

Organisational culture and safety: an interdependent relationship

GEOFF CLARK

Geoff Clark is a Health Services Administrator in Canada.

Abstract

Since the early 1990s, a body of evidence regarding the lack of quality in health care has emerged in many countries including Australia, the United Kingdom, New Zealand and the United States of America. It has brought the subject of health care safety to the top of the policy agenda and the forefront of the public debate worldwide. Studies show not only that failure of quality occurs, but also that it inflicts harm and wastes resources on a large scale. Experts in risk management, both within and outside the health care industry, emphasize system failures and system-driven errors over direct human error, and accentuate the crucial role that organisational culture plays in ensuring safety. Examination of the interrelationship between culture and safety in organisations demonstrates that organisational relationships influence both culture and safety and that effective two-way communication is pivotal to the success of the development of a corporate 'safety culture'.

Evidence of inadequate safety

The problem of adverse events in health care is not new. As far back as Babylon, nearly 4,000 years ago, during the reign of Hammurabi, King of Babylonia, the law provided for harsh punishments for adverse health outcomes. The death of a free citizen at the hands of a physician would result in the loss of the physician's hand or fingers (Sharpe & Fadden, 1998). More recently, physician James Doyle (1953) reported in the Journal of the American Medical Association, that after reviewing the records of more than 6,000 hysterectomies in thirty-five hospitals, he found hundreds of women who had received either no preoperative diagnosis or a simple diagnosis such as 'pain'. Post-operatively it turned out that 30 percent of all the patients aged twenty to twenty nine who were subjected to hysterectomy had no disease whatsoever; a number Doyle rightly called 'appalling'. Equally troubling however is that the study cannot be dismissed as outdated because substantial evidence exists that indicates that the rate of inappropriate hysterectomies has not altered significantly since this study (Shekelle et al 1998; Bernstein et al 1993).

The Institute of Medicine (1999) estimated that "medical errors" cause between 44 000 and 98 000 deaths annually in hospitals in the United States of America - more than the combined number of deaths and injuries from motor and air crashes, suicides, falls, poisonings and drownings in the US, and may be even greater since the underreporting of medical adverse events is considered to range between 50% and 96% annually (Barach & Small, 2000).

The United Kingdom Department of Health, in its 2000 report, *An organisation with a memory*, estimated that adverse events occurred in around 10% of hospital admissions, equating to about 850 000 adverse events per year. The Quality in Australian Health Care Study (QAHCs) released in 1995 found an adverse event rate of 16.6% among hospital patients - a rate that extrapolates to approximately 38 inadvertent deaths per day, more than the number of road deaths, industrial deaths and deaths from falls combined (Moller & Cantwell, 1999; NISU, 1999). The survey of Adverse Events in New Zealand Public Hospitals found that, in 1998, one in eight (12.9%) of all admissions were associated with an adverse event. One US review of quality studies concluded "... for most care that has been studied, there are large gaps between the care that people should receive and the

care they do receive. This is true for all three types of care [acute, chronic and preventative]. It is true whether one looks at overuse or underuse. It is true in different types of health care facilities and for different types of health insurance. It is true for all age groups, from children to the elderly. And it is true whether one is looking at the whole country or only one city" (Shuster, McGlynn & Brook, 1997).

Such studies show not only that failure of quality occurs, but also that harm is inflicted and resources wasted on a large scale. In the United Kingdom additional hospital stays alone cost about £2 billion a year, whereas hospital-acquired infections - 15% of which may be avoidable - are estimated to cost nearly £1 billion every year. The total national cost of preventable adverse medical events in the United States of America, including lost income, disability and medical expenses, is estimated at between US\$ 17 billion and US\$ 29 billion annually. Excluding costs such as litigation and loss of productivity, it has been estimated that preventable adverse events costs in the vicinity of AUS\$1.2 billion annually, a cost equal to that of all other forms of injury in Australia put together (Rigby & Runciman, 1999). Of equal importance is the erosion of trust, confidence and satisfaction among health care consumers.

