



LEARNING/TEACHING

The Quality of Australian Health Care Study: Implications for Education of Failure in Quality and Safety of Health Care¹

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ABSTRACT *Medical and health professional education needs to renew regularly the perspective from which it defines curriculum. The theme of this paper is that the study of health service in action will identify educational priorities for any country with the particular aim of improving the quality of health care and the effectiveness of clinicians within the system of health care. The Quality of Australian Health Care Study is the largest study of its kind to date. It is a study of adverse outcomes in health care resulting from error. From a study of causes, circumstance and strategies for prevention an educational agenda emerges, dealing both with clinical aspects of care and the less well-documented role of system errors. Studies of system errors in industry and other high risk occupations and systems are now lending insight to issues of error and safety in health care. A new agenda for health professional curriculum is the study of health services in action—the anatomy, physiology and pathology of health systems. Eight educational priorities were recommended to the National Task Force to improve patient safety and quality of care. These are discussed together with a broad strategy for curriculum implementation. The need for a health system that supports and informs practitioners involved in clinical and system errors, the extension of training to incorporate health system managers, and the extension of the consideration of safety to public awareness are discussed.*

In 1984 Maxwell described six dimensions of health care quality. He omitted safety and avoidance of error. In 1999 they would be included. Litigation, inquiries into quality of care, the profile of evidence-based medicine, recognition of organizational system error, and public concern have brought safety of care

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to the forefront of political and professional concern. It is a consistent theme for the *British Medical Journal* (Vincent, 1997, 1998) and the *Medical Journal of Australia* (Wilson & Harrison, 1997). It used to be assumed that good clinical training would alone provide for best quality care. That is still important, but health service as an organizational system, the hazards of complexity and scope of care, constrained resources and the stresses that result must also be taken into account.

If the health service itself is to become a topic for curriculum, then expertise of a new sort must be brought to bear. Much of that expertise is embedded within the health service in quality assurance committees and health service managers. Much of the academic infrastructure to that expertise is to be found in faculties other than medicine or health science—in management, health economics, information science, industrial psychology, etc. Health service evaluation must be a core theme for research.

The need for health teams to analyze, to cooperate and to understand each member's contribution to patient safety and quality of care is a persuasive reason for interprofessional education. It is equally important for health service managers, board members, and politicians. Audit and other systems monitoring quality of care focus on clinical decision-making and competence but not enough upon the properties of the system itself.

Education must be founded upon rigorous research. Definitions of best practice have relied upon quantitative control trials. More recently qualitative and descriptive analysis of health services and decision-making has extended that foundation. Most health service researchers teach only postgraduates. They must find a role with undergraduates. Research into a health service in action was the theme of the study I shall now describe—and its implication for education.

The Quality of Australian Health Care Study (QAHCS)

This is the largest study of its kind (Wilson *et al.*, 1995, 1999). It measured preventable injury due to error in health care and analyzed the circumstances, causes, consequences and possible preventive strategies of adverse outcomes from 14,000 randomly selected admissions across two states for the year 1992. The method was retrospective medical record review by senior experts. An adverse event (AE) in this study involves three components, namely: (1) an unintended injury or complication, (2) resulting in disability, death or prolongation of hospital stay, and (3) caused by health care management rather than the patient's disease. This excludes errors with no harmful effect or complications or delay in discharge. They occurred in 13% of admissions, with a further 3.6% of admissions being the result of a previous AE.

Most AEs were minor, with 46% resolving in a month and 77% in 12 months, but 13% resulted in permanent disability and 4.9% in death as an immediate

