Dr Foster's case notes

Variation in operation rates by primary care trust

Variation in the use of surgical procedures has been well documented in the US, England and Norway.^{w1 w2} With increasing emphasis in health care on clinical guidelines,^{w3} service frameworks,^{w4} and evidence based medicine,^{w5 w6} one might expect to see less variation in practice over time. Using hospital episode statistics, we looked at trends in variation between primary care trusts in operation rates for 10 common procedures over six years from 1998-9 to 2003-4.

The bottom line

- Carotid endarterectomy, haemorrhoidectomy, and cholecystectomy all showed high variation in operation rates by primary care trust in 2003-4
- Hernia repair showed the lowest variation in operation rates
- Carotid endarterectomy, coronary artery bypass grafts, and hernia repairs showed significant decreases in variation over the years examined
- Haemorrhoidectomy showed a significant increase in variation over the years examined
- Monitoring variation across healthcare boundaries might provide a useful method of evaluating the implementation of national guidelines

Indirectly standardised operation ratios were derived for each of the 303 primary care trusts (based on resident postcode) from 1998-9 to 2003-4; they were standardised for age, sex, and socioeconomic deprivation,^{w7} for all inpatient and day case episodes of care, using hospital episode statistics. The 10 operations that were examined had already been identified as having high or medium variation, except for hernia repair, which was found to have low variation (table, figure).^{w1 w2} The variation in standardised operation ratios between primary care trusts was determined by using the coefficient of variation and the systematic

Trends in variation of indirectly standardised operation ratios between primary care trusts. Systematic component of variation is based on hospital episode statistics

Variation* of indirectly standardised operation ratios by primary care trust, based on hospital episode statistics

Operation	1998-9	1999-2000	2000-1	2001-2	2002-3	2003-4
Carotid endarterectomy**	38.6*	30.2*	27.3*	31.0*	24.9*	28.3*
Haemorrhoidectomy**	10.7*	15.4*	13.6*	14.6*	15.5*	15.2*
Cholecystectomy	11.3*	14.4*	9.0*	11.5*	14.3*	12.3*
Tonsillectomy	7.6*	9.4*	9.6*	10.7*	7.6*	7.8*
Prostatectomy	6.6*	9.1*	9.8*	10.8*	7.4*	6.2*
CABG**	7.2*	8.3*	7.3*	7.5*	6.4*	5.8*
Hysterectomy	5.5*	6.1*	5.5*	4.9	5.1	4.8
Hip replacement	4.2	5.3	5.2	5.9*	4.1	4.3
Appendectomy	3.4	3.4	3.2	3.2	2.9	3.2
Hernia repair**	2.5	2.6	2.5	2.7	1.6	1.7

CABG=coronary artery bypass graft.

*Systematic component of variation $\times 100$, which adjusts for unequal contributions to the variance estimate that are introduced by differences in prevailing rates and population denominators between areas. Values >5.4 show high variation.

**Significant for difference between 1998-9 and 2003-4 ($P<0.05$).

component of variation,^{w1} which removes random variation caused by small numbers. High variation admissions are those with a systematic component of variation >5.4 .^{w8} Carotid endarterectomy showed the widest variation, and this variation fell significantly between 1998-9 and 2003-4.

Haemorrhoidectomy was the only procedure to show a significant increase in variation.

The use of surgical procedures still varies widely between primary care trusts. Contributors to this variation may include

confounding factors that we have been unable to control for, coding issues, and the accessibility and provision of services. Several operations have significantly reduced variation over the period examined; this would be consistent with an increased focus on the use of guidelines, or better and fairer resource allocation. Monitoring variation across healthcare boundaries might provide a useful method of evaluating both of these mechanisms.

This month's Dr Foster's case notes were compiled by Paul Aylin, Susan Williams, Brian Jarman, and Alex Bottle at the Dr Foster Unit at Imperial College. Dr Foster is an independent research and publishing organisation created to examine measures of clinical performance.

References, methodological details, and an additional table are on bmj.com