National Audit Office

Driving improvements in NHS stroke care: evaluating the impact

Summary

This paper sets out how we used existing data to estimate the impact of our value for money work on stroke care.

Background

We made a number of recommendations aimed at improving stroke care in both our 2005 report on Reducing Brain Damage: Faster access to better stroke care (HC 452, Session 2005-2006) and our 2010 report on Progress in improving stroke care (HC 291, Session 2009-2010). These included:

- more rapid access to specialised stroke units; and
- better access to brain scanning, treatments (eg thrombolysis) and early supported discharge.

Parliament's Committee of Public Accounts (PAC) took evidence on the basis of our reports, and reinforced the recommendations that we had made. Findings from the first National Audit Office (NAO) and PAC reports fed into the Department of Health's National Stroke Strategy, launched in December 2007.

We routinely document the financial and non-financial impact of our work to government, taxpayers and service users. We therefore sought to measure the efficiency savings in stroke care arising from these recommendations.

Method overview

We used publicly available data: hospital activity data (Hospital Episode Statistics[1]); cost data for patient spells (reference costs); and quality of care indicators. Our analysis involved:

- measuring whether the length of stay in stroke care from 2006-07 onwards was significantly reduced from what might have been expected;
- estimating cost savings in stroke care which could be attributed to improvements including reduction in length of stay; and
- assessing whether there had been improvements in care outcomes over this period, by examining changes in mortality and emergency readmission rates, and the proportion of patients returning home.

Lengths of stay

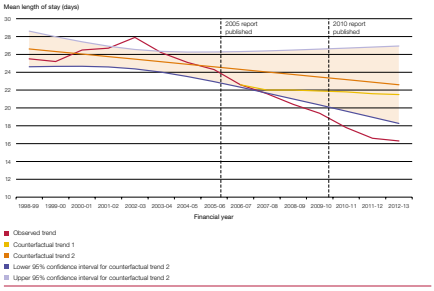
We explored whether the actual reduction in length of stay for stroke patients between 2006-07 and 2012-13 differed from what might have been expected by constructing two counterfactuals (alternative trends) that assumed the average length of stay for stroke patients followed:

1 the same rate as observed for all inpatient admissions from 2006-07 to 2012-13; and

2 the trend observed for stroke admissions from 1998-99 to 2006-07. We used linear regression to plot this trend, with the 95% confidence intervals providing a range in predicted forecasts for length of stay.

From 2006-07 to 2012-13, actual length of stay fell from 22.6 to 16.3 days, significantly different from the 21.5 and 22.6 days predicted by the alternative trends we constructed (**Figure 1**)

Figure 1
Comparison of calculated length of stay trends for stroke care, 1998-99 to 2012-13



Click to enlarge

Costs

We estimated the cost savings from improved stroke care. We first calculated observed total costs for stroke care, for 2006-07 to 2013-14, by multiplying activity levels for stroke-specific 'healthcare resource groups' (AA22-23) by the average unit cost per spell.

We then calculated the same total costs, assuming that the unit cost per spell stayed at 2006-07 levels (adjusted for inflation each year, using the hospital and community services 'pay and prices index'). The difference between these total costs and the observed costs provides an estimate for the savings (some £456 million from 2007-08 to 2013-14) **(Figure 2**).

1 We used ICD-10 primary diagnosis codes I60-I69.

Figure 2
Estimated savings, 2006-07 to 2013-14

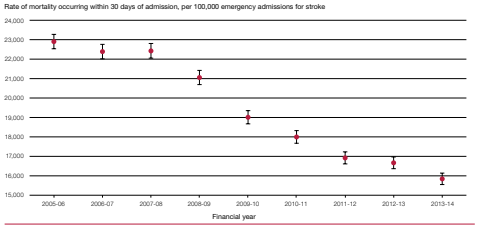
	Cost saving compared with 2006-07 unit costs (£000)		
HRG	**AA22**	**AA23**	**Total**
2006-07	0	0	0
2007-08	49,039	10,390	59,429
2008-09	67,929	11,789	79,718
2009-10	76,455	11,553	88,008
2010-11	78,984	13,787	92,771
2011-12	58,835	8,787	67,622
2012-13	30,140	6,546	36,685
2013-14	26,481	4,990	31,471
Total			**455,705**

Quality of care

Finally, we looked at trends in age and sex standardised mortality rates following a stroke (from 2005-06 to 2013-14), with confidence intervals used to measure whether changes across years were significant. A similar analysis was run for readmission rates and for the proportion of patients returning to their usual place of residence following a stroke.

The analysis showed that there had been a significant reduction in the mortality rate following a stroke admission during that period, while the proportion of patients returning to their usual place of residence increased. There was not a statistically significant trend for readmissions, except for an increase between 2007-08 and 2008-09.

Figure 3
Standardised mortality rate for stroke patients, including 95% confidence intervals, 2005-06 to 2013-14



Click to enlarge

Conclusions

Our analysis suggested that lengths of stay after 2006-07 fell significantly below the what might have been expected from the historical trend.

Using reference cost data and activity data, we calculated total savings of some £456 million in reduced costs for stroke care, after accounting for inflation. These savings are likely to be associated with a reduction in the number of bed days per year.

Defining the proportion of this impact attributable to the NAO is not an exact science. However, through providing impetus to improvements in stroke care, we estimated that 30% of this saving (parsimoniously rounded to £136 million) as our impact.

