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Analysis in Brief
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Patient Safety in Ontario Acute Care Hospitals: A Snapshot of Hospital-Acquired Infection Control Practices

Introduction

Most patients admitted to an acute care hospital do not expect to succumb to an infection acquired while in hospital, but it does happen. In fact, reducing the rate of hospital-acquired infections has become one of the top patient safety priorities for health care in Canada. These infections are among the most common types of reported adverse events in Canadian acute care facilities and are a major cause of morbidity and mortality.[1–3] A variety of policies and practices can help provide safer care to patients and reduce the potentially adverse outcomes for patients, as well as the costs, associated with these infections.

Patient safety is a fundamental component of quality health care. Although this seems relatively straightforward, implementing best practices in patient safety can be a challenging undertaking. Simple and clear processes for what things should be done in hospitals, and how, can help staff navigate a complex system and achieve the safest care possible. Provincial and federal governments, along with organizations such as the Canadian Patient Safety Institute (CPSI), are committed to improved patient safety and have focused on targeted interventions to enhance the quality and safety of care provided.

The simple practice of handwashing and the implementation of a hospital infection surveillance system are two key patient safety initiatives that guide hospitals and staff in providing safer care to patients and preventing hospital-acquired infections. Monitoring these and other patient safety practices is essential to ensuring that policies have their intended results of safer patient care. This enables hospitals to track successes and progress with implementation efforts and to identify areas for improvement. As health care is a system of competing and often limited resources, monitoring practices can also ensure that resources are allocated appropriately. Accordingly, it is important to share experiences on best practices so that patient safety can be improved across the country and within each hospital.

Purpose

This Analysis in Brief provides updated information on patient safety policies and practices related to the prevention of infections in Ontario acute care hospitals. The information will outline some of the current standards for infection control practices set forth by leading organizations in patient safety and, most importantly, will show how the policies and practices in Ontario acute care facilities compare to best practices. By presenting the results obtained from the Patient Safety section of the System Integration and Change (SIC) survey, this analysis will highlight progress made and identify areas that may require further improvement.

Methods: What Is the SIC Survey?

The SIC survey is an online survey completed by hospital management staff as part of the *Hospital Report: Acute Care* project, a joint initiative of the Ontario Hospital Association and the Government of Ontario. (For more information on the development of the SIC survey or the Ontario *Hospital Report* project, visit www.hospitalreport.ca). The 2008 SIC survey was completed by 103 of 123 acute care hospitals in Ontario (84% participation rate). Results comparing data from 2007 to 2008 are limited to hospitals that participated in the SIC survey in both years (n = 97). Responses to the SIC survey were not independently validated; however, managers responsible for the Patient Safety and Management of Human Resources sections of the survey were asked to disseminate the survey questions to the person in the organization who possessed the most knowledge about these topics and could confirm that the responses were accurate and reflected the current operating circumstances of the hospital.

What Are Hospital-Acquired Infections (Nosocomial Infections)?

A hospital-acquired, or nosocomial, infection is one that was contracted in the hospital (that is, it was not present or incubating at the time of hospital admission).[4] Hospital patients with weakened immune systems or chronic illnesses are particularly susceptible to these infections.[5–7] Several nosocomial infections, commonly referred to as "hospital superbugs,"[8] are currently under surveillance by the Canadian Nosocomial Infection Surveillance Program, including the following:

- Methicillin-resistant *Staphylococcus aureus* (MRSA) causes skin and soft tissue infections. It is resistant to methicillin, the antibiotic commonly used to treat infections of *Staphylococcus aureus*, which is a bacterium commonly found on the skin and in noses of healthy people.[5]
- Vancomycin-resistant enterococci (VRE) is an antibiotic-resistant strain of enterococci, which are bacteria normally found within the bowel and female genital tract.[6] VRE can lead to infection of the urinary tract, blood stream or wounds and are resistant to treatment with the antibiotic vancomycin.[6]

- *Clostridium difficile* (*C. difficile*) bacteria, found in feces, can cause symptoms ranging from diarrhea to more serious intestinal conditions, such as colitis (inflammation of the intestine). Diseases associated with *C. difficile* usually occur during or after the use of antibiotics, when the level of "good" bacteria in the intestine is reduced, allowing the growth of *C. difficile.*[9]

Why Are Nosocomial Infections an Important Patient Safety Concern?

