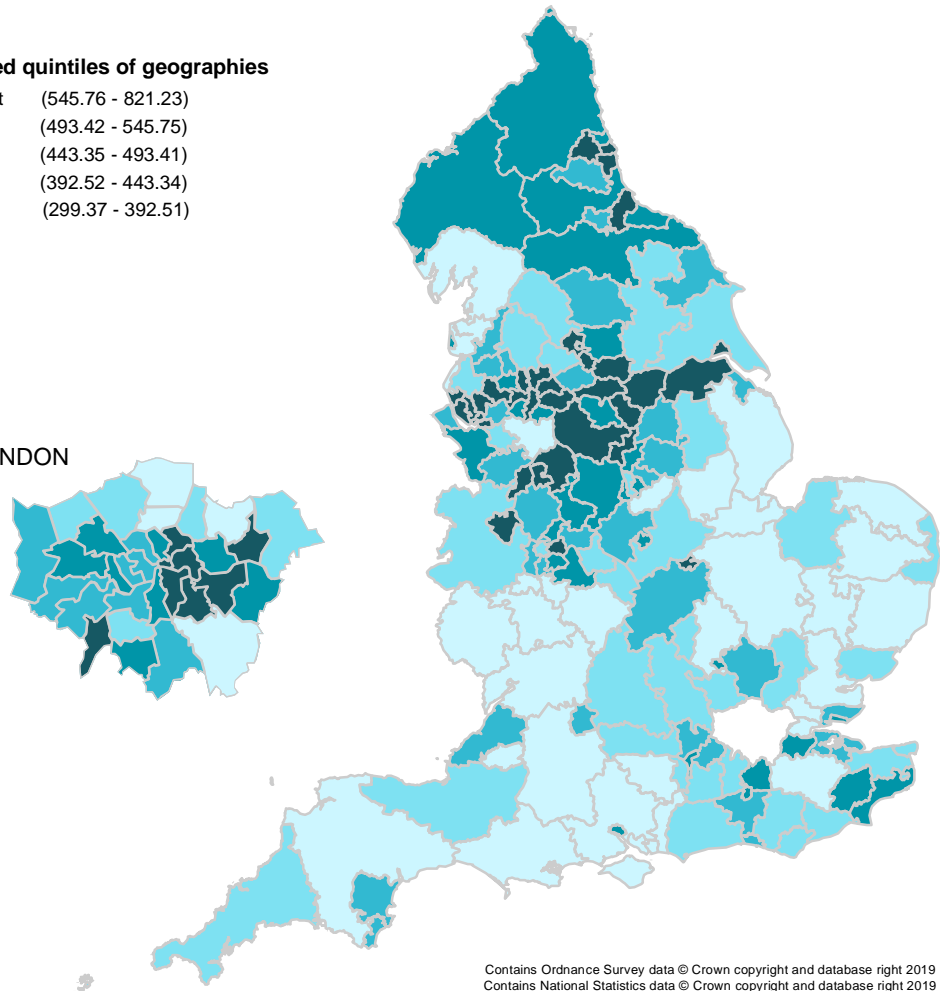
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Variation in rate of emergency admissions to hospital for pneumonia per population by CCG (2017/18)

