Chapter 1

Improving the Safety and Quality of Health Care in Canada

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Learning Objectives

Upon completing this chapter, you should be able to:

1. Identify why the safety and quality of health care in Canada are becoming important issues.
2. Explain the difference between the “old view” of safety and quality improvement and the “new view” that emphasizes systems and processes rather than individuals at the point of care.
3. Identify ways in which health care needs to change to improve the safety and quality of care.
4. List some key challenges to improving safety and quality in Canadian health care organizations.
5. Identify some current directions that hold promise in improving safety and quality in Canadian health care.
Introduction

Patient safety and quality of care have always been important issues in the education and practice of health care professionals, but new knowledge and innovative methods that have emerged in the past decade have renewed the agenda for improvement. The new knowledge and methods have influenced strategies in medication-use systems and in other areas of health care. In this chapter, we outline the reasons why safety and quality improvement have garnered added emphasis in the past decade. We consider the evolving views of safety and quality as “system properties” that require interventions focused on the redesign of care, not just the retraining of individuals. We end by reviewing current trends in policy and practice that are leading to new and hopefully sustainable efforts to improve care across Canada.

Growing recognition of problems in the safety and quality of care

The burgeoning health services research literature on safety and quality has highlighted the gap between professed goals and the current level of performance of health care systems in Canada and elsewhere. A widely cited US study has shown that Americans receive only about 55% of the care recommended for a wide variety of conditions, including screening for various types of cancer and appropriate medicines for coronary artery disease. A similar study by researchers in Manitoba determined that only about one-third to two-thirds of Winnipeg residents received appropriate care in 13 different areas. Analyses of Saskatchewan data concerning provision of care for patients who experience myocardial infarction showed that although the percentages of patients receiving beta-blockers, angiotensin-converting enzyme inhibitors, and statins have increased over time, many patients are still not receiving these medications (Figure 1).

Clinical practice guidelines have been a major instrument for shifting practice patterns to align with evidence for recommended care. Over the past 20 years, there has been substantial investment in guidelines development, but many studies have shown that guidelines have had limited effects on practice. There are many reasons for this suboptimal performance, including limited use of information technologies to bring information about patients and appropriate treatments to the bedside, lack of feedback on effective and ineffective practices, the explosion of new medical knowledge, and the growing complexity of modern health care, which has increased demands on physicians, pharmacists, nurses, and other personnel. The end result is considerable variation in the types of care provided to patients and a corresponding limit in achieving positive outcomes.

Even more troubling than the gaps in quality of care is the growing evidence that many patients are unnecessarily harmed in the course of their care. The Canadian Adverse Events Study demonstrated that 7.5% of adult hospital patients receiving acute care had unintended incidents during their care that resulted in prolongation of the hospital stay, disability at discharge, or death. The physicians who reviewed the charts of these patients found that nearly 40% of the “adverse events” could have been prevented with appropriate care. These Canadian results are roughly equivalent to those of similar studies in England, New Zealand, Australia, and the United States. All of these studies found that a large proportion of adverse events were related to medication practices. In the Canadian study, almost one-quarter of adverse events were related to drugs or fluids ordered for patients. Other studies have revealed even higher rates of adverse drug events (ADEs). For example, in a study in medical units in a US teaching hospital, Bates et al. found 530 medication errors for 379 patients over a 51-day period, more than one error per patient, which resulted in 25 ADEs and 35 potential ADEs. Forster et al. reported that 23% of patients experienced an adverse event after discharge from hospital, 72% of which were attributable to medication use. Other authors have documented patient safety issues in settings outside acute care, including long-term care, primary care, and...
community-based care. A recent Institute of Medicine report entitled *Preventing Medication Errors* estimated that 800,000 preventable ADEs occur each year in US long-term care facilities, and Medicare patients experience 530,000 preventable ADEs. See Table 1 for a list of the key studies reporting ADEs.

**Distinguishing patient safety from quality improvement**

The relationship between patient safety efforts and quality improvement efforts is a matter of debate in both the academic and practice communities. Some observers see these two endeavours as largely overlapping, whereas others have focused on the differences. Most agree that patient safety is oriented toward “working to avoid, manage and treat unsafe acts within the health care system” or “freedom from accidental injury.” Quality improvement, on the other hand, aims to “increase the likelihood of desired health outcomes . . . consistent with current professional knowledge.”

Quality improvement efforts have important roots in industrial quality management methods based on total quality management and similar initiatives, whereas patient safety draws more from academic disciplines such as human factors engineering and practical strategies used to reduce unintentional incidents in aviation and other used high-risk industries.

