

FOTOLIA

Malcolm Prowle scans the costs of medical imaging activities at four NHS trusts and identifies what lessons can be learnt

# RADIATION VIBES

**COSTING IS BACK** on the NHS agenda. Its importance has been growing in England since national average healthcare resource group costs were identified as the basis for the national tariff. But there is a growing view that understanding the costs of different activities is vital to managing and improving healthcare. And if costing information is to be used to make decisions about services, it must be accurate – NHS managers need to understand the potential different causes for any apparent variations in cost.

A recent project set out to examine the costs of radiological imaging at four acute trusts. Such data offers huge potential benefits. Analysing procedure costs (down to sub-procedure level) should enable trusts to:

- Undertake more targeted and sophisticated pricing of procedures to third parties
- Undertake cost comparisons to be made with other NHS and private providers
- Analyse operational processes that make up an imaging procedure and associated costs, to help develop a simulation model that analyses the service and cost impact of changes in the process.

The project used data from the four trusts on the activity levels, resource inputs and associated costs of undertaking various radiological imaging procedures. The trusts were broadly similar and none was a

teaching hospital or a foundation trust. The approach was essentially a bottom-up costing approach involving several key steps.

First, discussions were held with local clinical staff to classify the wide range of imaging procedures into a small number of meaningful sub-groups – bone, abdominal, cardiac – within a main group, such as MRI, where the level of resources required to undertake the procedure was broadly similar.

Then for each sub-group a data collection template was issued to the imaging department, which was asked to give its best estimate of the resources required to undertake each stage in the procedure. All data provided was subject to validation checks. If it failed the checks, the data was reassessed by the trust or normalised. Importantly, for all trusts the sum of the unit costs calculated was fully reconciled to the total imaging department expenditure.

There were considerable variations between trusts in the overall unit costs of the same imaging group (see table 1). Further analysis also shows large variations in the resource composition of the unit costs – somewhat surprising given that the project was attempting to calculate the costs of basically similar procedures in each trust.

The results were also compared with the relevant direct access tariffs for the year

2005/06 (see table 2). In many cases, the unit costs suggested by this exercise were above the tariff for direct access services. However, it was also apparent that in some cases the locally derived procedure groups did not have an obvious equivalent direct access tariff band.

For cost information to be useful there needs to be reasonable confidence about its accuracy. So it is important to understand why such significant variations exist between NHS trusts carrying out a fairly standard set of procedures. Given that the sum of the unit costs across all procedures reconciled to the total expenditure of the imaging departments, the variations cannot be dismissed as a result of a general over- or under-statement of costs out of line with the total. They must be caused by other factors.

Analysis suggested the causal factors of cost variations could be classified as being of three types: operational issues; accounting and costing practices; and data issues.

## OPERATIONAL ISSUES

A number of operational issues contributing to cost variations were identified:

- **Procedure mix** The trusts involved showed significant variations in the mix of imaging procedures within a main procedure group. For example, in two trusts only one

**Table 1: Comparison of trusts' imaging costs (£)**

|                          | Trust A | Trust B | Trust C | Trust D | Weighted mean |
|--------------------------|---------|---------|---------|---------|---------------|
| <b>MRI</b>               |         |         |         |         |               |
| Total cost per procedure | 213.05  | 209.46  | 197.82  | 102.40  | 177.81        |
| Numbers of procedures    | 2,816   | 6,412   | 1,340   | 4,363   |               |
| <b>CT</b>                |         |         |         |         |               |
| Total cost per procedure | 54.33   | 79.81   | 101.20  | 76.71   | 78.43         |
| Numbers of procedures    | 6,614   | 23,261  | 6,512   | 12,139  |               |
| <b>Ultrasound</b>        |         |         |         |         |               |
| Total cost per procedure | 21.45   | 23.65   | 49.71   | 42.06   | 29.12         |
| Numbers of procedures    | 25,034  | 95,616  | 18,568  | 25,708  |               |
| <b>Plain X-rays</b>      |         |         |         |         |               |
| Total cost per procedure | 34.82   | 30.04   | 26.79   | 31.95   | 30.77         |
| Numbers of procedures    | 84,567  | 315,312 | 70,297  | 139,413 |               |

type of MRI investigation was undertaken whereas in the other two a variety of MRI investigations were undertaken.

- **Practice models** Different models of imaging practice existed between trusts. The conduct of an imaging procedure comprises a series of largely sequential steps starting with referral and ending with reporting results. Although the steps were broadly similar, there were important differences between trusts that could influence overall costs. Such process differences might be the subject of a value stream analysis under a lean systems review.