All of these studies have argued there is a need for organisational culture to change, specifically highlighting the need to create the right culture if successful reporting and learning was to occur from errors and adverse events. This call related not only to patients but also to health care workers. "[A] safer environment for patients would also be a safer environment for workers and vice versa, because both are tied to many of the same underlying cultural ... issues" (Institutes of Medicine, 1999).

Importance of organisational culture

In a number of high hazard operations, where the risk of error involves dire consequences, leaders manage for safe, reliable performance. As a result, the term 'High Reliability Organisation' has been coined to describe organisations that are mandated to do everything possible to avoid certain kinds of negative outcomes (Klein, Bigley & Roberts, 1995; Roberts, 1993; Gaba, 2000; Weicke, 1987). These High Reliability Organisations take a similar approach to organisational management, emphasizing the importance of safety culture and organisational factors as a means of creating and sustaining a safe and reliable organisation. This concept of the importance of safety culture is firmly established in the analyses of errors and is supported in the theories of Reason (1997) and Rasmussen (1999).

Notions of culture have deep roots in the anthropological literature going back many decades. The application of these ideas to organisations rather than people began in the United States in the post-war period but did not come to popular attention until the 1980s. Despite the fact that the notion of organisational culture is now frequently invoked in both organisational and management literature, it remains a somewhat elusive concept (Brown, 1995). While there is a myriad of views, two broad schools of thought can be discerned. One tends to define organisational culture as a phenomenon that can be managed and manipulated, while a second school of thought, predominantly adopted by sociologists and anthropologists with a more ethnographic approach, conceives of an organisation as a unique, historically derived, subjective phenomenon beyond simple manipulation. It is the former school of thought that is discussed when considering organisational culture and error management (Helmreich & Merritt, 1998).

Organisational culture can be defined as the vision, values, norms, leadership styles, interpersonal behaviours and behavioural expectations and norms of an organisation. How authority, responsibility, rewards and incentives and information systems are designed in an organisation will drive most people's behaviours and directly influence the organisation's culture. Organisational culture is therefore assumed to be a contributor to organisational performance by socializing workers in a way that increases commitment to the goals of the entity, particularly safety (Roberts, 1993).

Emphasis on the importance of organisational culture is not new. In 1967 Drucker noted that developing effectiveness challenges directions, goals, and purposes of the organisation and raises the eyes of its people from a preoccupation with problems to a vision of opportunity. Drucker (1997), continuing this theme in more recent times, emphasized that the organisation is not just a tool; it bespeaks values and is both defined by and defines a specific enterprise's results.

"Organisational culture is...[seen by some as being]...central to every stage of the learning process - from ensuring that incidents are identified and reported through to embedding the necessary changes deeply in practice (DOH, 2001)." As such it embodies the philosophy of its leaders, which is translated into, and affects, the behaviour of employees (Spath, 2000). Although some schools of thought focus on the role of leaders of an organisation, others note that middle management likely plays a substantial role as well, conveying culture to front-line workers in an organisation. Studies examining the effective implementation of Total Quality Management have clearly demonstrated the role of middle managers in organisational culture (Baskin & Shortell, 1995).

Literature review

The term 'safety culture' does not appear to have any defined meaning within the literature, although there is a recurring theme that organisations with effective safety cultures share a constant commitment to safety as a top priority and this commitment permeates the entire organisation (International Nuclear Safety Advisory Group, 1991). More concretely, components include acknowledgement of the high risk, error prone nature of an organisations activities; blame free environment where individuals are able to report errors or close calls without punishment; expectation of collaboration across ranks to seek solutions to vulnerabilities, and a willingness on the part of the organisation to direct resources to address safety concerns (Helmreich (In Press), Roberts, 1993, Cooper, 2000). Based on extensive fieldwork in multiple organisations, Roberts et al (1993) have observed several common cultural values in reliability-enhancing organisations that align with the above views: interpersonal responsibility; personal centeredness; helpful and supportive co-workers; friendly, open sensitive personal relations; strong feelings of credibility, and strong feelings of interpersonal trust.