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**Figure 1 Three-day post-discharge drug dispensing rates after acute myocardial infarction in Saskatchewan**

Despite differences in their origins and focus, patient safety and quality improvement are often closely linked in practice. Moreover, both areas are ripe for improvement. Patient safety initiatives aim to identify and then prevent or mitigate harm as a result of treatment. Quality improvement initiatives focus on ensuring that all patients receive appropriate care in a timely fashion according to their health care needs. In many cases, these goals overlap: reductions in adverse events contribute to improvements in quality-of-care outcomes, and strategies focused on quality improvement uncover patient safety issues. One example is the use of anticoagulation therapy for atrial fibrillation. Studies have shown that many warfarin-eligible patients never receive this therapy, and that many for whom the drug is prescribed are undertreated. Numerous quality improvement activities have been directed at these gaps, including academic detailing, the development of specialty clinics, and the production of guidelines.27-29 Clearly, issues of both safety and quality are at stake here (Figure 2).

Wooll31 has argued that patient safety is essential for

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**Table 1  Selected studies of adverse events**

<table>
<thead>
<tr>
<th>Authors</th>
<th>Setting, year</th>
<th>Methods</th>
<th>No. of patients or admissions</th>
<th>No. of events</th>
<th>Adverse event rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Adverse events in acute care</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brennan et al.21</td>
<td>USA (New York State), 1984</td>
<td>Chart review</td>
<td>30 121</td>
<td>1133</td>
<td>3.7</td>
</tr>
<tr>
<td>Thomas et al.14</td>
<td>USA (Utah, Colorado), 1992</td>
<td>Chart review</td>
<td>14 700</td>
<td>475</td>
<td>3.2</td>
</tr>
<tr>
<td>Wilson et al.13</td>
<td>Australia, 1992</td>
<td>Chart review</td>
<td>14 179</td>
<td>2353</td>
<td>16.6</td>
</tr>
<tr>
<td>Vincent et al.11</td>
<td>UK, 1999–2000</td>
<td>Chart review</td>
<td>1 014</td>
<td>119</td>
<td>11.7</td>
</tr>
<tr>
<td>Davis et al.12</td>
<td>New Zealand, 1998</td>
<td>Chart review</td>
<td>6 579</td>
<td>849</td>
<td>12.9</td>
</tr>
<tr>
<td>Baker et al.10</td>
<td>Canada, 2000</td>
<td>Chart review</td>
<td>3 745</td>
<td>289</td>
<td>7.5</td>
</tr>
<tr>
<td>Forster et al.16</td>
<td>Canada, 2002</td>
<td>Telephone interviews and chart review</td>
<td>328</td>
<td>76</td>
<td>2.3</td>
</tr>
<tr>
<td><strong>Adverse drug events</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bates et al.15</td>
<td>US tertiary care teaching hospital, 1994</td>
<td>Self reports, chart review, review of medication documents</td>
<td>379</td>
<td>530 errors resulting in 25 ADEs and 35 potential ADEs</td>
<td>6.6</td>
</tr>
<tr>
<td>Kopp et al.22</td>
<td>US tertiary care teaching hospital, 2003</td>
<td>Observation</td>
<td>Thirty-three 12-hour shifts in ICU</td>
<td>13 nonpreventable ADEs, 22 preventable ADEs, 100 potential ADEs</td>
<td>Not calculated</td>
</tr>
<tr>
<td>Kaushal et al.23</td>
<td>2 US teaching hospitals (pediatric patients), 1999</td>
<td>Medication order sheets, medication administration records, charts</td>
<td>1120 pediatric patients</td>
<td>616 medication errors, 115 potential ADEs, 26 ADEs</td>
<td>0.24 for ADEs, 1.1 for potential ADEs</td>
</tr>
</tbody>
</table>

ICU = intensive care unit, ADE = adverse drug event.
better health care but that over investment in patient safety carries a risk of creating a safer, but lower-quality health care system. For example, patients are less likely to die from an overdose of warfarin than from not receiving warfarin at all.32 Efforts to improve health care thus need to strike a balance, emphasizing a range of goals beyond safety, such as patient-centredness, timely access, effectiveness, efficiency, and equity, to use the goals outlined by the Institute of Medicine.33 Improvements in quality of care require strategies that minimize the likelihood of injuries as a result of care, but we must also ensure that patients and clients can access effective and appropriate treatments in a timely fashion. Moreover, patient safety and high quality of care both require that organizations are designed and managed so that adequate numbers of appropriately educated staff are available to deliver care that is sensitive to the needs and backgrounds of patients. To take just one example of the importance of such organizational aspects, having too few nurses contributes to poor outcomes, including greater mortality, increased numbers of infections, and more adverse drug events.34-37

Achieving higher quality of care has not been easy in Canada or anywhere else. Interestingly, patient safety and quality-of-care problems are similar in developed countries, which suggests that the methods of organizing and paying for health care are not the key drivers of patient safety or quality of care. In a recent comparative study,38 the Commonwealth Fund used the perceptions and experiences of patients to compare the performance of health care in six highly developed countries (Canada, the United States, United Kingdom, Australia, New Zealand, and Germany). Canada ranked last or next to last in measures of patient safety, timeliness of access to care, patient-centredness, and efficiency, although it did somewhat better on measures...
of equity and effectiveness (Table 2). The United States was last in four of the six areas, despite spending considerably more per capita on health care (Table 2).