195 CCGs
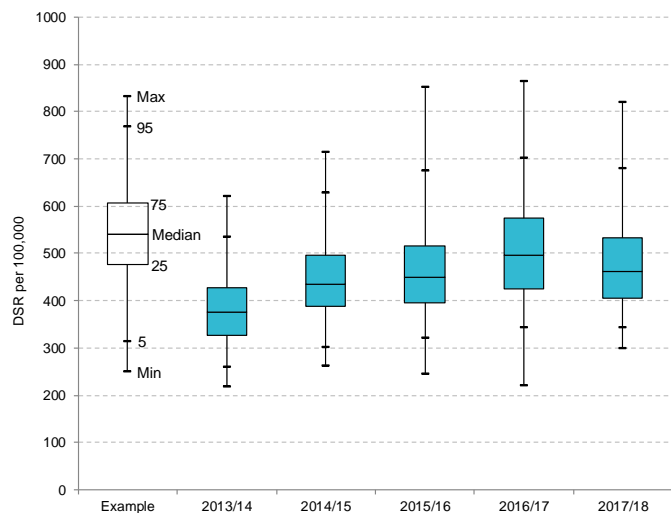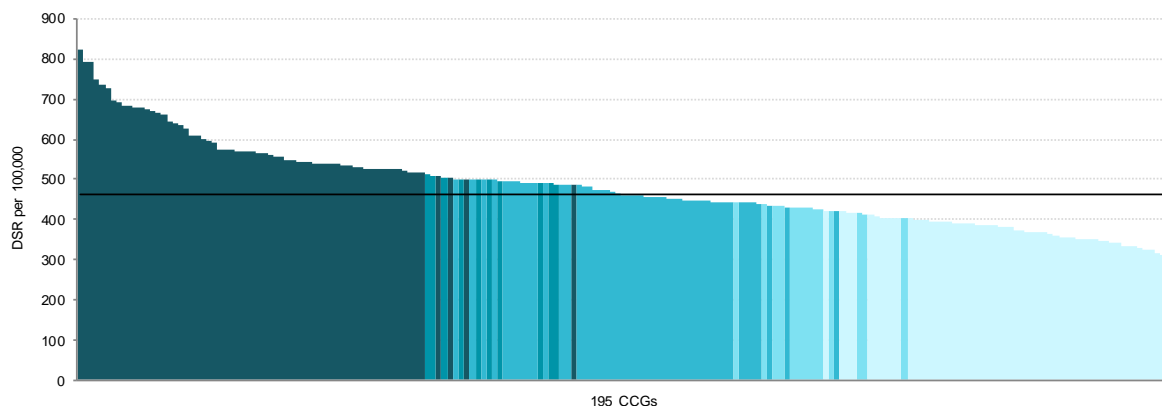
	Example	2013/14	2014/15	2015/16	2016/17	2017/18	
Max-Min (Range)		402.2	451.1	606.0	645.0	521.9	No significant change
95th-5th percentile		275.2	327.0	355.2	358.7	337.6	No significant change
75th-25th percentile		99.8	107.4	119.1	148.2	128.8	No significant change
Median		376.0	433.9	449.8	496.3	461.8	No significant change

Context

Pneumonia is the clinical manifestation of microbial infection within lung tissue. It is common and can affect anyone. Persons most at risk of developing pneumonia are those:

- at the extremes of age
- with an impairment of host defence

Modifiable factors that are associated with the development of pneumonia include:

- current smoking
- poor nutritional status
- alcohol overuse
- vaccination status

The pathogens causing pneumonia are commonly transmitted through person-to-person contact, either with persons who have an infection, or those who carry the pathogen asymptomatically. Regular contact with children is associated with a higher chance of developing pneumonia. Vaccination against influenza and Streptococcus pneumoniae can reduce transmission of pathogens, and protect against infection.

Pneumonia disproportionately affects older people who are both more likely to develop pneumonia and more likely to die from pneumonia. There were 245,620 hospital admissions for pneumonia in England in 2017/18. The majority of patients (85-90%) survive hospitalisation. However, full recovery from pneumonia to pre-morbid levels of fitness may take between 6 weeks and 6 months.

Magnitude of variation

Map 19: Variation in rate of emergency admissions to hospital for pneumonia per population by CCG (2017/18)

The maps and column chart display the latest period (2017/18), during which CCG values ranged from 299.4 to 821.2 per 100,000 population, which is a 2.7-fold difference between CCGs. The England value for 2017/18 was 463.0 per 100,000 population.

The box plot shows the distribution of CCG values for the period 2013/14 to 2017/18.

There has been no significant change in all 3 measures of variation.

Variation in emergency admission rates may be due to differences in:

a) population-related factors

- health-seeking behaviour
- case-mix; including social deprivation, smoking prevalence
- uptake of influenza and pneumococcal immunisation programmes

b) healthcare-related factors

- provision of community-based services for diagnosis and treatment of pneumonia
- accessibility of emergency care services

Options for action

When planning service improvement or development to reduce emergency admissions for pneumonia, commissioners, clinicians and service providers need:

- to review the emergency admission rate for pneumonia in the locality
- to promote the prevention of pneumonia through appropriate vaccination, lifestyle interventions and public health messaging on infection control measures
- to review the use of medicines that might increase the risk of pneumonia, including inhaled corticosteroids in patients with COPD, taking into consideration the potential risk of non-fatal pneumonia with inhaled corticosteroids
- to identify opportunities for improving the early diagnosis and treatment of pneumonia in primary care, and at the interface with secondary care

Resources

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