Quick user guide

Maps

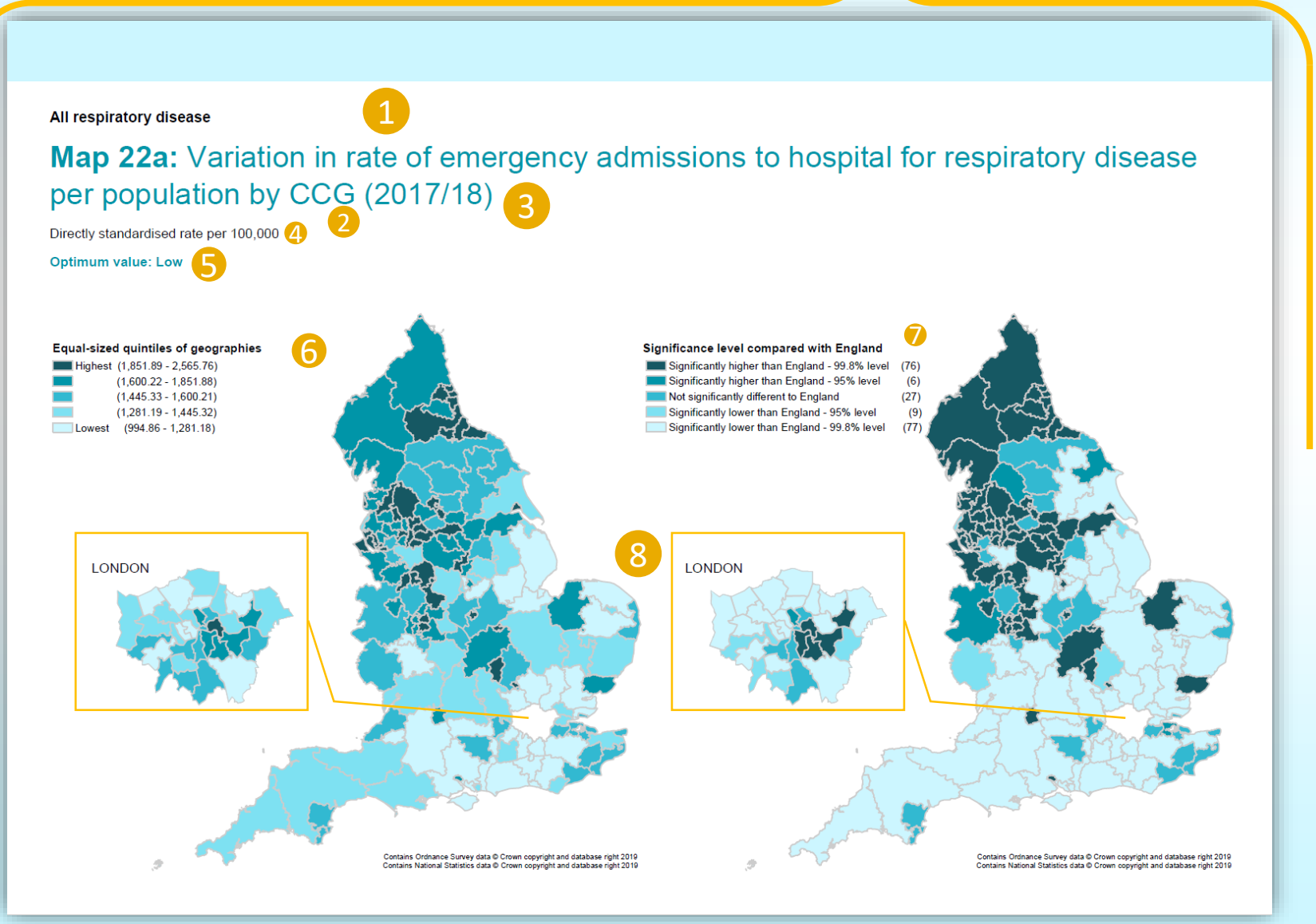
1 **Type of statistic** (e.g. rate, proportion)

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.