**Increasing calls for improvement**

Information on the relative safety and quality of health care has been accumulating for some years, but the impact of this information has been dramatically increased by several key reports. In the United States, the 1999 release of the Institute of Medicine report *To Err is Human* created a maelstrom of media attention and resulted in government initiatives and increased regulation by accreditation and other oversight bodies. Two years later, the Institute of Medicine released a second report, *Crossing the Quality Chasm*, which identified the gap between potential and current performance as a “chasm” and argued for investments in information technology, supports for evidence-based health care, and improvements in working environments to improve the health care system.

Canadian reports on patient safety and, more recently, calls for improvements in quality of care have helped to raise the public profile of patient safety and quality-of-care issues. Many professional groups have endorsed efforts to improve patient safety, and funding from Health Canada has supported the development of the Canadian Patient Safety Institute. Several provinces have funded bodies to support patient safety and quality improvement initiatives (e.g., the Health Quality Councils in Saskatchewan and Alberta). In addition, groups such as the Quality Health Care Network in Ontario and the Western Quality Improvement Network assist organizations and regions to develop quality improvement skills. Many professional regulatory colleges have developed requirements for practitioners to engage in quality assessment and improvement activities, which provide additional incentives for clinicians to participate in such work.

Another factor raising the visibility of safety and quality issues is the growing number of performance reports that highlight key quality issues. The Ontario Hospital Report, first released in 1998, regularly reports on the performance of Ontario hospitals in four dimensions, including clinical performance and

**Table 2 Patients’ perceptions of quality and safety in health care***

<table>
<thead>
<tr>
<th>Factor</th>
<th>Canada</th>
<th>Australia</th>
<th>Germany</th>
<th>New Zealand</th>
<th>United Kingdom</th>
<th>United States</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall ranking</td>
<td>5</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Patient safety</td>
<td>5</td>
<td>4</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Effectiveness</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td>6</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Patient-centredness</td>
<td>5</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Timeliness</td>
<td>6</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Efficiency</td>
<td>5</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Equity</td>
<td>4</td>
<td>2</td>
<td>5</td>
<td>3</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Health expenditures per capita (US$)</td>
<td>3003</td>
<td>2903</td>
<td>2996</td>
<td>1886</td>
<td>2231</td>
<td>5635</td>
</tr>
</tbody>
</table>

outcomes (see http://www.hospitalreport.ca). The Canadian Institute for Health Information (CIHI) has released several reports comparing the performance of different regions and provinces for a variety of services, including acute myocardial infarction services, stroke care, asthma care, cesarean section, prostatectomy, hysterectomy, and surgery for hip fracture.\textsuperscript{41} Reports such as these are growing in scope and detail and have helped to identify areas for improvement at the provincial level. For example, CIHI data\textsuperscript{41} indicated that the risk-adjusted rate of unplanned readmission after discharge for myocardial infarction in 2003 was 11.4% in Prince Edward Island but only 4.8% in Alberta.

A major driver of increased efforts in patient safety and quality improvement in Canada has been changes in accreditation requirements. As a reflection of growing concerns about patient safety and quality, the Canadian Council on Health Services Accreditation (CCHSA) has adopted a number of new standards and “required organizational practices” to advance improvements in patient safety. Among these are removing concentrated electrolytes from patient care units, monitoring infection rates, improving sterilization processes, and reconciling patients’ medications upon admission and on transfer to other institutions.\textsuperscript{42}

Although increased performance reporting and accreditation requirements have raised the visibility of safety and quality issues, the reporting of performance on its own cannot lead to improvements in care. Real improvements in patient safety and quality of care require disciplined local efforts, efforts that rely on investment in resources and personnel and the use of appropriate tools. Experts in improvement suggest that interdisciplinary teams must be created and supported as they set aims, measure current performance, identify changes that lead to improvements, test those changes, and then implement successful changes more broadly.\textsuperscript{43,44} Several different approaches to improving the safety and quality of care have been used by health care organizations in Canada and elsewhere, but before examining current efforts, we need to consider the underlying assumptions for such improvements. The “new view” of safety and quality varies considerably from the traditional approaches to reviews and audits in these areas.

