Quick user guide

Maps

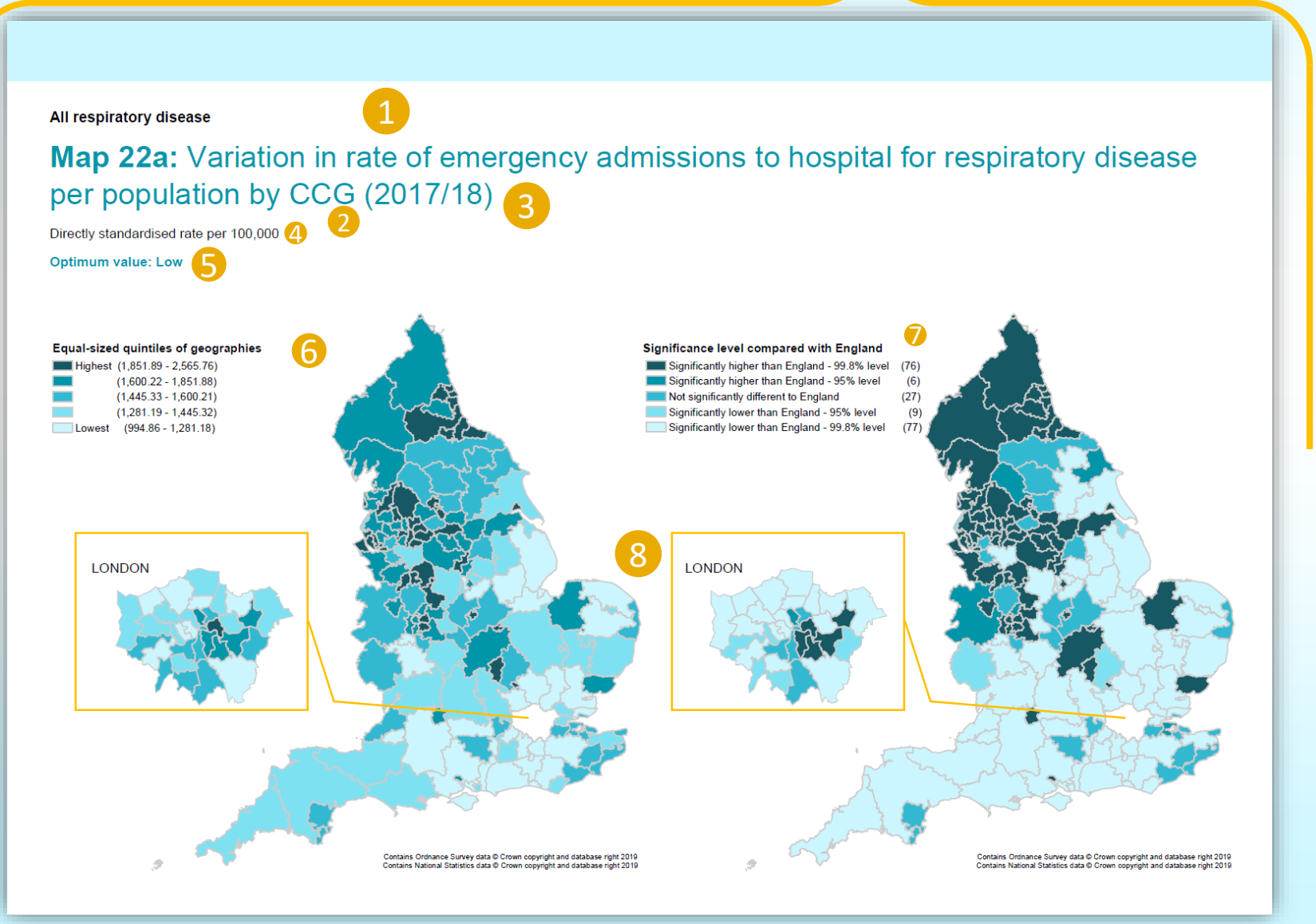
1 **Type of statistic** (e.g. rate, proportion)

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.

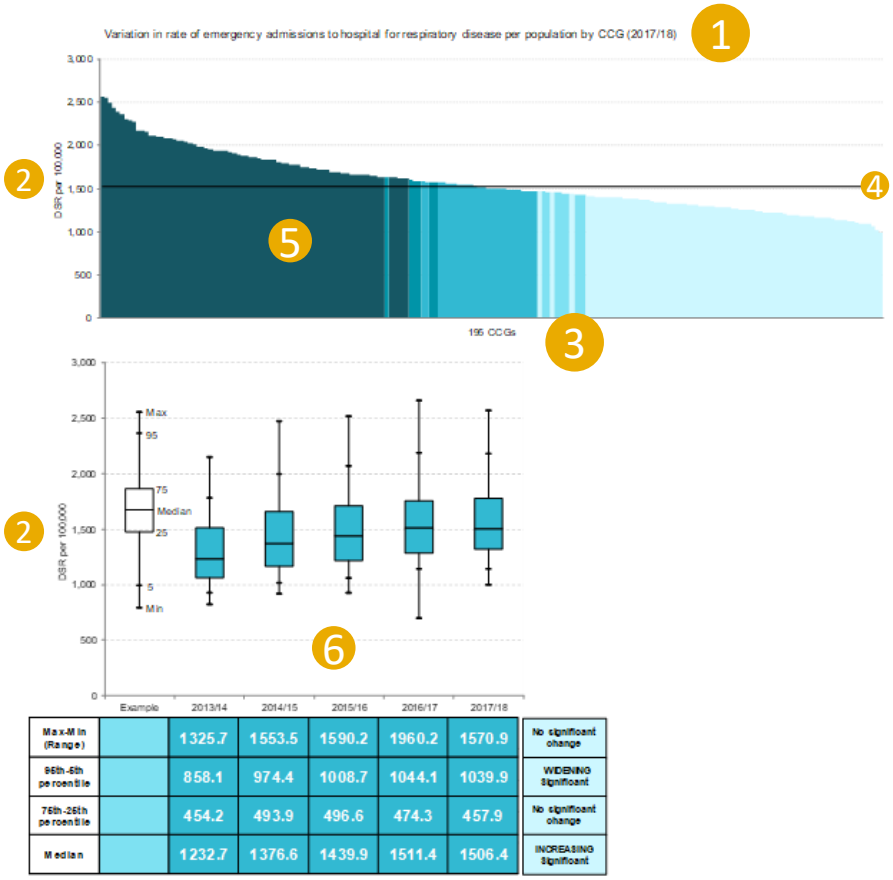
Chart, box plot and table

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

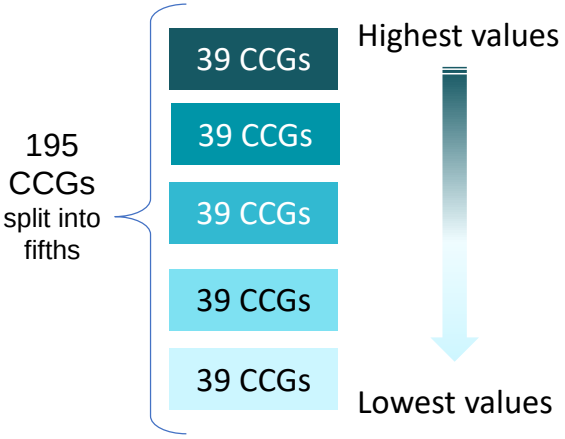
   Option for action – gives suggestions for best practice

   Resources – gives links to useful documents

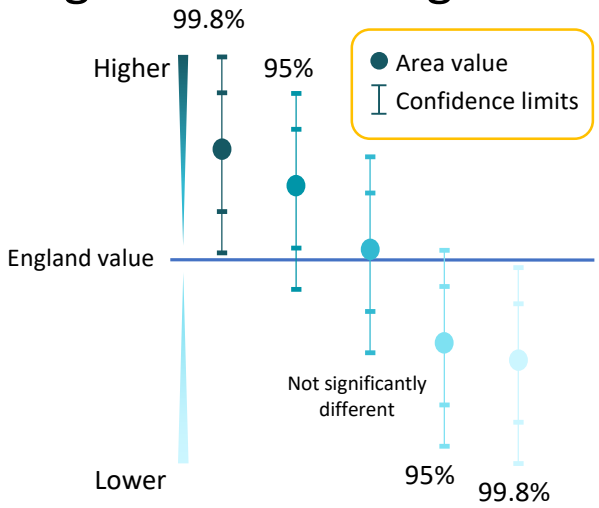
Quick user guide

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).

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.

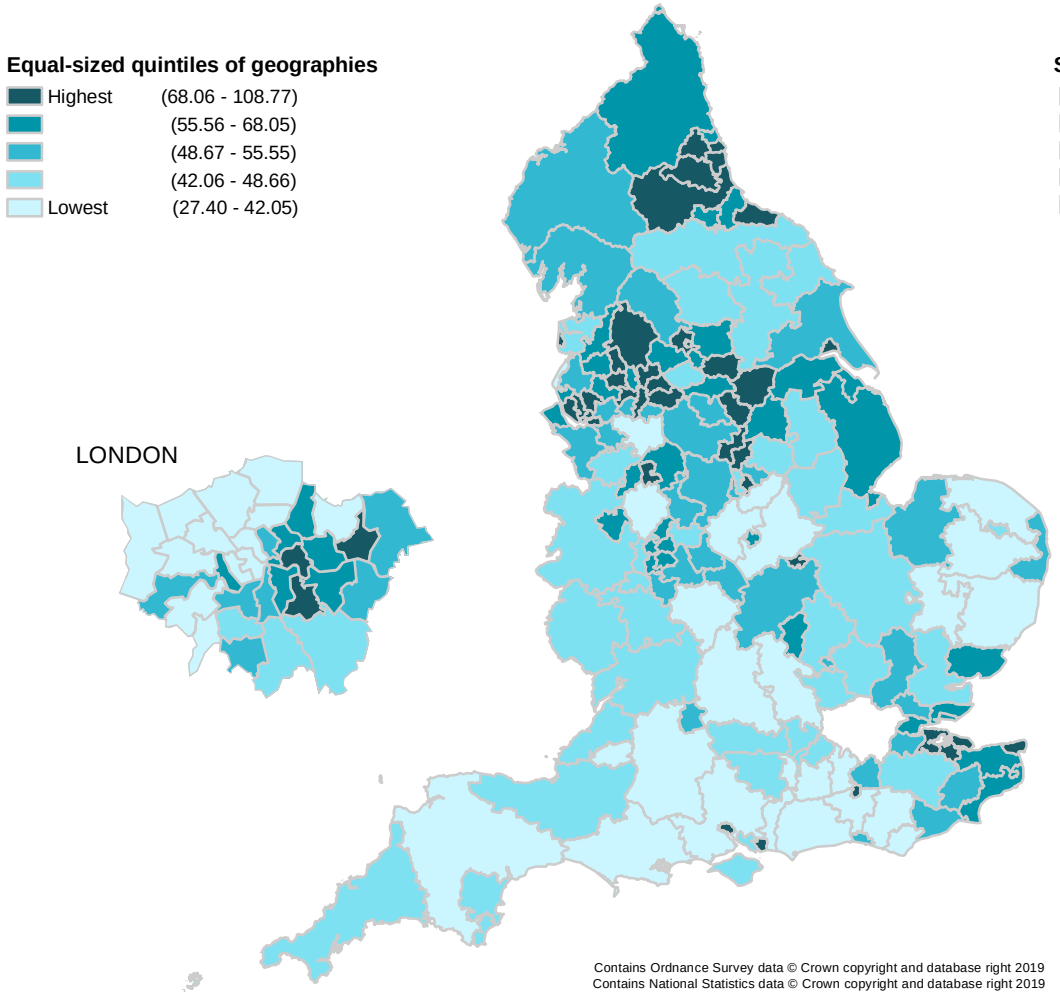
Box plot percentile	CCG rank position (195 CCGs in 2018)
Max	195
95%	Mid value between values of CCGs in ranks 185 and 186
75%	Mid value between values of CCGs in ranks 146 and 147
50% - Median	Mid value between values of CCGs in ranks 97 and 98
25%	Mid value between values of CCGs in ranks 48 and 49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

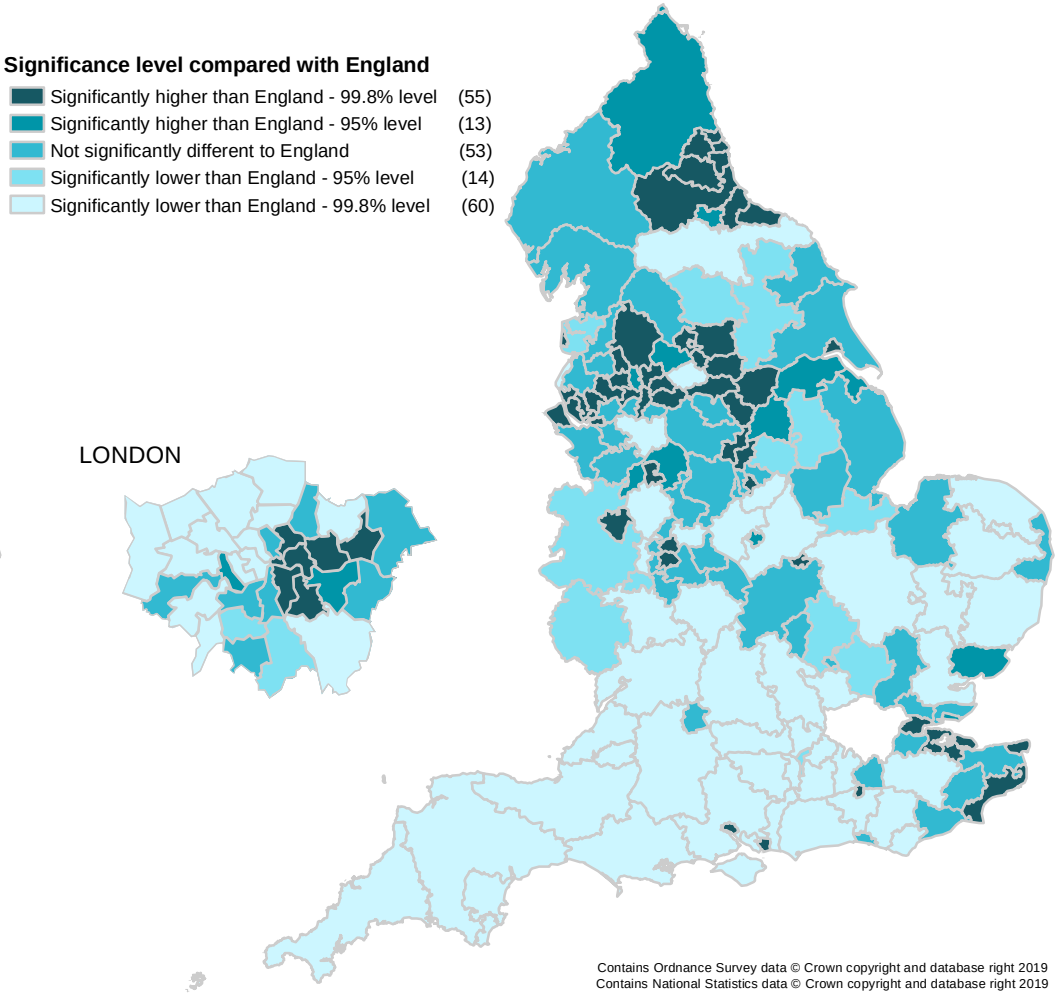
COPD – Disease burden

Map 7a: Variation in mortality rate from COPD (underlying cause) per population by CCG (2015-2017)

Directly standardised rate per 100,000

Optimum Value: Low



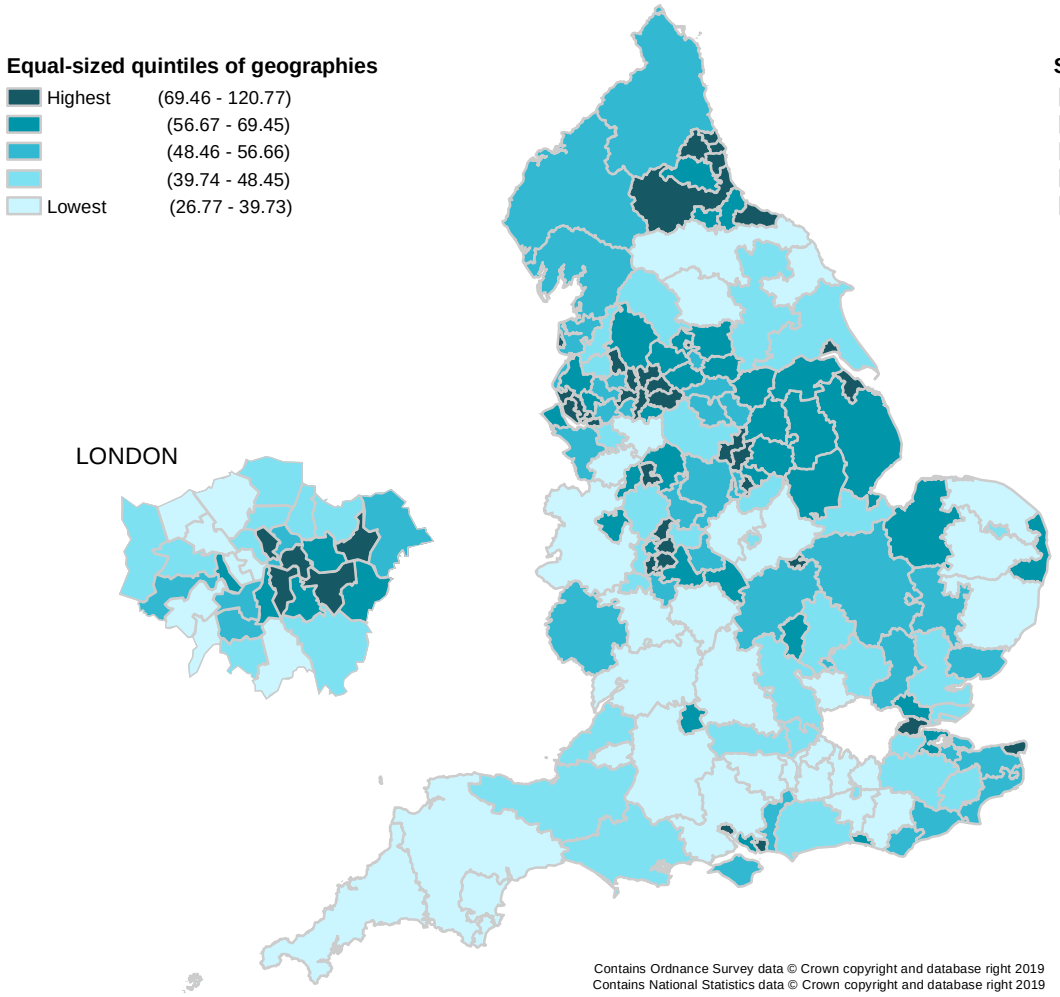


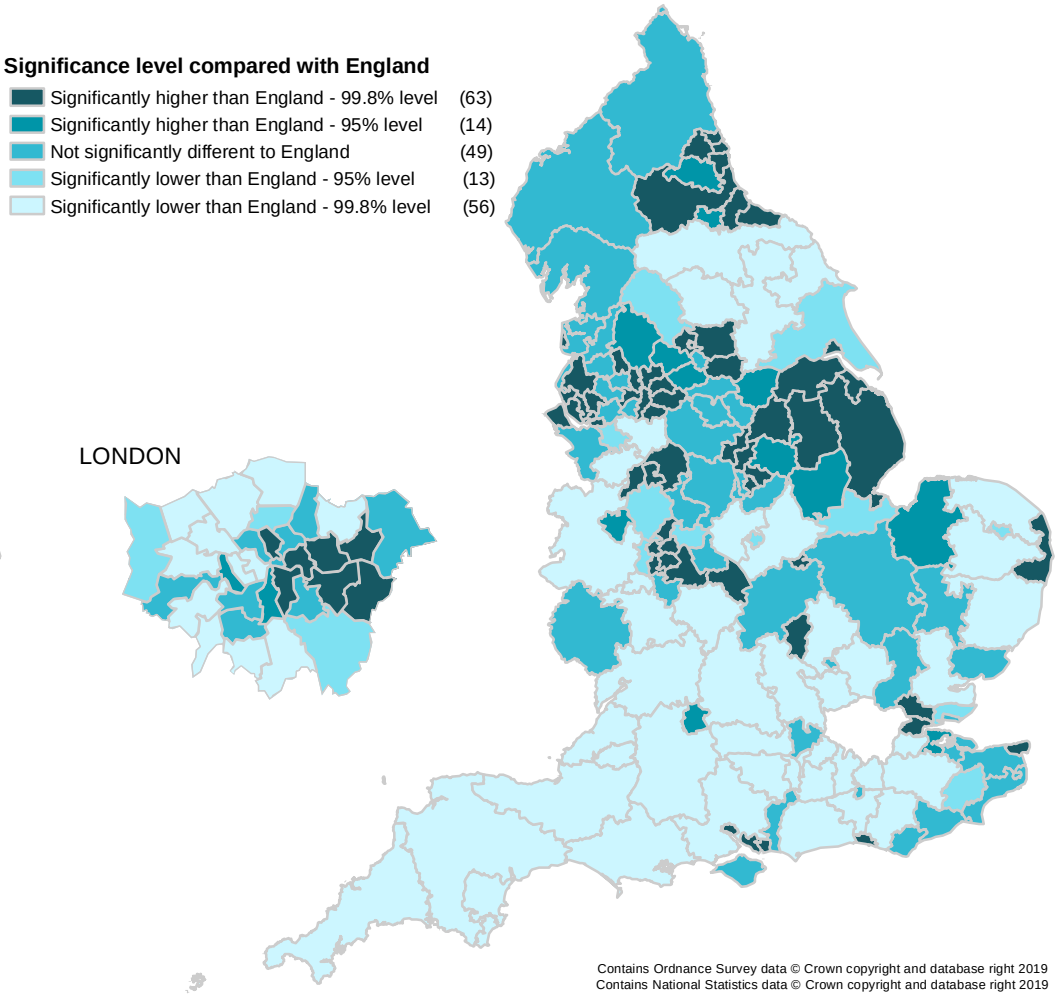
COPD – Disease burden

Map 7b: Variation in mortality rate from COPD as a contributory cause per population by CCG (2015-2017)

Directly standardised rate per 100,000

Optimum Value: Low

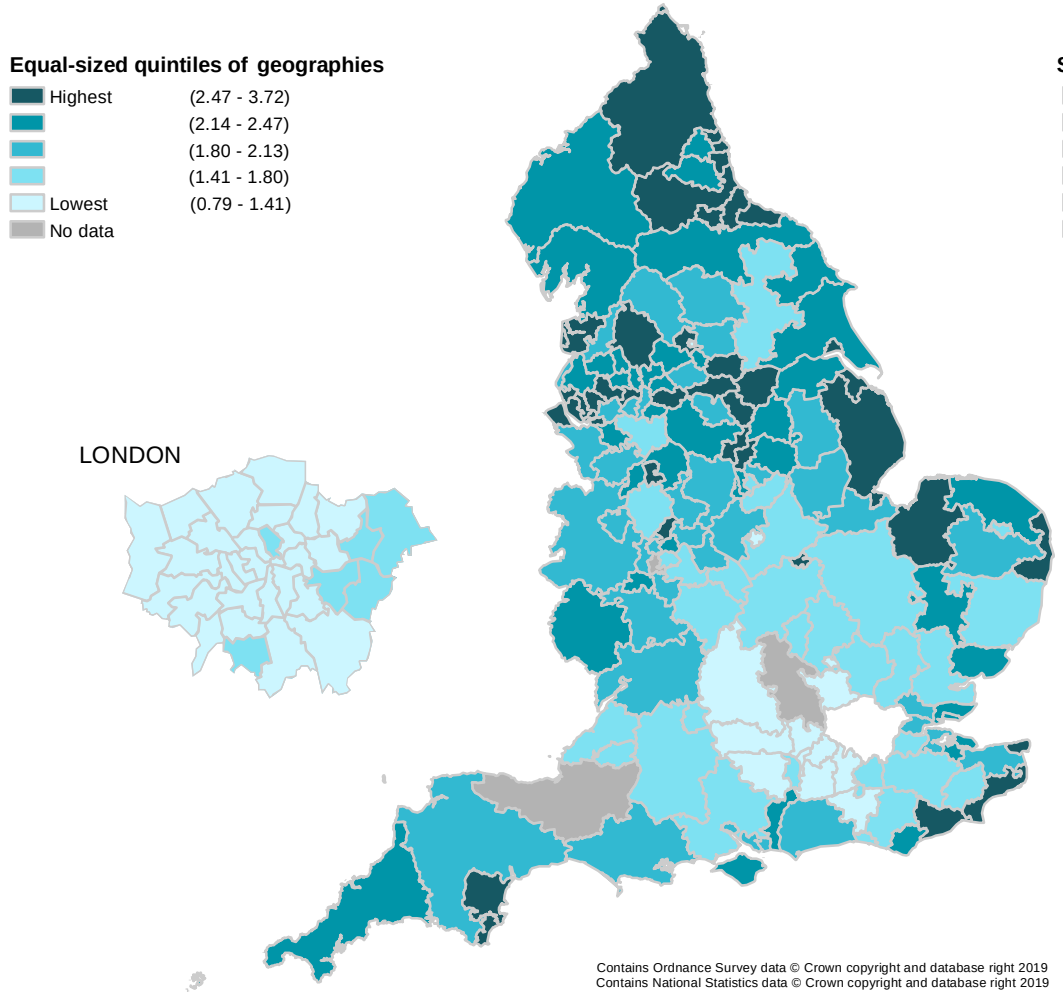




COPD – Disease burden

Map 7c: Variation in percentage of patients with COPD on GP registers by CCG (2017/18)