Approximately 1 in 10 adults and 1 in 12 children contract a nosocomial infection while in an acute care hospital.[10, 11] Nosocomial infections are an important patient safety concern because of their risk to patients and their economic impact on the Canadian health care system. Nosocomial infections, such as *C. difficile*–associated diarrhea and MRSA, are associated with considerable illness, hospital readmissions and deaths.[3, 12]

The costs associated with MRSA in Canadian hospitals have been estimated at between $42 million and $59 million annually.[12] A large national surveillance project found that, on average, a hospital is likely to have 10 readmissions each year, at a total estimated hospital cost of $128,200, from patients developing nosocomial *C. difficile*–associated diarrhea after discharge.[3] Moreover, patients who develop nosocomial infections tend to stay longer in hospital. Plowman and colleagues found that adult patients contracting a nosocomial infection remained in hospital 2.5 times longer than uninfected patients.[13]

How Are Nosocomial Infections Transmitted?

Nosocomial infections such as MRSA, VRE and *C. difficile* are spread by skin-to-skin contact or contact with contaminated items or surfaces.[5–7] For example, if a health care worker touches an infected patient or a contaminated surface and then touches another patient without properly cleaning his or her hands, the second patient may become infected.[5] Health care workers can spread the bacteria to patients and other surfaces if their hands are contaminated.[7, 9] Consequently, good hand hygiene, such as frequent washing with soap and water, is necessary for preventing MRSA, VRE and *C. difficile*–associated disease, as contaminated hands and surfaces play an important role in their transmission.[5, 6, 9]

Preventing Nosocomial Infections

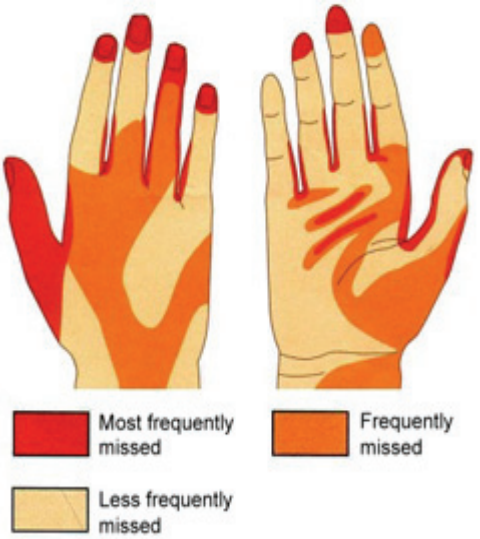
While prolonged hospitalization and immunosuppression may contribute to the risk that an individual will contract an infection, research shows that implementing and adhering to infection control practices can reduce such risks and significantly decrease rates of nosocomial infections.[14–17] Such practices include hand hygiene policies and compliance, screening and surveillance of infections and isolation and decontamination of infected patients and health care workers.[14, 16, 17]

Hand Hygiene

What Is Hand Hygiene?

The term "hand hygiene" refers to "handwashing, antiseptic handwash, antiseptic hand rub, or surgical hand antisepsis."[18] Proper handwashing has been recognized as an important step in preventing the spread of infection for more than 150 years.[19–21] Over time, new concerns in infection control have emerged, such as antibiotic-resistant organisms, but the fundamental principles of hand hygiene remain key to the prevention of infections.[19] In fact, proper handwashing is considered the single most important practice for preventing the transmission of hospital-acquired infections.[14, 22, 23] Studies have shown that infection rates associated with health care may be reduced by 15% to 50% with hand hygiene and other infection control programs.[21, 24]

Areas Missed During Handwashing[*, †]



* L. J. Taylor, "An Evaluation of Handwashing Techniques—1," *Nursing Times* 74, 2 (1978): pp. 54–55.

† M. Greger, *Washing Your Hands of the Flu* (Washington, D.C.: 2006), [online], cited September 8, 2008, from <http://www.birdflubook.com/a.php?id=95>. Reproduced with permission of the author.