### The “new view” of safety and quality

In the traditional view of safety and quality, the focus was on individual performance, and poor performers were blamed for bad outcomes and then disciplined or retrained. This approach assumed that individuals who delivered poor care or made errors did so because they were careless, incompetent, or negligent. Berwick has described this approach as the “theory of bad apples.”\textsuperscript{45}

Although widely used, methods based on this approach led to only limited improvements in outcomes, since they focused on the small number of individuals with severe deficits in performance. Furthermore, this focus on inspection and discipline had perverse effects, frightening the workforce and leading to underreporting of poor outcomes and adverse events. Not surprisingly, such efforts dampened the enthusiasm of clinicians to participate in patient safety and quality improvement activities. Blaming individuals for problems in patient safety and quality of care could not improve outcomes across the board because most problems were the result not of individual deficiencies but rather of poor system design, unclear or inappropriate work processes, and inadequate defences against error.\textsuperscript{46-48}

Thus, although individuals are always involved in poor or unsafe care, blaming those individuals creates what British psychologist James Reason has described as the “vulnerable system syndrome.”\textsuperscript{49} This syndrome is a vicious circle that prevents organizations from learning about the underlying system issues that impede improvements in performance. The syndrome has three critical elements: blaming front-line individuals for problems, denying the existence of systemic causes for poor performance, and focusing on financial performance and productivity while minimizing attention to improving quality and safety.\textsuperscript{49} Organizations that exhibit the vulnerable system syndrome do try to improve results, but their focus on seeking simple answers and blaming individuals (when poor care or...
Adverse events result from the unfortunate alignment of different acts in complex circumstances) greatly limits their ability to do so. While human nature suggests that we should always make individuals accountable for their acts, acting on such assumptions reflects a simplistic view of health care organizations and rarely contributes to improvement.

Instead of adopting such a simple view of error, we need to recognize that the current practice environment in health care is characterized by complex interactions between clinicians and between organizations with “tight coupling,” such that errors in one area influence outcomes in other areas, making the entire care process vulnerable to accidents.50 Three key sources of complexity in health care have been identified. First, in dealing with patients, clinicians and researchers are dealing with a biological system, the human body, and biological systems have greater ambiguity and uncertainty than machine-based systems. Second, keeping pace with the proliferation of diagnostic and therapeutic technologies (i.e., devices and drugs) used in 21st century health care creates stresses and increases complexity. Third, managing the complexity inherent in health care organizations is difficult because many patients require care for multiple problems, provided by different clinicians working in different settings.51 This complexity raises questions about just how safe health care can become.52 Still, the lessons learned over the past 25 years in other high-hazard industries, such as aviation, shipping, nuclear power, chemical manufacturing, and the military, suggest that it is possible to build safer systems with more reliable results.51,53,54 All human activity is fallible, but knowing the sources of vulnerability can help us to design safer work environments. Reason summarized this well by noting that “we cannot change the human condition, but we can change the conditions under which humans work.”55

Amalberti56 has described a continuum of systems, ranging from “dangerous systems” (with a risk of more than one unintentional incident per 1000 events) through “regulated systems” (with a risk of unintentional incidents between one per 1000 events and one per 100,000 events) to “ultra-safe systems” (with a risk of disaster below one incident per 100,000 or even one million events); (see Table 3 for more detail). A number of scholars have examined the mechanisms by which very safe systems, often described as high-reliability organizations, are able to achieve this state. High-reliability organizations, examples of which include commercial aviation, European railways, and nuclear

<table>
<thead>
<tr>
<th>Nature of system</th>
<th>Risk of unintended incidents</th>
<th>Examples</th>
<th>Typical safety measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dangerous (very unsafe)</td>
<td>$&gt;10^{-3}$ (1 in 1000)</td>
<td>Mountain climbing, much of health care</td>
<td>System relies on regulation of individual performance</td>
</tr>
<tr>
<td>Regulated</td>
<td>Between $10^{-3}$ and $10^{-6}$ (1 in 1000 to 1 in 100,000)</td>
<td>Road safety, chemical industry, chartered airlines, anesthesia for low-risk patients, gastroenterologic endoscopy</td>
<td>System uses regulations and procedures to govern performance; focuses on error-resistant design of work, on standardization, and on limits to professional autonomy</td>
</tr>
<tr>
<td>Ultra-safe</td>
<td>$10^{-6}$ and safer</td>
<td>Commercial aviation, European railroads, nuclear industry, blood transfusion</td>
<td>Priority given to safety rather than performance improvement; highly regulated limits on action by individual performers</td>
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</table>
power, have five main characteristics: a preoccupation with failure, constantly seeking out what they do not know; a reluctance to simplify interpretations; a sensitivity to operations, which in health care means a concern for the nature and demands of clinical work; a commitment to resilience; and a deference to expertise, not status or position.57-60 These high-reliability organizations can perform at a quick tempo for sustained periods and have the ability to do so repeatedly.55 By all these definitions, health care organizations at their present level of performance are not high-reliability systems. In fact, Amalberti,56 using data on adverse events, classifies them in his list of dangerous systems. No clinician or manager wants to work in an organization providing low-quality or unsafe care, but aspirations to improve safety and quality face several obstacles. First, many clinicians and managers are already burdened by their daily workload, so admonitions to provide better, safer care compete with existing clinical and operational responsibilities. Without clear direction and additional support, vague improvement goals are insufficient to generate change. Second, the pressures to improve safety and quality represent only one of several priorities in health care. Other important priorities include balancing budgets, providing more appropriate and efficient care, ensuring timely access, and dealing with equity. Many believe that investments in safety and quality of care will save money in the long run,61,62 but creating safer and higher quality care in a more supportive work environment will require considerable investments in new information systems, new treatments, and, above all, additional staff and expanded training. This conflict among goals exists at several levels. At the executive level, senior leaders must decide how much to invest in safety and quality improvements, relative to other expenditures that may improve efficiencies or expand programs. At the patient care level, the conflict between pressures to increase safety and those to improve efficiency lead clinicians to continually test the boundaries of safety. Protocols and regulations are intended to limit unsafe behaviour, but there are strong pressures to maintain or increase the numbers of patients treated or reduce the time needed to deliver care. These pressures inevitably lead to “violations” of rules designed to maintain safety: Do we really need to double-check the dose when the nearest nurse is on another unit? Can the anesthesiologist leave the operating room for 10 minutes to deal with an urgent call? Can we treat another patient even though the resident has already been on call for 23 hours? In most cases, such violations do not lead to problems, which reinforces perceptions that clinicians can breach such safety defenses without risk.