Optimum value: Requires local interpretation



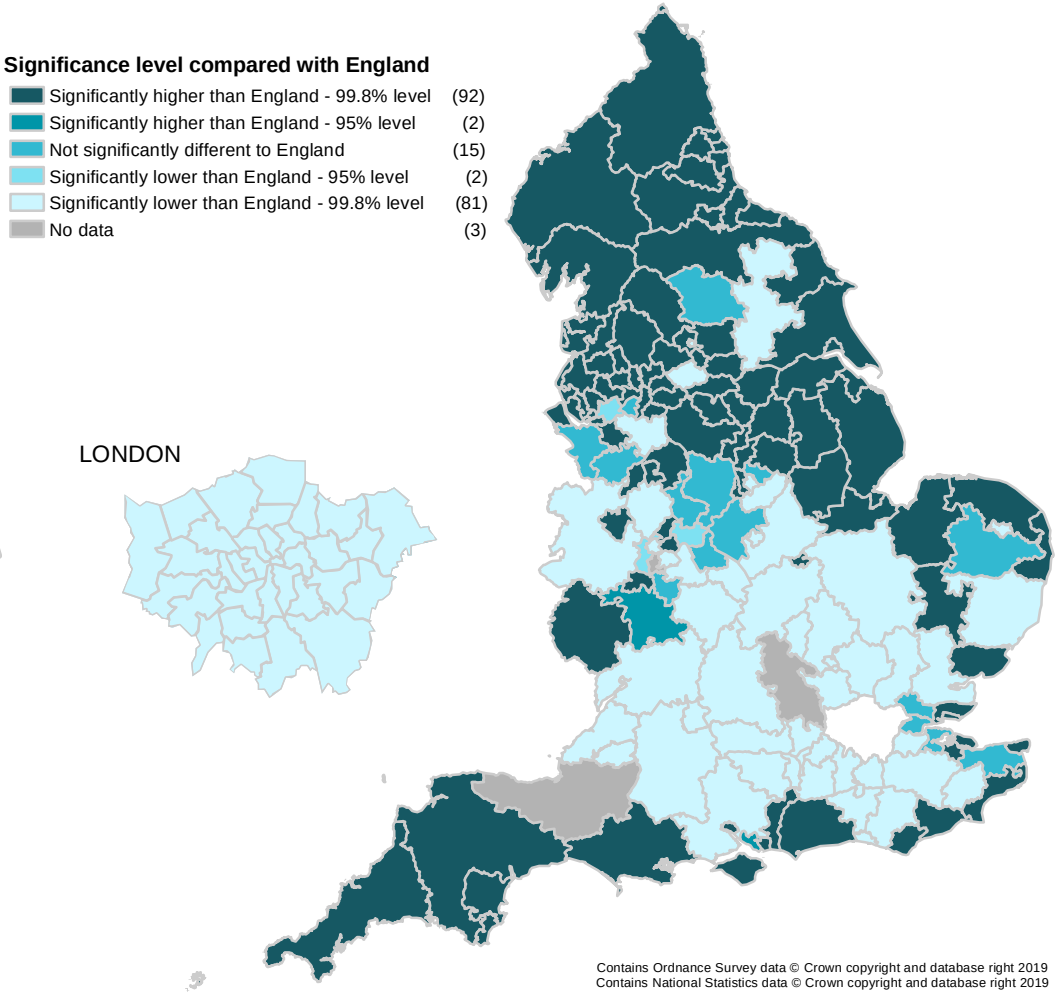


Figure 7.1: Mortality from COPD in selected EU countries[1]

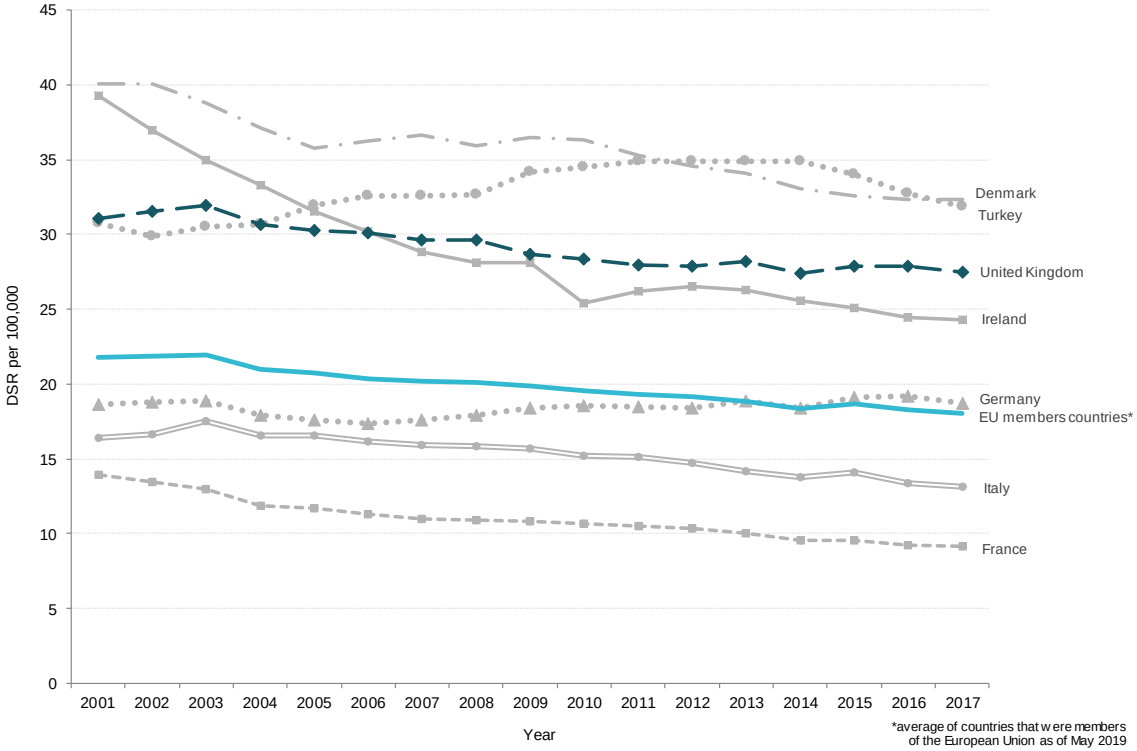
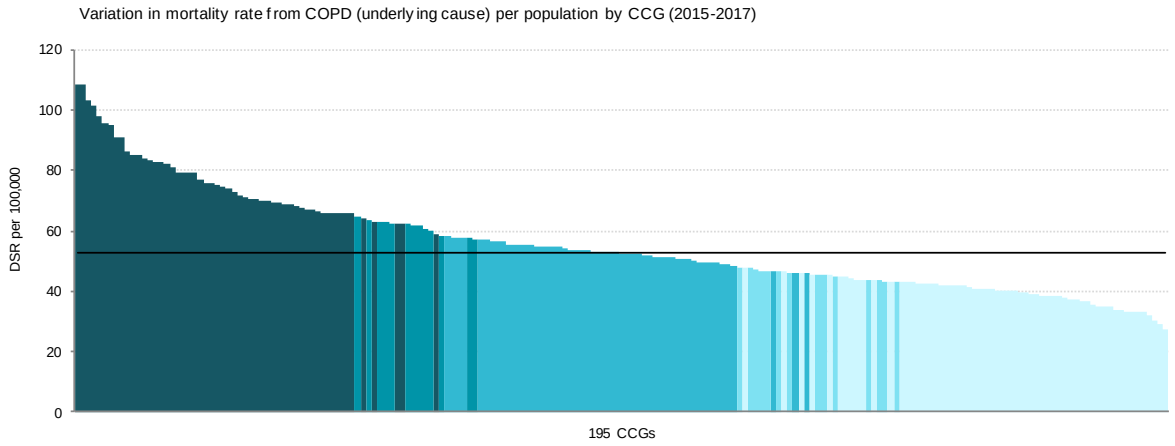


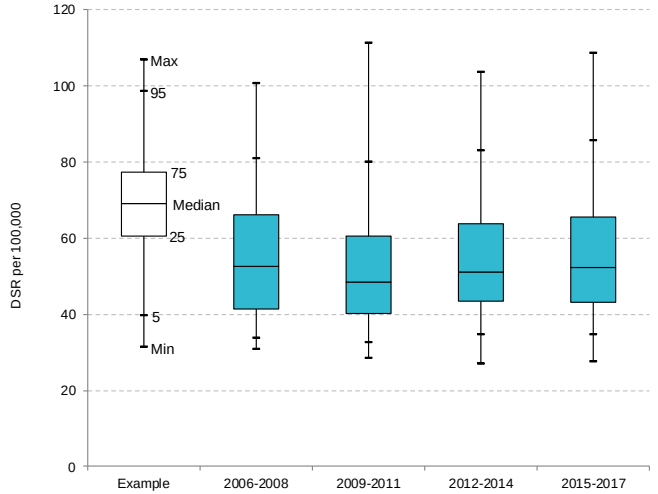
Table 7.1: Underlying cause of death for which COPD was a contributory factor in England (2015-2017)[2]	Count	Percentage
Cancer	25,830	32.4%
Acute heart disease	16,930	21.2%
Other	12,721	16.0%
Dementia	6,025	7.6%
Digestive diseases	4,516	5.7%
Chronic heart disease	4,290	5.4%
Stroke	3,999	5.0%
Genitourinary diseases	1,836	2.3%
Infections	1,387	1.7%
Liver disease	1,197	1.5%
Musculoskeletal disorders	771	1.0%
Blood diseases	176	0.2%
Pneumonia	37	0.0%
Total	**79,715**	**100.0%**

Context

Chronic obstructive pulmonary disease (COPD) is the name given to a range of lung conditions which can cause breathing difficulties. In addition to lung cancer and pneumonia, COPD is one of the 3 leading respiratory causes of death in England. COPD was responsible for more than 26,000 deaths in England in 2017.[2] Of COPD deaths 86% are estimated to be attributable to smoking.[3] Other causes of COPD include occupational exposure to fumes and dust, air pollution and genetics.[4] In many people with COPD, the underlying cause of death is related to co-existing conditions such as cardiovascular disease and cancer as shown in Table 7.1. Map 7b shows the variation in the mortality rate for COPD where it is a contributory factor on the death certificate.

The condition cannot be cured or reversed, but there is well-established evidence that healthcare and public health interventions reduce disease progression and mortality in people with COPD. Long-term oxygen therapy in appropriate patients, increases in physical activity and smoking cessation all improve survival. Non-invasive ventilation (NIV) substantially reduces mortality during COPD exacerbations complicated by acute respiratory failure, whilst long term (home) NIV reduces the risk of readmission or death in selected patients. Invasive ventilation and management in intensive care plays a key role in some severe hospitalised exacerbations. According to statistics from the British Lung Foundation, the UK is among the top 20 countries for COPD mortality worldwide.[5] The UK has one of the highest rates across Europe, with a rate 50% higher than the average across the European Union (Figure 7.1 and see also Figure A2 in the Introduction).





Max-Min (Range)		69.8	82.8	76.6	81.4	No significant change
95th-5th percentile		47.0	47.5	48.3	51.0	No significant change
75th-25th percentile		24.7	20.3	20.3	22.6	No significant change
Median		52.5	48.5	51.2	52.4	No significant change

Many people with COPD are unaware they have the condition. More than 1 million people in England are currently diagnosed with COPD on patient registers[6] and a further 2 million are undiagnosed.[7] Failure to diagnose is not confined to people with very mild disease: more than 50% of people with moderate COPD have not been detected and around 20% of undiagnosed people have severe or very severe disease. In a national audit in 2018, only 40.5% of admissions for COPD had an available spirometry report.[8] Making a diagnosis of COPD early is important for patients because:

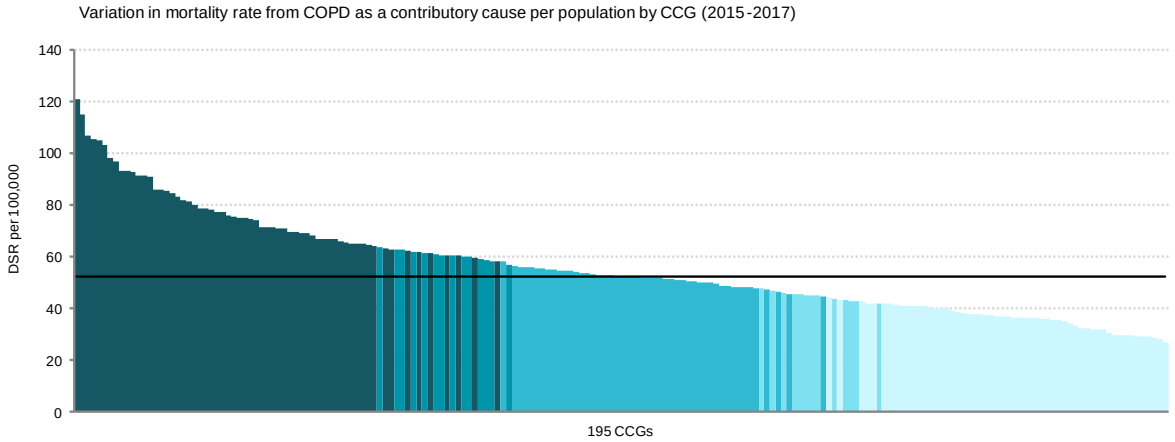
- lung function declines progressively, and the rate of decline is faster in the earlier stages of COPD
- early treatment makes a difference to symptom control, and disease impact and outcomes
- acute exacerbations are common even in moderate disease
- symptoms have a major impact on quality of life and physical and social activity

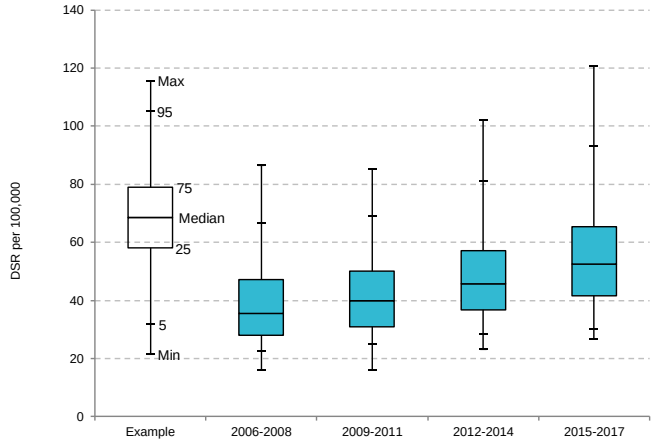
Magnitude of variation

Map 7a: Variation in mortality rate from COPD (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 27.4 to 108.8 per 100,000 population, which is a 4.0-fold difference between CCGs. The England value for 2015 to 2017 was 52.7 per 100,000 population.

The box plot shows the distribution of CCG values for the period 2006-2008 to 2015-2017. There was no significant change in any of the 3 variation measures between 2006 to 2008 and 2015 to 2017.





Max-Min (Range)		70.4	69.2	78.8	94.0	No significant change
95th-5th percentile		44.1	44.0	52.7	62.7	No significant change
75th-25th percentile		19.1	19.1	20.2	23.8	No significant change
Median		35.5	39.8	45.8	52.4	INCREASING Significant

Analysis by PHE for this Atlas, has shown that if all CCGs improved their mortality rate from COPD (by underlying cause) to that of the CCGs with the lowest mortality, approximately 7,700 lives would have been saved each year from 2015 to 2017.

Map 7b: Variation in mortality rate from COPD as a contributory 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 26.8 to 120.8 per 100,000 population, which is a 4.5-fold difference between CCGs. The England value for 2015 to 2017 was 52.4 per 100,000 population.

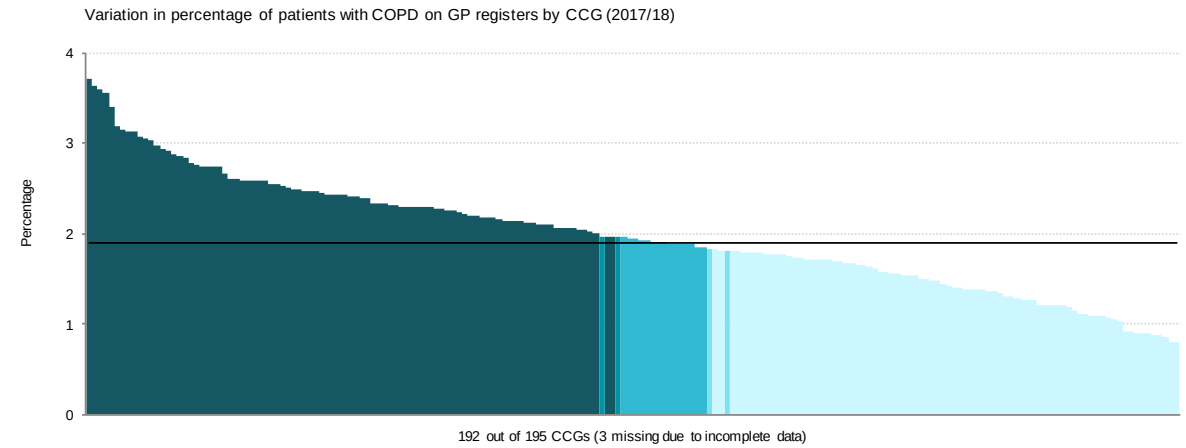
The box plot shows the distribution of CCG values for the period 2006-2008 to 2015-2017. There was no significant change in any of the three variation measures between 2006 to 2008 and 2015 to 2017. The median increased significantly from 35.5 in 2006-2008 to 52.4 in 2015-2017.

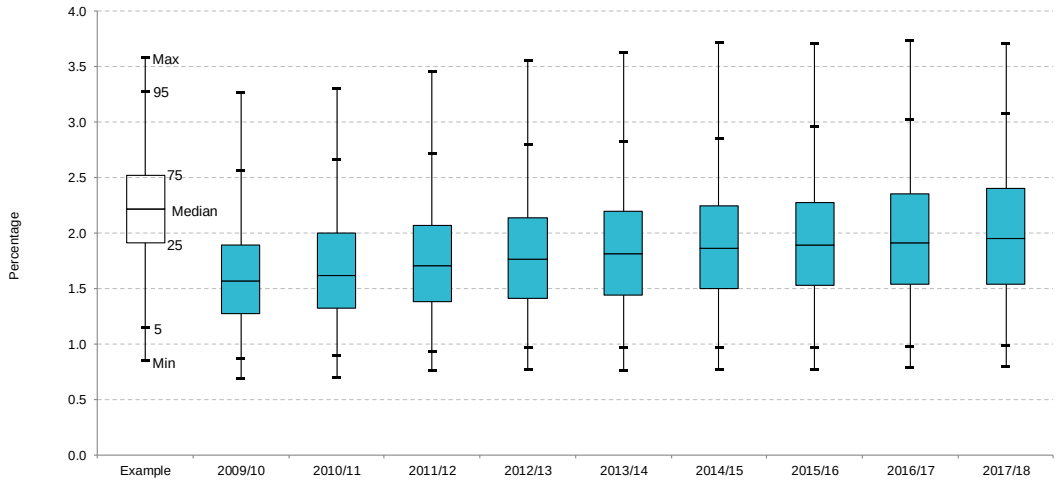
Some of the variation for mortality from COPD for both underlying and as a contributory cause of death will reflect differences in:

- smoking prevalence in local population
- levels of deprivation
- previous occupational exposures
- prevalence of COPD

Map 7c: Variation in percentage of patients with COPD on GP registers by CCG (2017/18)

The maps and column chart display the latest period (2017/18), during which CCG values ranged from 0.8% to 3.7%, which is a 4.7-fold difference between CCGs. The England value for 2017/18 was 1.9%.





		2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	
Max-Min (Range)		2.6	2.6	2.7	2.8	2.9	3.0	3.0	2.9	2.9	WIDENING Significant
95th-5th percentile		1.7	1.8	1.8	1.8	1.9	1.9	2.0	2.0	2.1	WIDENING Significant
75th-25th percentile		0.6	0.7	0.7	0.7	0.7	0.8	0.7	0.8	0.9	WIDENING Significant
Median		1.6	1.6	1.7	1.8	1.8	1.9	1.9	1.9	2.0	INCREASING Significant

The box plot shows the distribution of CCG values for the period 2009/10 to 2017/18.There has been significant widening of all three measures of variation.

The median increased significantly from 1.6 in 2009/10 to 2.0 in 2017/18.

Variation in recorded prevalence may be due to:

- lack of awareness of the symptoms of COPD and when people should seek medical attention
- doctors often treat patients' symptoms but do not investigate the underlying lung disease
- spirometry, the key diagnostic test, is often performed and interpreted inaccurately
- problems with accurate coding of diagnoses and test results

GP prevalence rates may also be affected by the underlying age structure of the local population. The QOF data is not age standardised. The prevalence of COPD increases with age. This is why in the maps high recorded prevalence rates of COPD are seen in CCGs with older populations as well as those with high smoking prevalence rates.

Options for action

To reduce avoidable mortality in people with COPD, commissioners and providers need to ask questions about how care is delivered across the entire patient pathway, and consider implementing the interventions shown in Box 7.1.