When Should Hand Hygiene Be Performed?[23]

- Before and after patient contact
- Before and after contact with patient's environment
- Before putting on and after removing gloves
- Before performing invasive procedures
- After care involving a patient's body fluids
- Before handling food
- After performing personal body functions
- Whenever a health care provider is in doubt about the necessity to do so

Additional Precautions for Effective Hand Hygiene[23]

- Removal of jewellery before patient contact
- Ensuring skin is intact and careful attention to skin care
- No artificial nails or nail enhancements

Compliance With Hand Hygiene

Despite the obvious link between hand hygiene practices and hospital-acquired infections, research shows poor handwashing compliance, with between 30% and 60% of hospital personnel following procedures properly.[25] A number of factors may contribute to this poor level of adherence to hygiene standards. They include skin irritation from hand hygiene products, understaffing or overcrowding within the hospital, performing activities with a high risk of cross-contamination (for example, performing invasive procedures or care involving bodily fluids) and working in intensive care.[25, 26]

Strategies to Improve Hand Hygiene Compliance

To support hospitals implementing proper hand hygiene practices and to improve compliance, the *Stop! Clean Your Hands* campaign was launched in June 2007 by the CPSI, the Community and Hospital Infection Control Association, Accreditation Canada (formerly the Canadian Council on Health Services Accreditation) and the Public Health Agency of Canada.[27] This national hand hygiene campaign supports and integrates existing local, regional and provincial hand hygiene initiatives. In Ontario, the Ministry of Health and Long Term Care (MOHLTC) unveiled the *Just Clean Your Hands* program in March 2008 (www.justcleanyourhands.ca). As part of this program, implementation guides as well as other tools are provided to health care providers and managers.[28]

Monitoring Hand Hygiene

Successful handwashing programs include regularly monitoring (that is, auditing) these activities to ensure practices are being followed correctly, to educate and to evaluate how the guidelines are working to ensure a safe system of care.[22] Some examples of hand hygiene auditing include observing staff to evaluate adherence, tracking use of hand hygiene products and communicating progress back to staff.[18, 28]

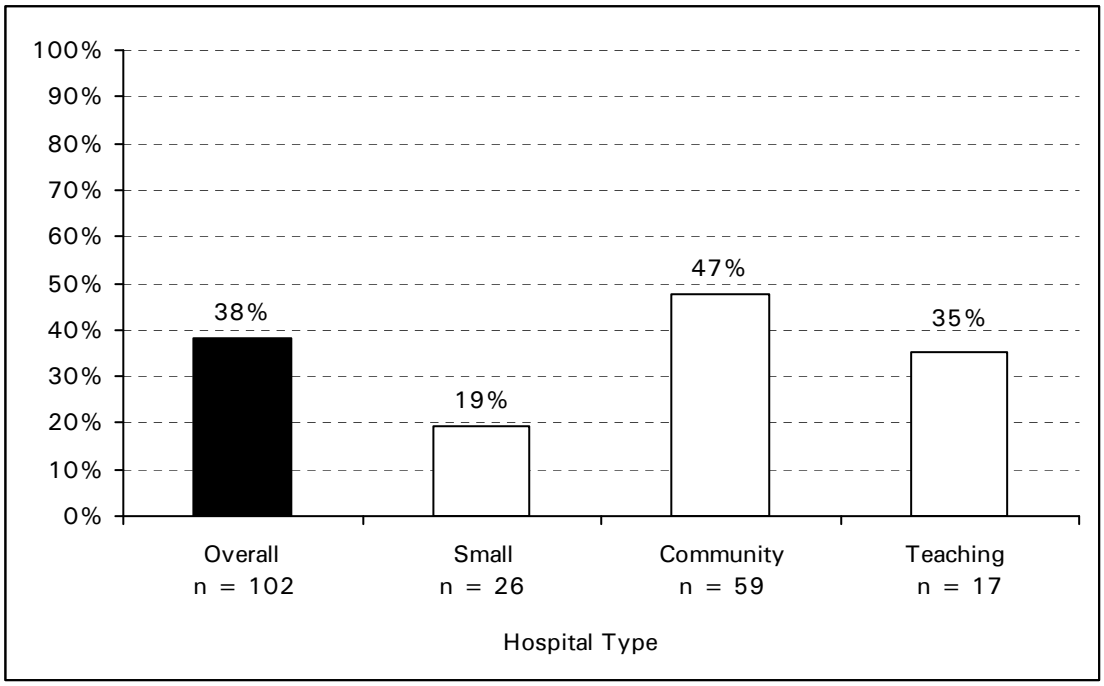
Hand Hygiene Auditing Involves:[18]

- Monitoring and documenting adherence to hand hygiene policies by personnel
- Providing feedback to personnel regarding performance
- Monitoring volume of alcohol-based hand rub/detergent used for handwashing or hand antisepsis
- Increased monitoring when infection outbreaks occur