From a review of the literature, there are five key principles to achieving a successful safety culture.

1. Safety culture drives attitudes.
2. All levels of the organisation are involved.
3. Safety is the overriding priority.
4. Every member of the organisation participates.
5. Participation is willing based on a joint belief in safety rather than compliance.

Drawing upon these principles, it is apparent that safety culture must transcend all levels of an organisation without being distorted by the segmentation inherent in different levels of most organisations. It must be a culture of inclusion, where every member has a role and feels responsible, to actively, willingly and with principle, place priority on safety in influencing collective behaviours. Furthermore, it must engender the various interrelationships and interactions involved with the various stages of the functioning of the organisation.

An organisation without an effective safety culture provides a powerful disincentive to employees not to report errors or close calls. Experience from the aviation industry has shown that confidential near miss reporting has been complementary to the success in improving air safety, and that when 'cracks' appear in the framework of trust among stakeholders, there is an associated decrease in reporting. Given the traditional culture that exists in health care with its emphasis on professional autonomy and collegiality, it is essential that health care organisations foster a strong safety culture in order to support a reliable reporting system (Barach & Small, 2000).

In contrast to the collaborative approach advocated in the literature, Bolsin (2001), while acknowledging the necessity for medical providers to change culturally to meet consumer needs, proposes the maintenance of a system that in effect continues to support the current health care tradition of professional autonomy and peer review. He notes that while the evidence to date does not support the likelihood of cultural change occurring rapidly within medicine, with time and technology he believes the profession will achieve the necessary change to achieve safety.

Many experts however would argue that safety excellence is not the result of any singular strategy and that, further, culture- or value-based safety systems are difficult to achieve and maintain for prolonged periods (Hansen, 2000, Miller, 1999). The dynamic relationship between management and workers and their environment plays an important role in the development and maintenance of a safety culture, and therefore leaving the complex issue of quality improvement in health care to the professions alone is unlikely to result in

the safety outcome desired (Iedema and Degeling, 2001). Eagar (2001), while acknowledging the need for the medical profession to change, also notes that the demands of quality management require everyone in an organisation to focus on the system, processes, customer needs, investment in people and the development of new knowledge, skills and innovative approaches if the necessary level of safety is to be achieved.

Leadership and organisational culture

Just as safety is a property of a system, so too is leadership. Leadership in this context though, does not only convey executive leadership. Evidence has clearly demonstrated that leadership, if it is to increase an organisation's capacity to learn and change, must be evident in all levels of an organisation. Significantly, the largest builders of community within an organisation are normally the informal network leaders: those individuals with no formal position of leadership but who use their demonstration of personal commitment to the organisation and its ideals to achieve leadership. Informal leaders, in order to be effective and accelerate organisational learning, must be sensitive to the culture and politics of an organisation, and be constantly building networks and finding ways to build teams within the existing structure (Carroll & Edmondson, 2002).

The leaders in health care organisations face an unprecedented set of challenges. The public has concerns regarding the health care system, and believes that the system needs major changes. Leaders must realign the organisation functionally and structurally to achieve new requirements and an improved quality of health care. Traditional management of hierarchies, policies and guidelines, which are provider driven as opposed to customer driven, need to be replaced with dynamic organisations that have a culture that is focussed on quality and safety and designed to meet the evolving needs of patients, communities, funders and those who deliver health care services. For this to be realized, leadership with vision is required to enable the organisation culture to develop and the organisation to function effectively. Organisations require a culture where learning is a constant, feedback is pervasive, and growth and improved performance are basic elements (Sethi, 1997).

The challenge of leading an organisation on a path of quality improvement requires significant knowledge, skills and often a change in attitude. The role of the leader in this process is vital to its success. It requires a leader who has the ability to think about the many combinations of people, processes, customers, suppliers and other factors in the organisational system and how these ingredients can be integrated to assist the organisation to achieve its goals. The organisations that will fare the best will be those that have a relentless commitment to learning, along with the strength to resolve past issues, including errors. To become better at what they do in the future, organisations will need to 'unlearn' some of their most basic attributes from the past (Langley et al 1996; Senge 1990).