Table 1. Human cause codes and the percentage of adverse events with these codes

| Description | % |
|--|------|
| Complication of, or failure in, the technical performance of an indicated procedure | 43.3 |
| Failure to synthesize, decide and/or act on available information | 19.8 |
| Failure to request or arrange an investigation, procedure or consultation | 14.7 |
| Lack of care/attention, failure to attend | 13.6 |
| Misapplication or, or failure to apply, a rule; or use of a bad or inadequate rule | 11.0 |
| Violation of a protocol or rule (failure to practice basic medicine) | 6.0 |
| Do not know/cannot tell | 3.9 |
| Other | 3.5 |
| Acting on insufficient information | 2.3 |
| Slips and lapses; errors due to "absent-mindedness" in activities in which the operator is skilled | 2.0 |
| Failure to continue established management | 1.8 |
| Lack of knowledge | 1.4 |
| Electively practicing outside area of expertise | 1.3 |
| Questionable practice ethics | 0.6 |

result of the AE. Many patients who died were aged, frail or severely ill with limited life expectancy. Incidence of AEs and severity of outcome increased overall with age. Half of all AEs were judged to be to a high degree preventable. Extrapolating to the whole of Australia, AEs considered preventable accounted for 1.7 million bed days per year, which is 8.8% of total bed days.

Human factor errors were the most common and many cases had more than one. Of the 13 human error codes, five accounted for 80% (Table 1). Errors of omission were more common than those of commission. AEs resulting from flaws in decision-making, including delay, were generally associated with higher preventability, permanent disability and death. Although most of the causes identified related to clinical decisions, actions and human error, 59% of AEs also had at least one system error or hazard identified, usually as a factor predisposing to the clinical error (Table 2). This is not as high as the 90% of system errors identified in quality problems in industry (Williams, 1988). Medical records, however, are written only about clinical activity and rarely are explicit about the factors in the system that might increase risk of error. From studies of industry the system sources of error are shown in Table 3 (Wilson *et al.*, 1999). These ring a familiar note for those in busy clinical practice. Further QAHCS studies have detailed both the human errors and system errors.

Table 2. Percentage of adverse events associated with a system cause code

| Description | % |
|---|------|
| Policies and protocols | 32.7 |
| Education and training | 24.4 |
| Unable to determine appropriate category | 13.8 |
| Organization, flow, storage and/or display of information | 4.6 |
| Organization culture | 2.7 |
| Organization management | 2.6 |
| Other | 2.0 |
| Personnel: the number available or their quality | 2.0 |
| Patient placed or managed in an inappropriate facility | 1.0 |
| Equipment and other physical resources: their availability or quality | 0.7 |

Table 3. Error-producing conditions in industry (Williams, 1988)

- Unfamiliarity with the task (× 17)
- Time shortage (× 11)
- Poor signal–noise ratio (× 10)
- Poor human–system interface (× 8)
- Designer user mismatch (× 8)
- Irreversibility of errors (× 8)
- Information overload (× 6)
- Negative transfer between tasks (× 5)
- Misperception of risk (× 4)
- Poor feedback from system (× 4)
- Inexperience, not lack of training (× 3)
- Poor instructions or procedures (× 3)
- Inadequate checking (× 3)
- Educational mismatch of person with task (× 2)
- Disturbed sleep patterns (× 1.6)
- Hostile environment (× 1.2)
- Monotony and boredom (× 1.1)

The Educational Implications of QAHCS

A National Expert Advisory Group² considered future action for patient safety. The submission of the QAHCS consortium to a preliminary task force listed eight priorities for action in education. The following is an abbreviated version of that submission, with one topic added, “Health Law and Ethics.”

Communication with the Patient

This has to do with diagnosis as well as reassurance and explanation, extremely important in establishing understanding and therefore competence for patients to manage their own problems. Good communication is an integral part of good clinical care and is itself a therapeutic tool. Failure to explain leads to noncompliance; failure to explain hazards and the reasons for a bad outcome leaves anger and resentment that energizes litigation.

Communication between Professionals

Flaws in communication between professionals were at the root of many AEs. The roles and responsibilities of different health professionals must be understood so that communication flows in the most efficient and appropriate way.

Medical Informatics

Information management includes the use of computer-based systems to provide data and evidence for decision-making, to reduce knowledge-based errors and to provide failsafe checks to avoid lapses of memory.

Clinical Competence

In a large number of AEs, the problem was a failure to provide up-to-date, standard clinical management. Some half of AEs were due to omissions rather than commissions or failure to follow an organized, coherent and timely plan of action. The educational imperative for clinical skills and well informed clinical decisions remains.

