has contracted with the private sector at price levels that imply fee reductions for practitioners. Some NHS independent treatment centres have contracted for extra activity at fee levels below the rates charged by the private health insurer BUPA. BUPA announced in June 2004 that it was cutting its fees to consultants because, with its markets under threat from the NHS, it has to increase competitiveness.³

Thus government policy has, probably unwittingly, undermined professional and insurance cartels that have held private fees high for decades. In doing so, it has increased the feasibility of fee for service payment in the NHS. Surgeons, facing reductions in their private sector earnings, may be offered the possibility of compensating for this through fee payments in the NHS. There is scope to pilot the use of fee for service payments to stimulate activity levels and deliver NHS modernisation targets.⁴

Currently, considerable variations exist in surgical activity rates.⁵ Some evidence shows that relatively small incentives can have considerable effects on behaviour.⁶ Introducing fee payments could increase average activity levels and influence variations in activity as clinicians respond to financial incentives—for example, by identifying and removing local activity bottlenecks and by allocating more of their time to care for patients.

Any introduction of fee payments requires a very cautious approach and will result in considerable debate. Current nominal equality in the payment of surgeons and physicians would be explicitly destroyed by selective fee payments for surgeons, anaesthetists, and some diagnostic specialties, creating differentials in pay within the profession. Fees for service are less appropriate for physicians and others, for whom a lower rate of admission (hence lower productivity, in its crudest sense) may be a sign of higher quality of care. The focus of other health reforms is currently the creation of integrated care for patients with chronic illnesses. This could be complemented by careful design of payment mechanisms aligning the financial incentives faced by physicians. Similar systems are currently being introduced in the United States and Germany.⁷

Increases in activity resulting from financial incentives would have to be managed with a cautiously designed fee schedule, as differences in relative prices of procedures would affect case mix. Monitoring effects

on the quality of care may require better measurement of the success of practitioners by using health related quality of life measures.⁸ Once introduced, fee for service systems of payment are difficult to change and may undermine NHS efficiency and cost control, introducing rigidities that are difficult to alter and potentially marginalising interventions for which there are no incentives.⁹ Finally, as Germany and France wish to abandon fee for service payments because of their cost, any NHS scheme would have to be capped to avoid undue cost inflation, and be subject to careful monitoring and evaluation to minimise unwanted effects.

Advocates of radical change in policy may generate superficially attractive ideas,¹⁰ but, like the quality framework for general practitioners, fee for service for consultants offers opportunities for gaming and the requirement for much more detailed management of practice. Any changes should be piloted and thoroughly evaluated, to show that patient care is demonstrably improved: a challenge that may not be embraced by impatient policy makers nearing a general election.

Alan Maynard *professor*

Karen Bloor *senior research fellow*

Department of Health Sciences, University of York, York YO10 5DD
(akm3@york.ac.uk)

Competing interests: AM is chair of York hospitals NHS trust. KB is a non-executive director of Selby and York primary care trust. Both authors have received research funds from the Department of Health policy research programme for work on productivity of hospital consultants.

- 1 Department of Health. *The NHS Plan*. London: Stationery Office, 2000.
- 2 Bramley-Harker E, Aslam S. *Fees for medical specialists: how does the UK compare?* London: NERA Economic Consulting, 2003.
- 3 Timmins N. Health market forces BUPA cuts. *Financial Times* 2004 June 10:1.
- 4 Department of Health. *New reward scheme will mean faster treatment for patients*. Press release 2004/0258, 9 July 2004.
- 5 Bloor K, Maynard A. Consultants: managing them means measuring them. *Health Serv J* 2002;112:10-1.
- 6 Le Grand J. *Motivation, agency and public policy: of knights and knaves, pawns and queens*. Oxford University Press, 2003.
- 7 Busse R. disease management programs in Germany's statutory health insurance system. *Health Affairs* 2004;23:56-67.
- 8 Kind P, Williams A. Measuring success in health care: the time has come to do it properly! *Health Policy Matters*. Issue 9. York: University of York; 2004. www.york.ac.uk/healthsciences/pubs/HPM9final.pdf (accessed 17 Sep 2004).
- 9 Maynard A, Bloor K. Do those who pay the piper call the tune? *Health Policy Matters*. Issue 8. York: University of York, 2003. www.york.ac.uk/healthsciences/pubs/hpm8final.pdf (accessed 17 Sep 2004).
- 10 Stevens S. Reform strategies for the English NHS. *Health Affairs* 2004;23:37-44.