To reduce the variation in the proportion of patients with COPD on GP registers, it is recommended that systematic targeted case finding is carried out to identify symptomatic patients without a diagnosis of COPD. This may include an audit of GP patient registers to identify smokers or ex-

smokers with a history of recurrent respiratory symptoms or infections, or patients with previous treatment with inhalers. Actively sending patients a symptom questionnaire and those with symptoms invited for spirometry testing.[9]

Box 7.1: Interventions to reduce avoidable mortality in people with COPD

- quality-assured accurate and early diagnosis
- pro-active chronic disease management with optimisation of pharmacotherapy and support for self management
- pro-active assessment and management of co-morbid conditions
- prompt integrated management of acute exacerbations with specialist input when required
- support for smoking cessation
- home oxygen therapy when indicated after structured assessment

Resources

Department of Health (2011) An outcomes strategy for people with chronic obstructive pulmonary disease (COPD) and Asthma in England [Accessed 11 July 2019]

Department of Health (2012) An Outcomes Strategy for COPD and Asthma: NHS Companion Document [Accessed 11 July 2019]

Association for Respiratory Technology and Physiology (2013) A Guide to Performing Quality Assured Diagnostic Spirometry [Accessed 11 July 2019]

NHS Medical Directorate (2012) COPD Commissioning Toolkit: A Resource for Commissioners [Accessed 07 August 2019]

National Institute for Health and Care Excellence (2016) Chronic obstructive pulmonary disease in adults (NICE quality standard [QS10]) [Accessed 11 July 2019]

NHS Improvement – Lung: National Improvement Projects (2011) Improving earlier diagnosis and the long term management of COPD: Testing the case for change [Accessed 11 July 2019]

National Institute for Health and Care Excellence (2018) Chronic obstructive pulmonary disease in over 16s: diagnosis and management (NICE guideline [NG115]) [Accessed 11 July 2019]

IMPRESS – IMProving and Integrating RESpiratory Services in the NHS [Accessed 11 July 2019]

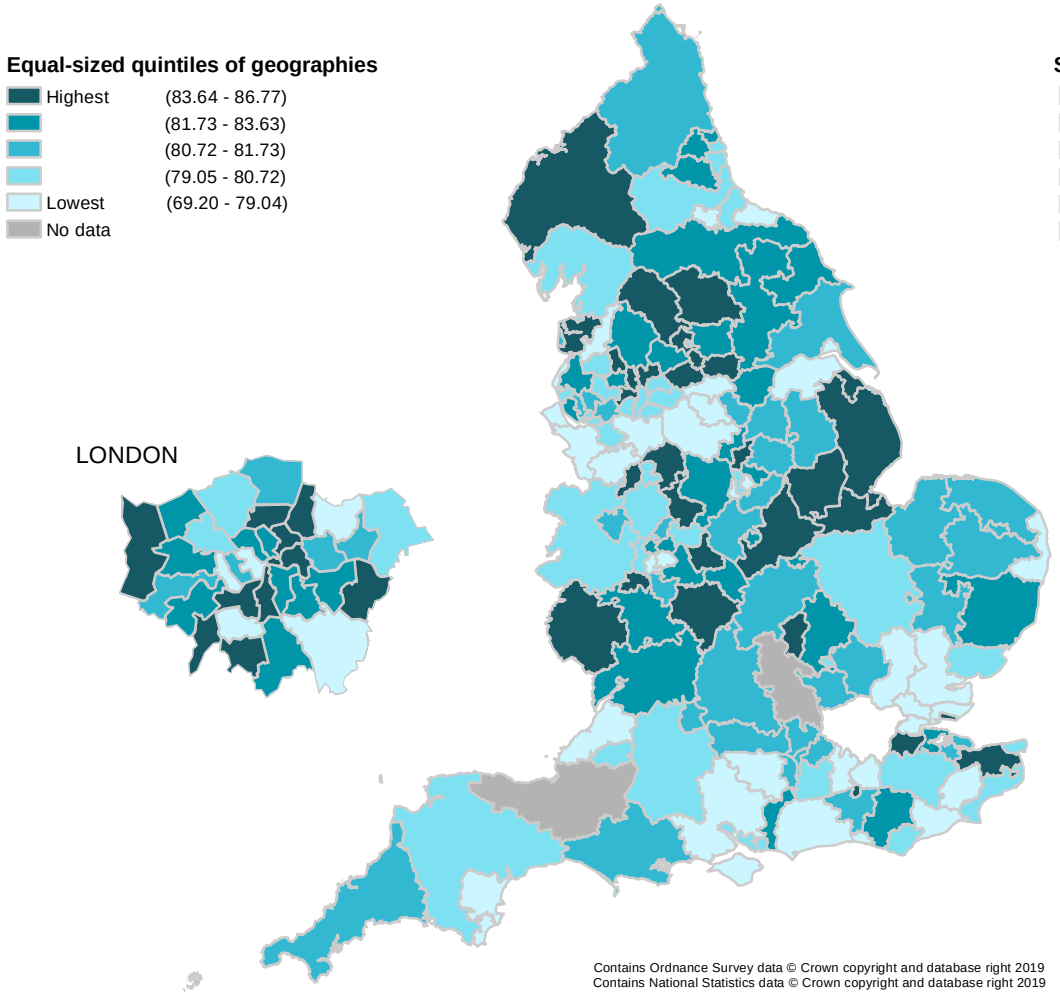
NHS England NHS RightCare Pathways: COPD [Accessed 11 July 2019]

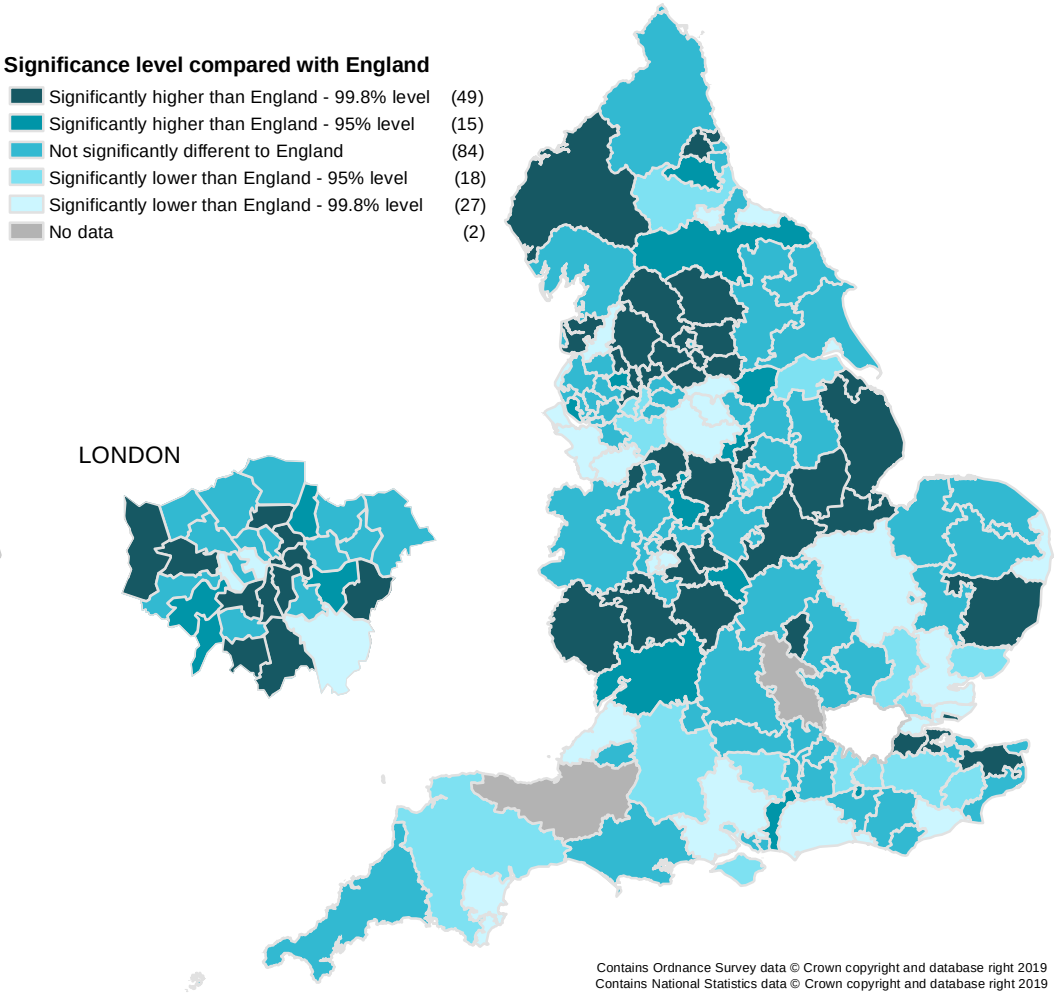
[1] WHO European Health Information Gateway [Accessed 11 July 2019]
[2] Office for National Statistics (2019) Mortality statistics: deaths registered in England and Wales Office for National Statistics, Newport, UK [Accessed 11 July 2019]
[3] Public Health England (2015) Press release: Chronic smoking-related lung disease blights over 1 million lives in England [Accessed 11 July 2019]
[4] NHS England (2016) Causes: Chronic obstructive pulmonary disease. Health A to Z [Accessed 11 July 2019]
[5] British Lung Foundation. Chronic obstructive pulmonary disease (COPD) statistics [Accessed 11 July 2019]
[6] NHS Digital Quality Outcomes Framework (QOF) 2017/18 [Accessed 11 July 2019]
[7] NICE (2016) Chronic obstructive pulmonary disease in adults Quality standard [QS10] [Accessed 11 July 2019]
[8] Hurst J, McMillan V, Mortier K and others (2019) COPD clinical audit 2017/18 (people with COPD exacerbations discharged from acute hospitals in England and Wales between September 2017 and 2018) National Asthma and COPD Audit Programme (NACAP) London: RCP [Accessed 11 July 2019]
[9] Jordan R, Adab P, Sitch A and others (2016) Targeted case finding for chronic obstructive pulmonary disease versus routine practice in primary care (TargetCOPD): a cluster-randomised controlled trial Lancet Respiratory Medicine 4:720–30 doi: 10.1016/S2213-2600(16)30149-7

COPD – Diagnosis

Map 8a: Variation in percentage of patients with COPD on GP registers in whom diagnosis confirmed by post bronchodilator spirometry (including exceptions) by CCG (2017/18)

Optimum Value: High

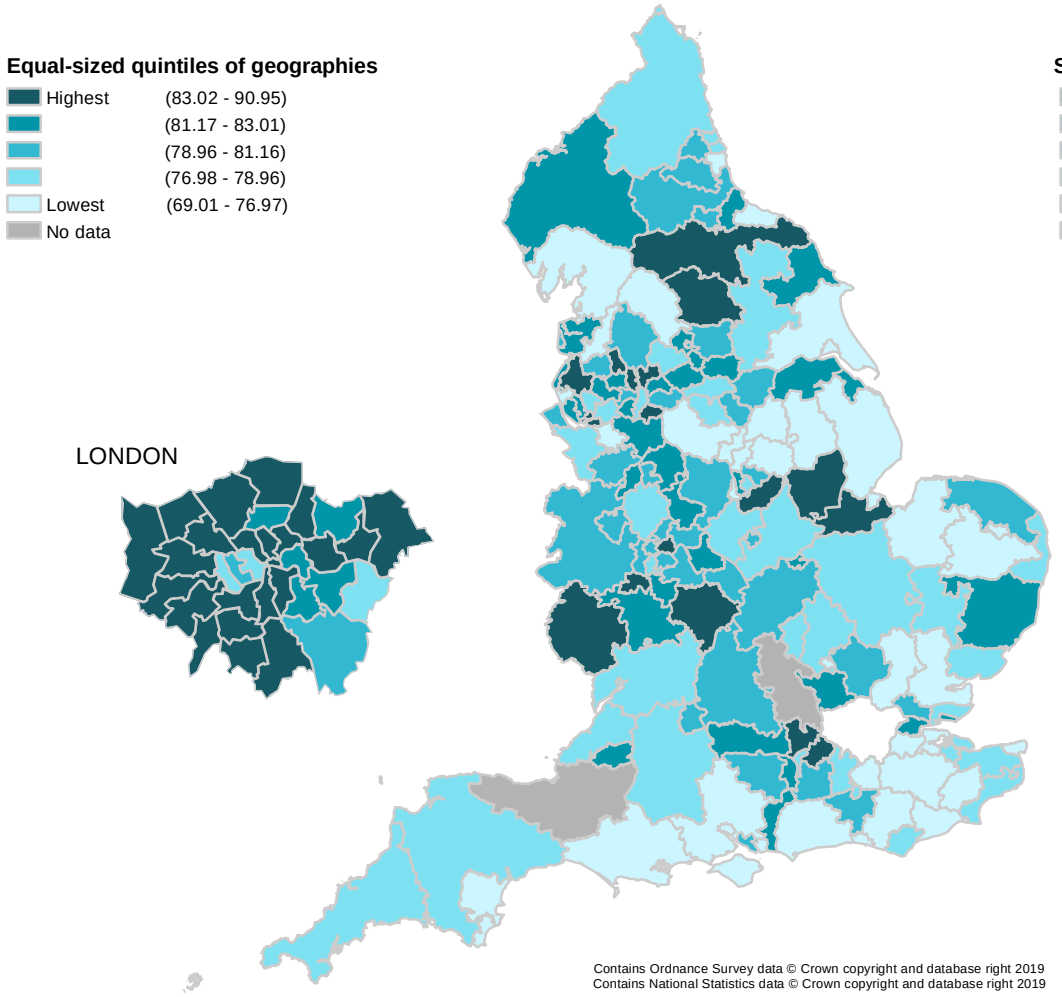


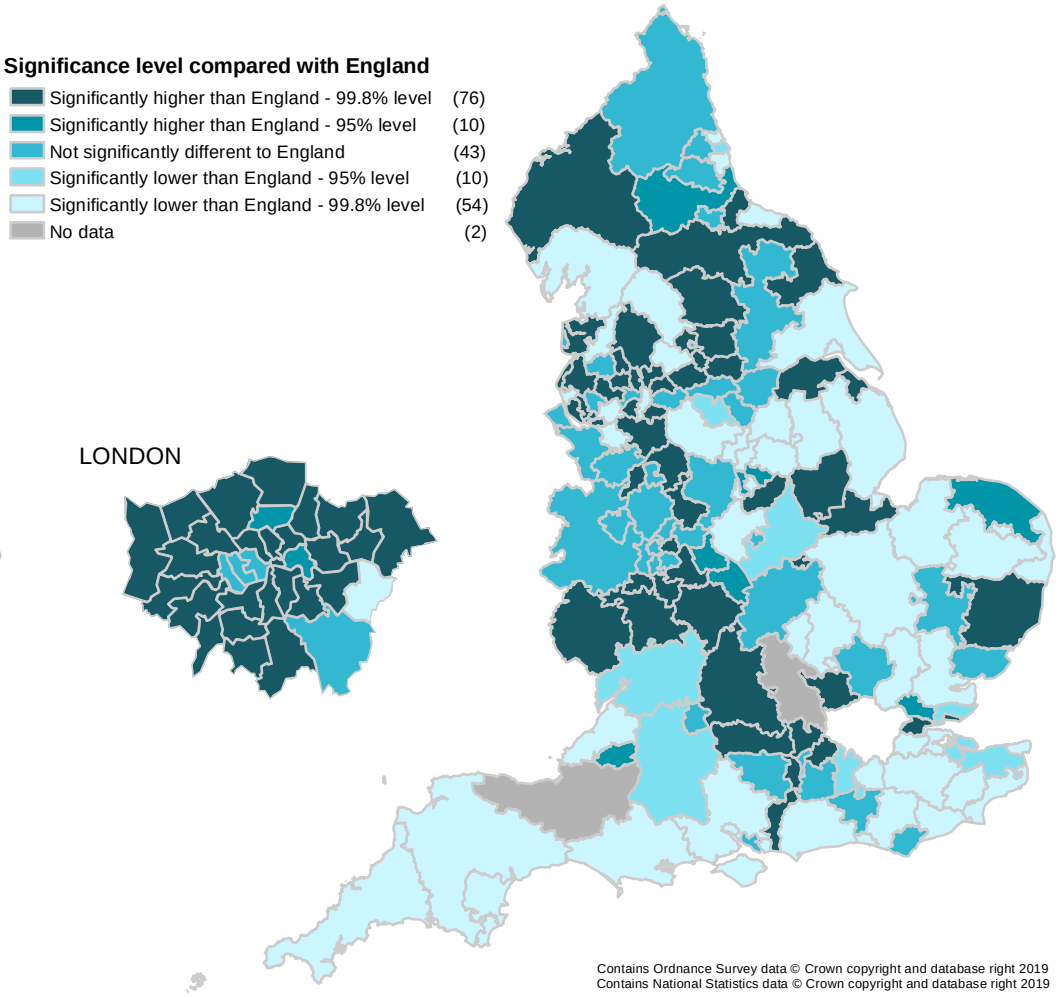


COPD – Diagnosis

Map 8b: Variation in percentage of patients with COPD on GP registers assessed using MRC dyspnoea score in the last 12 months (including exceptions) by CCG (2017/18)

Optimum Value: High

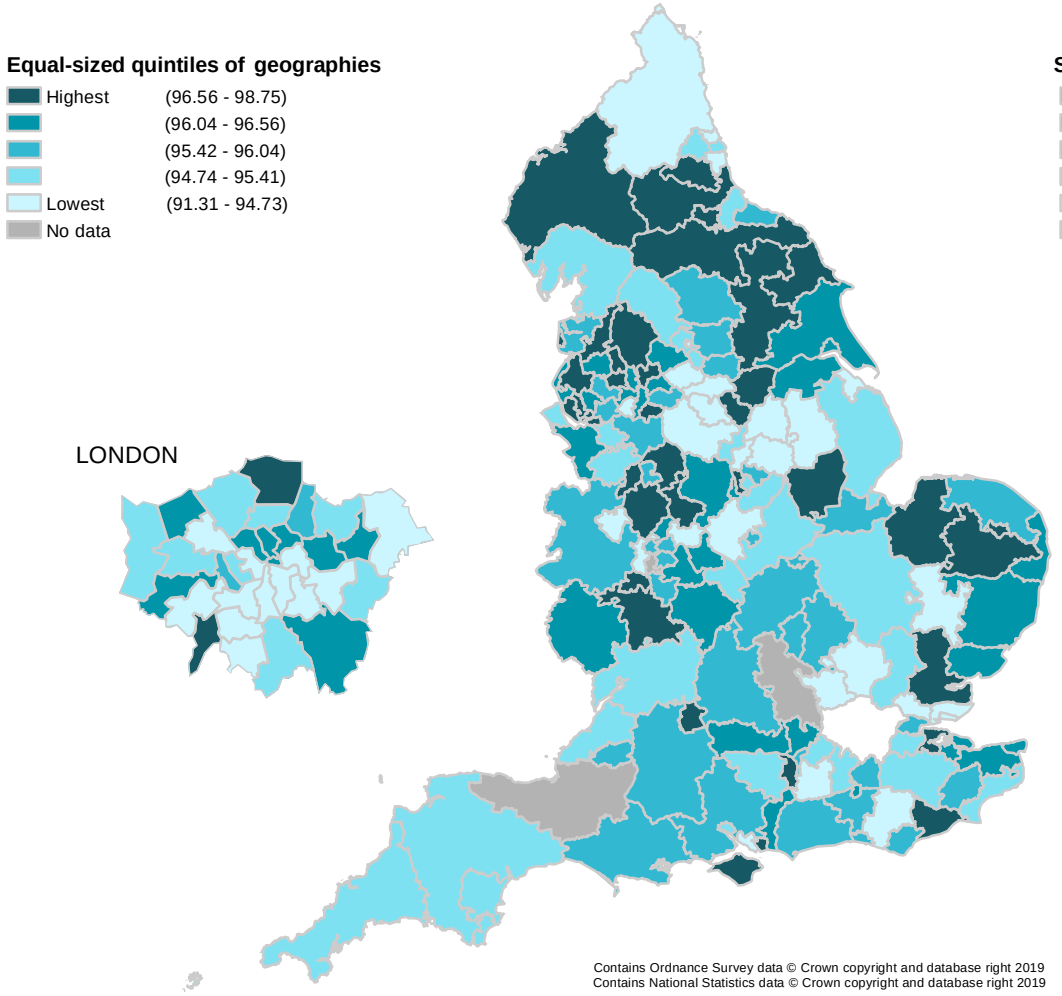


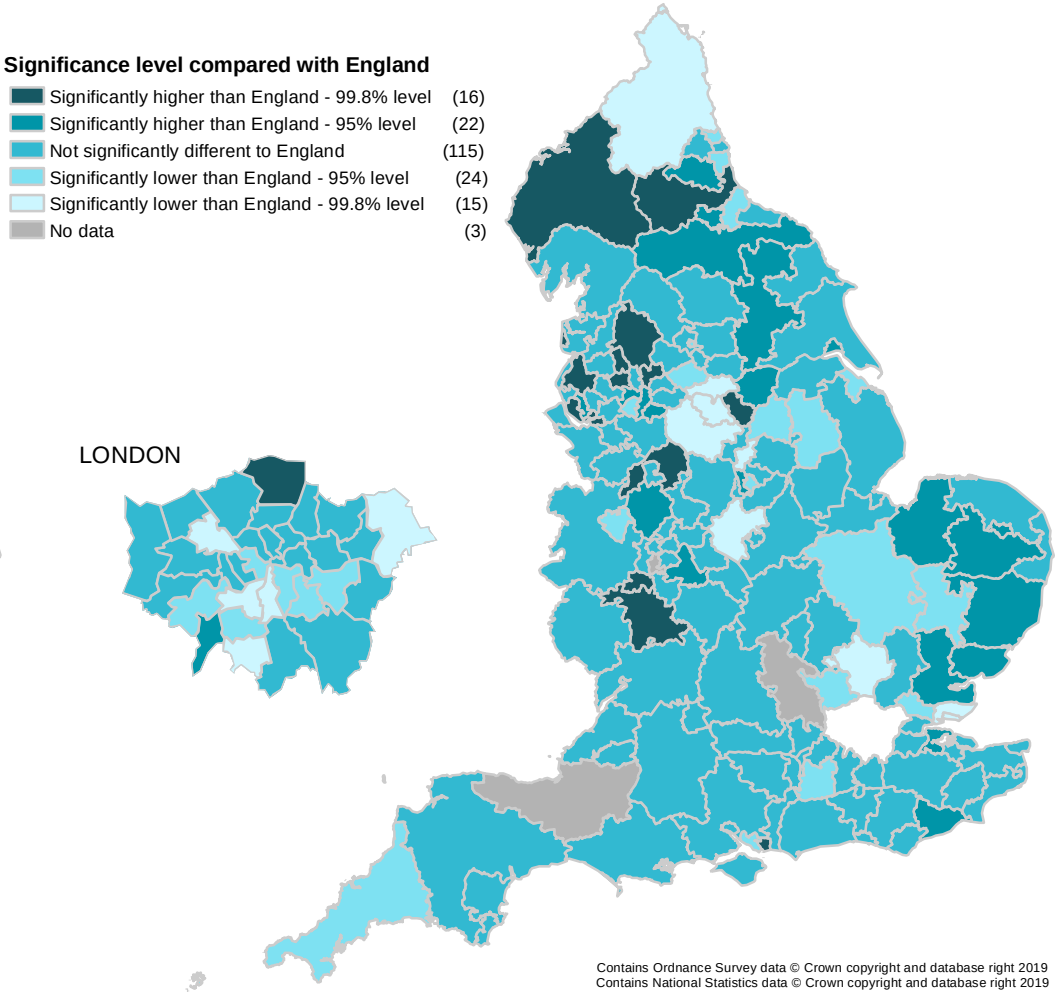


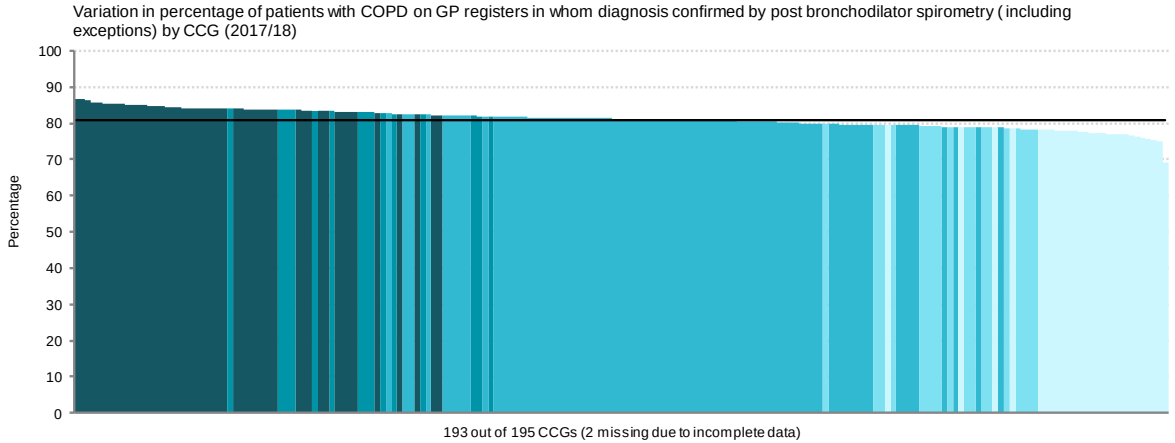
COPD – Diagnosis

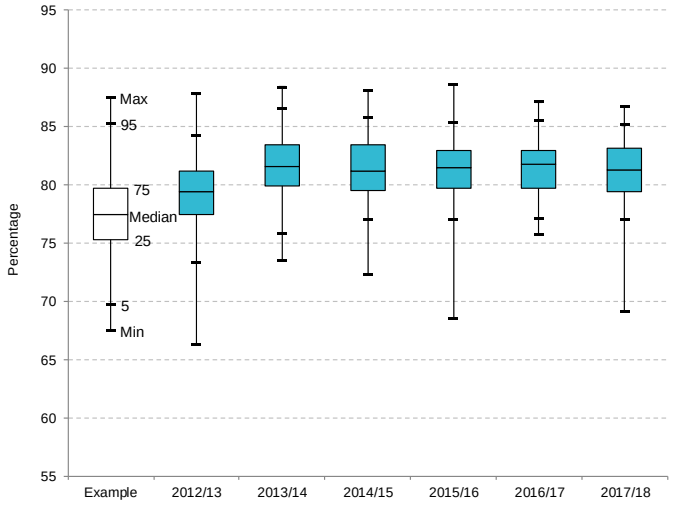
Map 8c: Variation in percentage of patients with COPD on GP registers with MRC dyspnoea grade >=3, with a record of oxygen saturation value within the preceding 12 months (including exceptions) by CCG (2017/18)