Building on these ideas, Amalberti56 has argued that all workers face pressures to “migrate” through the safety boundaries to achieve greater performance. This results in growing numbers of daily work operations that occur outside the intended “safe space,” with reduced margins for error and greater potential for more safety violations and deviation from established protocols. The pressures of balancing demands for greater productivity with simultaneous requirements to improve patient safety and quality of care thus place workers in an unsolvable dilemma. Maintaining safety requires error-resistant systems with appropriate use of protocols and procedures, but demands for greater volumes of patients or faster through-put hinder efforts to ensure safety.56,63 Such conflicts are viewed largely as problems for front-line clinicians, but the solutions rest with senior leaders and policy makers, who need to consider the trade-offs between safety and productivity.64 Although it is possible to design safer systems, imbuing such systems with the flexibility to anticipate problems, the deference to expertise at the front lines, and the decentralized decision making necessary for greater resilience requires substantial financial investment and a tolerance for less efficient operations.

Some leading health care systems in the United States and elsewhere have begun to systematically review their work processes and procedures to increase reliability. This work builds on an analysis of the conditions that lead to failure and a careful redesign of practices and structures to overcome these weaknesses. At East Alabama Medical Center in Opelika, Alabama, for example, chemotherapy administration has been redesigned to reduce the risk at each step.65
The difficulty of sustaining attention to improvements in patient safety and quality and the fact that some organizations achieve high levels of safety and quality while others do not suggests that there are common underlying characteristics of successful organizations. Improvements in safety and quality seem to bloom in supportive environments, an observation that has drawn attention to the important role of organizational culture, and, more recently, patient safety culture. Safety and quality are properties of systems, not just the products of individual activity. Moreover, as we have just seen, safety and quality compete with other goals in the daily work life of clinicians and managers. Thus, changes that will yield sustainable improvements in safety and quality require shifts in underlying values, beliefs, and work patterns. Safer health care must be based on new patterns of work and a commitment to continual improvement of care. Reason outlined four interconnected aspects essential to a safety culture: reporting (organizational encouragement for staff to report their errors and near misses), justice (an atmosphere of trust in which people are encouraged, even rewarded, for providing essential safety-related information and are not punished for reporting such information), flexibility (transfer of control to those who are the task experts, regardless of the hierarchy of the organization), and learning (individuals’ and groups’ willingness and ability to understand and make changes based on the safety information that is provided through the system). Each of these attributes may be viewed as a continuum, and organizations need to consider what actions and initiatives will help to reshape values and work patterns to yield higher quality and safer care.

**Improved information and clinical decision support systems**

To achieve high-quality health care, clinicians must deliver care that is evidence-based and safe, but providing relevant information about the effectiveness and safety of specific interventions has been challenging. Relatively few hospitals in Canada and the United States have developed the sophisticated decision support systems needed to guide the selection of medications and other treatments for individual patients. Even where electronic health records have been linked to decision support systems, the systems are not always effective. Most of the literature on the success of such systems comes from a small number of leading-edge organizations that have developed their own “homegrown systems.” Elsewhere some studies have shown that physicians often override the recommendations of these decision support systems and that the resultant number of warnings leads to “alert fatigue” that can, in turn, create opportunities for adverse drug events. Implementation is difficult and requires strong leadership from the clinicians who help guide the design. Well-designed systems with strong clinical input and continual monitoring hold great promise, and a few Canadian hospitals have had success in this area. In most hospitals, however, that promise has yet to be fulfilled.

