

# Are patients with acute stroke taking longer to get to hospital in the UK? Data from the National Stroke Registry

Ellie McMullen<sup>1</sup>, Kaili Stanley<sup>1</sup>, Walter Muruet<sup>1</sup>, Abdel Douiri<sup>1</sup>, Ajay Bhalla<sup>2</sup>, Charles Wolfe<sup>1</sup>, Martin James<sup>1</sup>

1. King's College London, School of Population Health and Environmental Sciences, London, United Kingdom. 2. Guy's and St Thomas' NHS Foundation Trust, London, United Kingdom. On behalf of the SSNAP Collaboration.

## Background

Patients arriving to hospital sooner after the onset of stroke are more likely to be eligible to receive hyper-acute interventions such as thrombolysis and thrombectomy for ischaemic strokes, and blood-pressure lowering treatment for intracerebral haemorrhage (ICH) patients.

## Methods

Data from April 2014-March 2019 were extracted from the Sentinel Stroke National Audit Programme (SSNAP). SSNAP is the national stroke registry which covers 92% of the UK population. For patients with reported onset times (precise or best estimate), the median annual onset-to-arrival times were analysed and changes in the proportion of patients arriving to hospital across 1.5 hour periods were compared.

## Results

Of 433,209 patients admitted to 344 stroke units over 5 years, 68% had a known onset time. 81% arrived by ambulance. The median onset-to-arrival time has increased by 36 minutes from 150 minutes [IQR 80-451] in 2014/15 to 186 minutes [IQR 95-573] in 2018/19, [ $p < 0.001$ ].

The proportion of patients arriving to hospital within 1.5 hours decreased from 33% to 22%, [ $p < 0.001$ ], while the proportion arriving beyond 4.5 hours increased from 35% to 41%, [ $p < 0.001$ ] (figure 1). Over the same 5-year period, 49,582 received thrombolysis (12% of all recorded strokes). The onset-to-arrival time for these patients has increased by 12 minutes from 76 minutes [IQR 55-109] to 88 Minutes [IQR 62-126]. In contrast, the median door-to-needle time has only decreased by 5 minutes from 56 minutes [IQR 39-83] to 51 minutes [IQR 35-75] (figure 2).

## Conclusion

Our **five years of data** from a **national, prospective stroke registry in the UK** show a steady year-on-year increase in onset-to-arrival time, amounting to 36 minutes over 5 years, and 12 minutes for thrombolysed patients. For patients receiving thrombolysis this increase more than cancels out the modest 5-minute reduction in the median door-to-needle time over the same period – an effect that will inevitably lead to a **reduced population benefit from reperfusion**. This increase may be attributable to **regional reconfigurations** of stroke services, but these have been predominantly urban, and thus unlikely to result in the magnitude of change observed. Our suspicion is that this increase is more likely due to **increasing pressure on pre-hospital services** leading to delays in response times. These data require further exploration on response times for stroke now being collected from ambulance services in England.

**Acknowledgements:** Thank you to all of the individuals and organisations who participate in SSNAP. SSNAP is funded by NHS England and Wales.

