2 Dixon J. Improving efficiency in the NHS in England: options for system reform. *Clin Med* 2010;10:445–9.
3 Coulter A, Fitzpatrick R, Cornwell J. *The point of care, measures of patients' experience in hospital: purpose, methods and uses.* London: The Kings Fund, 2009.
4 Graban M. The case for lean hospitals. *Lean Hospitals* 2009:1–16.
5 Liker JK. *The Toyota way*. New York: McGraw-Hill, 2004.
6 Kim CS, Spahlinger DA, Kin JM, Billi JE. Lean health care: what can hospitals learn from a world-class automaker? *J Hosp Med* 2006;1:191–9.
7 Albright B. Lean and mean. *Health Informatics* 2008.
8 Trebble TM, Hansi N, Hydes T, Smith MA, Baker M. Process mapping the patient journey: an introduction. *BMJ* 2010;341:c4078.
9 Mould G, Bowers J, Ghattas M. The evolution of the pathway and its role in improving patient care. *Qual Saf Health Care* 2010;19:e14.
10 Womack JP, Jones DT. *Lean thinking*, 2nd edn. London: Simon & Schuster UK Ltd, 2003.
11 Westwood N, James-Moore M, Cooke M. *Going lean in the NHS.* London: NHS Institute for Innovation and Improvement, 2007.

Address for correspondence: Dr TM Trebble, Department of Gastroenterology, Queen Alexandra Hospital, Southwick Hill, Portsmouth PO6 3LY.
Email: tim.trebble@porthosp.nhs.uk

EDITORIALS

Clinical Medicine 2011, Vol 11, No 4: 310–11

Diagnostic error: the Achilles' heel of patient safety?

John Scarpello

In 1999 the Institute of Medicine's report *To err is human* drew the attention of healthcare policymakers to the causes and frequency of harm in clinical practice.[1] The Department of Health (DH) published *An organisation with a memory* in 2000, which focused upon learning from errors and led to the establishment of the National Patient Safety Agency (NPSA).[2] The NPSA raised the profile of patient safety in the NHS and improved reporting but it is to be abolished following the DH review of 2010.[3] National initiatives have improved awareness of patient safety and increased reporting, although reports from primary care remain disproportionately low. The NPSA has alerted the NHS to specific risks by means of patient safety alerts and rapid response reports[4] plus the implementation of system changes including the surgical safety checklist.[5] By contrast, there has been less interest and research concerning diagnostic errors and how they might be reduced. This may reflect the considerable public interest in high profile clinical errors, such as the removal of a wrong organ or injection of a wrong drug. Devastating as those events are, they are very rare. Diagnostic errors are common and can be just as harmful, but have attracted less attention although this is now increasing. For example, concerns over delayed diagnosis of cancer which many believe is an important factor in the reduced survival rates of some patients in the UK compared with elsewhere in Europe.[6]

Missed and delayed diagnoses in ambulatory settings are important patient safety problems.[7] The emergency department has been described as a 'natural laboratory of error'[8] and emergency medicine as 'a practice prone to error'.[9] It is not hard to seek reasons why, including stressful working conditions, the number of patients seen in a short time, and pressures to move patients out of emergency areas to make way for new arrivals; until recently made worse by government-imposed targets. Diagnostic error rates in the emergency room are reported to be in the range of 10–15%.[10] In primary care, where over 95% of NHS contacts take place, getting the diagnosis right is of particular importance and yet a review of reported safety incidents found errors of diagnosis to be the most common followed by delayed or inappropriate treatment.[11] Post-mortem findings in a critical care unit revealed important diagnostic discrepancies in one-fifth of patients who underwent autopsy and in 4% of them, survival may have been adversely affected.[12] In another study from a general medical/surgical intensive care unit, the clinical diagnosis and post-mortem findings agreed in only 45%. Myocardial infarction, carcinoma and pulmonary embolism represented the most frequently missed diagnoses.[13]

Errors of diagnosis are multifactorial involving both system-related and cognitive factors.[14] The subject is difficult to study since omissions characterise missed diagnosis, they are difficult to identify and tend to be recognised only in retrospect.[15] Reporting is poor and when they are reported, documentation is often insufficient to allow causal analysis. An error is more often noticed when it is a discrete event (missing pneumonia on a chest X-ray). By contrast, a series of events over time (missed malignancy from a failure of referral or in coordinating investigation) is not always seen as a diagnostic error and rarely reported.