There were also staffing mix differences. In some trusts, for some procedures there will be a significant radiologist involvement while in other trusts much of the work will be done by radiographers. Given the difference in salary between radiologists and radiographers, this can have a significant impact on costs. There is some published evidence to suggest that using radiographers instead of radiologists need not necessarily have a negative impact on service outcomes.

In one trust, a significant proportion of the pathway for MRI investigations was outsourced to a private provider with the evaluation and reporting of results being provided by trust radiologists. Again, this has significant implications on the cost structure of the procedures, although outcomes would also need to be factored in to any discussions.

### ACCOUNTING AND COSTING

Differences in accounting and costing practices also contribute to variations in cost.

- **Analysis of imaging department costs** Within the trusts, the staff resources and costs of the imaging department were attributed to the various sub-sections of the department – MRI or CT, say. Subsequently, the costs of the sub-sections were attributed by the project team to individual procedures undertaken within the sub-sections. In some

trusts, it appears that the attribution of costs between the sub-sections was not undertaken very accurately with a knock-on effect on the unit costs of the different procedures. Quite often, certain costs that should have been attributed to smaller sub-sections, such as CT, were left in the largest cost pool – plain X-rays. The understatement of costs of CT was significant, while the overstatement of costs of X-rays was minimal.

- **Hospital overhead costs** The method and accuracy of apportioning hospital overhead costs to the imaging department and to its sub-sections varied between trusts.
- **Equipment costs** There are different approaches to acquiring imaging equipment which affects unit costs. In some trusts, imaging equipment had been fully depreciated, avoiding depreciation charges.

### DATA FACTORS

There are also a number of data issues:

- **Resource estimates** There were significant variances in the accuracy of estimates of staff time and consumable costs per procedure provided by imaging departments. While the procedure costs

obtained were not overstated in total, they could have incorporated some degree of over- or under-statement of unit costs for individual types of procedures.

- **Sample size** This project was based on data from a small number of trusts and if one or more of them were outliers, this could distort the overall picture.

The results of this exercise suggest there are limitations to the usefulness of the cost data produced for internal planning purposes or for making cost comparisons with other providers. It suggests actions should be considered to improve comparability of data.

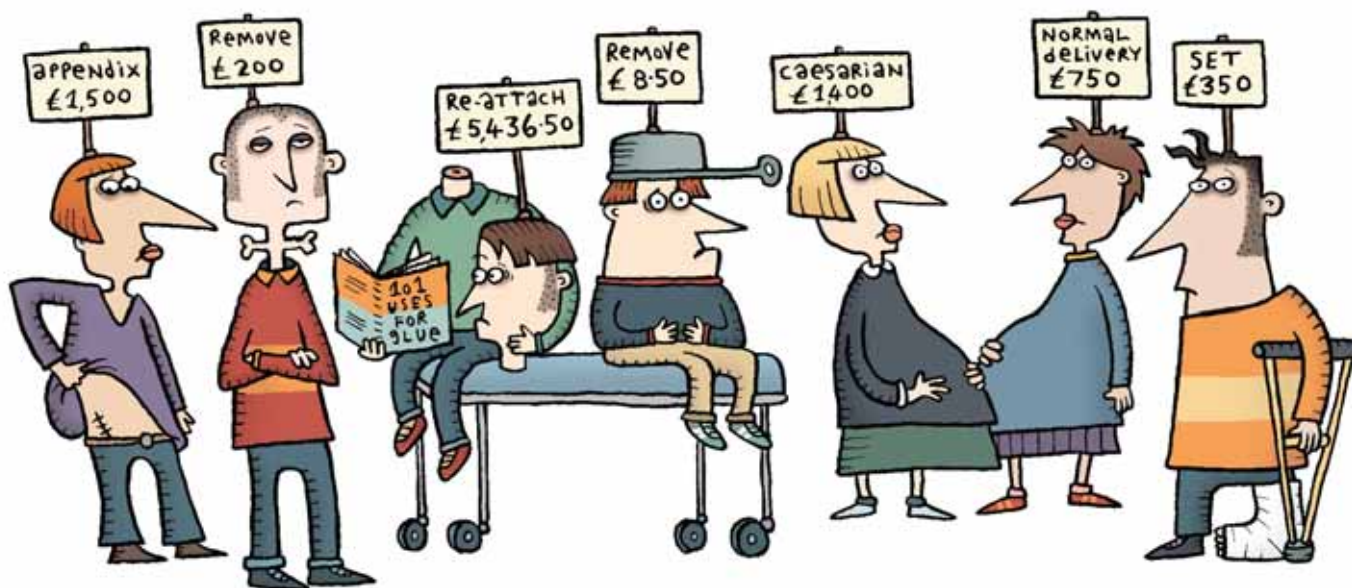
If a trust wished to compare its unit costs with other providers, it is important to remove the variable concerned with the mix of procedures. This could be done by undertaking some modelling of the mix variables to remove variations caused by differing procedure mix. Improvements could also be made to the data collection process with more staff training and more time for assessments to be made. This should improve the accuracy and comparability of unit costs produced.