Optimum Value: High









		2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	
Max-Min (Range)		21.4	15.0	15.8	20.1	11.4	17.6	No significant change
95th-5th percentile		11.0	10.7	8.7	8.4	8.5	8.2	NARROWING Significant
75th-25th percentile		3.8	3.6	3.9	3.2	3.2	3.7	No significant change
Median		79.4	81.5	81.2	81.5	81.8	81.3	No significant change

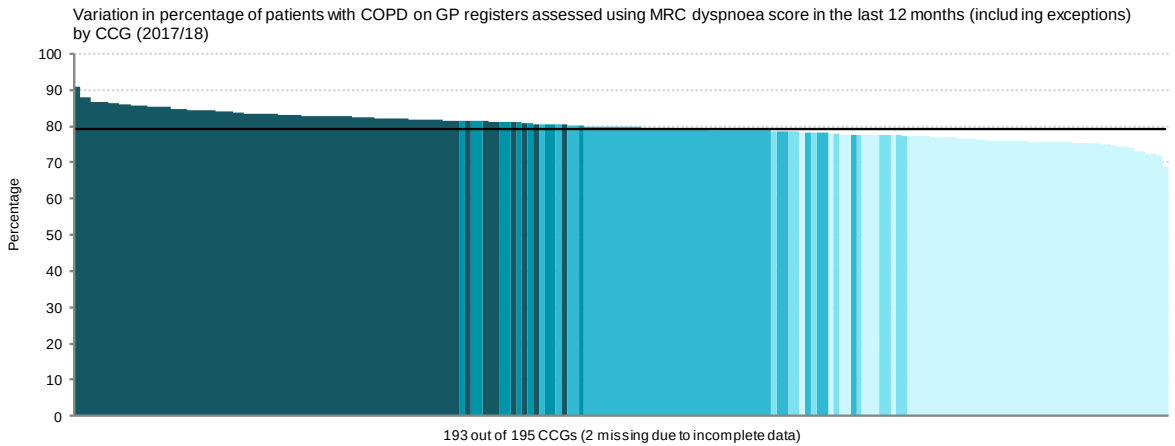
Context

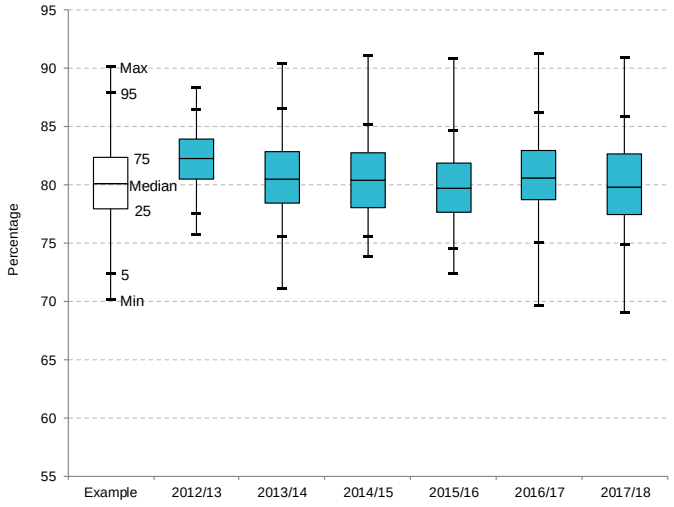
It has been estimated that up to 2 million people in the UK with COPD remain undiagnosed.[1] Late diagnosis can result in faster respiratory deterioration and a higher number of exacerbations. Many patients are also incorrectly diagnosed with COPD when they have another condition. Consequently, they may receive inadequate, inappropriate and often expensive treatment. There are several reasons for the high level of late and inaccurate diagnosis:

- people often do not recognise the symptoms of COPD because they develop gradually
- many people believe it is normal to have a cough and be short of breath, think the symptoms are due to age or smoking and that nothing can be done
- when patients present, doctors often treat the symptoms but do not investigate the underlying lung disease
- spirometry, the key diagnostic test, is often performed and interpreted inaccurately
- problems with accurate coding of diagnoses and test results in both primary and secondary care

According to the latest NICE guidance, a diagnosis of COPD should be suspected based on symptoms and signs and supported by spirometry. Post-bronchodilator spirometry should be performed to confirm the diagnosis of COPD and to reconsider the diagnosis in those who show an exceptionally good response to treatment.

Breathlessness is one of the primary symptoms of COPD. The Medical Research Council (MRC) dyspnoea scale[2] is the tool recommended by NICE to grade breathlessness according to the corresponding level of exertion.





Max-Min (Range)		12.6	19.4	17.3	18.5	21.6	21.9	WIDENING Significant
95th-5th percentile		9.0	11.0	9.7	10.1	11.2	11.0	No significant change
75th-25th percentile		3.4	4.4	4.7	4.2	4.3	5.2	No significant change
Median		82.3	80.5	80.4	79.7	80.6	79.9	No significant change

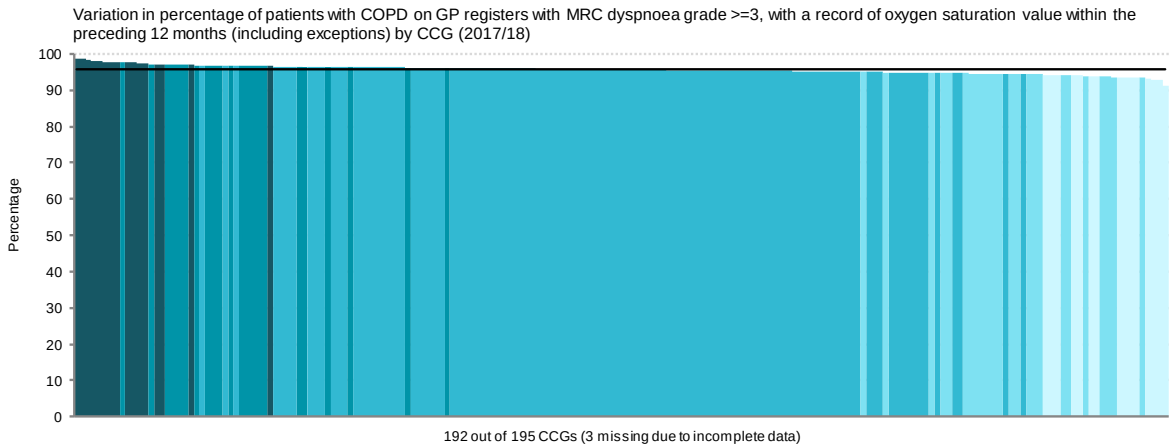
Pulse oximetry is usually used to direct referral for long term oxygen therapy assessment in stable patients, and in the assessment and management of acute exacerbations, including the decision to refer to hospital.

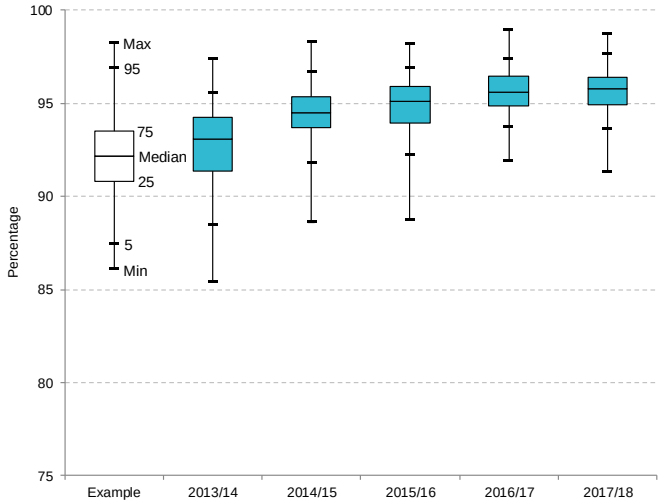
These measures can easily be performed in primary care, where the necessary equipment and expertise are usually available.

It is recommended by NICE that patients with COPD are reviewed at least annually, and more frequently if required. Annual reviews are an important opportunity to discuss with patients how they are managing their COPD, any change in severity of symptoms, review medicines, identify comorbidities, promote smoking cessation, flu vaccination, regular exercise and pulmonary rehabilitation and address any other issues in their COPD management.

Inhaler technique should be included in this review, and clinicians should also consider the environmental impact of any inhalers prescribed: metered dose inhalers (MDIs) have been found to be a source of greenhouse gases, whereas dry powder inhalers (DPIs) are not known to have this harmful effect on the environment. DPIs, although not suitable for all patients, are associated with fewer inhaler errors and, compared to MDIs used without a spacer, better deposition of the drug in the lung.

Under the QOF scheme, GPs are rewarded for achieving an agreed level of population coverage for each indicator. In calculating coverage, practices are allowed to exclude appropriate patients (known as exceptions) from the target population to avoid being penalised for factors beyond the practices' control, for example when patients do not attend for review despite repeated invitations, or if a medication cannot be prescribed due to a contraindication or side-effect.





		2013/14	2014/15	2015/16	2016/17	2017/18	
Max-Min (Range)		12.0	9.7	9.5	7.0	7.4	NARROWING Significant
95th-5th percentile		7.1	4.9	4.6	3.7	4.0	No significant change
75th-25th percentile		2.9	1.7	1.9	1.6	1.5	No significant change
Median		93.1	94.5	95.1	95.6	95.8	INCREASING Significant

The exception-adjusted population coverage is reported annually by NHS Digital.[3] The analysis presented in this Atlas aims to show the intervention rate so includes exceptions within the denominators (see Introduction to the data section).

Magnitude of variation

Map 8a: Variation in percentage of patients with COPD on GP registers in whom diagnosis confirmed by post bronchodilator spirometry (including exceptions) by CCG (2017/18)

The maps and column chart display the latest period (2017/18), during which CCG values ranged from 69.2% to 86.8%, which is a 1.3-fold difference between CCGs. The England value for 2017/18 was 80.8%.

The box plot shows the distribution of CCG values for the period 2012/13 to 2017/18.

The 95th to 5th percentile gap narrowed significantly.

Map 8b: Variation in percentage of patients with COPD on GP registers assessed using MRC dyspnoea score in the last 12 months (including exceptions) by CCG (2017/18)

The maps and column chart display the latest period (2017/18), during which CCG values ranged from 69.0% to 90.9%, which is a 1.3-fold difference between CCGs. The England value for 2017/18 was 79.4%.

The box plot shows the distribution of CCG values for the period 2012/13 to 2017/18.

The maximum to minimum range widened significantly.

Map 8c Variation in percentage of patients with COPD on GP registers with MRC dyspnoea grade >=3, with a record of oxygen saturation value within the preceding 12 months (including exceptions) by CCG (2017/18)

The maps and column chart display the latest period (2017/18), during which CCG values ranged from 91.3% to 98.8%, which is a 1.1-fold difference between CCGs. The England value for 2017/18 was 95.6%.

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

The maximum to minimum range narrowed significantly.

The median increased significantly from 93.1 in 2013/14 to 95.8 in 2017/18.

Reasons for variation are likely to be due to differences in primary care procedures. Some areas may provide additional staff guidance on the tests and investigations to be carried out at reviews of patients with COPD, acting as an 'aide memoire' when performing the review and ensuring that all necessary tests have been carried out.

Performing spirometry and pulse oximetry requires trained staff and available equipment. Figures may be lower in areas where there are fewer trained primary care staff who are able to carry out the investigations, or complete the MRC dyspnoea questions with their patients.

There is also likely to be variation in the frequency with which patients are labelled as 'exceptions' between practices. Whilst being labelled as an 'exception' may prevent the practice from recalling a patient to complete the investigations included here, the dataset in this report includes exceptions, and so may appear unfavourable on areas where practices have a large number of exceptions.

Options for action

Potential options to reduce the variation in the measures above include:

Quality-assured diagnostic spirometry: Ensure that diagnostic spirometry is performed only by professionals with the appropriate training, competencies and equipment; standards are clearly defined and equally applicable to primary, community and secondary care settings.

Breathlessness symptom pathway to improve the accuracy of diagnosis: to streamline and coordinate care to achieve early diagnosis and early treatment for patients suffering from non-acute breathlessness.

Quality-assured workforce trained to make accurate diagnosis of respiratory symptoms.

Public health campaigns to promote lung health and early recognition of the symptoms of COPD.

Resources

National Institute for Health and Care Excellence (2018) Chronic obstructive pulmonary disease (NG115) Chronic obstructive pulmonary disease in over 16s: diagnosis and management (NICE guidance [NG115]) [Accessed 19 February 2019]

NHS England NHS RightCare Pathways: COPD [Accessed 19 February 2019]

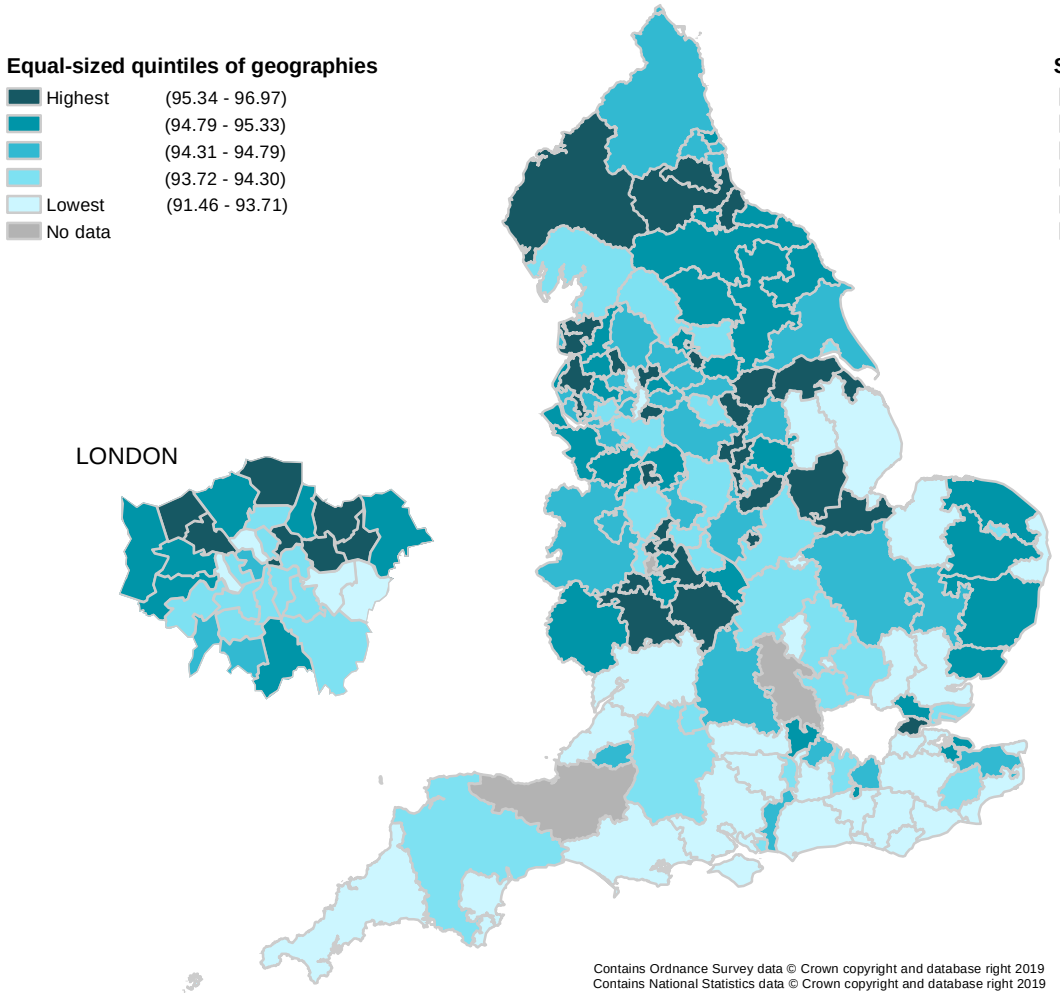
Leicester, Leicestershire, Rutland (University Hospitals of Leicester NHS Trust) (2016) Breathlessness Pathway [Accessed 19 February 2019]

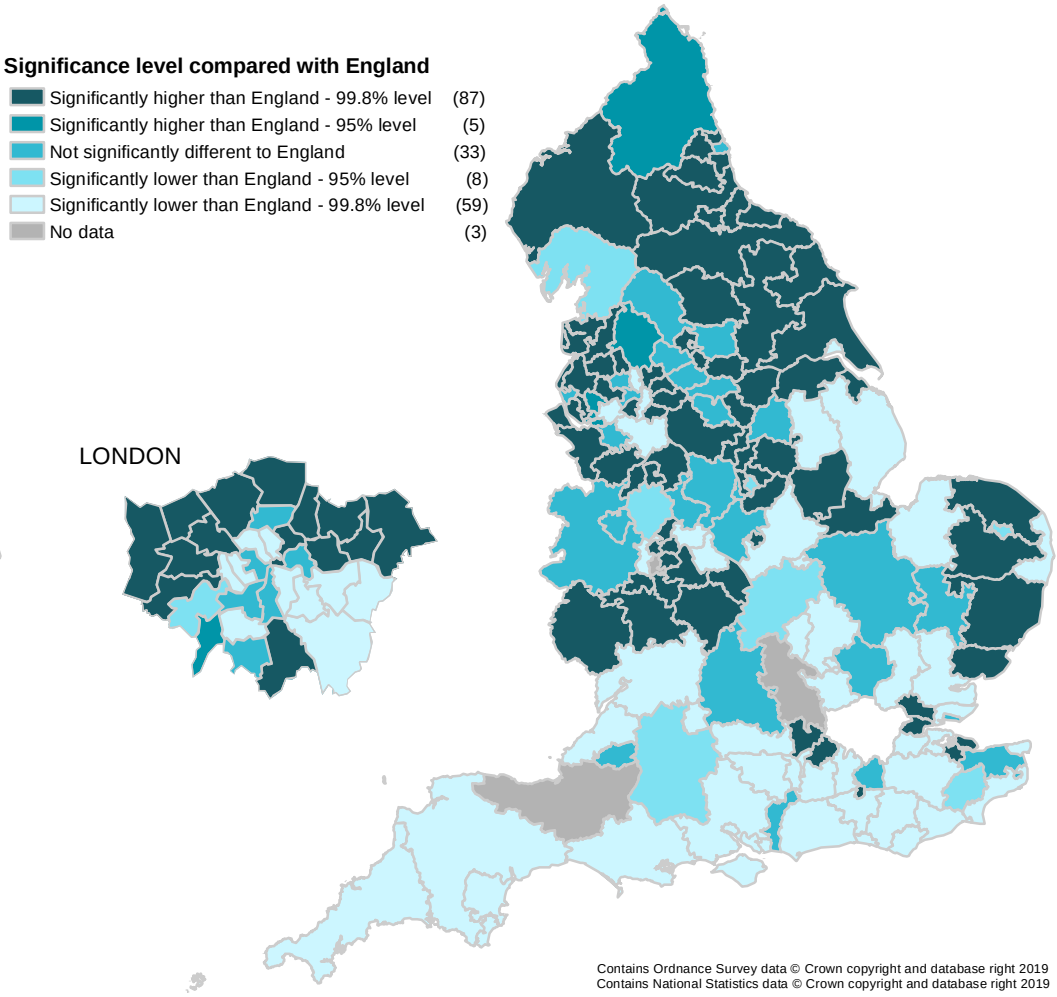
[1] National Institute for Health and Care Excellence (2016) Chronic obstructive pulmonary disease in over 16s: diagnosis and management (NICE quality standard [QS10]) [Accessed 30 January 2019]
[2] Medical Research Council (1959) MRC Dyspnoea scale / MRC Breathlessness scale [Accessed 19 February 2019]
[3] NHS Digital Quality Outcomes Framework (QOF) [Accessed 10 June 2019]

COPD – Tobacco dependence

Map 9a: Variation in percentage of patients with certain conditions, including COPD, whose notes record smoking status in the preceding 12 months (including exceptions) by CCG (2017/18)