**More consistent delivery of evidence-based care**

Studies of hospital patients who experience cardiac arrest have revealed that these events are often preceded by warning signs that appear many hours beforehand. The creation of rapid response teams (also known as medical emergency teams), composed of intensive care physicians, nurses, and respiratory therapists, reduces the number of inpatients experiencing cardiac and respiratory arrest and the number of deaths from such events. Yet the number of hospitals that have instituted such teams has, until recently, been very small. Similarly, despite considerable evidence about the most effective care for patients who experience
acute myocardial infarction, many patients never receive this care or receive only certain elements and go on to experience another myocardial infarction.\textsuperscript{1,76}

In December 2004, the US-based Institute for Healthcare Improvement (IHI) announced the 100,000 Lives Campaign, an initiative to speed the implementation of rapid response teams and the application of evidence-based care for acute myocardial infarction and other critical situations, with the overall goals of improving care and reducing mortality rates. More than 3000 US hospitals signed up for one or more of the six components of the initiative: creation of rapid response teams, medication reconciliation on admission to hospital, prevention of surgical-site infections, prevention of bloodstream infections associated with central lines, improved care for acute myocardial infarction, and prevention of ventilator-associated pneumonia. (More details about the interventions are available from the IHI website [http://www.ihi.org].) At the end of the campaign, in June 2006, IHI staff estimated that more than 122 000 lives had been saved.

Building on the US efforts, in April 2005 a coalition of Canadian clinicians and patient safety experts launched a similar Canadian effort, called Safer Healthcare Now! The initial scope of the Canadian campaign focused on the same six interventions targeted in the IHI campaign (descriptions of the Canadian adaptations of the IHI interventions are available from the Safer Healthcare Now! campaign [http://www.saferhealthcarenow.ca]). More than 600 clinical teams in hospitals and regions across Canada have enrolled in Safer Healthcare Now! In both Canada and the United States, these efforts represent the largest health care quality improvement projects ever undertaken in terms of the numbers of teams and organizations participating. Aside from the results achieved in improving care, these initiatives have created partnerships and data collection efforts that will serve as the basis for further initiatives.

\textbf{Reporting and learning systems}

To improve care, we need to identify failures, examine the contributing factors, and redesign systems and processes of care to prevent further instances of these failures. Efforts to create effective reporting and learning environments are under way in many countries, and the World Health Organization\textsuperscript{77} has declared reporting and learning as one of its 10 action areas in patient safety. Still, in most Canadian health care organizations the reporting of adverse events is underdeveloped. In part, this stems from the fear of many clinicians and managers that such reports will expose them to legal actions and discipline. Although incident reporting systems are virtually universal, they are not well used in many organizations. Furthermore, although most provinces now protect the analyses of reports of adverse events from being used by plaintiffs in legal proceedings, many organizations and many clinicians continue to fear such use. However, such is not the case everywhere. Indeed, the Veterans Administration (VA) hospitals in the United States have been diligently reporting adverse events for several years and informing patients when these events occur. Data from one VA hospital that was an early adopter of these policies indicate that such open disclosure resulted in more claims but lower total payments to those injured relative to other VA hospitals.\textsuperscript{78} Still, even in VA hospitals, incident reports are filed for only a small portion of cases in which tort claims are filed\textsuperscript{79} (although some claims may be founded on events that do not require incident claims). A similar program at the University of Michigan Hospitals has shown that disclosure of adverse events to patients, compensation for injuries, and investigation of all adverse events with a view to seeking improvements together lead to fewer claims and lower litigation costs. Savings from this area are now being invested in improvements in patient safety reporting systems.\textsuperscript{80}

The health care reporting system maintained by the National Patient Safety Agency (NPSA) for the National Health Service (NHS) in the United Kingdom is probably the largest such system in the world. Between 2003 and 2005, it received more than 300 000 reports from a large number of organizations. The NPSA has developed innovative ways of analyzing and following up on these reports through the launch of the Patient Safety Observatory, which helps to quantify, characterize, and
prioritize patient safety issues identified through reporting, to provide support to the NHS in creating safer health care. In a recent discussion of this experience, Williams and Osborne suggested the need to deal explicitly with safety culture and information use concurrently with the development of reporting systems. Indeed, despite the efforts to create a national event reporting system in the United Kingdom, some have been critical of this effort. The challenges of encouraging and capturing reports about events and near misses have obscured the even more difficult task of translating reports into actions to reduce the likelihood of future events. Effective organizational learning requires enhanced structures and processes to extract learning from adverse events and near-miss experiences and to error-proof vulnerable systems.