Finally, we identified that the mortality rate had decreased, while the proportion of patients returning home after care had increased. This suggested that quality of care was not compromised by the efficiency gains identified above.

Limitations

These calculations were made at an aggregate level for stroke patients, rather than by using patient-level statistics. Some data, such as reference costs, have known limitations in terms of data quality. Monitor found that 49% of the 75 hospital trusts provided materially inaccurate reference cost submissions in its audit of the 2014-15 data. However, this limitation is likely to have a greater bias on comparisons between trusts rather than at the national level used here.

We selected two plausible counterfactuals to consider how stroke care length of stay may have changed without the national interventions, although recognise that other forecasts are conceivable.

Trends and improvements in stroke care will have been caused by a number of factors. Our impact assessment recognises that our contribution to improvements in stroke care are difficult to separate from other developments in the sector, including other bodies which published reports on the topic. We therefore agreed a proportion of the overall impact with NHS England that reasonably reflected the scale of our contribution to changes in stroke care.

Other uses

This type of analysis, which makes use of readily available clinical and costing data, is applicable to a number of other impact assessments, particularly where clinical and operational benefits are concerned.

Resources

We accessed Hospital Episode Statistics data from http://content.digital.nhs.uk/hes

We accessed reference cost data from www.gov.uk/government/collections/nhs-reference-costs

We accessed quality of care data from the Health and Social Care Information Centre's indicator portal http://content.digital.nhs.uk/indicatorportal

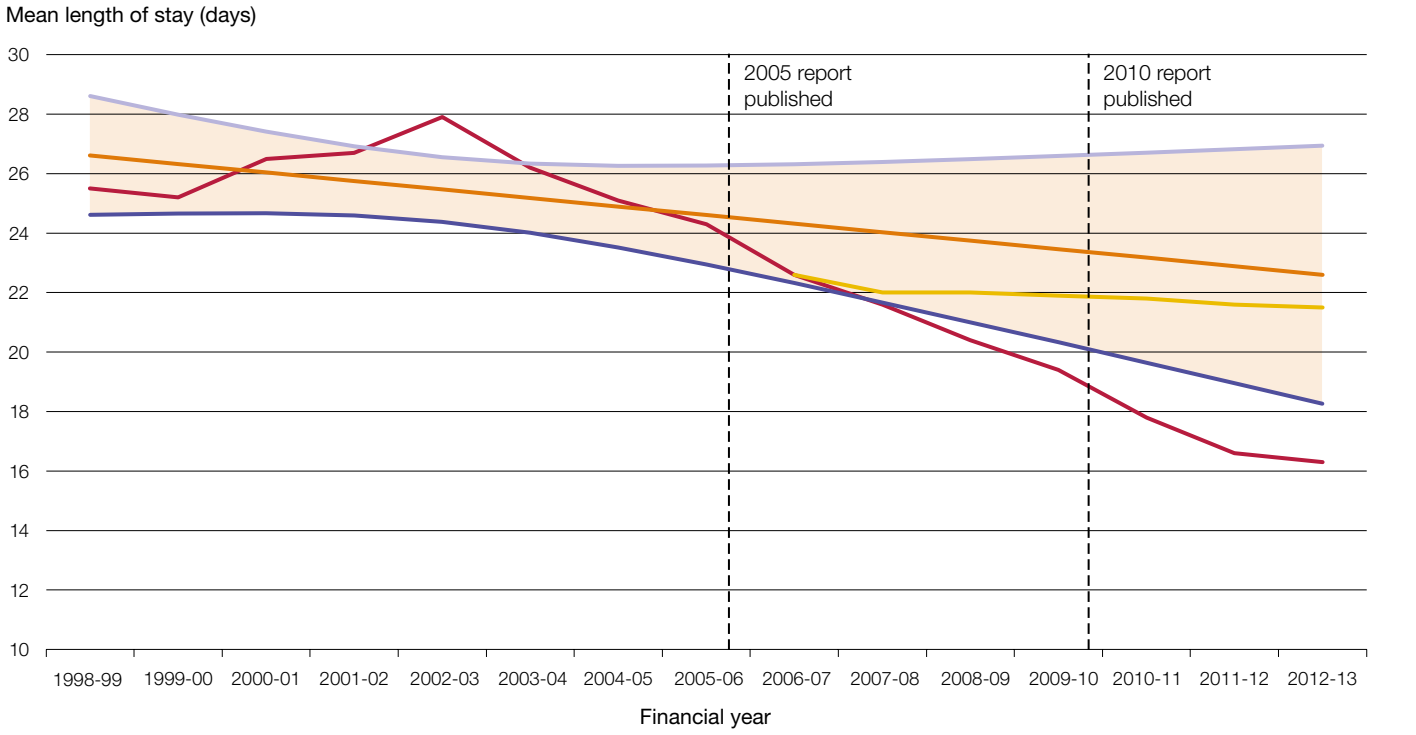
Design and Production by NAO External Relations
DP Ref: 11319-001 | © National Audit Office 2017

National Audit Office

Back

Figure 1

Comparison of calculated length of stay trends for stroke care, 1998-99 to 2012-13



Back

Figure 3

Standardised mortality rate for stroke patients, including 95% confidence intervals, 2005-06 to 2013-14