Optimum value: High

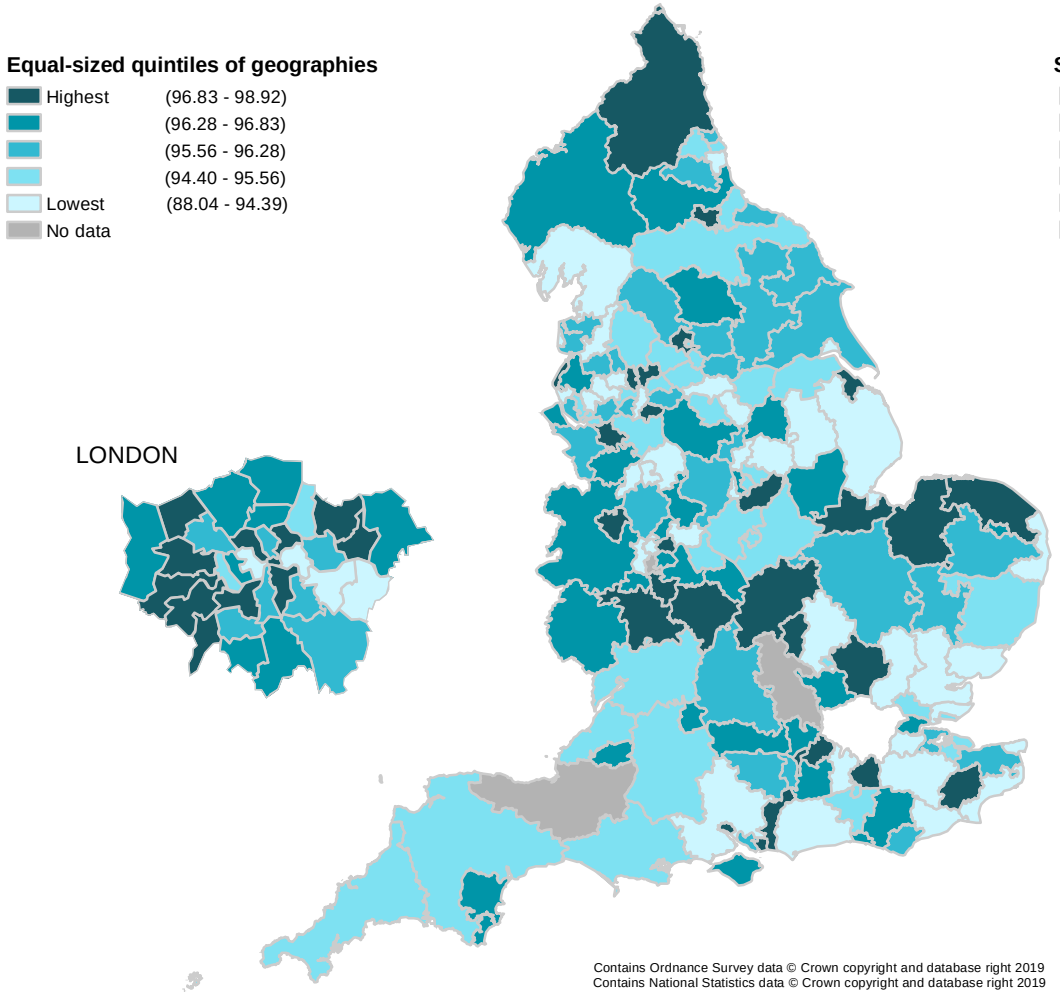


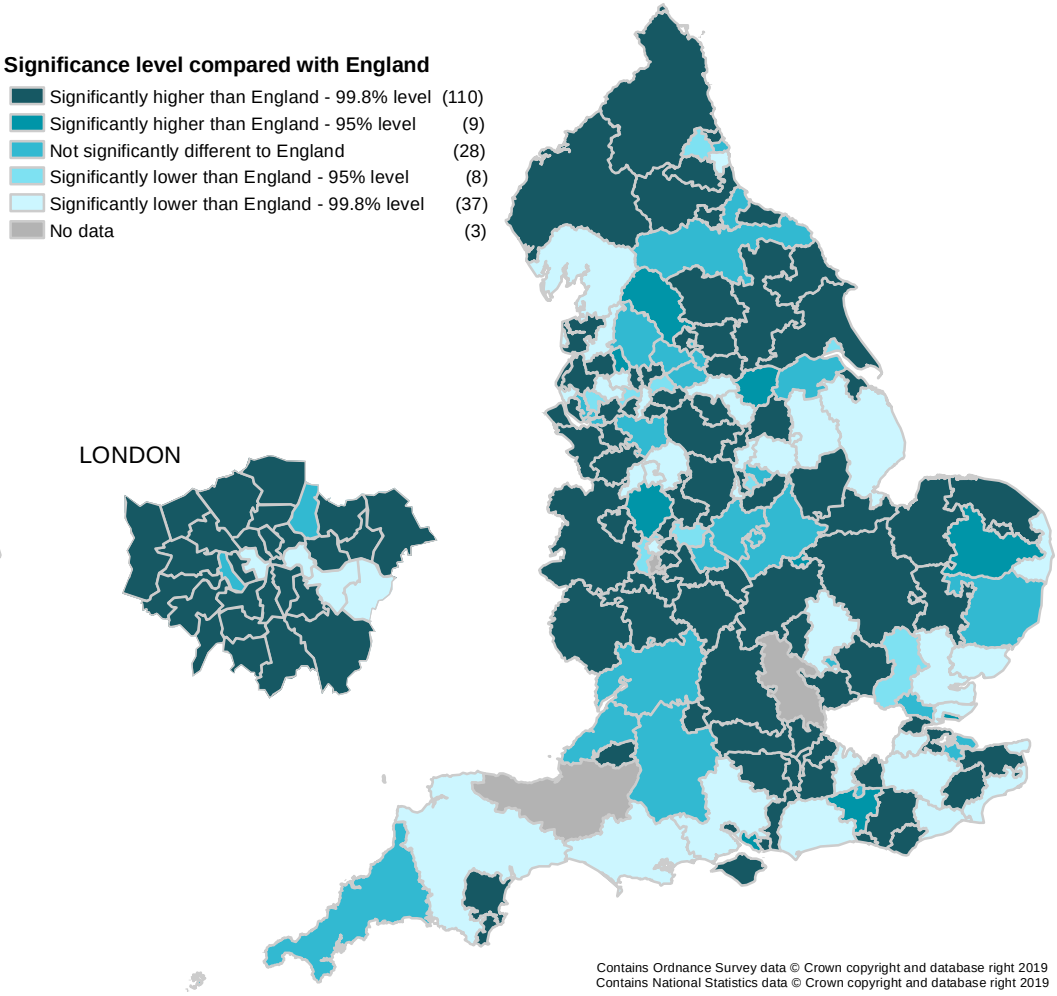


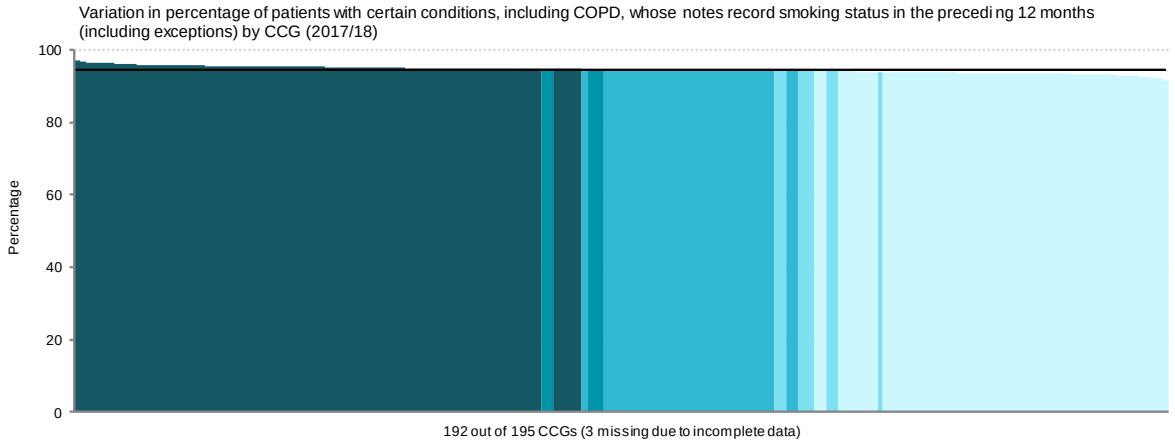
COPD – Tobacco dependence

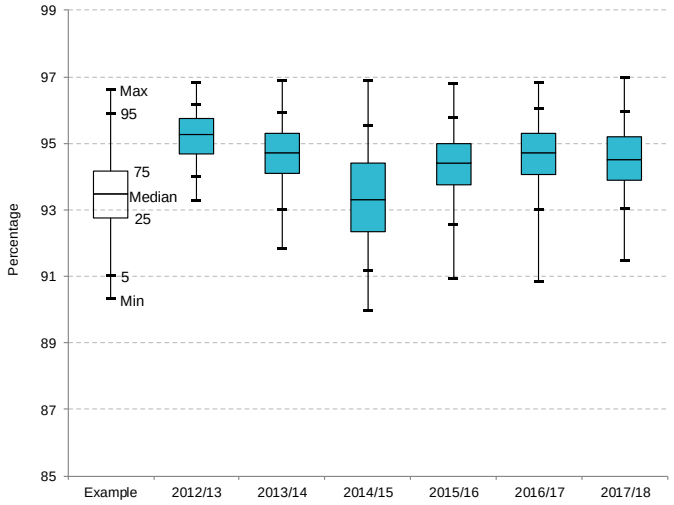
Map 9b: Variation in percentage of patients with certain conditions, including COPD, who smoke whose notes contain a record of an offer of support and treatment within the preceding 12 months (including exceptions) by CCG (2017/18)

Optimum value: High









		2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	
Max-Min (Range)		3.6	5.1	6.9	5.9	6.0	5.5	No significant change
95th-5th percentile		2.2	2.9	4.3	3.2	3.0	2.9	No significant change
75th-25th percentile		1.1	1.2	2.1	1.2	1.2	1.3	No significant change
Median		95.3	94.7	93.3	94.4	94.7	94.5	No significant change

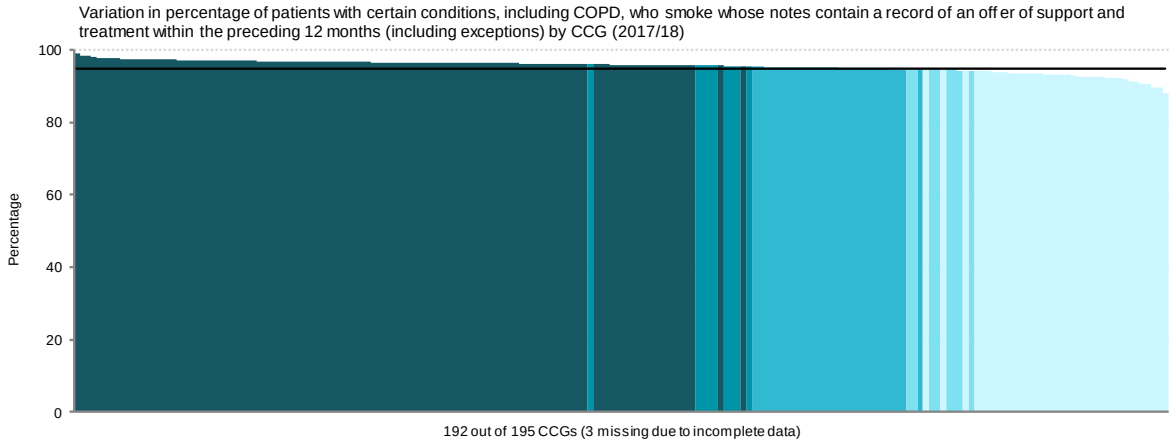
Context

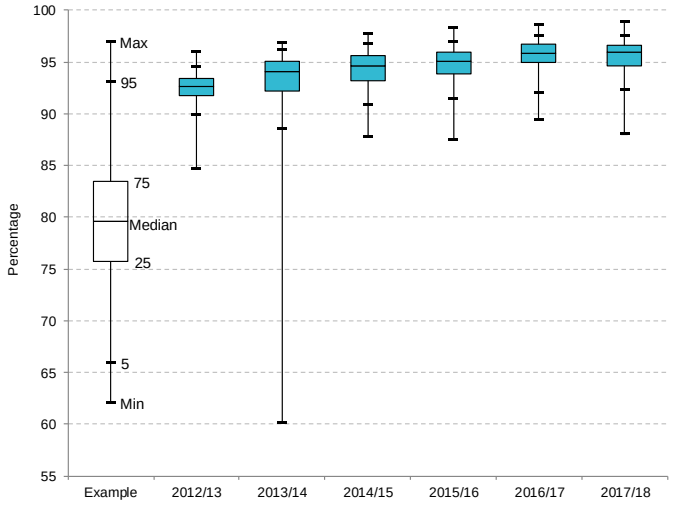
COPD is caused by destruction of the air-sacs in the lungs and inflammation and thickening of the bronchial tubes within the lungs. The most common cause for this is smoking, although the condition can sometimes affect people who have never smoked but have been exposed to outdoor and indoor air pollution, occupational exposures to certain dusts or fumes, or have a rare genetic problem. There is also evidence that smoking in pregnancy, asthma and childhood infections are associated with a higher risk of COPD.[1]

The likelihood of developing COPD increases with both the amount and duration of smoking. The main recommendation for treating COPD is to stop smoking, with the latest NICE guidance advising clinicians to encourage all those with COPD who are still smoking to stop, and offer help to do so, at every opportunity. The most effective stop smoking interventions include both the prescription of pharmacotherapy drugs and counselling support.[2]

There is no routinely collected data on how many patients with COPD smoke. One UK wide study using primary care data found that 31% of patients with COPD were current smokers and 56% ex-smokers.[3] However, it is estimated in England that 86% of chronic obstructive lung disease deaths in 2016 in people aged 35 years and over were attributable to smoking.[4]

The data presented here from the QOF monitors how many patients with coronary heart disease, peripheral arterial disease (PAD), stroke or transient ischaemic attacks (TIA), hypertension, diabetes, COPD, chronic kidney disease (CKD), asthma, schizophrenia, bipolar affective disorder or





		2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	
Max-Min (Range)		11.4	36.7	9.9	10.9	9.2	10.9	No significant change
95th-5th percentile		4.6	7.6	5.9	5.5	5.6	5.2	No significant change
75th-25th percentile		1.7	2.8	2.4	2.0	1.8	2.0	No significant change
Median		92.6	94.1	94.6	95.1	95.8	95.9	INCREASING Significant

other psychoses are being asked about their smoking habits and whether they are then offered support to quit.

There is evidence that people who smoke are receptive to smoking cessation advice in all healthcare settings and that healthcare professionals are effective in helping people to stop smoking.[5]

Magnitude of variation

Map 9a: Variation in percentage of patients with certain conditions, including COPD, whose notes record smoking status in the preceding 12 months (including exceptions) by CCG (2017/18)

The maps and column chart display the latest period (2017/18), during which CCG values ranged from 91.5% to 97.0%, which is a 1.1-fold difference between CCGs. The England value for 2017/18 was 94.4%.

The box plot shows the distribution of CCG values for the period 2012/13 to 2017/18.

There was no significant change in any of the 3 variation measures between 2012/13 and 2017/18.

Map 9b: Variation in percentage of patients with certain conditions, including COPD, who smoke whose notes contain a record of an offer of support and treatment within the preceding 12 months (including exceptions) by CCG (2017/18)

The maps and column chart display the latest period (2017/18), during which CCG values ranged from 88.0% to 98.9%, which is a 1.1-fold difference between CCGs. The England value for 2017/18 was 94.9%. The box plot shows the distribution of CCG values for the period 2012/13 to 2017/18.

There was no significant change in any of the 3 variation measures between 2012/13 and 2017/18. The median increased significantly from 92.6% in 2012/13 to 95.9% in 2017/18.

Reasons for variation are likely to be due to differences in primary care procedures.

There will be variation in how smoking status and treatment offers are recorded by practices to meet the QOF requirements. The QOF business rules require practices to use Read codes to record their actions. This means practices can meet the QOF measure without health care practitioners speaking face to face with patients about their smoking habits.

The recording of an offer of support and treatment does not necessarily reflect the quality of the intervention or if the patient takes up the offer. QOF figures show a high percentage of patients offered treatment, however there is evidence that this has not resulted in higher prescriptions of pharmacotherapy.[6]

Options for action

NICE have produced a quality standard on smoking cessation (QS43, Smoking: supporting people to stop). This outlines a number of strategies to increase the number of people who attempt to stop smoking.

Service providers should ensure that healthcare practitioners are trained to provide evidence based very brief advice (VBA) to patients.

Service providers should ensure that a system is in place for healthcare practitioners to ask patients if they smoke face to face and offer evidence based advice to stop smoking.

Commissioners should fund a service whereby people who smoke are offered a referral to an evidence-based smoking cessation service.

Healthcare practitioners should offer a full course of pharmacotherapy to those people who smoke and seek support to stop smoking, and who agree to pharmacotherapy. This is at least 8 to 12 weeks, depending on the pharmacotherapy used.

People who smoke are more likely to stop smoking if they are offered a combination of interventions. Services should be available which offer behavioural support to people who smoke, in addition to pharmacotherapy. This can be individual or group behavioural support.

Service providers should follow up patients to determine if they have taken up the offer of support and treatment.

However, targeting action to tackling inequalities in tobacco use is key, with smoking prevalence being significantly higher in some communities. This is associated with a higher prevalence of COPD. NICE guideline (NG92) suggests prioritising people with mental health or substance misuse problems, health conditions, and people in custodial settings or disadvantaged circumstances, who are at high risk of tobacco related harm.[7]

Resources

NHS Choices COPD [Accessed 11 July 2019]

National Institute for Health and Care Excellence (2018) Chronic obstructive pulmonary disease in over 16s: diagnosis and management (NICE guideline [NG115]) [Accessed 11 July 2019]

Department of Health (2011) An outcomes strategy for people with chronic obstructive pulmonary disease (COPD) and Asthma in England [Accessed 11 July 2019]

National Institute for Health and Care Excellence (2013) Smoking: supporting people to stop (NICE quality standard [QS43]) [Accessed 11 July 2019]

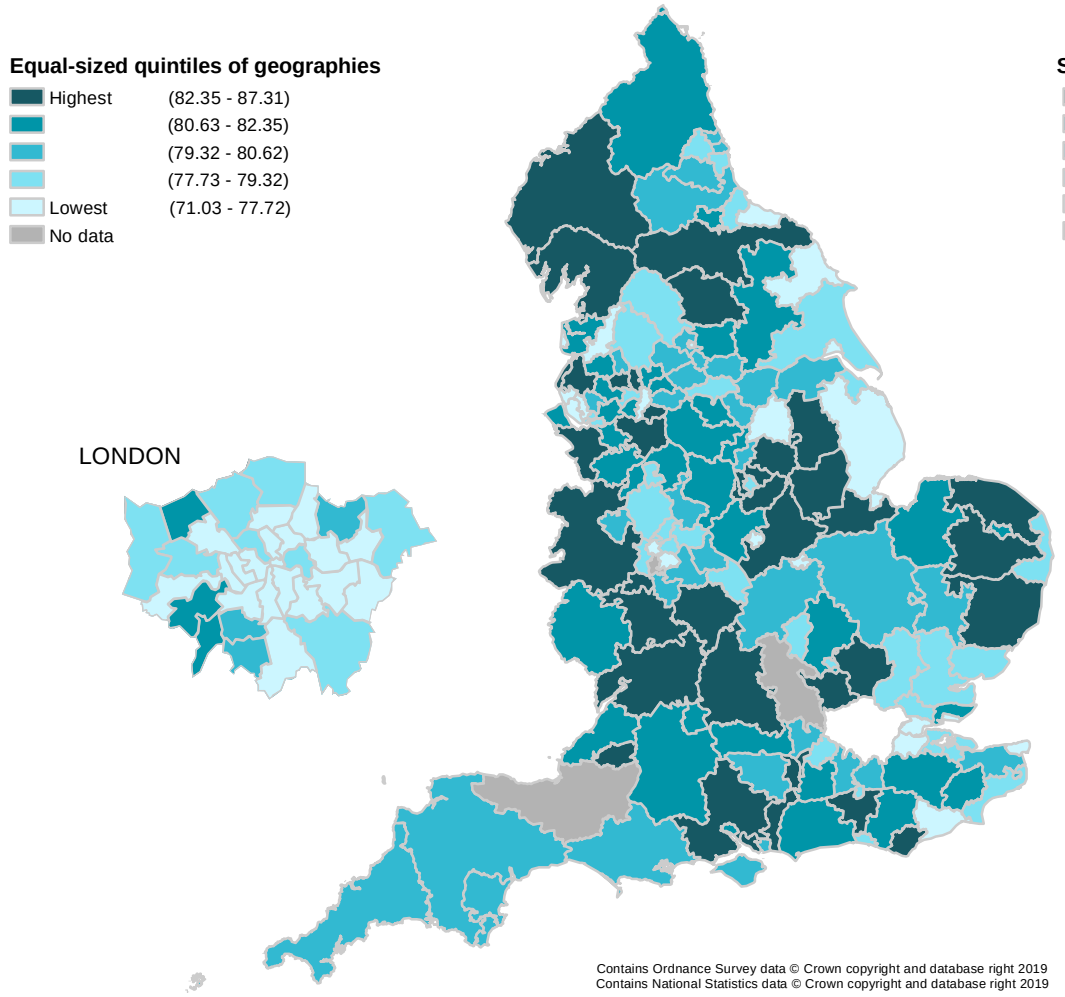
National Centre for Smoking Cessation and Training. Very brief advice training module [Accessed 11 July 2019]

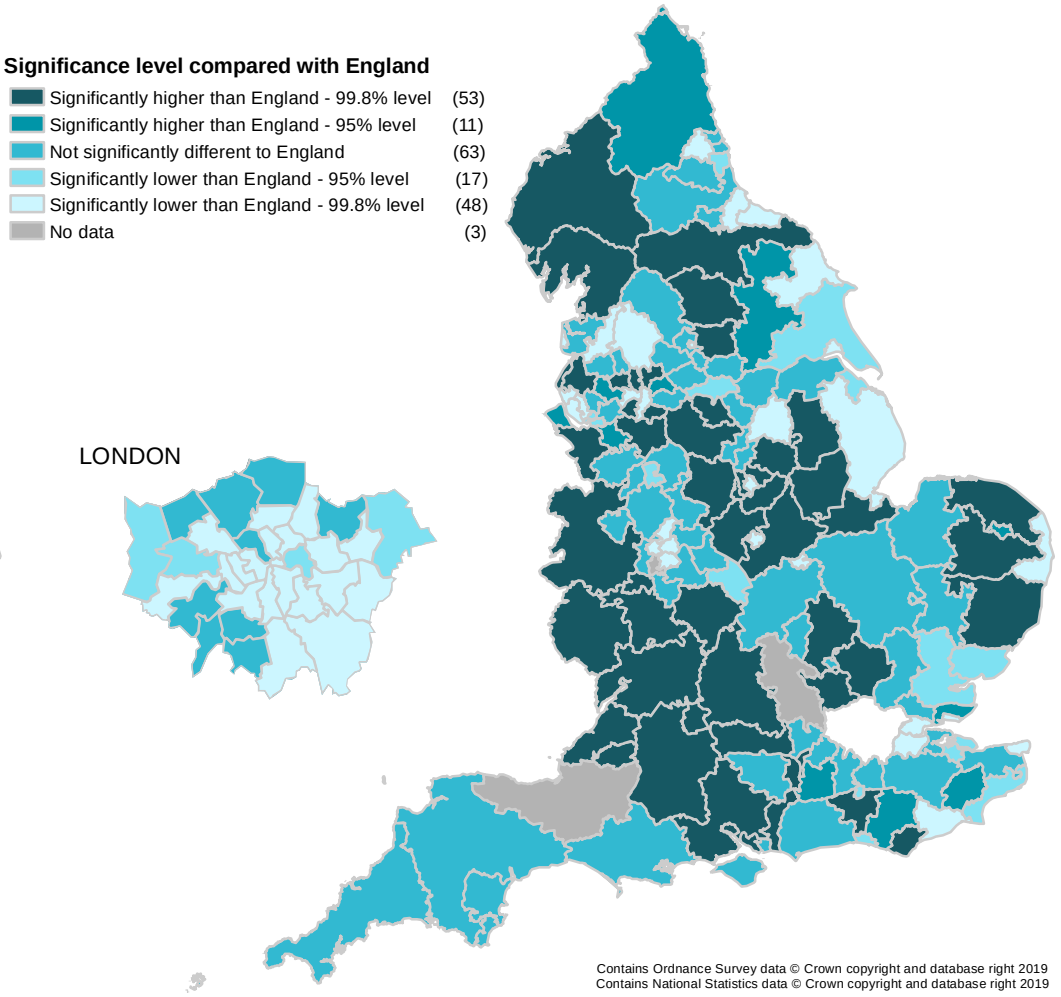
[1] Postma DS, Bush A and van den Berge M (2015) Risk factors and early origins of chronic obstructive pulmonary disease The Lancet 385:899-909. [Accessed 11 July 2019]
[2] Public Health England (2017) Models of Delivery of Stop Smoking Services [Accessed 11 July 2019]
[3] Price DB, West D, Brusselle G and others (2014) Management of COPD in the UK primary-care setting: an analysis of real-life prescribing patterns Int J Chron Obstruct Pulmon Dis 9:889-904 [Accessed 11 July 2019]
[4] NHS Digital (2018) Statistics on smoking – England 2018 [PAS] Table 3.5 [Accessed 11 July 2019]
[5] National Institute for Health and Care Excellence (2016) (updated March 2018) The percentage of patients with any or any combination of the following conditions: CHD, PAD, stroke or TIA, hypertension, diabetes, COPD, CKD, asthma, schizophrenia, bipolar affective disorder or other psychoses who are recorded as current smokers who have a record of an offer of support and treatment within the preceding 12 months (NICE quality and outcomes framework indicator [NM38]) [Accessed 07 August 2019]
[6] Szatkowski L and Aveyard P (2016) Provision of smoking cessation support in UK primary care: impact of the 2012 QOF revision Br J Gen Pract. 66(642):e10-5 [Accessed 21 May 2019]
[7] National Institute for Health and Care Excellence (2018) Stop smoking interventions and services (NICE guideline [NG92]) [Accessed 07 August 2019]

COPD – Primary care - Interventions/treatments

Map 10a: Variation in percentage of patients with COPD on GP registers receiving influenza immunisation in the preceding 1 August to 31 March (including exceptions) by CCG (2017/18)