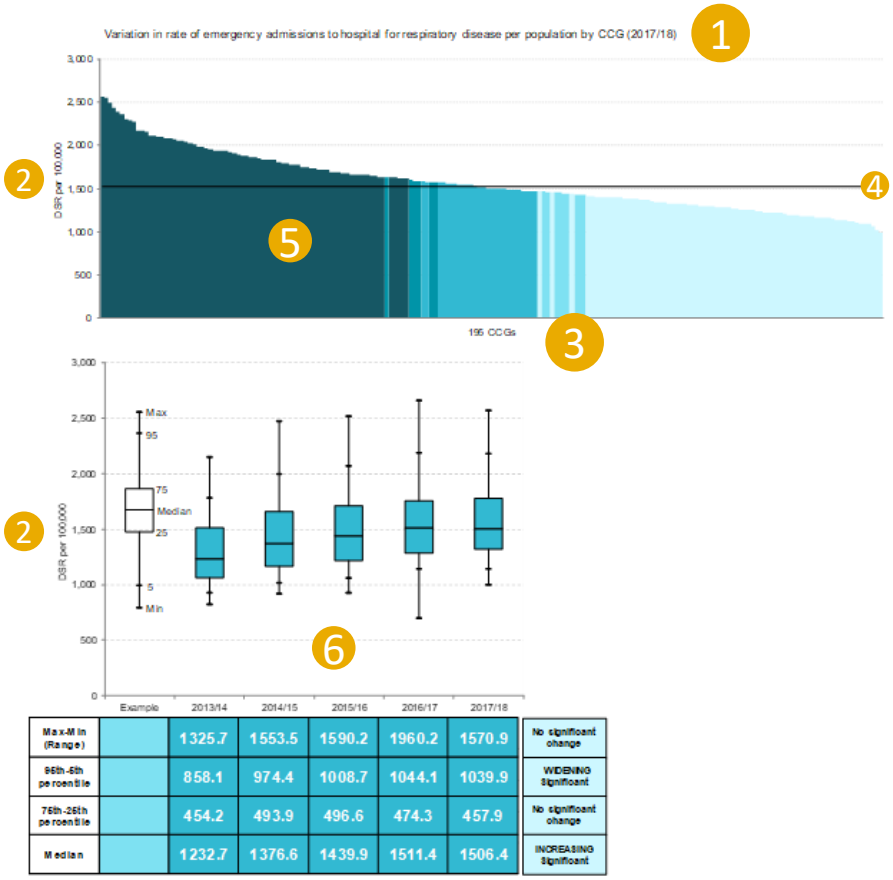
Chart, box plot and table

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

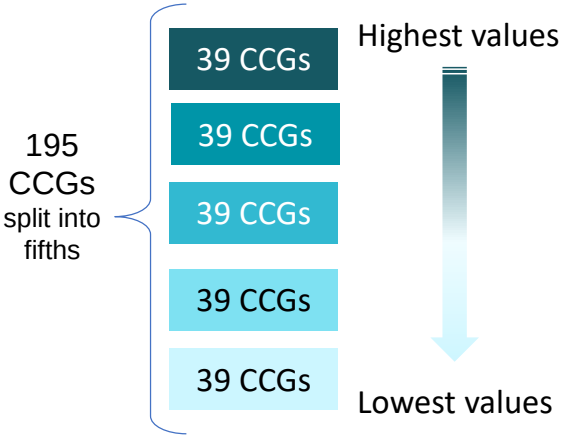
   Option for action – gives suggestions for best practice

   Resources – gives links to useful documents

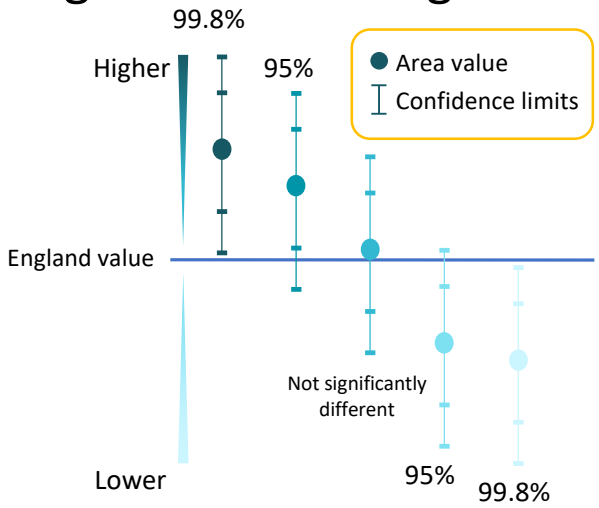
Quick user guide

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.