The new CCHSA patient safety goals and required organizational practices represent an important lever for change in Canada, since they mandate health care organizations to perform at least one prospective analysis process (e.g., health care failure modes and effects analysis) per year, with the implementation of appropriate improvements. In addition, health care organizations must have processes in place to identify, report, assess, and manage sentinel events and near misses; must investigate the causes of events; and must have a process by which to record incidents.

More effective teamwork

Since much of health care relies on coordinating the work of caregivers with different knowledge and skills, and communicating between shifts and between organizations, excellent teamwork and communication are critical for safer health care. Other industries, such as aviation, have invested considerable resources in training crews to communicate effectively and to cross-monitor performance. Despite some initial efforts to develop teamwork training, to use checklists and debriefings to improve communication, and to invoke structured communications protocols such as SBAR (situation–background–assessment–recommendation) in interdisciplinary interactions, investments in team performance are still rudimentary in most health care organizations. Such teamwork training and tools will be essential for improving care. Even more challenging is the limited communication that occurs between health care settings. For example, the research on medication reconciliation clearly demonstrates that even basic knowledge about a patient’s status and treatment (such as the current medication list) is not communicated with much fidelity between caregivers in different organizations (or even between units within the same hospital).

Greater investment in team training and communications will be expensive, but such training, along with appropriate documentation and communications tools, is critical to efforts to create better, safer care.

Integration of patient safety and quality improvement into the education of health care professionals

The long-term success of patient safety and quality improvement efforts relies on widespread, in-depth education of all health care professionals. The health care professional of the future will need core skills and competencies in the provision of health care, the ability to form genuine partnerships with patients, the ability to work effectively in multidisciplinary teams, the ability to recognize the causes of unsafe practice and act upon them, the ability to assess quality of care and identify ways of improving it, and the ability to communicate, inform, and educate. Team-oriented education that emphasizes systems-level thinking, fosters collaboration, and builds awareness and respect for what all members of the patient care team do needs to become part of the formal (and informal) curriculum. Training for most health care professions currently offers limited education in patient safety and quality improvement; usually in a single-discipline environment. However, a group of US schools of medicine, nursing, pharmacy, and health administration (sponsored by the IHI) has initiated the Health Professions Interdisciplinary Collaborative to develop quality
improvement and patient safety education linked to clinical training.\textsuperscript{87} Future education in the health care professions must incorporate knowledge about patient safety and quality improvement methods and must inculcate in health care professionals a sense of responsibility to collaborate with other clinicians to improve the quality of patient care, promote a safer and more rewarding patient care environment, and minimize the risk of preventable adverse outcomes.\textsuperscript{88-92}

**Improvements in culture and leadership drive**

Improvements in technology, including information technology and safer medication systems, are vital, but the core changes that will enable safer, more reliable health care derive from the development of “generative” cultures that support awareness of risks, reporting of events and near misses, and innovation to improve care and reduce risks.\textsuperscript{93} Many have noted the critical contribution of organizational culture to facilitating improvement,\textsuperscript{94,95} but specific approaches to transforming cultures are rarely articulated. Moreover, while creating safer health care environments will require bedrock changes in underlying values, beliefs, and ways of working, the appetite for such changes seems limited in many organizations. Indeed, the failure to make much progress on patient safety in the United States in the 5 years after the 1999 release of the Institute of Medicine report *To Err is Human*\textsuperscript{25} has been attributed by Leape and Berwick to the difficulty of transforming entrenched organizational cultures. These authors have concluded that “building a culture of safety is proving to be an immense task and the barriers are formidable.”\textsuperscript{96}

There are many challenges to first understanding and then changing organizational culture to encourage reporting and learning for better and safer care. There continues to be a lack of consensus about how to study and accurately capture information on culture to evaluate and determine areas for improvement.\textsuperscript{97,98} Nonetheless, there has been a growing recognition of the need to analyze organizational culture to spur improvement. Efforts to analyze organizational culture in health care are likely to increase, now that CCHSA has mandated organizations to conduct regular assessments of safety culture.\textsuperscript{42}

Many organizations are also experimenting with strategies aimed at improving their culture of safety. For example, leadership walk rounds require senior leaders to visit patient units and have face to face discussions with front-line workers about safety issues and to follow up with reports and recommended changes in practice to address these concerns.\textsuperscript{99} These walk rounds have shown promising results in some organizations,\textsuperscript{100} yet leadership is only one piece of the complex culture puzzle that needs to be addressed. Carroll and Quijada\textsuperscript{101} have suggested that efforts to shift the culture should appeal to an organization’s current strengths and cultural values and should work to reframe and link these to the desired new values. These new behaviours will then be tested and, if shown to be effective, will become more deeply ingrained, promoting necessary changes.