In the article by Neale and colleagues (pages 317–21), they report their analysis of cognitive processes that may lead to

John Scarpello, emeritus consultant physician, University Hospital of North Staffordshire; former deputy medical director, National Patient Safety Agency

errors of diagnosis and clinical decisions. They describe how biases in thought processes lead almost inevitably to errors, illustrated by case studies which will be all too familiar to physicians involved in acute medical care. They remind us that diagnosis evolves during the course of illness and discuss how the practice of multiple handovers between trainee doctors and different clinical teams, which rely upon written records, can introduce errors. They argue that timely reflection about the diagnosis by the follow-up team is sometimes replaced by blinkered adherence to the initial treatment plan and that the opportunity to return to first principles and review the evolving evidence may be lost. They plead for a change from recording 'clinical impression' and instead to list the likely diagnosis and possible alternatives. They also remind us that system fixes, for example the early warning score (EWS) may introduce new risks by deskilling nursing staff and reducing independent thought. All such system changes require careful risk assessment before introduction and careful monitoring to detect unexpected consequences.

What lessons can we learn and how might we reduce diagnostic mistakes? We should encourage cross-specialty review of cases and open discussion. Multidisciplinary team meetings, which are mandatory in the management of cancer and some other specialties, are good examples of this. In hospital, some physicians now share the responsibility for their ward patients which enables them to be seen more often and decisions shared – two heads are usually better than one! This also benefits discharge planning. All clinical teams should audit their patient outcomes including morbidity and mortality meetings. This practice, promoted by the Royal College of Physicians many years ago, has become neglected in some trusts perhaps due to pressure of time and availability of trainees. The learning opportunities from these multiprofessional meetings are considerable and should be part of structured appraisal. Awareness of diagnostic and treatment errors is more difficult than in the past when patients were usually followed throughout their illness by one team. Consultants and GPs are appointed earlier than previously and may have less experience. Accurate diagnosis in acutely ill patients, many of whom are elderly and with multiple pathologies is challenging.

The issues discussed by Neale and his colleagues should be of interest to those concerned with undergraduate and postgraduate training. Are we testing the knowledge required to achieve accurate diagnosis, perhaps the most fundamental skill for a clinician, in appropriate clinical settings? Should we make more use of clinical assessment centres which can reproduce some of the 'real life' presentations of illness, for example the emergency room in which patients rarely provide a clear history and may be confused and anxious? Surgical trainees are now refining their technical skills in such laboratories.

Diagnostic error is the hidden 'elephant' for patient safety. We need systems and practices that will minimise these errors which are so important for safe care. Patients should be seen early and by trained clinicians with the skills to ensure accurate diagnosis. All members of the team should be expected to challenge and re-evaluate treatment plans. Current proposals for restructuring the NHS with general practice commissioning will change referral pathways. Commissioners should work with clinical teams to monitor missed and delayed diagnosis and encourage further opinion with early referral when diagnosis is unclear. Clinicians in all healthcare settings must review their diagnostic skills as part of appraisal and guard against working outside their expertise.

References

1 Kohn L, Corrigan J, Donaldson MS. *To err is human. Building a safer healthcare system*. Washington, DC: National Academy Press, 1999:1–16.
2 Department of Health. *An organisation with a memory: learning from adverse events in the NHS*. London: Stationery Office, 2001.
3 Department of Health. *Review of arm's length bodies to cut bureaucracy*. London: DH, 2010.
4 Lamont T, Scarpello J. Safety alerts. National Patient Safety Agency: combining stories with statistics to minimise harm. *BMJ* 2009;339:b4489.
5 National Patient Safety Agency. www.npsa.nhs.uk.
6 Gatta G, Capocaccia R, Sant M *et al*. Understanding variations in survival for colorectal cancer in Europe: a EUROCARE high resolution study. *Gut* 2000;47:533–8.
7 Gandhi TK, Kachalia A, Thomas EJ *et al*. Missed and delayed diagnosis in the ambulatory setting: A study of closed malpractice claims. *Ann Inter Med* 2006;145:488–96.
8 Bogner MS. Introduction: *Human error in medicine*. Hillsdale, NJ: Erlbaum, 1994:1–11.
9 Croskerry P, Sinclair D. Emergency medicine: a practice prone to error? *Can J Emerg Med* 2001;3:271–6.
10 Berner ET, Graber ML. Overconfidence as a cause of diagnostic error in medicine. *Am J Med* 2008;121(Suppl):S2–33.
11 Sanders J, Esmail A. The frequency and nature of medical error in primary care: understanding the diversity across studies. *Fam Pract* 2003;20:231–6.
12 Twigg SJ, McCrirrick A, Sanderson PM. A comparison of post-mortem findings with post hoc estimated clinical diagnoses of patients who die in a United Kingdom intensive care unit. *Int Care Med* 2001;27:706–10.
13 Perkins GD, McAuley DF, Davies S *et al*. Discrepancies between clinical and post mortem diagnoses in critically ill patients: an observational study. *Critical Care* 2003;7:129–32.
14 Graber ML, Franklin N, Gordon R. Diagnostic error in internal medicine. *Arch Intern Med* 2005;165:1493–9.
15 Norman GR, Eva KW. Diagnostic error and clinical reasoning. *Med Educ* 2010;44:94–100.

Address for correspondence: Dr J Scarpello.
Email: john.scarpello@virginmedia.com