Health Service as an Organization

Any complex system has its own dynamics, hazards and capabilities. The health system, its anatomy, physiology and pathology, must itself become a topic for curriculum. The relevant disciplines are unfamiliar: management, economics, systems theory, the sciences of health service evaluation (epidemiology, statistics, social sciences). For clinicians it will not be sufficient just to study the health service as a business or administrative organization. It must be tied in to outcomes of care.

Pharmaceuticals and Technology

Drugs and technology are powerful, effective, costly and hazardous. The balancing of benefits and risks is crucial in clinical management. Inappropriate, inadequate or overzealous use of medications and technology or the failure to monitor toxic medications all contributed to AEs. An epidemiological approach

to clinical pharmacology is important in relation to outcomes, costs, risks, both short-term and long-term. There has to be a bridge between the sanitized clinical trials (the main instrument for the Cochrane Collaboration) and the reality of clinical practice in which many patients are the very ones excluded from a clinical trial because of comorbidity, complications, age or drug interaction.

The Continuity of Medical Education

There is now better structured continuity and expectation of continuing education. This provides for repositioning of some elements of curriculum into more appropriate stages of professional development than simply jamming them into the undergraduate program. The foundation must be established in the undergraduate years and must be built upon throughout professional life.

The Educational Value of Quality Assurance and Adverse Outcome Review

Reviewers in the QAHCS, expert as they were, found the inquiry into expectation of best practice and the lessons learned from case analysis to be highly educational. A similar approach can be used in the working day in hand-over rounds stimulating a search for the evidence upon which decisions should be made. What is less familiar is a systems approach to the same issue. Much of the work in anaesthetic critical incidence has emphasized system issues, with educational benefit for practitioners. The cases of the QAHCS are a rich educational resource if backed by accessible literature about evidence for best practice and sources of risk for error and adverse outcome. Problem-based learning is an ideal educational technique suitable for the years of clinical experience, when the reality of health systems in action is experienced. This is the opportunity for administrators and clinicians and epidemiologists to get together.

Health Law and Ethics

The medical framework for decision-making is embedded in the larger framework of medical ethics and shaped in part by health law. The skills of ethical analysis and ethical decision-making, determination of patient competence, patient values and choice in this larger frame work are the business of clinical ethics. This requires the development of the clinical skill to ensure that the expectations of outcome by the patients are those that guide the decisions of clinicians. They are essential skills to high quality of care and informed consultation and decision-making with the patient (Kerridge *et al.*, 1998).

Lessons from Industry

In the matter of safety and protection from error there is much to learn from studies of high risk industries: airline travel, oil rigs, nuclear generators. Inquiries into accidents demonstrate the nature of errors, both “active” errors at the point of action and “latent” errors, meaning “accidents waiting to happen.” They have also explored responsibility for maintaining a culture of safety. Inquiries into medical mishaps, particularly recently in Britain, have thrown similar searching lights on clinical governance and control of quality of health care. A taxonomy of error has been developed (Leape, 1997). Strategies of risk recognition, assessment and management have become a research agenda in health services research, and support clinical governance in Britain.

Health is being asked why it has not learned the lessons of industry. In Britain, clinical governance is to be advised by a “Learning from Experience” committee to which safety experts from industry will contribute. It is now time the lessons become the agenda of undergraduate curriculum. It is an agenda for all involved—clinicians, managers, politicians, lawyers, consumers, both as teachers and as learners.

Goals for Health Professional Education

For the agenda we are considering, there are four goals:

1. that graduates have the skill to work effectively for patient well-being and safety, using their knowledge of health systems in action;
2. that graduates adapt and contribute to evolving policy and practice of health services to ensure optimal quality of patient care;
3. that health service managers understand their role, capacity and responsibility to so organize the circumstances of health care that patient safety and quality of care are optimized; and
4. that all health professionals and managers cooperate with a common understanding of these issues to establish a culture of patient safety and of quality of care.