Implicit however in the type of leadership that stimulates vision and change is risk. One can neither lead nor improve without taking risk. Even positive change creates uncertainty and anxiety and human beings instinctively seek to create recognizable patterns in all aspects of life in order that life has some sense of consistency. When established patterns are challenged or are no longer effective, one is not sure where the changes will lead and fear can set in. The short-term reaction of management to these types of stresses may be to attempt a 'quick fix'; however, as Deming observes, it is imperative that leaders sustain a 'constancy of purpose' and not jump from problem to problem, strategy to strategy, if the organisation is to realign itself to a culture of quality and safety (Deming, 1986).

Organisations often encounter difficulty in changing themselves because culture cannot always be directly manipulated. The challenge is to attain new, shared perceptions of the beliefs and values central to an organisation and to focus on the 'climate' of the organisation. The climate of an organisation is inferred by its members and is organized around two issues: how the organisation goes about its daily business and the goals the organisation pursues. The inferences organisational members make about the climate are based on the policies, practices, procedures and routines that they are subject to, as well as on the kind of behaviours that are expected, get rewarded and are supported.

There are four key climate dimensions. The first three relate to function and the fourth to the organisation's goals:

- The nature of interpersonal relationships.
- The nature of the hierarchy.
- The nature of the work.
- The focus of support and rewards. (Schneider et al, 1996)

The organisational climate reflects the tangibles that produce a culture, the kinds of things that happen to and around employees that they are able to describe. Only by altering the everyday policies, practice, procedures, and routines, thereby impacting the beliefs and values that guide employee actions, can change occur and be sustained (Schneider et al, 1996).

Organisational culture is also susceptible to unrealistic self-concept and ultimately to complacency. Some experts argue that this is due to the fact that the shared experience between the various levels within an organisation is limited and there is often a marked difference in attitudes and backgrounds, which lead to different frames of reference and ineffective communication. As a result, the basic conceptualisations of safety can differ significantly between management and employees (Harvey, Bolam & Gregory, 1999).

Pool explains that safety culture, which he refers to as institutional in nature, is rooted in conviction, and acts as a safety mechanism to guard against omission, or directives that may degrade safety and reliability (Pool, 1997). This concept paints a picture of safety culture as a mechanism to create realignment based on principal rather than cultural norms or business decisions, and that the external influence and mandate of safe operation, which is placed on High Risk Organisations, may not be adequately represented within organisational values (Rochlin, 1999). Organisational culture is the foundation for safety culture, but it cannot yield safety culture by itself. What is clear is that solving safety problems effectively is a requirement for being an effective organisation, and that to do so, requires individuals and groups that are committed to the organisation having an effective learning culture.

Learning and organisational culture

Covey (1991) describes a slow transformational process whereby the organisation cultivates the principles and skills necessary to be a catalyst in improving the culture. Miller (1997) echoes Covey's thoughts on slow transformation and modelling correct principles and proposes that to change an organisation it is necessary to start with behaviours: especially with the executive's modelling of desired behaviours. He emphasizes that it is necessary to understand and acknowledge that changing the attitudes beneath behaviours is a process that requires time.

Organisations that have been successful in transforming did so by successfully shifting their organisation's culture toward behaviour and thinking that reflects personal responsibility, accountability, leadership and stewardship. When a fear is driven out of an organisation, creativity and innovation can flourish. When organisations and the people in them are genuinely practicing respect, building trust, and being open to learning, they are on the path of transformation.

Contemporary quality frameworks reconnect leaders to their organisations quality processes by emphasizing the leader's role in promoting quality as an organisational value, setting meaningful quality goals, and actively using information to improve organisational effectiveness. For health care organisations, achieving a culture of quality and safety means developing a shared vision through learning; one that challenges the old paradigms and rewrites the unwritten, informal and taken for granted 'way things get done around here' (Yank, 1993).