Computed tomography in children

Statements about the damaging effects of radiation on learning were erroneous

A paper published recently in the *BMJ* reported results from a historical study of intellectual capacity in people receiving head and neck radiotherapy before the age of 18 months.¹ Hall et al concluded that the severity of intellectual impairment was a dose dependent result of radiotherapy. They further commented that radiation doses associated with contemporary diagnostic computed tomography of the head were comparable with radiotherapy doses

quoted from their study and concluded that this was a cause for concern. The "What this paper adds" box stated: "Diagnostic evaluation of children with minor head injuries by computed tomography needs to be re-evaluated." We believe that the data presented in the paper do not support that conclusion. For "This week in the *BMJ*," the chosen headline was: "Computed tomography scanning in infancy may affect later learning." This was unfortunate, as the paper did not address

BMJ 2004;329:930-2

that topic. Equally unfortunately, the press releases to the media carried this message, which was subsequently published in many newspapers. Those of us working in paediatric imaging expected a deluge of inquiries from worried parents. We were not disappointed.

Radiology professionals are required to know the radiation burdens of x ray techniques used, which can be assessed by several different methods. Figures are usually quoted for effective whole body dose expressed in milliSievert (mSv), whereas in other situations individual organ doses are more appropriate, measured in milliGray (mGy). The important distinction between the two is that whole body dose measurements are required to estimate the level of risk of any future adverse complications, which include a range of malignancies. Hall et al were not explicit in defining the doses referred to but quote from a document from the Swedish Radiation Protection Society for doses associated with computed tomography of the head (68 mGy for adults and approximately 90 mGy for children).² We have interpreted their figures as being for the organ (brain) dose. If so, their figures are considerably higher than estimated doses at Sheffield Children's Hospital. Our standard computed tomography protocol is slices of 3 mm thickness through the posterior fossa and of 5 mm thickness to the vertex on a GE Light speed plus (4 multislice) scanner using 200 mA and 120 kV. For a child of 2 years the effective whole body dose is 0.98 mSv, and the brain dose is 23 mGy. For a child of 12 years the figures are 1.95 mSv and 46 mGy (ImPACT computed tomography patient dosimetry calculator version 0.99n, as used in 2003). These doses are categorised as very low risk by the National Radiological Protection Board. This level of data is cumbersome and probably without meaning to many readers of the *BMJ*, but this depth of information is needed to open an informed debate about radiation doses and risks.

A further confounding factor, which may have led to bias in the data provided by Hall et al, was the caseload. Although many of the cutaneous lesions that were treated were likely to be isolated abnormalities, some patients with Sturge-Weber syndrome could have been included in the study. These children have severe brain abnormalities that lead to poor academic performance.³ A few cases of Sturge-Weber syndrome could seriously bias the results. Moreover, many other reasons exist why children with disfiguring head and neck haemangiomas may not perform well at school, and the lack appropriate controls in this study was a problem.

Our major criticism, however, is that the authors quote 68-90 mGy for the dose associated with computed tomography of the head, and yet they say that no consistent difference was seen between the two lowest dose categories (1-20 mGy and 20-100 mGy). The odds ratios quoted for those groups are not significantly different from doses of zero, therefore no measurable effect seems to occur below 100 mGy, which includes their estimated computed tomography doses—for example, the multivariate odds ratios for the frontal regions were 1.14 (95% confidence interval 0.86 to 1.51) mGy and 1.06 (0.88 to 1.36) mGy, respectively.