Optimum value: High

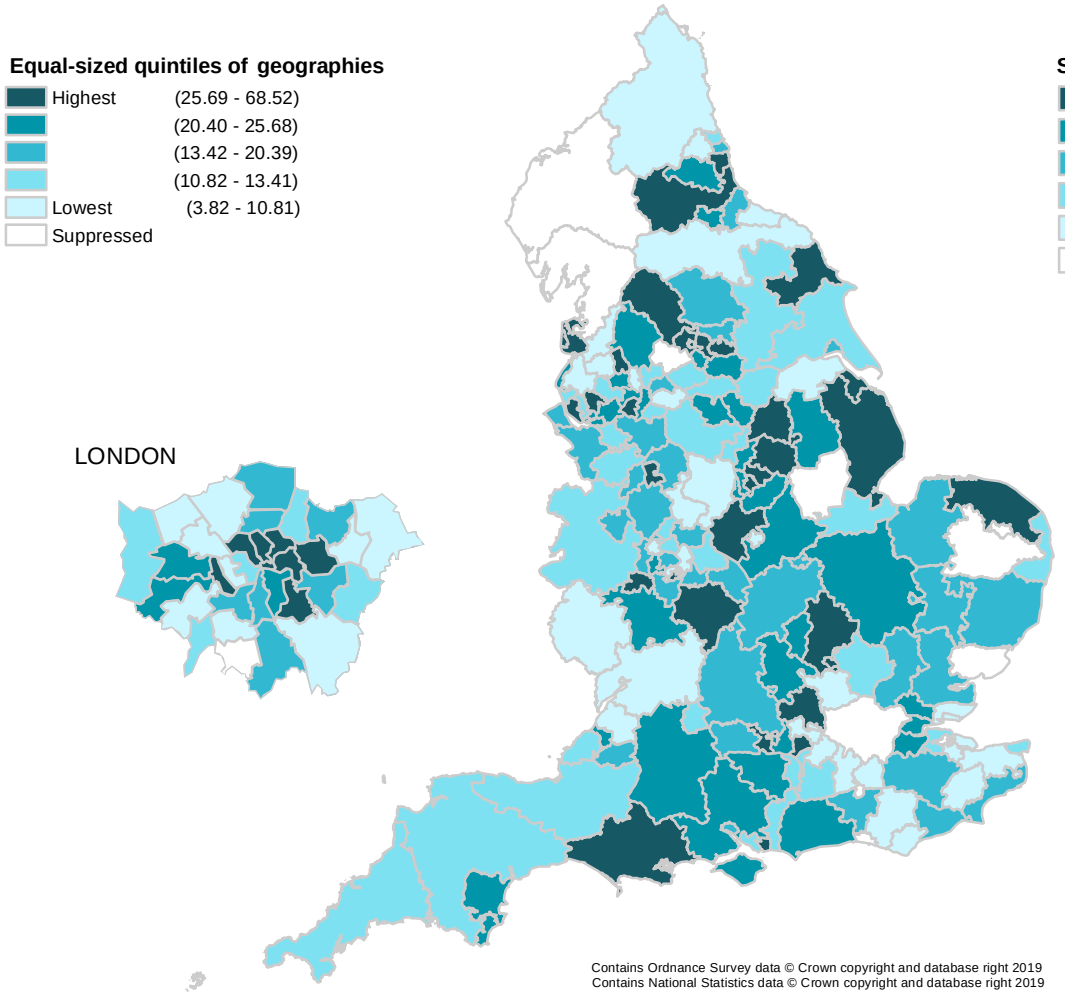


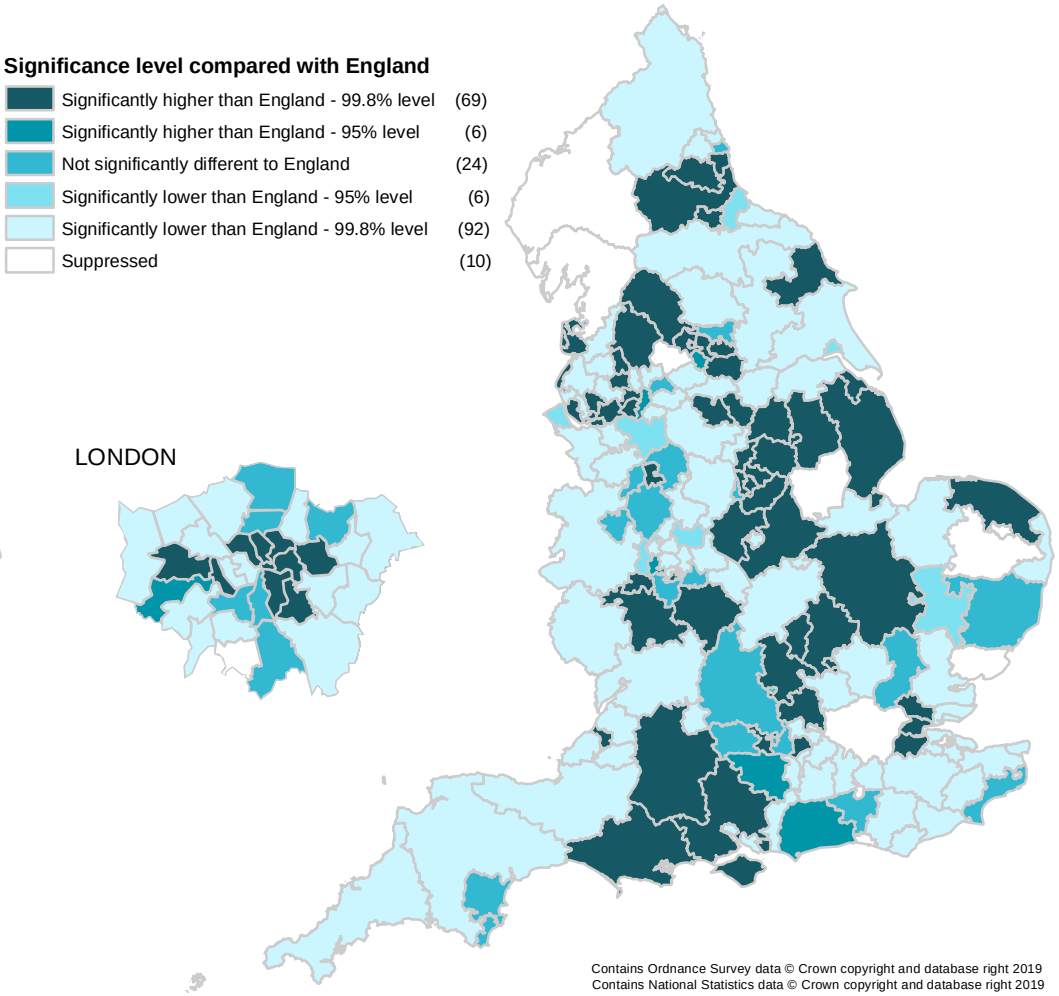


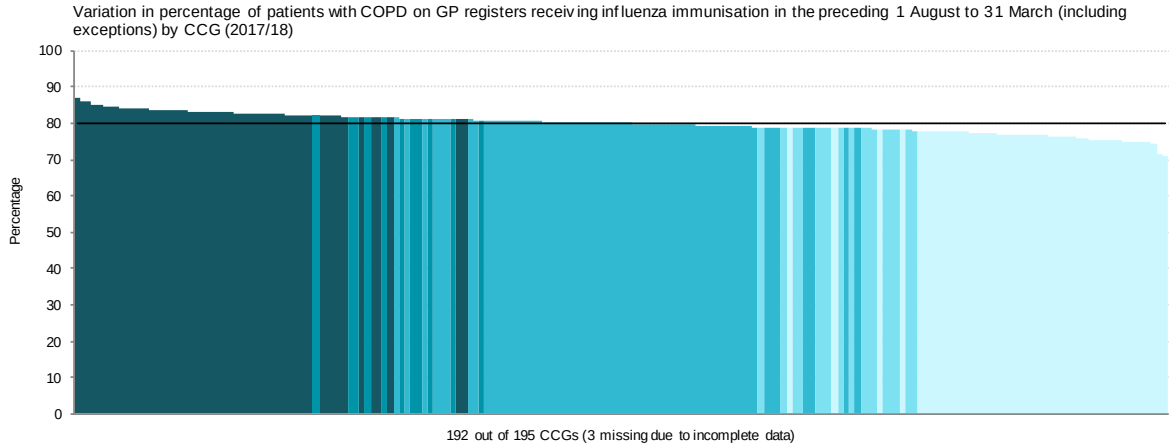
COPD – Primary care - Interventions/treatments

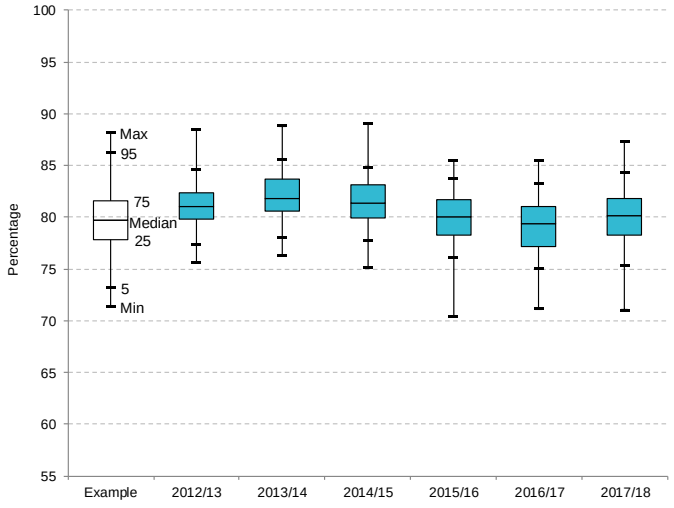
Map 10b: Variation in percentage of people with COPD and Medical Research Council Dyspnoea Scale >=3 referred to a pulmonary rehabilitation programme by CCG (2014/15)

Optimum value: High









		2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	
Max-Min (Range)		12.8	12.4	13.9	15.2	14.4	16.3	WIDENING Significant
95th-5th percentile		7.4	7.6	7.0	7.6	8.2	8.9	No significant change
75th-25th percentile		2.5	3.1	3.2	3.4	3.8	3.6	WIDENING Significant
Median		81.1	81.8	81.4	80.0	79.3	80.1	No significant change

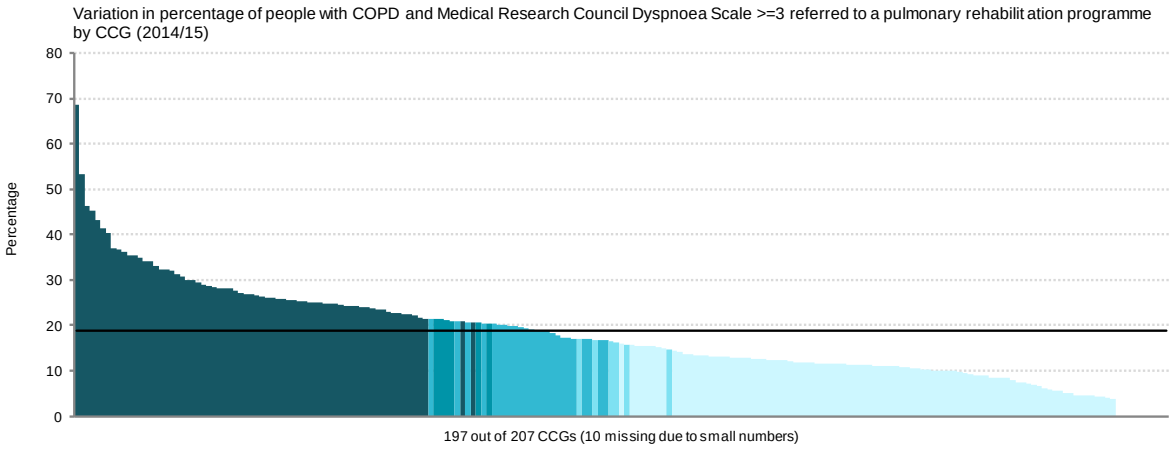
Context

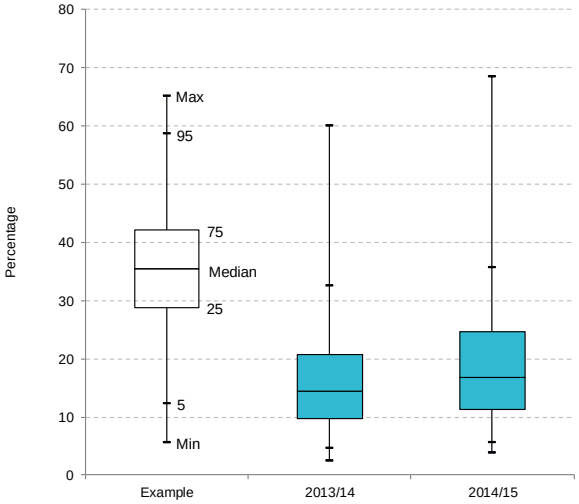
Most of the care for people with chronic obstructive pulmonary disease (COPD) is provided in primary care. Chronic disease management by GPs and nurses is likely to have a considerable impact on patient outcomes such as symptom control, quality of life, physical and social activity, admission to hospital, and mortality. The NHS London Respiratory Team found influenza immunisation of greatest value in cost per QALY for at-risk group[1] (IMPRESS has built on this work).

Indicators in the Quality and Outcomes Framework[2] (QOF) reflect the long-term disease management of COPD in primary care, including the percentage of patients with COPD who have had influenza immunisation in the preceding 15 months. People with COPD are at high risk of developing complications from influenza, and around 17% of influenza deaths each year are in people with chronic respiratory disease. Evidence shows that the influenza vaccination reduces the risk of hospitalisation for pneumonia, and death, in patients with COPD. The influenza vaccination receives a large amount of publicity and is recommended annually to all those with a diagnosis of COPD by the Joint Committee on Vaccination and Immunisation and the Chief Medical Officer.

A non-pharmacological treatment to improve symptoms of COPD is pulmonary rehabilitation. Pulmonary rehabilitation can be defined as a multidisciplinary programme of care for patients with chronic respiratory impairment that is individually tailored and designed to optimise each patient's physical and social performance and autonomy.[3]

Programmes comprise individualised exercise programmes and education.





		2013/14	2014/15
Max-Min (Range)		57.7	64.7
95th-5th percentile		27.8	30.1
75th-25th percentile		11.1	13.4
Median		14.4	16.8

It is recommended that pulmonary rehabilitation is offered to all patients with MRC dyspnoea grade 3 and above, and people with COPD who have recently been hospitalised with an acute exacerbation. The programme should include components of physical training, disease education, and nutritional, psychological and behavioural intervention.

Magnitude of variation

Map 10a: Variation in percentage of patients with COPD on GP registers receiving influenza immunisation in the preceding 1 August to 31 March (including exceptions) by CCG (2017/18)

The maps and column chart display the latest period (2017/18), during which CCG values ranged from 71.0% to 87.3%, which is a 1.2-fold difference between CCGs. The England value for 2017/18 was 80.0%.

The box plot shows the distribution of CCG values for the period 2012/13 to 2017/18.

Both the maximum to minimum range and the 75th to 25th percentile gap widened significantly.

It should be noted that the indicator on influenza vaccination shows the actual population coverage for each CCG not the published QOF achievement: excepted patients have been included in the denominator. There is marked variation in exception reporting at a local and practice level, which is worthy of particular attention among CCGs and clinicians. This includes patients who decline vaccination, perhaps in the mistaken but commonly held belief that vaccination causes influenza and doubts about efficacy.

Potential reasons for the degree of variation observed include differences in:

- level of awareness among people with COPD of the need for influenza vaccination
- effectiveness of the promotion and offer of influenza vaccination to people with COPD, particularly in primary care
- access to free influenza vaccination services

Map 10b: Variation in percentage of people with COPD and Medical Research Council Dyspnoea Scale >=3 referred to a pulmonary rehabilitation programme by CCG (2014/15)

The maps and column chart display the latest period (2014/15), during which CCG values ranged from 3.8% to 68.5%, which is a 17.9-fold difference between CCGs. The England value for 2014/15 was 18.8%.

The box plot shows the distribution of CCG values for the period 2013/14 to 2014/15.

The 2014/15 data on pulmonary rehabilitation is the most recent time period measured by the Quality and Outcomes Framework (QOF). A new indicator measuring pulmonary rehabilitation is to be reintroduced to the QOF from April 2019. This follows a national review of the QOF and a stated desire to secure early progress on clinical priorities identified in the 2019 NHS Long Term Plan.[4]

The latest National Chronic Obstructive Pulmonary Disease (COPD) Audit Programme pulmonary rehabilitation report (April 2018) found 29% of services did not offer early post-discharge pulmonary rehabilitation for patients following discharge from hospital for acute exacerbation of COPD[5]. This may be due to a lack of a clear patient pathway for acute exacerbations of COPD admitted to hospital, including a comprehensive discharge bundle of assessments and referrals where necessary. Services also estimated that 33% of patient referrals did not attend an initial pulmonary rehabilitation assessment.

Options for action

The NICE guidance [NG103] for increasing influenza vaccination uptake among those eligible recommends:

- raising awareness in health and social care staff. Staff with direct contact with COPD patients should receive training on influenza and influenza vaccination
- raise awareness in COPD patients eligible. This should be done at the earliest opportunity before the flu vaccination season starts. Provide a personal invitation to all eligible patients
- uptake rates should be audited and monitored to enable regular feedback and review of progress to identify COPD patients who have not been vaccinated

The NICE guidance [NG115] on chronic obstructive pulmonary disease recommends:

- pulmonary rehabilitation should be available to all appropriate people with COPD, including those with recent hospitalisation for an acute exacerbation
- pulmonary rehabilitation should be offered to all patients who consider themselves functionally disabled by COPD (MRC dyspnoea grade 3 and above)
- the rehabilitation process should incorporate a programme of physical training, disease education, nutritional, psychological and behavioural intervention

Resources

Department of Health (2011) An outcomes strategy for people with chronic obstructive pulmonary disease (COPD) and Asthma in England [Accessed 11 July 2019]

Department of Health (2012) An Outcomes Strategy for COPD and Asthma: NHS Companion Document [Accessed 11 July 2019]

NHS Medical Directorate (2012) COPD Commissioning Toolkit: A Resource for Commissioners [Accessed 07 August 2019]

NHS England NHS RightCare Pathways: COPD [Accessed 11 July 2019]

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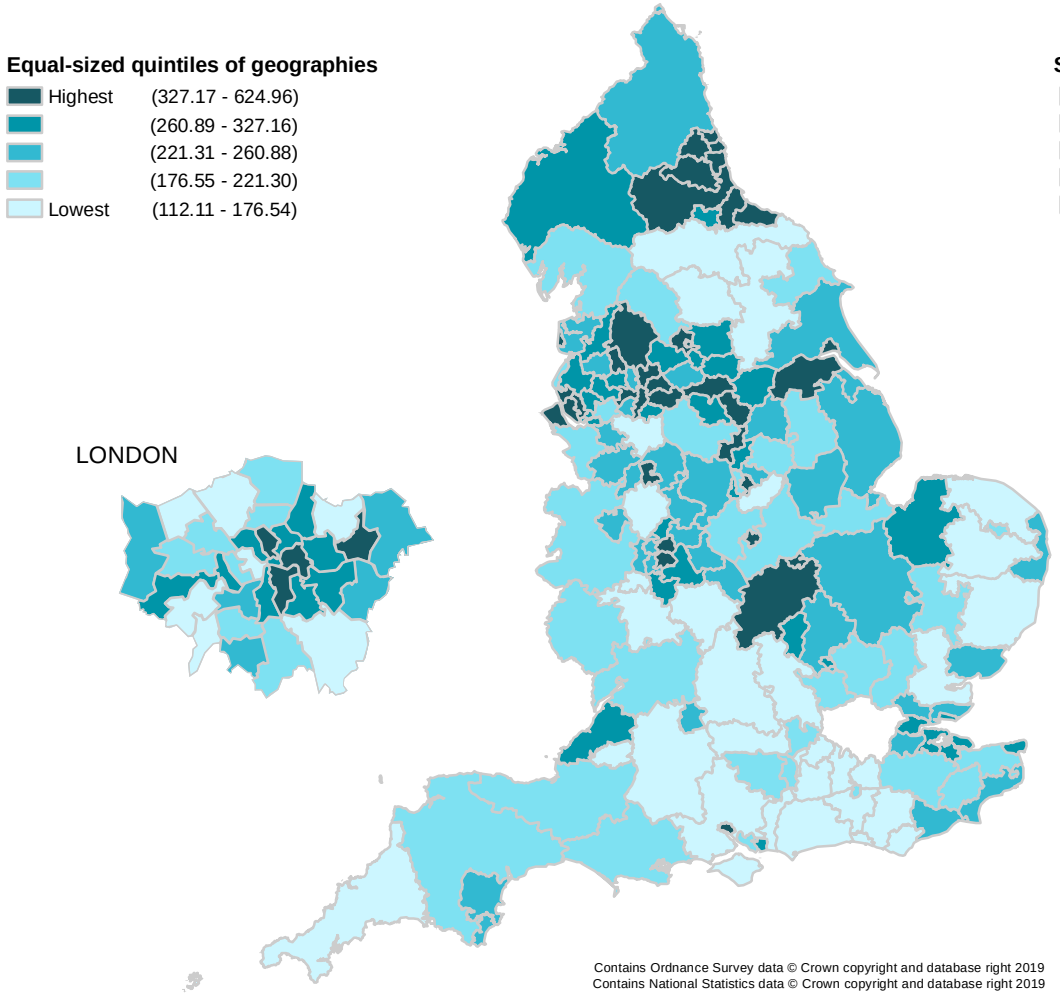
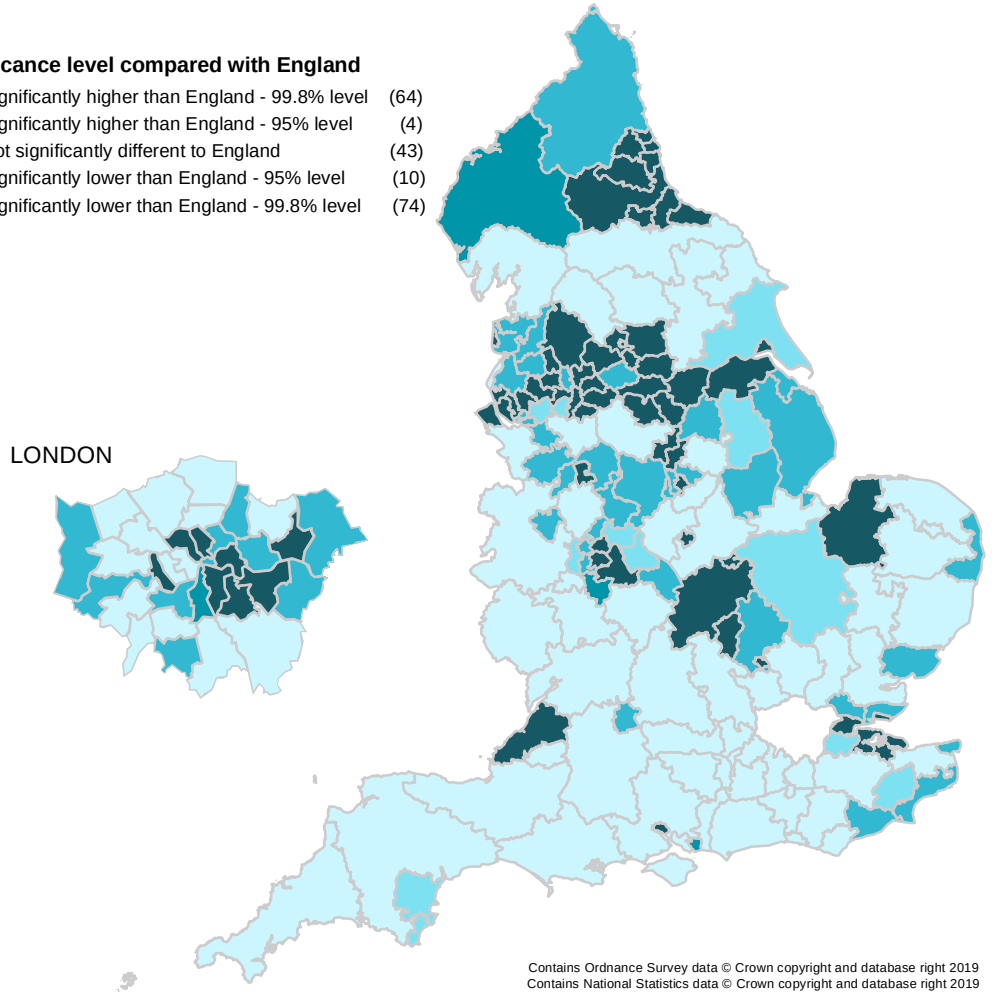
COPD - Secondary care - Hospital admissions