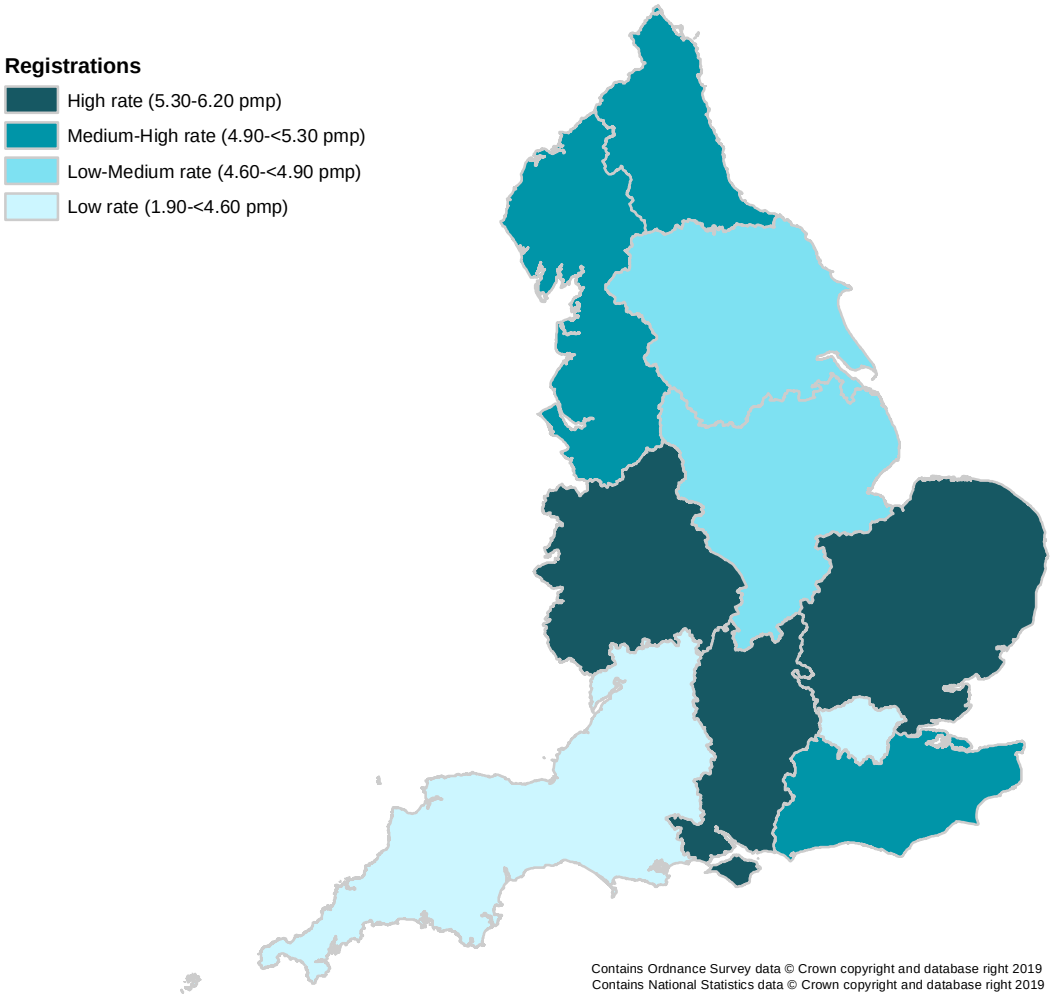
Box plot percentile	CCG rank position (195 CCGs in 2018)
Max	195
95%	Mid value between values of CCGs in ranks 185 and 186
75%	Mid value between values of CCGs in ranks 146 and 147
50% - Median	Mid value between values of CCGs in ranks 97 and 98
25%	Mid value between values of CCGs in ranks 48 and 49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

Lung transplantation

Map 31a: Variation in rate of lung transplant registrations per population by Strategic Health Authority (2017/18)

Crude rate per million population

Optimum value: High



Context

Lung transplantation is a recognised treatment for some patients with end-stage lung disease when all other medical and surgical interventions have been exhausted. A lung transplant can significantly extend a person's life expectancy as well as improving their quality of life.[1] However, the number of lung transplants performed every year remains low and about a quarter of those on the transplant list will die before receiving a transplant or be removed from the list as they become too frail.[2] Conditions that can be treated with a lung transplant include COPD, cystic fibrosis, pulmonary hypertension and idiopathic pulmonary fibrosis.[3]

The criteria for selection onto a transplant list have been defined (see 'Resources'), and are reviewed regularly by the Cardiothoracic Advisory Group for the Directorate of Organ Donation and Transplantation at NHS Blood and Transplant (NHSBT). Criteria for referral for consideration of transplantation are different from those for transplantation.

