

# Variations in hospital resource use across stroke care teams in England, Wales and Northern Ireland

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**Background:** The prevalence, short-term and long-term consequences of stroke are reflected in the high use of resources associated with the treatment and rehabilitation of stroke patients. Previous research has shown that the direct stroke treatment costs in England ranges between £3-4.4 billion a year and that informal care in the UK costs approximately £2.4 billion per year.

**Objectives:** Using inpatient length of stay (LoS) as an indicator of resource use, this paper aims to identify the main drivers of inpatient stroke care resource use, to estimate the influence of each stroke care team on the LoS of its patients over and above patient and admission-specific characteristics and to analyse the variation in relative performance across stroke care teams.

**Methodology:** This study uses data from the national stroke register of England, Wales and Northern Ireland – Sentinel Stroke National Audit Programme (SSNAP) – from June 2013 to July 2015. The analysis follows a two-step approach for each of four types of stroke care teams: hyper acute stroke units (HASUs), routinely admitting teams (RATs), non-routinely admitting acute teams (NRATs) and non-acute inpatient teams (NAITs). The first step specifies a multilevel count data model describing the variation of LoS which considers that stroke admissions are clustered within stroke teams to estimate the team influence on LoS purged of patient and admission-specific characteristics. Each team effect is then interpreted as a measure of stroke care relative performance and, in the second stage, a generalised least squares model is estimated to analyse the variation in the estimated stroke team effects.

**Results:** The results of the multilevel models show that the main driver of LoS is the need for stroke therapy even after conditioning for stroke severity. All the associations found were significantly different from zero at the 1% significance level and the magnitude range between 34% and 133% longer LoS for stroke patients needing speech and language therapy in NAITs and psychological therapy in RATs, respectively (each compared with patients in NAITs and RATs not needing the kind of therapy in question). Despite recent re-organisation of stroke care services in the UK, there are important variations in the resource use in stroke care teams, within each team category. The stroke team effects on the LoS of patients range from 19% below to 20% above the HASU national average; from 53% below to 110% above the RAT national average; from 38% below to 129% above the NRAT national average; and from 53% below to 95% above the NAIT national average. These variations are not explained by measurable patient, admission-specific and team characteristics across all stroke care team categories. Therefore, these findings deserve further operational and financial analyses that can help unmasking the cause of the huge variation in stroke care performance within stroke care team categories.

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**Topic of the paper**

Quality and efficiency of health care services

**Presentation format**

Oral session