Map 11a: Variation in rate of emergency admissions to hospital for COPD per population by CCG (2017/18)

Directly standardised rate per 100,000

Optimum value: Low

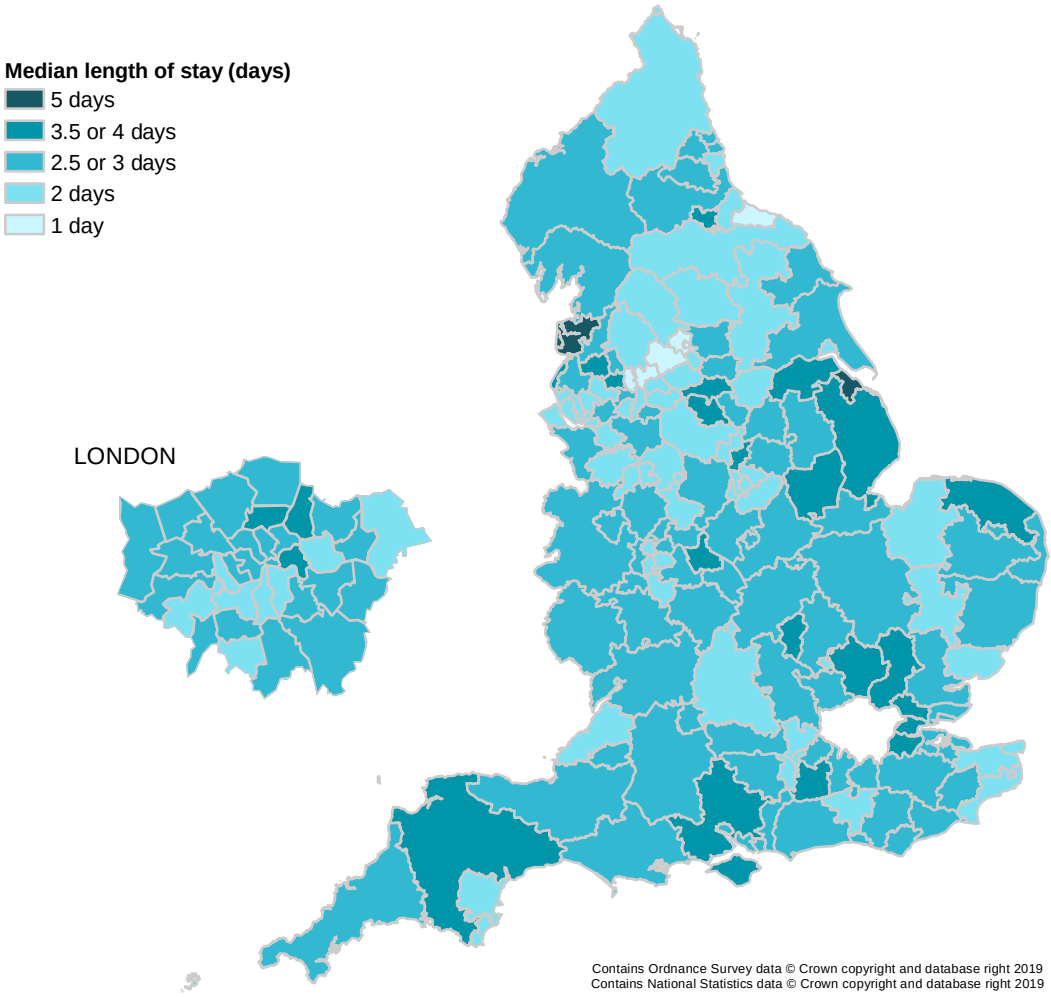




COPD - Secondary care - Hospital admissions

Map 11b: Variation in median length of stay (days) of emergency admissions to hospital for COPD by CCG (2017/18)

Optimum value: Requires local interpretation



Context

People with chronic obstructive pulmonary disease (COPD) can experience recurrent flare-ups or exacerbations that need more intensive treatment, some of which can be severe enough to require hospital admission. Indeed, COPD exacerbations are the second most common reason for all emergency admission to hospital in adults in the UK.[1] Patients with frequent exacerbations have a more rapid decline in lung function and reported worsening quality of life outcomes.[2]

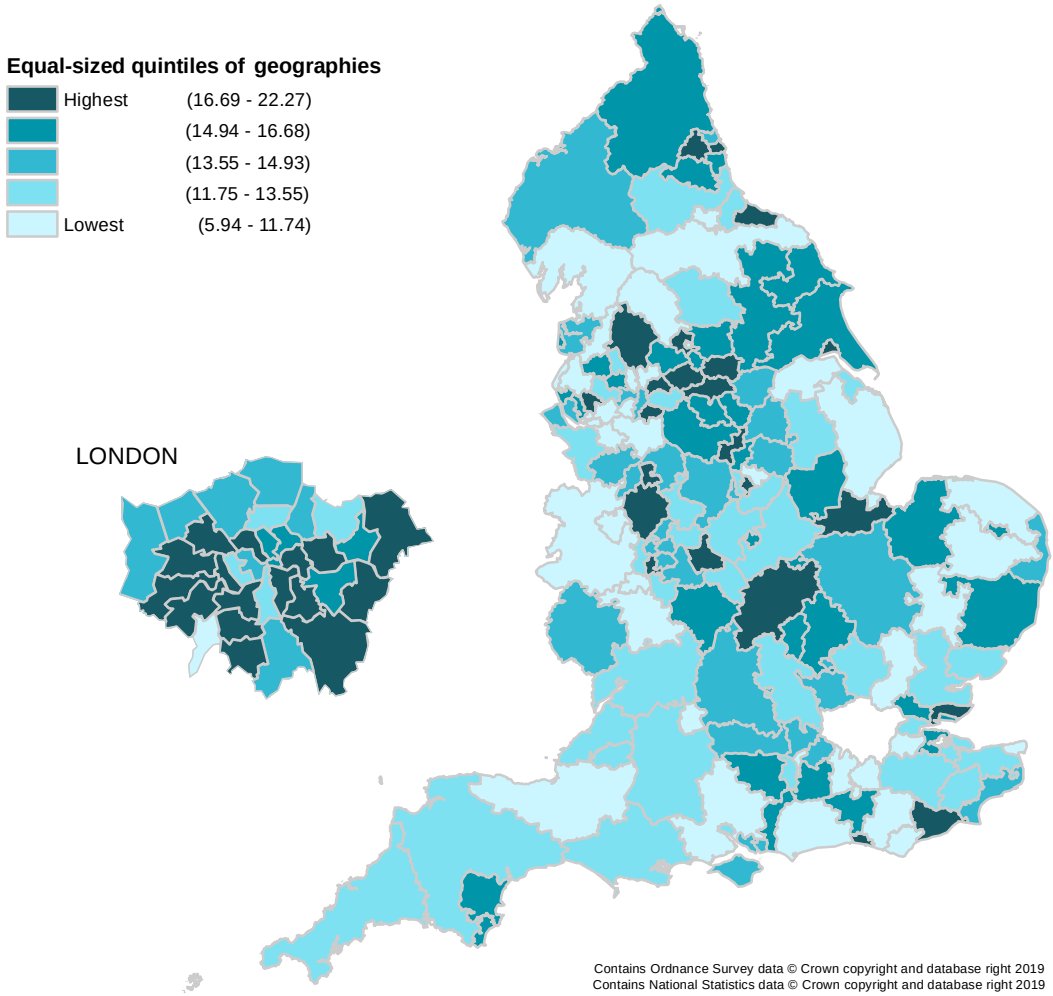
The care of people with COPD in hospital settings is costly for the NHS; RightCare have estimated that £49 million could be saved if CCGs achieved the emergency admission rate of their best 5 peers.[3]

Admission and re-admission to hospital are major adverse outcomes for patients, which place considerable demands on NHS resources. Levels of re-admissions are a substantial problem in the treatment of patients with COPD. The 2017 National COPD Audit Programme showed 24.8% of patients were readmitted within 30 days and 43.1% within 90 days.[4] Although COPD and emphysema were the most common cause of readmission for COPD patients they only

COPD - Secondary care - Hospital admissions

Map 11c: Experimental statistic: Variation in percentage of admissions to hospital for COPD that were re-admitted as an emergency within 30 days of discharge by CCG (2017/18)

Optimum value: Low



accounted for 41.3% of readmissions within 30 days and 38.6% within 90 days. A large proportion of readmissions are not due directly to COPD. The NACAP report advocated that a holistic approach to care focusing on patient comorbidities would reduce readmission rates.[4]

Magnitude of variation

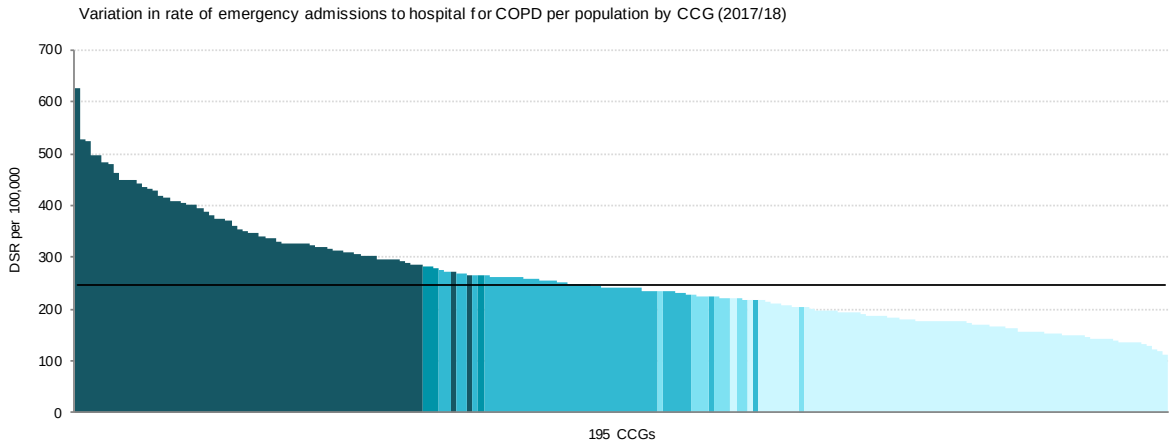
Map 11a: Variation in rate of emergency admissions to hospital for COPD per population by CCG (2017/18)

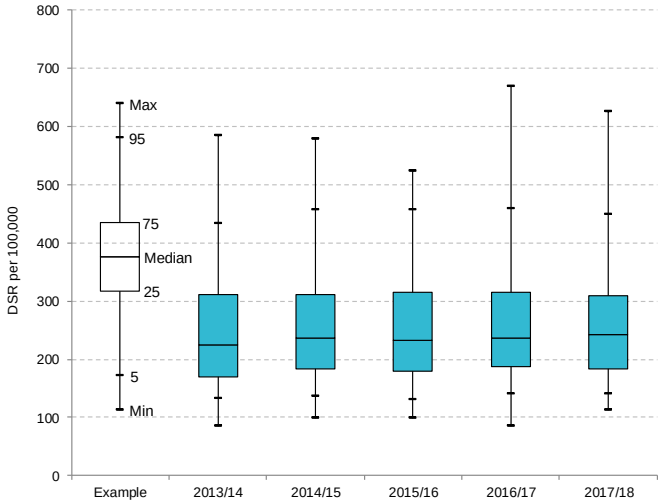
The maps and column chart display the latest period (2017/18), during which CCG values ranged from 112.1 to 625.0 per 100,000 population, which is a 5.6-fold difference between CCGs. The England value for 2017/18 was 247.6 per 100,000 population.

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.

One possible reason for the degree of variation observed is differences in the extent to which all services providing care for people with COPD are integrated into an effective system of care. In addition, deprivation and differences in public health initiatives will also impact on levels of variation





Max-Min (Range)		500.0	478.0	426.0	584.7	512.9	No significant change
95th-5th percentile		300.6	321.3	324.8	319.4	308.2	No significant change
75th-25th percentile		141.1	128.6	134.4	127.5	126.7	No significant change
Median		224.6	237.1	231.6	236.4	242.1	No significant change

observed. Following the National COPD Audit Programme report in 2015, the Royal College of Physicians called for the implementation of a discharge bundle to optimise follow up, and subsequently minimise the chance of readmission.[5]

Map 11b: Variation in median length of stay (days) of emergency admissions to hospital for COPD by CCG (2017/18)

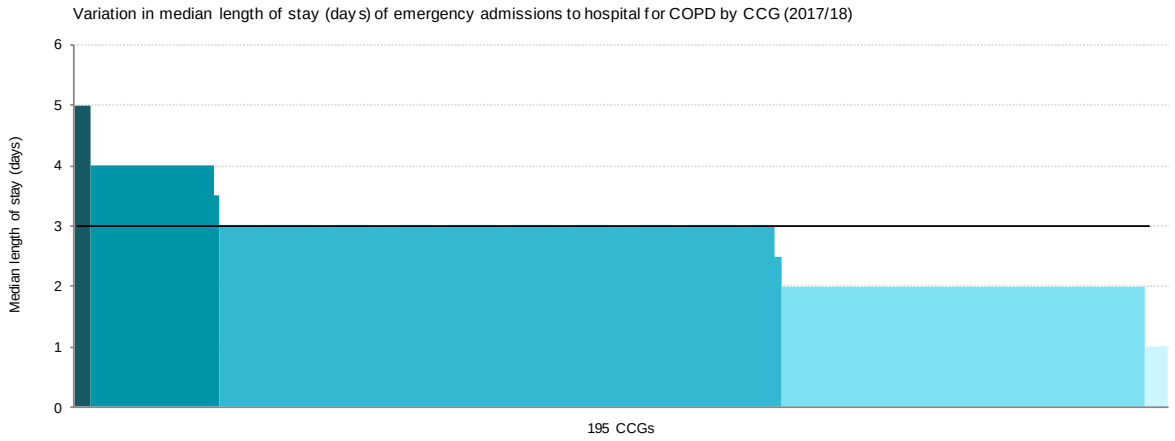
The maps and column chart display the latest period (2017/18), during which CCG values ranged from 1 to 5 days, which is a 5.0-fold difference between CCGs. The England value for 2017/18 was 3 days. The box plot shows the distribution of CCG values for the period 2013/14 to 2017/18.

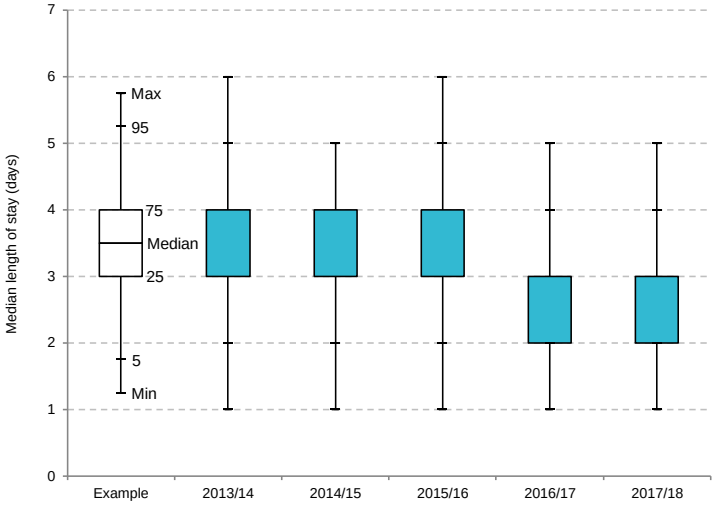
There was no significant change in any of the 3 variation measures between 2013/14 and 2017/18. Length of stay can depend on many factors, and patients with COPD often have other co-morbidities, which can lead to a more protracted stay in hospital. Patients are likely to have a longer hospital stay if they delay treatment for exacerbations, do not respond to treatment, or have requirements such as oxygen therapy or social circumstances which delay discharge.

Map 11c: Experimental statistic: Variation in percentage of admissions to hospital for COPD that were re-admitted as an emergency within 30 days of discharge by CCG (2017/18)

The maps and column chart display the latest period (2017/18), during which CCG values ranged from 5.9% to 22.3%, which is a 3.7-fold difference between CCGs. The England value for 2017/18 was 14.7%.

The box plot shows the distribution of CCG values for the period 2013/14 to 2017/18. There was no significant change





Max-Min (Range)		5.0	4.0	5.0	4.0	4.0	No significant change
95th-5th percentile		3.0	3.0	3.0	2.0	2.0	No significant change
75th-25th percentile		1.0	1.0	1.0	1.0	1.0	No significant change
Median		4.0	3.0	3.0	3.0	3.0	No significant change

in any of the 3 variation measures between 2013/14 and 2017/18. The median decreased significantly from 14.4 in 2013/14 to 14.2 in 2017/18.

Some emergency re-admissions are necessary and unavoidable:

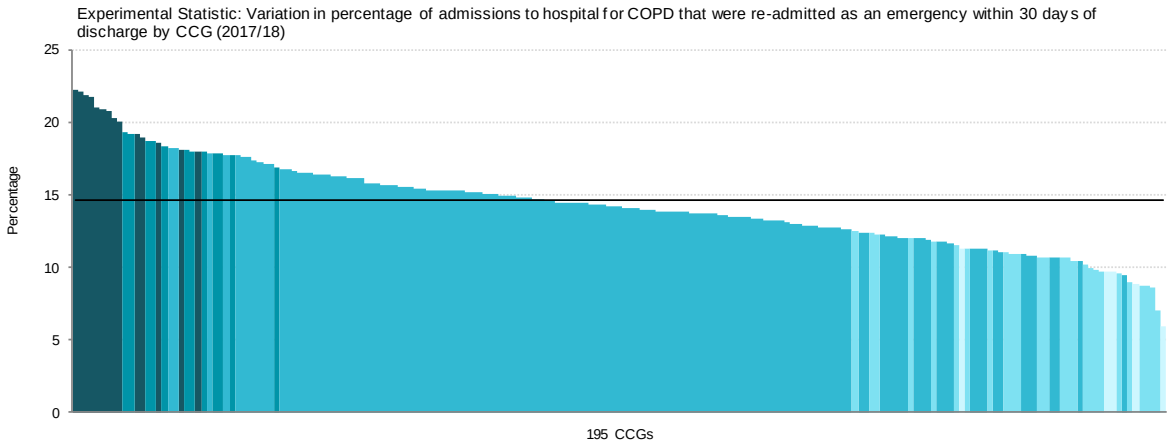
- a small number will be due to new clinical problems
- some will result from complications that could not be avoided

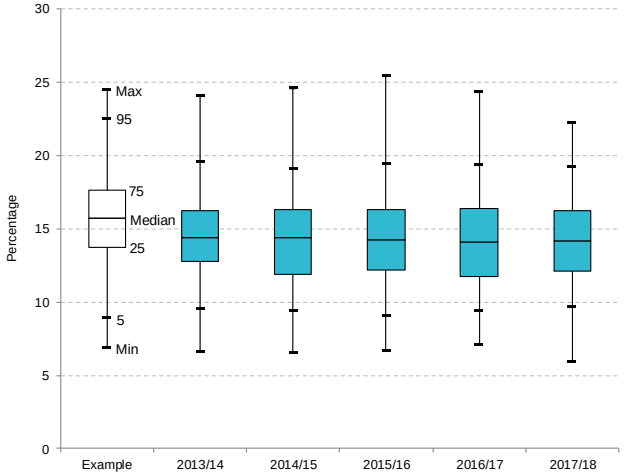
However, the degree of variation observed among CCGs shows that in many localities there is substantial scope for reducing emergency re-admissions. Action to prevent emergency re-admissions could not only improve outcomes for patients but also save money because expenditure on COPD admissions is high in every CCG.

Options for action

It is recommended by RightCare Pathways to optimise community support, and communication between hospital and community teams in order to reduce admissions, length of stay and in particular to reduce the risk of re-admission. It is also suggested that inpatient care should be delivered consistently to national standards across all hospital sites. This includes:

- standardised admission pathway for all admissions suspected to be due to COPD exacerbation, including review by a COPD specialist within 24 hours
- standardised post-exacerbation pathway, including a discharge bundle
- smooth transition between primary and secondary care during exacerbations requiring hospital treatment
- encouraging and supporting patients and their carers to complete the British Lung Foundation patient passport





		2013/14	2014/15	2015/16	2016/17	2017/18	
Max-Min (Range)		17.5	18.0	18.8	17.3	16.3	No significant change
95th-5th percentile		10.0	9.7	10.4	10.0	9.6	No significant change
75th-25th percentile		3.5	4.5	4.2	4.6	4.1	No significant change
Median		14.4	14.4	14.2	14.1	14.2	DECREASING Significant

A new Best Practice Tariff (BPT) was introduced for COPD in 2017/18. It is acknowledged that trusts that take up the COPD BPT have better results than those that don't. The BPT aims to improve the proportion of patients that receive specialist input and discharge bundles.[6] Attainment of the BPT is measured by the National Asthma and COPD Audit Programme's continuous COPD secondary care clinical audit.[7]