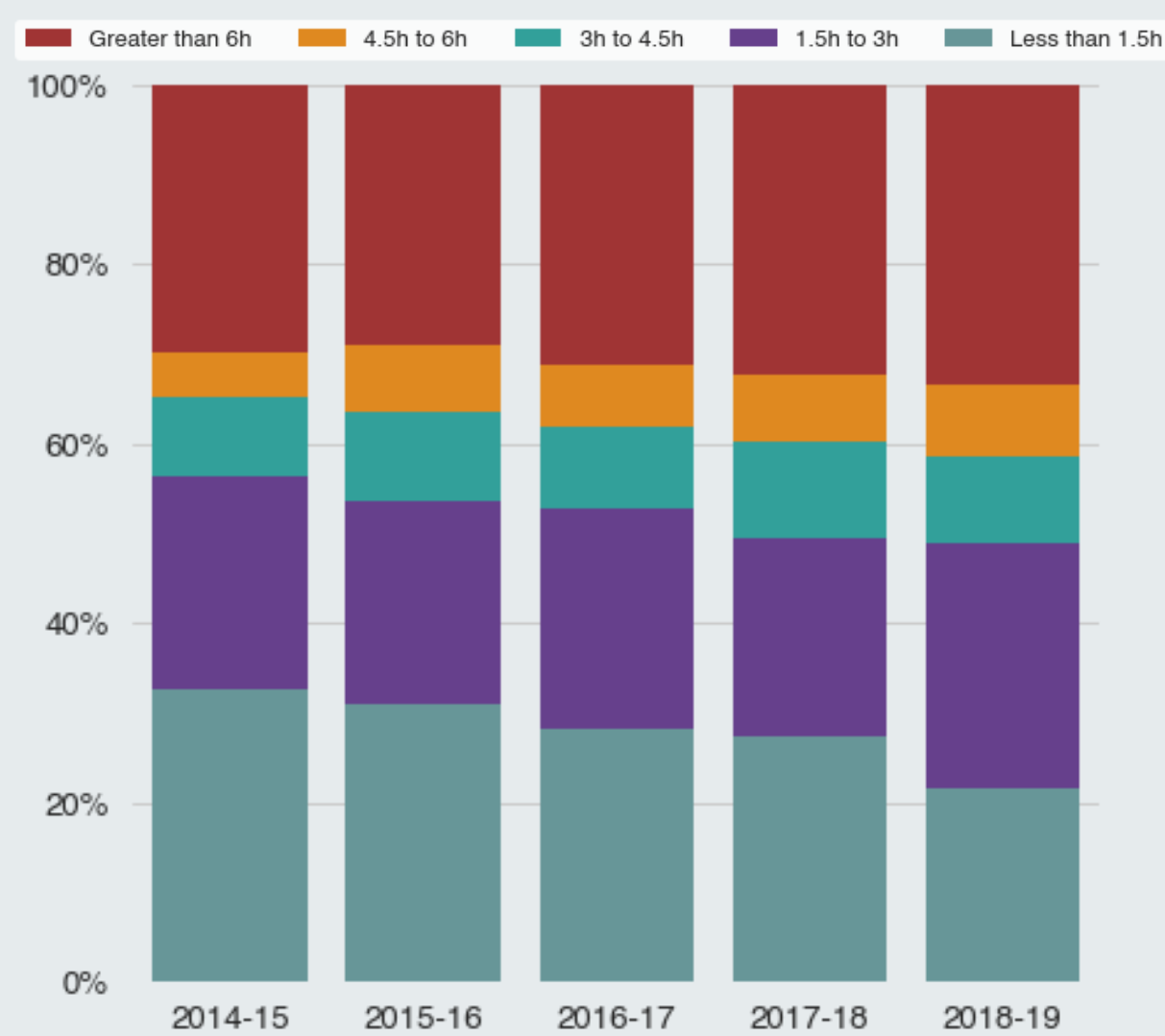


Figure 1: Onset-to-arrival time by 1.5-hour periods

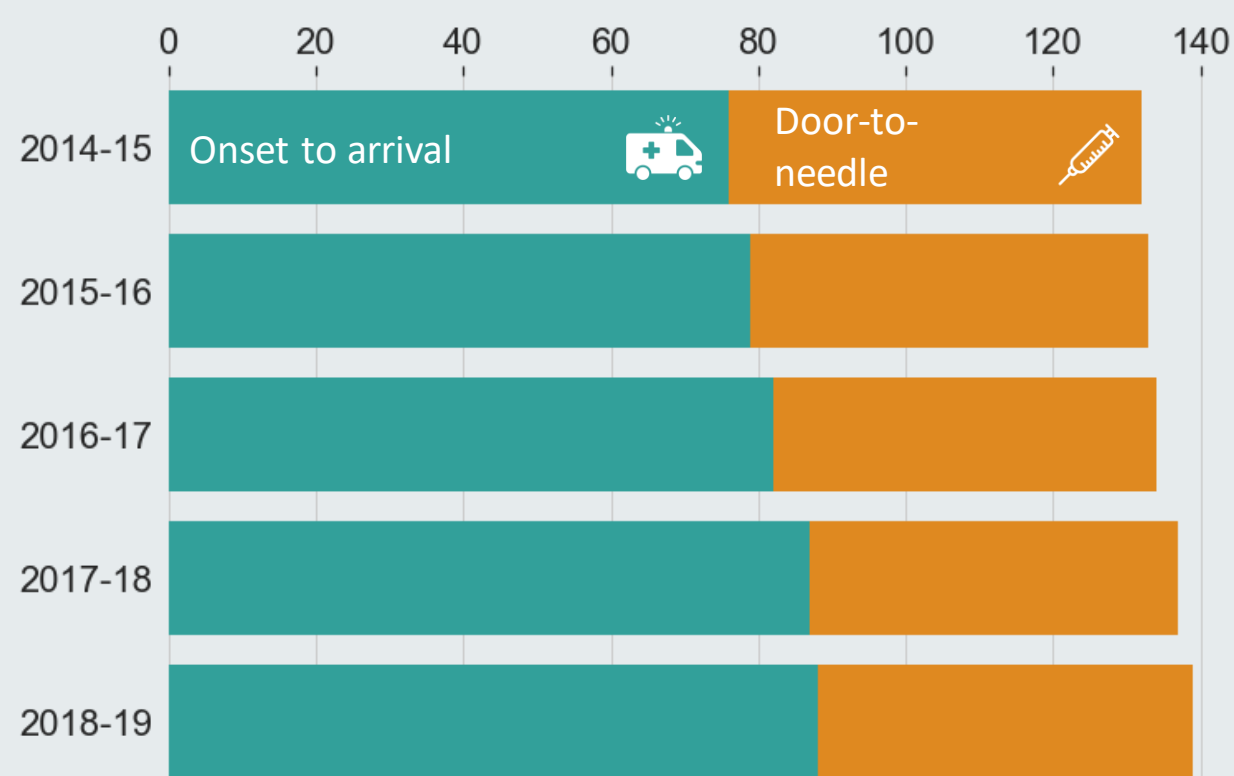


Figure 2: Onset-to-arrival time vs. door-to-needle time over 5 years for thrombolysed patients