The most effective way of changing culture is to demonstrate that new patterns of behaviour are possible and yield desirable results. A culture that supports improvement and safety must also value reports of poor quality and unsafe care; thus, efforts to create more effective reporting, to reward or thank (rather than punish) those who report, and to publicize widely the improvements that result from the analyses of events are all critical to changing culture. Those who are recognized and rewarded for participating on quality improvement teams, or for reporting incidents or near misses, are likely to do so again. Even so, such patterns of behaviour shift slowly, especially when old values and assumptions are deeply ingrained. The norm of individual responsibility for failure and the strong fear of being blamed for things that go wrong have long been a part of health care cultures. Changes in such beliefs are understandably slow and require work at several levels: at the patient care level, among senior managers, and in the policies and practices that determine liability and discipline.

Demonstrating that better, safer care is possible also...
helps to build commitment and change organizational culture. For many years, ventilator-associated pneumonia was assumed to be an unfortunate but unavoidable complication of mechanical ventilation of patients in the intensive care unit (ICU), contributing to the deaths of many patients and adding as much as $40,000 to the cost of a patient’s hospital stay. Quality improvement efforts in a growing number of hospitals have demonstrated that this condition can be greatly reduced, if not eliminated. Michigan’s Keystone Project, for example, supported participation by more than 100 ICUs in that state. Using quality improvement methods to implement evidence-based practices, more than 75% of participating ICUs eliminated ventilator-associated pneumonia for 5 months or more during the project. A Massachusetts hospital project that focused on implementing safer practices for medication reconciliation and reporting critical test results contributed to improved outcomes for 25 of the 50 medication reconciliation teams and 26 of the 40 critical results teams. Positive results in one project often lead to support for improvement in other areas.

The effort required to shift practice and change culture can happen only with strong leadership. Senior leaders need to set improvement goals, provide support to teams, and help to manage the changes needed to implement and sustain practices that lead to better and safer care. Safer and higher quality of care happens as a result of improvement at the front line, but successful improvement work also requires leadership. Leaders must support the skill development of clinical and improvement experts, provide resources to teams, and reward these teams for their efforts.

Conclusions

There is a growing recognition among professionals, policy makers, and the general public of the gap between the quality and safety of care that is possible and the care that is currently delivered in our health care organizations. Problems occur even in the most reputable organizations, and public opinion polls in many countries suggest a growing discomfort among patients and the public at large about the quality and safety of the care provided. This public pressure is helpful for “raising the bar” on expectations, and the growing number of performance reports and research studies that assess the quality of care are creating pressure on organizations and governments to improve results.

Most safety and quality problems do not result from poorly trained professionals, deficient motivation, or even limits on resources, such as staff and technology. Rather, the most critical problem facing the Canadian health care system (and those of other developed nations) is a failure to view health care as a complex system and to support improvements in the processes and structures of care delivery. Leadership is needed to enhance efforts to identify, adapt, and implement the practice changes and culture necessary to create better, safer care.

Health care will always be dependent on a complex mix of people, skills, technology, and treatments. New information technologies, such as computerized physician order entry and medication administration systems, hold great promise. Yet even with these advances, safe, high-quality health care depends largely on people: effective communication and coordination between caregivers, between patient care units, and between organizations are essential. Thus, improvements must encompass more than technology; leaders and caregivers need to understand the systems and processes of care delivery and the methods that can be used to improve those systems. Too often, we have assumed that well-educated health care workers can provide excellent care without considering the impact of placing those workers in environments that undermine their own best efforts.

The aspects of improvement that present the greatest challenges are building the organizational capacity to improve and helping leaders to understand their roles in facilitating this improvement, both at the front line and at senior leadership levels. Safer, better care is possible, but the leadership and investments necessary to turn this goal into reality are only beginning to emerge in Canadian health care. Increased reporting of current levels of performance, ongoing support for
improvements through organizational participation in safety and quality collaborative and other leading-edge initiatives, and enhanced education of clinicians, managers, and senior leaders are all critical to building the capacity for improvements into Canadian health care.

References


**Suggested reading**

**Dekker SWA. The field guide to understanding human error.** Aldershot (UK): Ashgate Publishing; 2006.

A clearly written, nontechnical guide to the “new view” of human error and the need to understand and investigate systems rather than blame individuals. This book helps readers to understand the problems of “hindsight bias” and offers practical advice on learning from failure.


Vincent’s book provides an excellent guide to current thinking and research on patient safety. He highlights the critical issues and summarizes research on patient safety culture, the use of information technology, and the design of safer care, among other issues.


The editors of this book provide a framework on the nature of high-reliability organizations and describe the components of a safety-oriented environment, including effective teamwork, reliable care processes, patient involvement, and communication about episodes of harm to patients.


Reason’s view of organizational vulnerability to failure and his “Swiss cheese” model of defenses are fundamental. This book uses many examples from a variety of industries to illustrate organizational and human contributions to error. He assesses the strengths and weaknesses of regulatory approaches and the critical nature of safety-culture responses to minimizing organizational accidents.