Means of Education

The focus of education must be the direct experience of health services in action. This is most appropriate in the clinical years and should continue into the postgraduate years. Errors are not exceptions—they recur, and systems robust enough to withstand errors must be understood, developed and used. Start with the study of the nature of specific individual adverse events drawn perhaps from the studies quoted here or from the reality of day-to-day clinical practice—the “problem” declares itself in the observation of the health service in action. The

factors that lead to that adverse outcome should then be analyzed. This will require exploration of the basis of guidelines for evidence-based medicine and the relationship between control trials and the reality of clinical care of complex problems of real patients. Some causative factors will be organizational; academic resources must then be sought in management and staff responsible for safety and quality of care. Problem-based learning is ideal for this, and allows students to explore new and unfamiliar areas to make sense of the clinical environment in which they will practice. This is core curriculum. More detailed exploration could be pursued in selectives. The agenda must be widened to the general matter of quality of care. This is a proper agenda for interprofessional education.

Implications for Those Involved in Clinical Errors

Clinicians involved in error feel bad enough. Studies have shown poor debriefing, poor learning from the event, and little support to deal with emotional impact. Health professional culture expects perfection and anything short of that is often met with denial or punitive blame, or most damagingly, litigation. We have a duty of care to our graduates who may feel that they are let into the world of health services like babes in the wood, full of unknown and unseen threats. Clinical errors are highest in the first year after graduation and studies in Australia³ and by the Postgraduate Council of Scotland (Baldwin *et al.*, 1997) have shown that stress in junior medical postings is high and that the fear and consequence of error is a major factor. For some it may determine career choice or create a phobia about particular circumstances of practice. It is difficult for us, as health professionals, to come to terms with errors. The case for an educational program is strong (Pilpel *et al.*, 1998).

Health Care in the Community

The QAHCS reflects hospital care. What about community care? Some AEs resulted from delay or error in community care and some from failure in continuity of care and communication at the interface on discharge or admission. General practice always works with a high level of uncertainty, balancing risks of action and observation. A new study in Australia describes critical incidents in general practice (Bhasale *et al.*, 1998). These “near misses” usually are saved by luck or good chance but, in some, harm or death does result.

When the entirety of a health service is evaluated, then the dominance of the system as a whole becomes very clear. The experience of national programs for Diarrhoeal Disease Control makes the point. I chaired the WHO Technical Advisory Group. The technical tools and knowledge are well

developed. Failure is in the system of delivery of those tools and knowledge, or in matching the community's needs or understandings.

Student Experience within a Community

Well-intended clinical care can go wrong and may be of poor quality if it is not carried through by the patient. Failure is often blamed upon the patient, but it is also a failure of the health system. An AE from noncompliance is not made better by arguing over blame. The complexity of this issue is usually not seen from the door of the clinic. Students will only understand and learn how to respond by being in the community and studying the real thing.

I shall close with the experience of community-based education for clinical students in the Universiti Sains Malaysia (Ja'afar & Hassan, 1990). In early years students live within a community and study it from a population perspective. In the last two clinical years the issues we have been considering come to light. Students follow patients with long-term medical problems, regularly visiting them at home, identifying issues that impinge upon the quality of their care. Time after time deficits in support systems, misunderstandings or cultural beliefs that seem to contradict instruction from the clinic, or a lack of comprehension of the nature of their problems led to less than optimum care and sometimes unsafe care. From the clinic door this might be quite unknown. These adverse events that result are due to the system of care. That system must incorporate the patient, family and community. Unless students see their responsibility extended beyond the usual boundary of medical control, they will not provide, nor enable, patients to provide for themselves optimal safe care.

I believe this to be a tidy agenda for a quiet afternoon!

Notes

1. Adapted from an invited keynote address at the Biennial Meeting of the Network of Community-Oriented Educational Institutions for Health Sciences, Linköping, Sweden, October, 1999.
2. National Expert Advisory Group on Safety and Quality in Australian Health Care (1999). *Implementing safety and quality enhancement in health care*. Final report to Health Ministers, July.
3. Australian Medical Workforce Advisory Committee (1998). *Influences on participation in the Australian medical workforce*. AMWAC Report, 4 June.

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