The radiologist acts as an adviser to clinical teams about the most appropriate way to investigate a particular problem by formulating an analysis of risk and benefits, considering such variables as the expected pathology, radiation dose, condition of the patient, and the effect of missing the diagnosis. In most centres, however, it falls to the paediatrician to give the information to patients and parents and to obtain informed consent. One of the most difficult areas is when ionising radiation is used for reassuring worried parents that, for example, their child with headaches does not have a brain tumour. Although this sounds like a misuse of radiation, 8-10% of children with brain tumours may have headache as their sole presenting complaint.^{4 5} We need to ensure that adequate facilities exist to perform this task, without recourse to radiation based techniques using magnetic resonance imaging or ultrasonography. As well as eliminating the risk associated with ionising radiation, magnetic resonance imaging has been shown to have superior diagnostic accuracy for many brain pathologies in children compared with computed tomography. This is not true for all clinical situations. Magnetic resonance imaging produces poor bone detail, and acute haemorrhage can be imaged only with difficulty.

Computed tomography remains the imaging method of choice for investigating trauma (including non-accidental injury) and when haemorrhage is suspected—these account for a considerable portion of neuroimaging in children and young adults. The speed of modern computed tomography scanners is such that sedation or general anaesthesia are rarely required, whereas magnetic resonance imaging in children may require anaesthesia because it takes much longer to carry out. The small risks associated with anaesthesia are comparable to, or sometimes greater than, the risks of exposure to radiation from computed tomography.

The more politically charged issues, such as availability of scanners, long waiting times, and local expertise to interpret the scans also need to be considered. A good example of magnetic resonance imaging replacing computed tomography is in the follow up of children with treated brain tumours, which is particularly relevant for children with tumours such as low grade astrocytomas, who have a good long term prognosis. Other areas present further challenges. An early version of a document to be released by the National Institute for Clinical Excellence recommends neuroimaging for most children with focal epilepsy.⁶ These children should have magnetic resonance imaging, but we do not have sufficient numbers of scanners and experts to do this. As a result many of these children will be scanned by computed tomography. This not only carries a radiation burden, but also has an exceptionally low chance of detecting the pathologies sought for in focal epilepsy.

Better access to magnetic resonance imaging would reduce the radiation dose in children and we must strive to obtain the required level of equipment and expertise. In some situations, however, computed tomography remains the imaging method of choice irrespective of availability of magnetic resonance imaging or ultrasound. We need to stress that no imaging method is completely safe and that computed tomo-

graphy of the head in children should be used only after careful clinical consideration. We do not believe, however, that an examination of the head by computed tomography in a child presents a serious threat to intellectual development.

Paul D Griffiths *professor of radiology, University of Sheffield*

Section of Academic Radiology, Royal Hallamshire Hospital, Sheffield S10 2JF (p.griffiths@sheffield.ac.uk)

Giles D Morrison *radiology protection adviser*

Sheffield Teaching Hospitals NHS Trust, Sheffield S5 7AU

Competing interests: None declared.

- 1 Hall P, Adami H-O, Trichopoulos D, Pedersen NL, Lagiou P, Ekblom A, et al. Effect of low doses of ionising radiation in infancy on cognitive function in adulthood: Swedish population based cohort study. *BMJ* 2004;328:19-21.
- 2 Leitz W, Jonsson H. *Patient doses from X-rays in Sweden—a summary of results from health care reports in 1999* [in Swedish]. Stockholm: Swedish Radiation Protection Institute, 2001.
- 3 Chapieski L, Friedman A, Lachar D. Psychological functioning in children and adolescents with Sturge-Weber syndrome. *J Child Neurol* 2000;15:660-5.
- 4 Abu-Arafeh I, Russell G. Prevalence and causes of headache in schoolchildren. *BMJ* 1994;309:765-9.
- 5 Haslam RA. Headaches. In Behrman RE, Kliegman RM, Jenson HB, eds. *Nelson textbook of pediatrics* 16th ed. Philadelphia: WB Saunders, 2000:1834.
- 6 National Institute for Clinical Excellence. Epilepsy—full guideline, first consultation. Draft for first consultation. London: NICE, 12 December 2003. www.nice.org.uk/pdf/Epilepsy_FULL_guideline_first_consultation.pdf (accessed 24 Aug 2004).

