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BACKGROUND

Understanding the costs of healthcare is a fundamental component of healthcare quality, recognised in the Institute for Health Improvement's "Triple Aim". We aimed to use health economic modelling to estimate the direct health and social care costs attributable to stroke, and integrate this into the national quality register of stroke care of England and Wales (SSNAP; Sentinel Stroke National Audit Programme). The goal was to enable SSNAP to report data on the costs of stroke alongside data on quality and outcomes.

METHODS

An individual patient sampling model [Figure 1] was built to simulate the stroke care pathway and derive estimates of direct health and social costs attributable to acute stroke. Data on patient demographics, acute stroke care and rehabilitation practice were extracted from SSNAP. Data on post stroke survival, disability and quality of life were extracted from the South London Stroke Register, a population based register with long term longitudinal follow up.

The model estimated the direct costs of incident stroke at one and five years after stroke, including healthcare costs (Hospital care, primary care, prescribing, rehabilitation) and social care costs (home care and nursing home care for people with impairments in activities of daily living as a result of stroke).

Costs were estimated for 80 different combinations of patient characteristics (Age, sex, stroke type, stroke severity). Cost utility analyses were carried out to estimate the cost effectiveness of thrombolysis and early supported discharge.

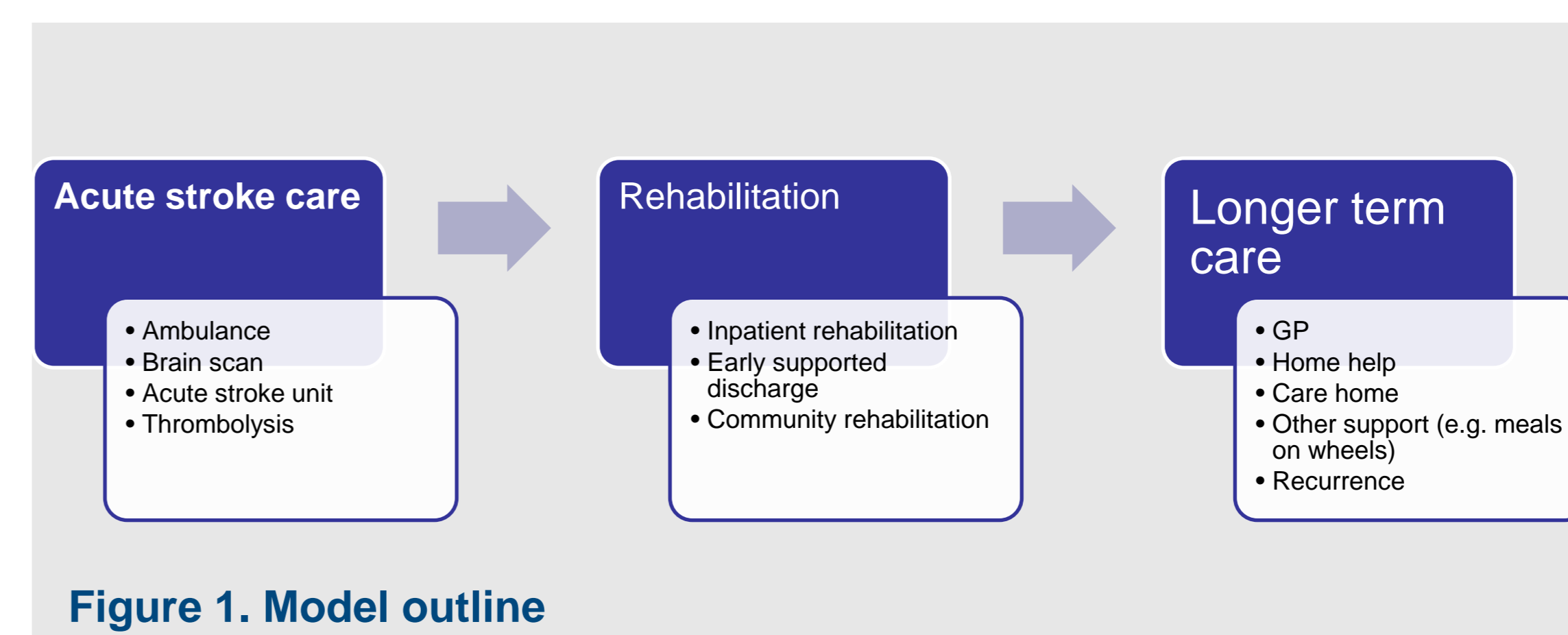


Figure 1. Model outline

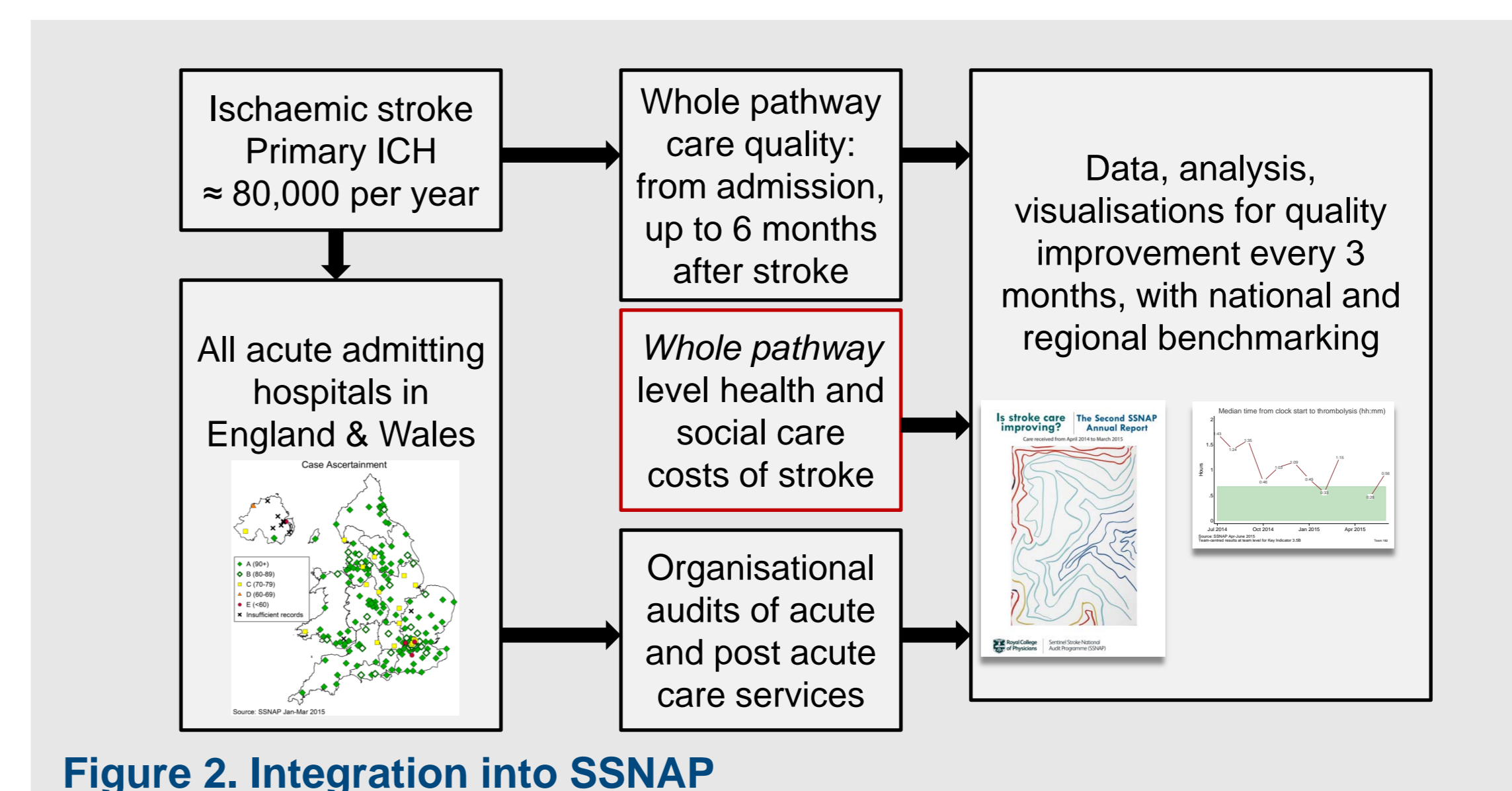


Figure 2. Integration into SSNAP

Results

The total costs per year of incident stroke in was £1.66 billion (Euro 2.1 billion) in the first year after stroke, rising to £3.45 billion (Euro 4.3 billion at five years) [Figure 3].

