

- Safety and efficacy of nitric oxide in chronic lung disease. *Arch Dis Child Fetal Neonatal Ed* 2002;86:F41-F45.
4. Kang JL, Park W, Pack IS, et al. Inhaled nitric oxide attenuates acute lung injury via inhibition of nuclear factor-kappa B and inflammation. *J Appl Physiol* 2002;92:795-801.
 5. Ballard PL, Gonzales LW, Godinez RI, et al. Surfactant composition and function in a primate model of infant chronic lung disease: effects of inhaled nitric oxide. *Pediatr Res* 2006;59:157-62.
 6. Cotton RB, Sundell HW, Zeldin DC, et al. Inhaled nitric oxide attenuates hyperoxic lung injury in lambs. *Pediatr Res* 2006; 59:142-6.
 7. McCurnin DC, Pierce RA, Chang LY, et al. Inhaled NO improves early pulmonary function and modifies lung growth and elastin deposition in a baboon model of neonatal chronic lung disease. *Am J Physiol Lung Cell Mol Physiol* 2005;288:L450-L459.
 8. Tang JR, Markham NE, Lin YJ, et al. Inhaled nitric oxide attenuates pulmonary hypertension and improves lung growth in infant rats after neonatal treatment with a VEGF receptor inhibitor. *Am J Physiol Lung Cell Mol Physiol* 2004;287:L344-L351.
 9. Van Meurs KP, Wright LL, Ehrenkranz RA, et al. Inhaled nitric oxide for premature infants with severe respiratory failure. *N Engl J Med* 2005;353:13-22.
 10. Schreiber MD, Gin-Mestan K, Marks JD, Huo D, Lee G, Srisuparp P. Inhaled nitric oxide in premature infants with the respiratory distress syndrome. *N Engl J Med* 2003;349:2099-107.
 11. Mestan KKL, Marks JD, Hecox K, Huo D, Schreiber MD. Neurodevelopmental outcomes of premature infants treated with inhaled nitric oxide. *N Engl J Med* 2005;353:23-32.
 12. Kinsella JP, Cutter GR, Walsh WF, et al. Early inhaled nitric oxide therapy in premature newborns with respiratory failure. *N Engl J Med* 2006;355:354-64.
 13. Ballard RA, Truog WE, Cnaan A, et al. Inhaled nitric oxide in preterm infants undergoing mechanical ventilation. *N Engl J Med* 2006;355:343-53.
 14. Haynes RL, Baud O, Kinney HC, Volpe JJ, Folkherth DR. Oxidative and nitrative injury in periventricular leukomalacia: a review. *Brain Pathol* 2005;15:225-33.
 15. Lupton AR, O'Shea TM, Shankaran SS, Bhaskar B. Adverse neurodevelopmental outcomes among extremely low birth weight infants with a normal head ultrasound: prevalence and antecedents. *Pediatrics* 2005;115:673-80.
- Copyright © 2006 Massachusetts Medical Society.

Paying for Performance in the United States and Abroad

Arnold M. Epstein, M.D.

The British sometimes have been characterized as steadfast, measured, tolerant of bus queues and surgical waiting lists, and perhaps even a bit stodgy. Parts of this portrait may be accurate, but the British adoption of pay for performance should dispel the last of these stereotypes forever.

In this issue of the *Journal*, Doran et al.¹ describe the initial operation and effect of a British policy (adopted in April 2004) that bases a substantial portion of salary payments to general practitioners on their success in meeting 146 criteria for high-quality performance, each of which is tied to a variable number of points. Doran et al. report that British family physicians received additional salary payments averaging more than \$40,000 per physician in the program's initial year. For clinical indicators, targets were met for 83 percent of eligible patients; practices earned nearly 97 percent of the possible points available, resulting in much higher payments than those projected by the National Health Service, which had anticipated that practitioners would earn only 75 percent. The high level of performance, which has contributed to the National Health Service deficit,² suggests that the targets were set too low or that British physicians improved their practices or their documentation of care to meet the new standards or gamed the system by excluding patients whose care did not meet the

performance criteria. Although available data preclude a determination of which, if any, of these explanations is most responsible for the findings of Doran et al., future studies to assess changes in performance over time and the inclusion of new auditing procedures should shed more light on this question.

In the United States, pay for performance is an idea whose time has come, as well. Policy-makers now almost universally agree that the amplification and extension of the use of financial incentives will promote a higher quality of care. Federal legislation enacted in 2003 set a mid-2006 deadline for the Institute of Medicine to report on financial incentives that the Centers for Medicare and Medicaid Services (CMS) could use to reward high performance by doctors, hospitals, health plans, and other providers. In addition, legislation enacted earlier this year requires that the secretary of Health and Human Services develop a plan for value-based Medicare hospital payments beginning in fiscal year 2009.

Some of the operational building blocks for a national program of pay for performance are already in place. The December 2004 Medicare Modernization Act established a small financial incentive — 0.4 percent of payments — to encourage hospitals to report on 10 quality indicators for acute myocardial infarction, congestive heart failure, and pneumonia. These data, now

submitted by almost all acute care hospitals, provide an obvious platform from which to launch pay for performance for hospitals. The recently enacted Deficit Reduction Act increased the financial incentive to 2 percent and allows Health and Human Services to expand or replace measures. During the past two years, the federal government has also been conducting demonstration projects of pay for performance for hospitals³ and physician groups.⁴ Furthermore, this year, the CMS has established a voluntary reporting system in which physicians report on 16 quality indicators for ambulatory care, such as levels of low-density-lipoprotein cholesterol and glycated hemoglobin in patients with diabetes.

With this kind of momentum building, it is very likely that Congress will pass legislation phasing in pay for performance by the CMS for physicians, hospitals, health plans, and possibly other providers. Although it would be premature to predict what the details of such a program would be, certain key features that will greatly affect practicing physicians are virtually assured.