Resources

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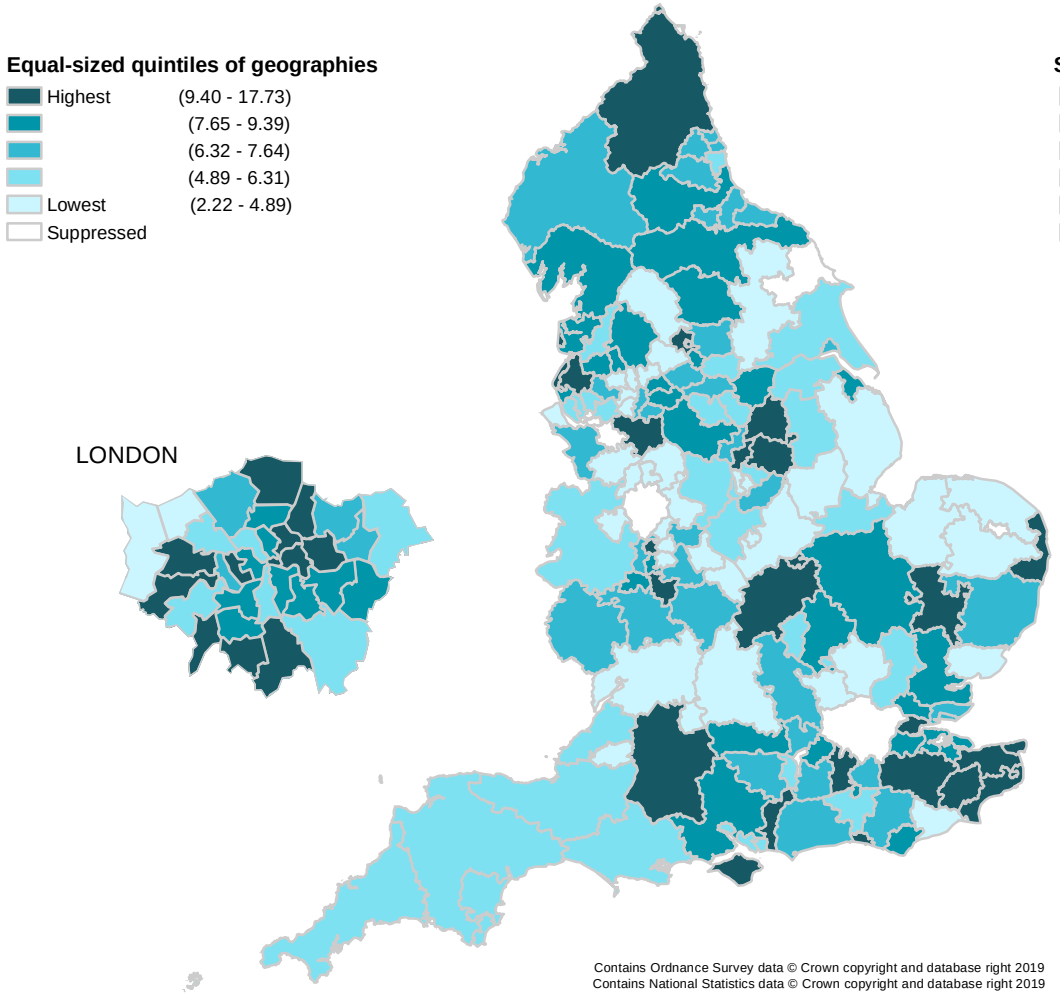
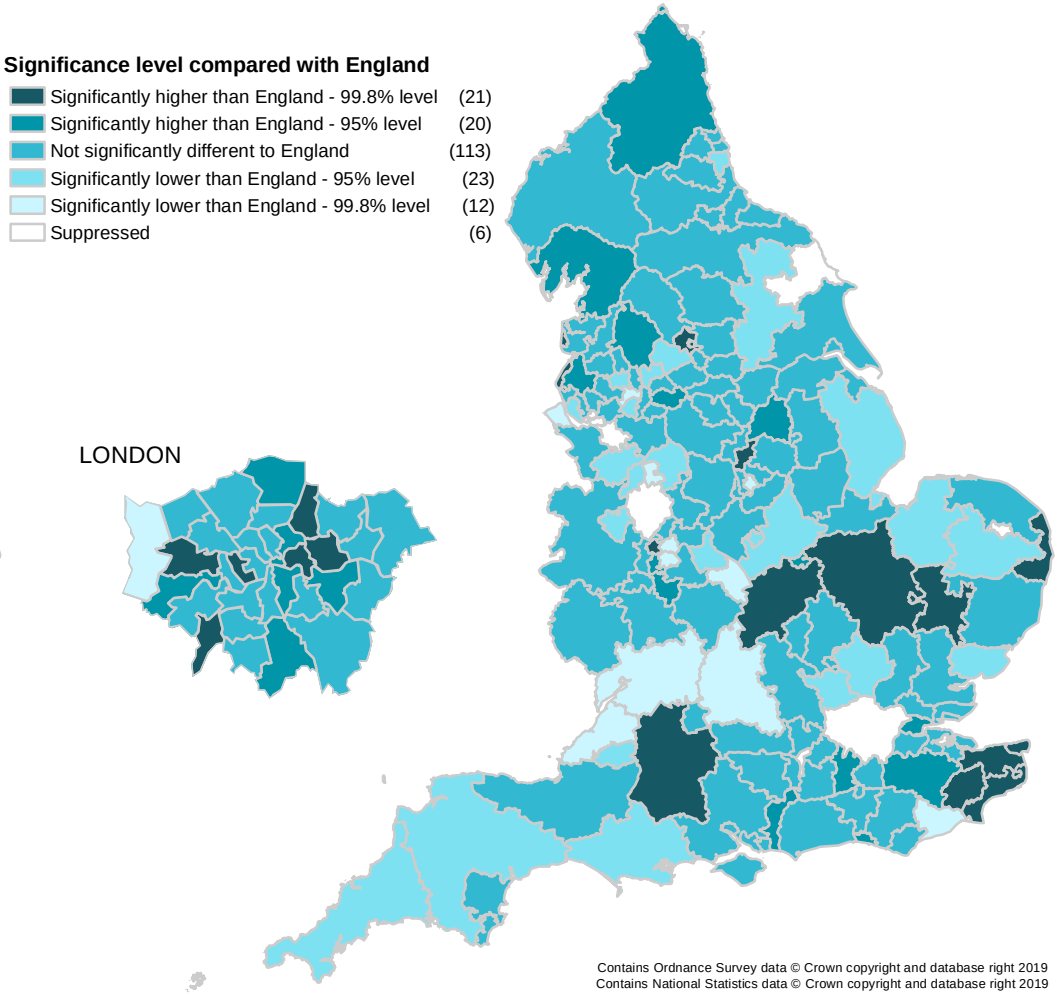
COPD - Secondary care - Treatment/outcomes

Map 12a: Variation in percentage of patients admitted to hospital for COPD receiving non-invasive ventilation (NIV) by CCG (2017/18)

Optimum Value: Requires local Interpretation



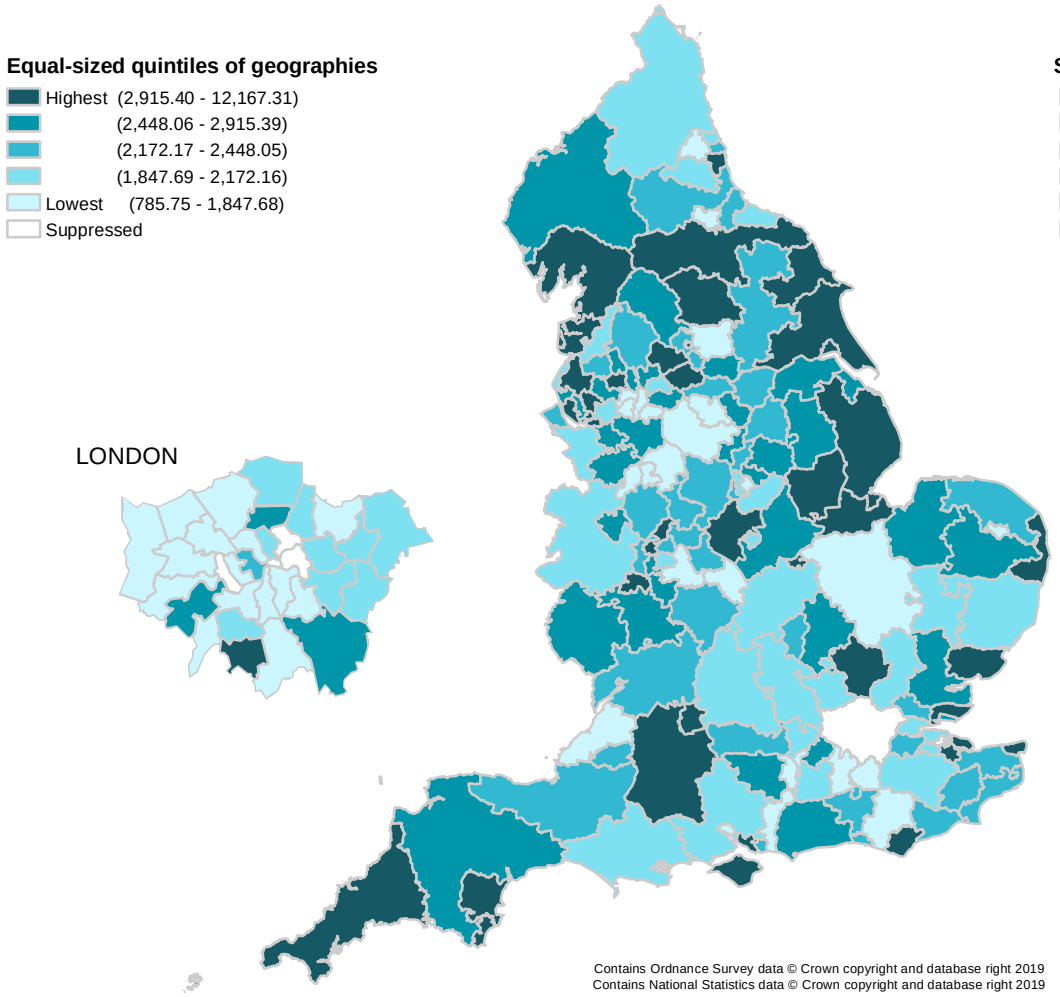


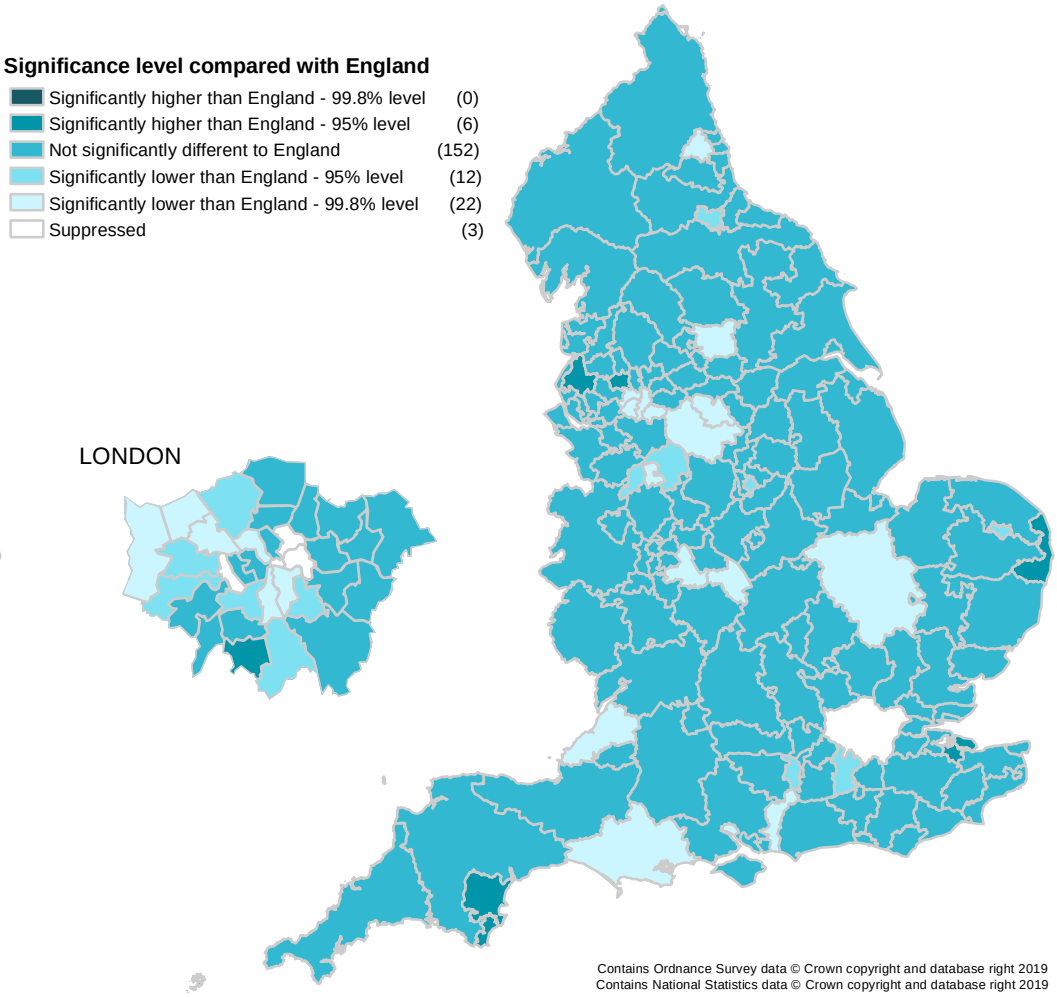
COPD - Secondary care - Treatment/outcomes

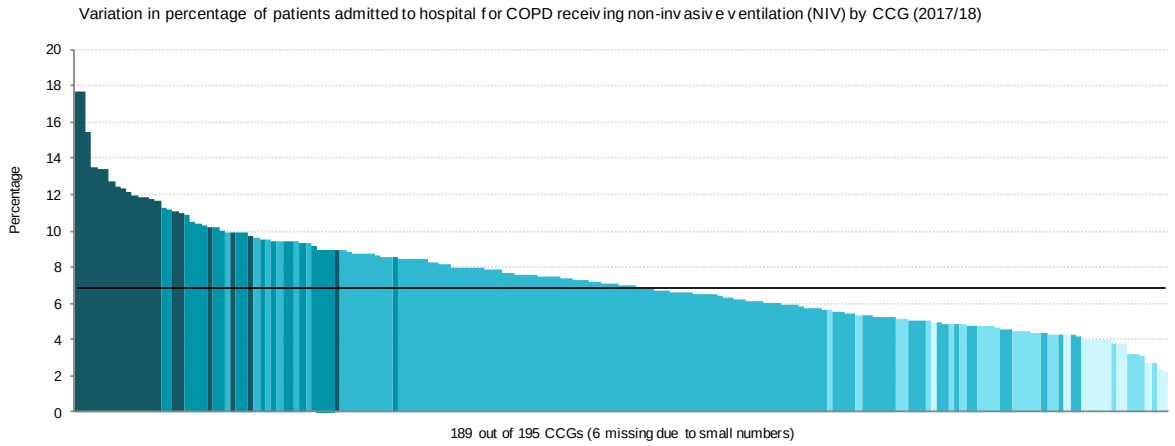
Map 12b: Experimental Statistic: Variation in mortality rate of patients who died within 30 days of an emergency hospital admission for COPD by CCG (2016-2018)

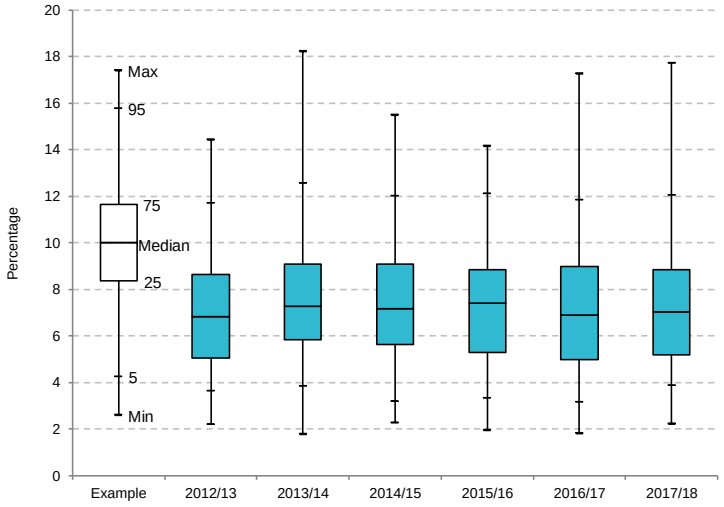
Directly standardised rate per 100,000 COPD hospital admission

Optimum Value: Low









Max-Min (Range)		12.2	16.4	13.2	12.2	15.5	15.5	No significant change
95th-5th percentile		8.1	8.7	8.8	8.8	8.7	8.2	No significant change
75th-25th percentile		3.6	3.2	3.5	3.6	4.0	3.6	No significant change
Median		6.8	7.3	7.2	7.4	6.9	7.0	No significant change

Context

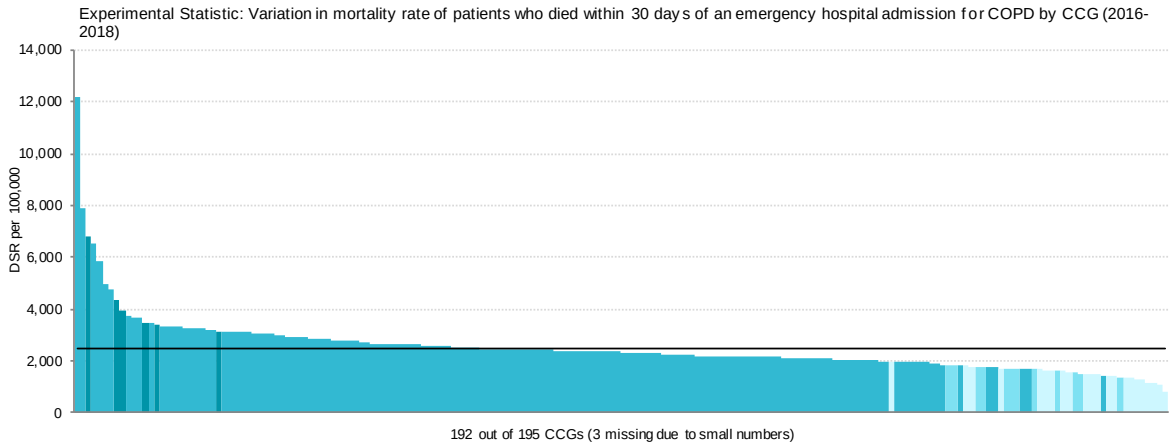
COPD is characterised by a progressive decline in lung function and in health status, accompanied by repeated acute exacerbations. Sometimes these exacerbations can be managed in primary care and recovery is fairly rapid, but some exacerbations may require more intensive management in hospital and the episode may be complicated by respiratory failure.

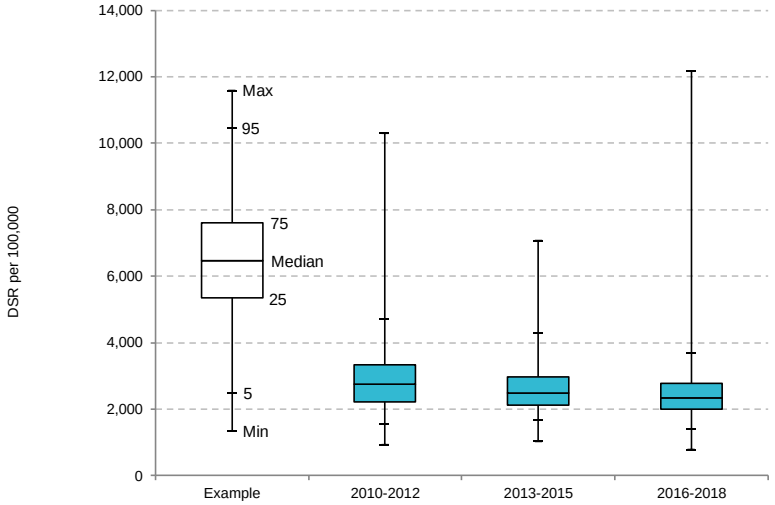
Acute exacerbation of COPD is one of the commonest reasons for hospital admission and is associated with high mortality in hospital, especially if the patient is admitted with, or develops, acute respiratory failure. Mortality is 25.1% for patients with COPD who receive non-invasive ventilation (NIV). In this patient group, mortality is 18.7% for patients with an arterial blood pH of 7.26-7.35; as the pH drops further, the mortality rate rises.[1]

Approximately one in 16 patients (6.1%) admitted because of an exacerbation will die within 30 days of their hospital stay and one in nine (11.3%) will have died within 90 days. About one-third of these deaths are due to causes other than COPD.[2] Ensuring comorbidities, especially cardiac, are identified and treated is as important as optimising long term COPD management.

Beyond treating the underlying infection and clearing sputum, supporting ventilation to reduce the carbon dioxide levels and correcting resultant acidosis is essential. Ventilatory support techniques are the preferred option. This is predominantly provided by NIV.

Non-invasive ventilation (NIV) is the preferred means of ventilation in most cases of COPD exacerbations. NIV is when a mask is used to improve ventilation by providing





Max-Min (Range)		9374.8	6058.0	11381.6	No significant change
95th-5th percentile		3143.7	2628.0	2286.1	No significant change
75th-25th percentile		1115.2	845.5	780.9	No significant change
Median		2752.1	2481.0	2337.4	No significant change

positive airway pressure. In appropriate patients, outcomes are superior to invasive ventilation.

While invasive ventilation is very effective it has greater risks associated with intubation and sedation. Patients are also at risk of developing ventilator-associated pneumonia, which NIV avoids There are clear exceptions when invasive ventilation is superior, including multi-organ failure, and patients who are intolerant of the non-invasive interface.

There is strong evidence to support NIV as the treatment of choice. In a Cochrane systematic review and meta-analysis, the survival benefit of NIV in the management of acute type 2 respiratory failure was confirmed: the number needed to treat (NNT) is only eight to avoid one death.[3] However, it should be delivered in a dedicated setting with trained and experienced staff.[2]

Magnitude of variation

Map 12a: Variation in percentage of patients admitted to hospital for COPD receiving non-invasive ventilation (NIV) by CCG (2017/18)

The maps and column chart display the latest period (2017/18), during which CCG values ranged from 2.2% to 17.7%, which is an 8.0-fold difference between CCGs. The England value for 2017/18 was 6.9%.

The box plot shows the distribution of CCG values for the period 2012/13 to 2017/18.

There was no significant change in any of the three variation measures between 2012/13 and 2017/18.

Despite clear, evidence-based criteria outlining patients who would benefit from NIV, the 2014 COPD audit showed that there is variation in whether patients meeting criteria

received NIV; approximately a third of patients with acidaemia did not receive NIV.[4] However, patients who develop acidaemia after admission despite primary treatment have a worse outcome, thus NIV is not always appropriate. The 2008 COPD audit noted that 6% of patients with respiratory failure became acidotic later in their admission.[5] The degree of variation in the provision of NIV across the country is considerable: a patient's chance of receiving this life-saving treatment can differ substantially depending on where they live. The length of time elapsed between admission and receiving NIV can also show marked variation, as seen in the 2018 National COPD Audit by the Royal College of Physicians.[6]

The pattern of geographical variation observed suggests that it cannot be explained by:

- differences in rates and severity of COPD admissions
- distance from acute hospitals

The most likely explanations for the differences in patient experience are:

- lack of 24-hour service provision in some units
- differences in local admission policies
- access to specialist opinion
- errors in coding for NIV

Map 12b: Experimental Statistic: Variation in mortality rate of patients who died within 30 days of an emergency hospital admission for COPD by CCG (2016-2018)

The maps and column chart display the latest period (2016 to 2018), during which CCG values ranged from 785.7 to 12,167.3 per 100,000 population, which is a 15.5-fold difference between CCGs. The England value for 2016 to 2018 was 2,472.7 per 100,000 population.

The box plot shows the distribution of CCG values for the period 2010-2012 to 2016-2018. There was no significant change in any of the three variation measures between 2010 to 2012 and 2016 to 2018.

Some of the difference in death rates within 30 days of an admission for COPD may be due to differences in:

- case-mix
- population composition
- availability of community support for patients with exacerbations of COPD

However, some of the difference in death rates is likely to be due to variation in the quality of clinical care provided before, during and following admission to hospital.

The degree of variation observed suggests there is considerable scope to achieve better outcomes for patients with COPD.

Options for action

Given the improved survival associated with NIV, it needs to be made available to all patients admitted with acute type 2 respiratory failure in a timely manner. To reduce unwarranted variation in NIV provision, commissioners and providers could consider the interventions in Box 12.1.

Box 12.1: Reducing unwarranted variation in access to NIV

- all patients admitted with acute exacerbations of COPD to undergo blood gas analysis immediately on arrival in hospital, except those with oxygen
- saturations >92% breathing room air
- patients who meet evidence-based criteria for acute NIV should start NIV within 60 min of the blood gas result associated with the clinical decision to provide NIV and within 120 min of hospital arrival for patients who present acutely, as recommended in the British Thoracic Society guidelines (see 'Resources')
- NIV supported by senior-level decision-making to be made available in acute hospitals 24 hours per day, and delivered by sufficiently-trained staff
- all patients who receive acute NIV to be coded as E85.2 procedure to ensure accuracy of data recording
- hospitals to monitor provision of and outcomes from NIV through regular clinical audit

To improve patient outcomes through the prompt and pro-active management of acute exacerbation of COPD, commissioners and providers need to consider the interventions shown in Box 12.2.

Box 12.2: Prompt and pro-active management of acute exacerbation of COPD

- structured hospital admission
- assessment within 24 hours by a respiratory specialist
- daily senior-level decision-making by a respiratory clinician
- prompt blood-gas analysis and assessment for non-invasive ventilation
- provision of non-invasive ventilation where indicated within the recommended 1 hour
- comprehensive assessment and management of co-morbid conditions
- optimisation of medical therapy
- referral for pulmonary rehabilitation
- referral for home oxygen assessment and review if indicated

Hospital-at-home and assisted-discharge schemes are also recommended by NICE as safe and effective ways of managing patients with COPD who would otherwise need to be admitted, or need to stay in hospital. In a study of home treatment of COPD, use of the DECAF prognostic score to select patients for hospital at home approximately doubled the proportion considered eligible and was shown to be safe and preferred by most patients. Mean health and social care costs over 90 days were £1,016 lower than standard care.[7] Commissioners should consider a service where a multi professional team of allied health professionals with experience of treating COPD is able to deliver care in the community. The team may include nurses, physiotherapists, occupational therapists or other health workers.

Resources

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