There is clearly room for improvement on costing practices. Limitations in the procedures for apportioning overhead costs have been noted. While greater central prescription of costing practices might not be attractive, trusts may need to revisit their own costing practices to assess their suitability in the light of the materiality of the costs involved. Improvements in this area should improve the accuracy and comparability of the costing results.

*Professor Malcolm Prowle is visiting professor at the Nottingham Business School*

**Table 2: Comparison of the costing exercise with direct access tariffs**

|                         | No of data points | Mean cost £ | Range of costs £ | Direct access tariff band | Direct access tariff 05/06 £ |
|-------------------------|-------------------|-------------|------------------|---------------------------|------------------------------|
| Bone MRI                | 4                 | 184         | 95-209           | F1                        | 227                          |
| Abdominal MRI           | 2                 | 139         | 103-234          | F1                        | 227                          |
| Cardiac MRI             | 2                 | 209         | 201-250          | No clear band             | No tariff                    |
| CT group 1              | 4                 | 70          | 48-76            | C5                        | 50                           |
| CT group 2              | 4                 | 92          | 60-116           | C5                        | 50                           |
| CT group 3              | 4                 | 105         | 66-161           | No clear band             | No tariff                    |
| CT group 4              | 4                 | 76          | 59-87            | C5                        | 50                           |
| CT Interventional       | 4                 | 135         | 106-161          | No clear band             | No tariff                    |
| Ultrasound group 1      | 4                 | 28          | 20-45            | B3                        | 33                           |
| Ultrasound group 2      | 4                 | 37          | 26-68            | B3                        | 33                           |
| Ultras'd interventional | 4                 | 60          | 30-86            | No clear band             | No tariff                    |
| Ultrasound mobiles      | 4                 | 34          | 23-121           | No clear band             | No tariff                    |
| Plain X-rays            | 4                 | 27          | 25-32            | A                         | 16                           |
| Special X-rays          | 4                 | 57          | 50-97            | C6                        | 70                           |
| Interventional X-rays   | 4                 | 115         | 60-137           | No clear band             | No tariff                    |



# Costing gets personal

Having set up a system in which funds follow the patient, the focus in the English NHS is now on understanding the costs of individual episodes of care. Steve Brown reports on the push for patient level costing

WHEN REFERENCE COSTS were introduced, there were big hopes for the initiative. Here was a way of benchmarking treatment and procedure costs between hospitals and engaging with clinicians about an organisation's costs. But in the vast majority of cases it simply hasn't happened. Instead, reference costs – often dismissed as an average of average – made little sense to clinicians and they simply switched off, leaving reference costs stuck in the finance department.

Reference costs' credibility problem was not confined to the clinical workforce. Many financial professionals were unconvinced by their accuracy and thus their relevance as useful management information. The Department of Health was also conscious of the variability of data. There are plenty of stories of organisations submitting ludicrous data – an average hip replacement costing less than the price of the prosthesis, for instance – and the Department quickly moved from publishing the full range of submitted costs to just focusing on the interquartile figures (the middle 50% of costs).

While reference costs do have a role – particularly as the current basis for setting the national tariff – they have not become the important management information they were meant to be. Reference costing has remained an annual exercise far removed from the day-to-day running of health services.

But there is still an awareness that accurate costing information is vital to driving service improvement. And with clinical engagement key to any costing initiative's success, it has been recognised that

costing has to be robust and in a form that clinicians can relate to – at the patient level.

The Department has been banging the drum for patient level costing – or patient level information and costing systems (PLICS) – for several months (*Healthcare Finance*, December 2006 page 8). But it has formalised these calls recently in its *Options for the future of payment by results* consultation paper, where it suggests that patient-level costing – already widespread in private healthcare companies – is an important opportunity for the NHS. And it talks about building on the experience of early implementers 'to inform the evidence base for national roll-out'.

The pragmatic way forward for patient level costing is the use of a dedicated software system or managed service – the collection and reporting of patient level information has to be close to automatic if it is to be used for day-to-day management. But choosing the right system or service is not straightforward.

The complete focus on reference costing in England in recent years means that patient level costing systems cannot simply be bought off the shelf – certainly not systems with an established UK user base. This means hospitals are left choosing from less familiar suppliers with experience outside the UK or from suppliers rapidly developing systems to meet the new demand.

The Department is keen to help. In the consultation paper, it promised to 'engage with suppliers of costing systems to the NHS to