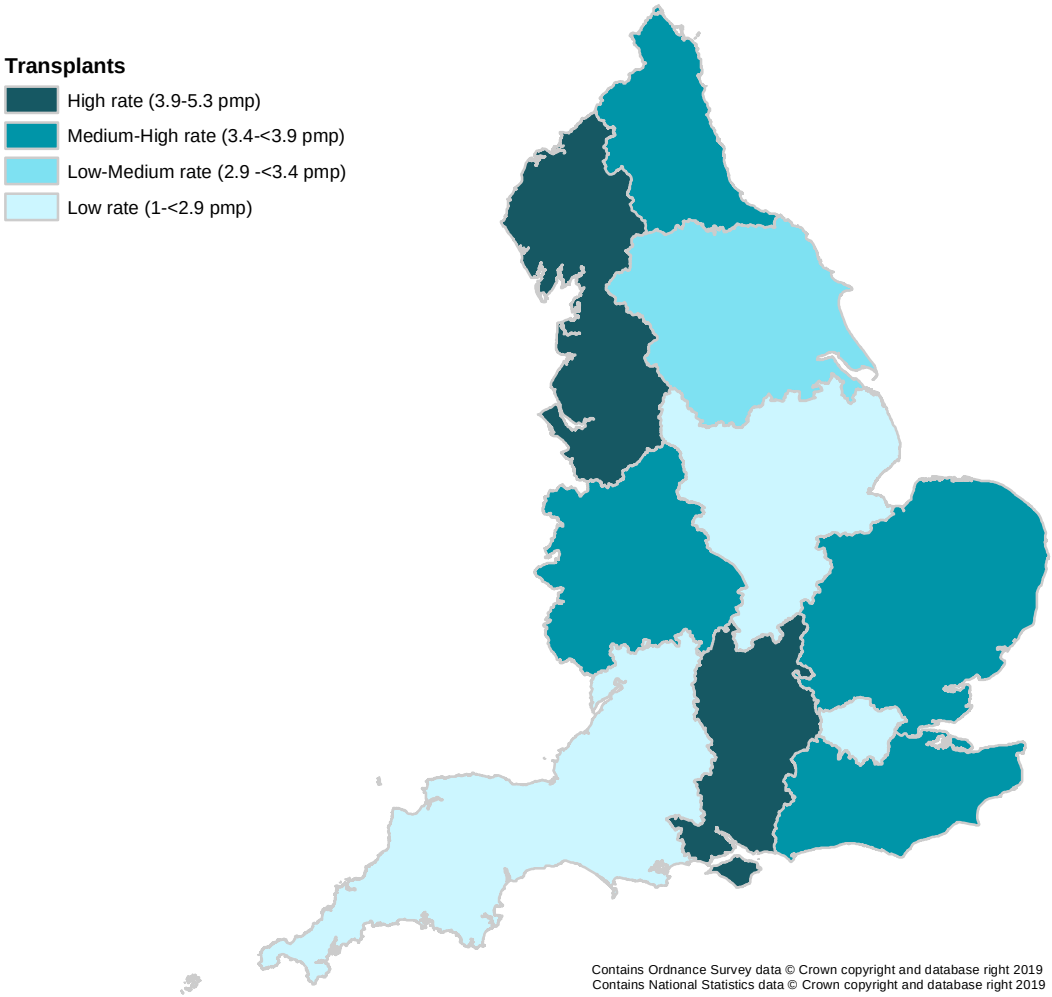
Selection for a transplant list, once referred, is carefully monitored. There are NHSBT guidelines for referral to a transplant centre (see 'Resources') to ensure that individuals

Lung transplantation

Map 31b: Variation in rate of lung transplants per population by Strategic Health Authority (2017/18)

Crude rate per million population

Optimum value: High



across the country have equal access to a transplant centre for prompt assessment of their lung disease. Donor lungs are allocated on a national basis for those on the super-urgent and urgent lists. For patients on the non-urgent list, lungs are allocated on a centre basis for local allocation. NHS Blood and Transplant have developed a universal allocation process, identical in all transplant centres (see 'Resources').

In the UK in 2017/18, 208 adult lung transplants were performed as part of the deceased donor lung programme. Of these, 46 were in urgent patients and 6 in super-urgent patients.