Schein (1997) identifies ten characteristics of a learning culture, which he attributes to the success of an organisation to make its own 'perpetual diagnosis', and self manage transformation as needed. Many of these characteristics are inherent of a High Risk Organisation, although there is one particular characteristic of which the health care industry could benefit the most. That is the encouragement and fostering of the identification of problems from all levels of the organisation and the subsequent implementation of appropriate corrective actions.

Solving problems effectively is a requirement for being an effective organisation. The individuals and groups that are responsible for problem solving can inadvertently focus on people or departments involved rather than the real causes of the problems. This creates an organisational culture that focuses more on blaming other groups and individuals than solving problems. While blame may not be a defined policy within an organisation, even subtle remarks, especially by management, can be interpreted as endorsements of this approach.

Three common characteristics of this blame approach to problem solving in organisations is an unwillingness of employees to come forward with information about a problem, incomplete analyses of problems by concluding that 'human error' was the cause, and too much focus on 'who?' rather than identifying the causes of a problem by asking a lot of 'why?' questions. Organisations that use the blame approach with employees may believe that they are making an example of an employee, thereby encouraging others to avoid making the same mistake. In reality the message being sent to everyone in the organisation is quite different. The blame culture results in people involved in errors not disclosing and is remarkably effective at discouraging other people with information from coming forward. It creates an organisational denial and provides a false sense of security.

Examining the interrelationships inherent in the health care industry reveals much about the dynamics that influence behaviour and culture at the various levels. Each level is confronted with a different set of conflicts, or dynamics, which challenges the attitudes, values and behaviour that ensure a safety culture. To enable organisations to become more effective at safety and solving problems, people at every level of the organisation must be given opportunities to use their skills, talents, and creativity.

Broadly considered, the health care industry has four essential levels - a corporate governance level, an executive level, a middle management level and an operational level. At corporate governance level, policy is developed which broadly reflects the organisational direction and goals. This may be government health care policy or corporate health care policy when looking at the private health care sector. This policy is directly influenced by stakeholder expectations, and if appropriate, stockholders. Thus corporate governance policy must satisfy the expectations of all stakeholders, and stockholders, in order to operate effectively in a High Risk market where public perception can greatly influence the life cycle of an organisation.

The second level is the organisational executive level. This level is influenced by both corporate governance policy and by health care industry regulators such as Health Care Complaints Commissions, Health Professional Regulatory Authorities, and the Therapeutic Goods Administration to name but a few. Thus, the executive must meet the mandate of corporate governance policy, whose overriding priority may be throughput numbers or profit, while concurrently calming stakeholders such as regulators. Corporate expectations may also be in conflict with industry and regulatory operating priorities of safety and reliability. In some organisations, there may be the additional difficulty that corporate governance policy is developed within a culture that does not have as its primacy health care. The organisational executive level is responsible for the development of organisational focused policy that incorporates corporate governance policy and the needs of other stakeholders.

The third level is that of the middle management level. This level is expected to implement organisational policy and meet the expectations of the two levels above. The interaction between middle management and the lower organisational level is both formal - those interactions involved in passing on policy expectations - and informal - those that are based on personal expectations and beliefs.

The fourth level is the operational level and encompasses all staff involved in actual service delivery. This level is influenced through their interaction with management and policy and through their contract of employment. The operating environment - managing health care, performing procedures, and interfacing with technology, also influences this level of the organisation. The totality of these influences represents a dynamic interrelationship, which can create or restrain high performance, yet a large portion of the influences are out of the direct control of those who must operate within their effect. The procedures must integrate with the technology, individuals must have the appropriate experience and supervision, and policies must reflect the actuality of practice. This dynamic generates conflict between the components of the operating environment, and if not managed effectively, can be expressed through violations and errors.

