

## **What has caused the fall in stroke admissions during the COVID-19 pandemic?**

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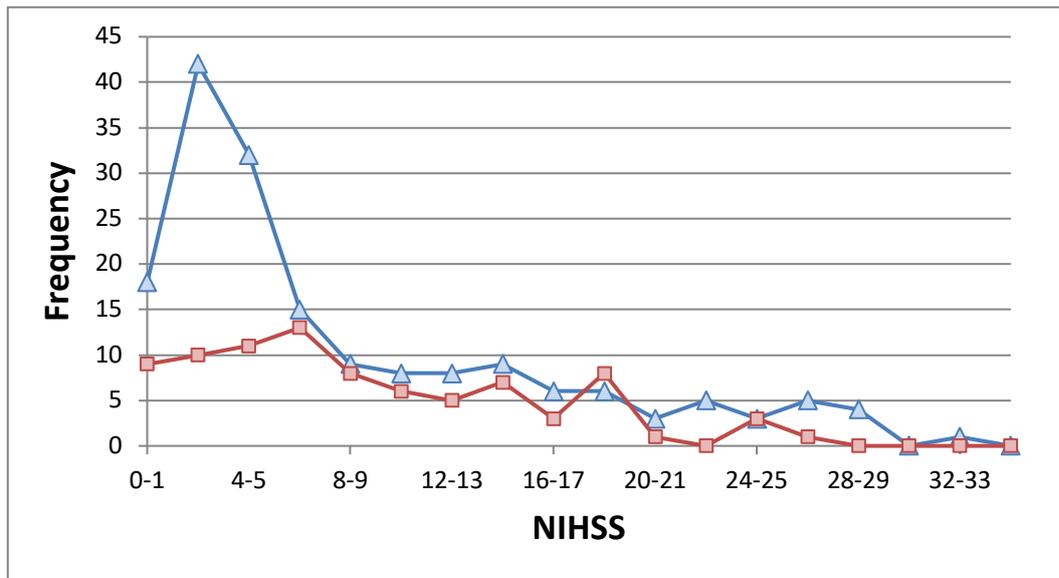
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During the current COVID-19 pandemic there has been a decline in stroke admissions in centres all over the world [1,2] and no doubt this phenomenon has contributed to the sharp fall in the number of patients attending Emergency Departments in England during March 2020 [3]. The explanation remains unclear. Hypotheses fall into two main categories. Either the incidence of stroke has declined during this period, or a higher proportion of patients who have strokes are never reaching stroke services [2]. We reasoned that any change in the spectrum of stroke severity in patients presenting during the pandemic might yield important clues to distinguish between these two possibilities, as follows.

If the main explanation is that a lower proportion of patients having a stroke are finding their way into stroke beds, then probably most of that decline will have been among those with the mildest strokes. These are the patients most likely to decide to manage their stroke at home, perhaps for fear of the risk of contracting COVID-19 whilst in hospital. They are the most likely to have their neurological symptoms missed at a time of severe respiratory illness from the virus, or to be turned away from overstretched emergency services rather than being directed into the stroke pathway [4]. Finally, minor stroke symptoms are probably more likely to be overlooked in residents of care homes. On the other hand putative mechanisms for a decline in stroke incidence, such as reduced strain whilst people are not at work or lower levels of pollution [3], would not necessarily impact on strokes of any particular severity.

To distinguish between these hypotheses we examined stroke severity in patients with a final diagnosis of acute stroke who were admitted to the Hyperacute Stroke Unit at UCL Hospitals, which provides the comprehensive stroke service for North Central London in the United Kingdom.



**Figure 1.** Distribution of National Institutes of Health Stroke Scale (NIHSS) for patients presenting in the 40 days from 1<sup>st</sup> February 2020 (blue triangles, total 175 patients) and for those presenting during the 40 days from 1<sup>st</sup> April (red circles, total 84 patients). The NIHSS is a score between 0 and 42 representing the degree of neurological impairment, higher scores representing more severe strokes. Bin width = 2.

Figure 1 shows the distribution of stroke severities (using the National Institutes of Health Stroke Scale) in admissions to our Hyperacute Stroke Unit for two 40-day periods: before the decline in emergency admissions in England [3] (1<sup>st</sup> February to 12<sup>th</sup> March, blue triangles) and after it (1<sup>st</sup> April to 11<sup>th</sup> May 2020, red circles). The decline in the number of patients admitted with mild strokes (NIHSS  $\leq$  5) was far more dramatic than was seen for moderate or severe strokes (NIHSS > 5). It seems unlikely that a fall in the true incidence of stroke would have been so strongly biased towards mild strokes, and more plausible that the major factor driving this decline is that patients with mild strokes were no longer reaching our service during the second period.

If patients with minor strokes are no longer reaching stroke inpatient services, as our data appear to suggest, then this is a worrying conclusion. Without treatment about 10% of these patients will have a recurrent stroke within a week [5]. On the other hand, the risk of catching the infection whilst in hospital is likely to be very low [6]. The public health message is clear: individuals who think that they may be having a stroke, regardless of symptom severity, are much better off calling for an ambulance than staying at home.

## Declaration of interests

RP and AB have no interests to declare. RS shares the role of Clinical Director for Stroke in London.

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