Survival following lung transplantation in the UK is good: for 706 transplants from 1 April 2013 to 31 March 2017, one-year survival for first adult lung only transplants (unadjusted) was 80.0%. This compares well internationally where studies have shown average one-year survival rates of 80%.[4]

Demand continues to exceed the availability of organs donated: in 2017/18 more patients were registered for a lung transplant than there were organs suitable for transplantation. At 31 March 2018, there were 339 adult patients on the non-urgent lung only transplant list. In 2017/18 there were 284 new registrations to the lung only transplant list. On 18 May 2017, the super-urgent and urgent lung allocation schemes were introduced and on 31 March

2018, there were no patients on the super-urgent list and 1 patient active on the urgent list.

During 2017/18, the lungs of 996 potential deceased organ donors without evidence of pulmonary consolidation, intra-thoracic malignancy or lung disease were offered for donation, with only 215 (22%) accepted for transplantation. In January 2018, the maximum age of lung donors was extended to 75 years (if a non-smoker for at least 10 years) in an attempt to increase transplants.

For adult patients listed for a lung only transplant in 2014/15, at one year post-registration 45% of patients had been transplanted, rising to 57% after 3 years. However, 19% of patients died within one year of listing and 26% of patients had died after 3 years of listing. After 3 years of listing a further 9% of patients had been removed from the list, mainly due to deteriorating condition.

Magnitude of variation

The NHSBT Annual Report on Cardiothoracic Transplantation found no evidence of geographical variation between SHAs beyond what would be expected at random.

Potential reasons for any observed differences may include:

- the prevalence of those lung diseases that are most suitable for transplantation
- access to expertise in lung disease locally
- differences in the application of the criteria for referral for assessment for lung transplant
- care pathways for people who may require a lung transplant

Options for action

When planning service improvement or development for lung transplantation, commissioners, clinicians and service providers could:

- identify whether there are high mortality rates from lung disease but low transplant rates in the locality, and review local services in relation to the adequacy of expertise in cardiothoracic medicine and of liaison with transplant centres
- review care pathways for patients with lung disease
- review criteria for selection onto a transplant list to ensure that patients who have the potential to benefit from referral for lung transplantation are considered for the intervention
- where possible, provide transplant assessment services locally rather than requiring patients to travel – this could be achieved via outreach networks from transplant and tertiary centres

Resources

Cardiothoracic Advisory Group on behalf of NHS Blood and Transplant Lung Transplantation: Donor Lung Distribution and Allocation Policy POL230/10 Effective 10/06/2019 [Accessed 2 August 2019]

Cardiothoracic Advisory Group on behalf of NHS Blood and Transplant Lung Transplantation Candidate Selection Criteria Policy POL231/3.1 Effective 06/06/2019 [Accessed 2 August 2019]

NHS Blood and Transplant Statistics about organ donations. [Accessed 2 August 2019]

NHS Blood and Transplant Introduction to Patient Selection and Organ Allocation Policies Policy POL200/4.1 Effective 08/11/2018 [Accessed 2 August 2019]

NHS Blood and Transplant Organ Donation and Transplantation. Activity Report [Accessed 2 August 2019]

NHS Blood and Transplant Produced in collaboration with NHS England (2018) Annual Report on Cardiothoracic Organ Transplantation. Report for 2017/2018 (1 April 2008 – 31 March 2018) [Accessed 2 August 2019]

NHS England. Schedule 2 – The Services: A. Service Specifications 170006/S Lung Transplantation service (Adults) [Accessed 2 August 2019]

[1] Kourliouros A, Hogg R, Mehew J and others (2019) Patient outcomes from time of listing for lung transplantation in the UK: are there disease specific differences? Thorax 74:60-68 doi: 10.1136/thoraxjnl-2018-211731 [Accessed 5 August 2019]
[2] Taskforce for Lung Health (2018) A National Five Plan for Lung Health [Accessed 5 August 2019]
[3] National Health Service Lung transplants [Accessed 5 August 2019]
[4] Chambers D, Yusen R, Cherikh W and others (2017) The Registry of the International Society for Heart and Lung Transplantation: Thirty-fourth Adult Lung and Heart–Lung Transplant Report-2017; Focus Theme: Allograft ischemic time The Journal of Heart and Lung Transplantation 36(10):1047-1059 doi: 10.1016/j.healun.2017.07.016 [Accessed 5 August 2019]