Conclusion

The various levels of relationships have a great influence on organisational and safety culture. Examination of the interrelationship between culture and safety demonstrates that traditional reliance on corporate policy alone to formulate and retain safety culture is not realistic. Good safety management requires an organisational environment in which staff are well motivated and where their concerns and suggestions are listened to and acted upon. Open and effective two-way communication on safety issues throughout the organisational structure is an essential feature of such an environment. Safety information needs to flow from the 'top down' but equally important, also from the 'bottom up' if an organisation's culture is going to support an effective 'safety culture'.

References

- Australian Health Ministers' Advisory Council 1996, '*The final report of the Taskforce on quality in Australian health care*', AGPS, Canberra, ACT.
- Barach P & Small SD 2000, Reporting and preventing medical mishaps: lessons from non-medical near miss reporting systems, *BMJ*, vol 320, pp 759-763.
- Baskin ST & Shortell SM 1995, Total Quality Management: needed research on the structural and cultural dimensions of quality improvement in health care organisations. *The Journal of Health Administration Education*, vol 13, pp143-154.
- Bernstein S, McGlynn E, Siu A, et al 1993, The appropriateness of hysterectomy: a comparison of care in seven plans. *Journal of the American Medical Association*, vol 269, pp 2398-2402.
- Bolsin S 2001, League Tables and professionalism: on quality in health care, *Australian Health Review*, vol 24, no 3.
- Brown A 1995, '*Organisational Culture*', Pitman, London.
- Carroll JS & Edmondson AC 2002, Leading organisational learning in health care. *Quality and Safety in Health Care*, vol 11, pp 51-56.
- Cooper MD 2000, Towards a model of safety culture. *Safety Science*, vol 36, pp111-136.
- Covey SR 1991, '*Principle-centered leadership*', Simon & Schuster, New York.
- Davies HTO & Nutley SM 2000, Organisational culture and quality of health care. *Quality and Safety in Health Care*, vol 9, pp111-119.
- Deming WE 1986, '*Out of the crisis*', MIT, Cambridge, MA.
- Department of Health 2000, '*An organisation with a memory: Report of an expert group on learning from adverse events in the National Health Service*', The Stationery Office, Norwich, UK. <http://www.doh.gov.uk/orgmem> Accessed 16th May 2002.
- Department of Health 2001, '*Building a safer NHS for patients: implementing an organisation with a memory*', Department of Health, London, p.ix www.doh.gov.uk/buildsafenh Accessed 13th May 2002.
- Doyle JC 1953, Unnecessary hysterectomies: study of 6,248 operations in thirty-five hospitals during 1948. *Journal of the American Medical Association*, vol 151, pp360-365.
- Drucker PF 1967, '*The Effective Executive*', Harper Collins, New York.
- Drucker PF 1997, Introduction. In '*The Organisation of the Future*', Hesselbein, F, Goldsmith, M, & Beckhard, R (Eds) Jossey-Bass, San Francisco.
- Eagar K 2001, On learning to say 'sorry' and other strategies for quality improvement, *Australian Health Review*, vol 24, no 3.
- Gaba DM 2000, Structural and organisational issues in patient safety: A comparison of health care to other high-hazard industries. *Californian Management Review*, vol 43, pp83-102