First, the adoption of financial incentives will almost certainly be accompanied by wide-scale public reporting of the quality of care. For more than a decade, we have seen public reporting by health plans on the Health Plan Employer Data and Information Set (known as HEDIS) quality indicators. Now we are likely to see similar reporting on the quality of performance of medical groups and even of individual physicians. Consequently, pay for performance will, in effect, merge financial incentives with a tremendous expansion in public profiling. Public reports on individual doctors have been particularly controversial because of the small number of patients seen by an individual doctor for whom a given quality measure would be relevant, the difficulties in case-mix adjustment, and the particular sensitivity of associating performance reports with an individual physician who may be only one of several caregivers. Clearly, reporting efforts that focus on groups and individual doctors must be carefully constructed to minimize these limitations, but I believe these efforts may be potentially as important as are financial incentives in motivating a higher quality of care.^{5,6}

Second, in contrast with the British system, we can expect the CMS's approach to extend beyond primary care physicians. In this country, specialists, including surgeons, receive a substan-

tial majority of payments for physician services from the CMS. Because the CMS is unlikely to restrict its efforts to generalist physicians, we must develop a broader array of quality measures for specialists' care to make this policy effective.

We can also expect the continuing budget deficit to constrain the magnitude of payments. In the United Kingdom, pay for performance was adopted coincident with a substantial increase in funds provided to the National Health Service for payments to physicians. Thus, most physicians benefited from the new system, and no physicians saw their incomes decrease. In the United States, however, budgetary pressure will undoubtedly force the CMS to establish more modest initial financial incentives, probably on the order of 1 to 2 percent of payments to physicians — substantially less than the 5 to 10 percent often provided by health plans to provide sufficient impetus for doctors to change their practices.^{7,8} Of course, the British numbers are larger still — averaging approximately 30 percent before physicians paid any extra nursing or administrative costs. If larger incentives are needed, financial pressures to introduce budget-neutral policies will probably force the CMS to carve out quality bonuses from funds available for annual increases in payments or even from funds for existing payment levels, making some physicians winners and some substantial losers.

Finally, pay for performance will almost certainly extend beyond narrowly defined quality indicators. Incentives initially may be tied to clinical quality indicators and measures of satisfaction reported by patients, but eventually measures of efficiency — how well physicians constrain costs while maintaining quality — will almost certainly become an important component of the targeted indexes as well. The wide regional variation in the cost of care without apparent relation to the quality of care^{9,10} has led many observers to conclude that money must be spent in a different way to get more value from the health care dollar. Unfortunately, a focus on efficiency may raise skepticism among providers that saving money is the real goal of government, which would reduce the political support for such a program from providers. We currently lack well-accepted metrics for an assessment of efficiency; the development of such metrics may well be our most challenging task.

Americans have long viewed themselves as being on the cutting edge, especially in comparison with their British and western European cousins. Yet the British are clearly ahead of us in the adoption of financial incentives for improving the quality of care. We would do well to learn from their experience. The study by Doran et al. reminds us that policy changes may lead to unexpected consequences, such as the higher payments to doctors by the National Health Service, which have resulted in increased budget deficits. Perhaps the most important lesson we can take from the experience in the United Kingdom would be to consider carefully the myriad potential consequences of pay for performance and to monitor the implementation of such a program carefully.

No potential conflict of interest relevant to this article was reported.

From the Department of Health Policy and Management, Harvard School of Public Health; the Division of General Medicine (Section on Health Services and Policy Research), Brigham and Women's Hospital; and Harvard Medical School — all in Boston.

1. Doran T, Fullwood C, Gravelle H, et al. Pay-for-performance programs in family practices in the United Kingdom. *N Engl J Med* 2006;355:375-84.
2. Pay rises blamed for NHS deficits. BBC News. January 26, 2006. (Accessed July 6, 2006, at <http://news.bbc.co.uk/1/programmes/panorama/default.stm#>.)
3. Premier Hospital Quality Incentive Demonstration. Baltimore: Centers for Medicare & Medicaid Services, 2006. (Accessed July 6, 2006, at http://www.cms.hhs.gov/HospitalQualityInits/35_HospitalPremier.asp)
4. Physician Group Practice Demonstration financial and quality reporting model. Baltimore: Centers for Medicare & Medicaid Services, 2006. (Accessed July 6, 2006, at http://www.cms.hhs.gov/DemoProjectsEvalRpts/downloads/MMA646_PGP_FactSheet.pdf)
5. Marshall MN, Shekelle PG, Leatherman S, Brook RH. The public release of performance data: what do we expect to gain? A review of the evidence. *JAMA* 2000;283:1866-74.
6. Rosenthal MB, Frank RG, Li Z, Epstein AM. Early experience with pay-for-performance: from concept to practice. *JAMA* 2005;294:1788-93.
7. Rosenthal MB, Fernandopulle R, Song HR, Landon B. Paying for quality: providers' incentives for quality improvement. *Health Aff (Millwood)* 2004;23(2):127-41.
8. Landon BE, Epstein AM. Quality management practices in Medicaid managed care: a national survey of Medicaid and commercial health plans participating in the Medicaid program. *JAMA* 1999;282:1769-75.
9. Fisher ES, Wennberg DE, Stukel TA, Gottlieb DJ, Lucas FL, Pinder EL. The implications of regional variations in Medicare spending. Part 1: the content, quality and accessibility of care. *Ann Intern Med* 2003;138:273-87.
10. *Idem*. The implications of regional variations in Medicare spending. Part 2: health outcomes and satisfaction with care. *Ann Intern Med* 2003;138:288-98.

Copyright © 2006 Massachusetts Medical Society.