Back to the future?

From April 2005 individual general practices can apply to commission services

The NHS Improvement Plan and new Department of Health guidance sets out proposals to revive commissioning by individual general practices of health services in the NHS in England, as part of a commitment to explore and evaluate new models of devolved commissioning.^{1 2} From April next year, any general practice that so desires can obtain an indicative commissioning budget from their primary care trust.

We have been here before. For many people, practice based commissioning will seem to be simply general practice fundholding rebadged. The new proposals bear striking similarities to fundholding, sharing such characteristics as budget holding by general practices, commissioning freedoms for individual practices, and direct financial incentives for general practitioners. Fundholding was, perhaps, the most contested element of the NHS internal market setup by the last Conservative government and was opposed bitterly by the opposing Labour Party. The creation in 1999 of collective primary care commissioning through primary care groups (which evolved into primary care trusts) was proposed as an antidote to the perceived drawbacks of fundholding, in particular, inequities in access to elective care and high transaction costs. So why should a Labour government court controversy by rekindling interest in such a similar policy now?

Three compelling reasons may be behind this apparent shift in policy.³ Firstly, a widespread belief prevails that primary care trusts are failing to have sufficient impact as commissioners of hospital care.⁴ Such failure is gaining in importance as NHS trusts convert to foundation hospitals and gain greater freedom, and as new incentives for cost-per-case contracting are introduced to the NHS through the new policy Payment by Results.⁵ Second, frontline primary care clinicians may not be sufficiently engaged with the work of their primary care trusts, or may perceive that they wield little influence over the actions of those trusts.⁶

The third and perhaps most important reason lies in the UK government's anxieties over demand management. The current push to shorten waiting

times for treatment while increasing the capacity of the NHS may result in rapid growth in patients' demands for services. Practice based commissioning is intended to re-engage clinicians (particularly, but not exclusively, general practitioners) in the process, and the related financial incentives are intended to encourage general practitioners to scrutinise their referrals to hospital and to seek ways of enhancing primary care to prevent avoidable admissions to hospital. The new public service agreement target to reduce days spent in hospital for emergencies by 5% by 2008 is also concentrating minds.⁷

So what can we learn from our experiences in the past? A systematic review of research on fundholding during the mid 1990s was equivocal about the benefits of the scheme.⁸ However, research published after the demise of fundholding has allowed a more fulsome appraisal of the initiative. For example, one important study concluded that patients referred through fundholding experienced waiting times for treatments that were 8% shorter than those for corresponding patients of non-fundholding general practitioners.⁹ Another study, based on admission data for four years, showed that fundholders reduced admission rates for elective procedures by 3.3% compared with non-fundholders.¹⁰ The Achilles heel of small-scale, commissioning by practices has often been seen to be the management of financial risk. However, research into "total purchasing" pilots (extended fundholding schemes incorporating a broader range of services and often involving more than one practice) showed that single practices and small multipractice groups managed these risks better than large multipractice ventures.¹¹

Despite such evidence, many will be anxious about the return of anything resembling fundholding. Yet the new incarnation of commissioning by practices may be able to avoid at least some of the main pitfalls of unfair access to services and high administrative costs. The NHS has changed considerably since the heyday of fundholding. The Payment by Results policy introduces a standard price tariff and a new mechanism for contracting, and opportunities for individual general practice commissioners to negotiate advantageous

BMJ 2004;329:932-3