- Hansen LL 2000, The Architecture of Safety Excellence. *Professional Safety*, May, pp26-29.
- Harvey J, Bolam H & Gregory D 1999, How many safety cultures are there? *The Safety and Health Practitioner*, December, p11.
- Helmreich RL, in press, 'Culture, threat and error: Assessing system safety.' In *Safety in Aviation: The Management Commitment: Proceedings of a Conference*. London: Royal Aeronautical Society, p3.
<http://homepage.psy.utexas.edu/homepage/group/HelmreichLAB/Publications/pubfiles/Pub257.pdf> Accessed 21st April 2002.
- Helmreich RL & Merritt AC 1998, 'Culture at Work in Aviation and Medicine', Ashgate, Aldershot, UK.
- Iedema R & Degeling P 2001, Quality of Care: Clinical Governance and Pathways, *Australian Health Review*, vol 24, no 3.
- Institute of Medicine 1999, 'To Err is Human. Building a Safer Health System', National Academy Press, Washington, DC, US. <http://www.nap.edu/books/0309068371/html/> Accessed 18th May 2002.
- International Nuclear Safety Advisory Group, 1991, 'Safety Culture,' International Atomic Energy Agency, Vienna.
- Klein RL, Bigley GA & Roberts, K H 1995, Organisational Culture in High Reliability Organisations: An Extension. *Human Relations*, vol 48, no 7, pp771-793.
- Langley GJ, Nolan K et al 1996, 'The Improvement Guide: A practical approach to enhancing organisational performance', Jossey-Bass, San Francisco.
- Miller D 1997, The Future Organisation: A Chameleon in all its Glory. In 'The Organisation of the Future', Hesselbein, F, Goldsmith, M, & Beckhard, R (eds) Jossey-Bass, San Francisco.
- Miller DW 1999, Sociology, not Engineering, May Explain our Vulnerability to Technological Disaster. *The Chronicle of Higher Education*, October, pp19-24.
- Ministry of Health (NZ) 2001, 'Adverse Events in New Zealand Public Hospitals: Principal Findings from a National Survey', Ministry of Health, Wellington, NZ. <http://www.moh.govt.nz/publications> Accessed 3rd June 2002.
- Moller J & Cantwell G 1999, 'Paradigm Shift - Injury from problem to solution', Strategic Research Development Committee of the National Health and Medical Research Committee, NHMRC, Canberra.
- NISU 1999, 'Injury Deaths Australia 1979-1998', National Injury Surveillance Unit Report. www.nisu.flinders.edu.au/data/ Accessed 6th June 2002.
- Pool R 1997, When failure is not an option. *Technology Review*, July, pp38-46
- Rasmussen J 1999, The concept of human error: Is it useful for the design of safe systems in health care? In 'Safety in Medicine', Vincent C & de Moll B (eds), Elsevier, London.
- Reason J 1997, 'Managing the Risks of Organisational Accidents', Ashgate, Aldershot, UK.
- Rigby K, Clark RB & Runciman WB 1999, Adverse events in health care: setting priorities based on economic evaluation. *Journal of Quality in Clinical Practice*, vol 19, pp7-12.
- Roberts KH 1993, Cultural Characteristics of Reliability Enhancing Organisations. *Journal of Managerial Issues*, vol 5, pp165-181.
- Rochlin GI 1999, Safe operation as a social construct. *Ergonomics*, vol 42, no 11, pp1549-1560.
- Schein EH 1997, 'Organisational Culture and Leadership', 2nd ed, Jossey-Bass Publishers, San Francisco, pp363.
- Schneider B, Brief AP et al 1996, Creating a climate and culture for sustainable organisational change. *Organisational Dynamics*, vol 25, pp7-19.
- Senge PM 1990, 'The fifth discipline: The art and practice of the learning organisation', Doubleday, New York.
- Sethi D 1997, The Seven R's of Self-Esteem. In 'The Organisation of the Future', Hesselbein, F, Goldsmith, M, & Beckhard, R (eds.) Jossey-Bass, San Francisco.

- Sharpe VA & Fadden LA 1998, '*Medical Harm*', Cambridge University Press, Cambridge.
- Shekelle P, Kahan J, Bernstein S et al 1998, The reproducibility of a method to identify the overuse and underuse of medical procedures. *New England Journal of Medicine*, vol 338, pp1888-1895.
- Shuster M, McGlynn E & Brook R 1997, '*Why the quality of US health care must be improved*', National Coalition on Health Care. Washington, DC.
- Spath P 2000, Does your facility have a 'patient safe' climate? *Hospital Peer Review*, vol 25, pp80-82.
- Weicke KE 1987, Organisational culture as a source of high reliability. *California Management Review*, vol 29, pp112-127.
- Yank G 1995, Quality Improvement in health care organisations: a general systems perspective. *Behavioural Science*, vol 40, no 2, pp85-103.