The average cost per stroke was £22,175 (Euro 28,000) at one year and £45,233 (Euro 57,600) at five years (Figure 4). Per patient costs increased with stroke severity and age with social costs rising more strongly with increasing age.

Because patient costs can be calculated according to individual patient characteristics, the model can produce individual estimates for all patients included in SSNAP. This allows for novel and flexible uses of the data [Figure 4], such as:

- estimated costs for different age groups
- estimated cost of potentially preventable stroke, such as AF related ischaemic stroke

| | Health costs | Social Care costs | Health & Social Care |
|--------|---------------|-------------------|----------------------|
| 1 year | £1.03 billion | £633 million | £1.66 billion |
| 5 year | £1.40 billion | £2.05 billion | £3.45 billion |

Figure 3. Total costs per year

The model can be used to estimate costs for all patients included in SSNAP

The model also allows costs to be estimated for sub populations – such as patients with AF (blue dots)

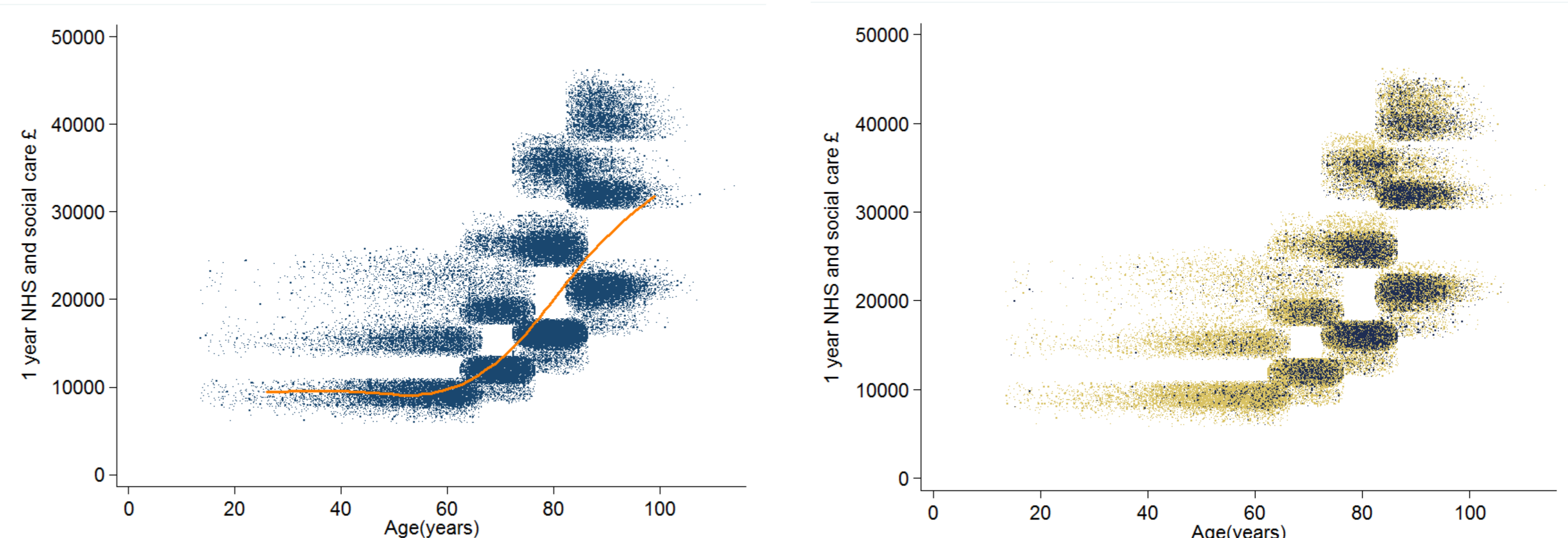


Figure 4. Scatterplots of per-patient costs for all patients (n=80,000) included in SSNAP in April 2014-March 2015

CONCLUSION

SSNAP will be one of the first national quality registers in the world to integrate reporting of health and social care costs alongside other data on healthcare quality. This will allow new uses of SSNAP data for quality improvement in stroke care: providing robust and up to date data on the costs on stroke to clinical teams, managers, and healthcare administrators for use in business plans, quality improvement projects and in organising stroke care services. We anticipate that the data will also support the funding of stroke prevention projects, such as the detection and management of atrial fibrillation. Stroke registers in other countries could consider using a similar approach to integrate health economic data into quality improvement registers.