Accreditation Canada recently promoted the adoption of formal auditing processes for hand hygiene in all Canadian hospitals. As part of the current accreditation process, hospitals are required to monitor infection rates regularly and participate in hand hygiene initiatives. Starting in January 2009, hospitals seeking accreditation will be required to implement auditing procedures for hand hygiene compliance; share the audit results with staff, service providers and volunteers; and use these results to improve practices.[29]

According to the 2008 SIC survey, almost all participating Ontario hospitals (99%) reported having a policy on hand hygiene. Ninety-one percent of these hospitals had a policy that included standards for jewellery and fingernails. Monitoring compliance with these policies through a fully implemented formal hand hygiene auditing mechanism was reported by almost two in five hospitals (38%), with the highest percentage among community hospitals (Figure 1). Overall, this reflects an improvement from the previous year (23% in 2007). Of the respondents reporting no fully implemented formal mechanism for hand hygiene audits, more than half (59%) reported that they will develop one in 2008 and implement it fully in 2009.

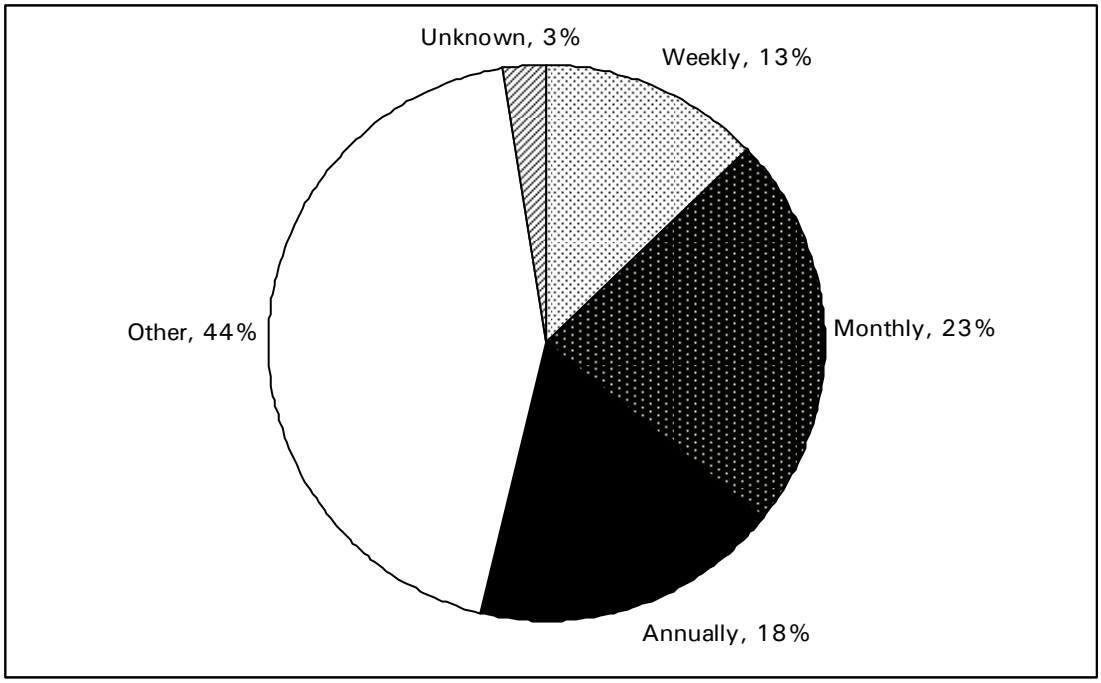
Figure 1 Percentage of Hospitals With a Fully Implemented Formal Mechanism for Auditing Hand Hygiene Practices, Among Hospitals With a Hand Hygiene Policy, by Hospital Type



Source
System Integration and Change Survey, 2008.

Among hospitals that regularly monitor hand hygiene processes through a fully implemented formal hand hygiene audit, the frequency of hand hygiene monitoring varied markedly (Figure 2). This may be because both the Ontario and national hand hygiene campaigns are relatively new, and because hospitals are at different stages of implementation. Access to resources among hospitals may also affect their ability to dedicate personnel to hand hygiene audits and regular monitoring.

Figure 2 Frequency of Hand Hygiene Monitoring Among Hospitals With a Fully Implemented Formal Mechanism for Hand Hygiene Auditing



Source
System Integration and Change Survey, 2008 (n = 39).

Hospital Infection Control Programs

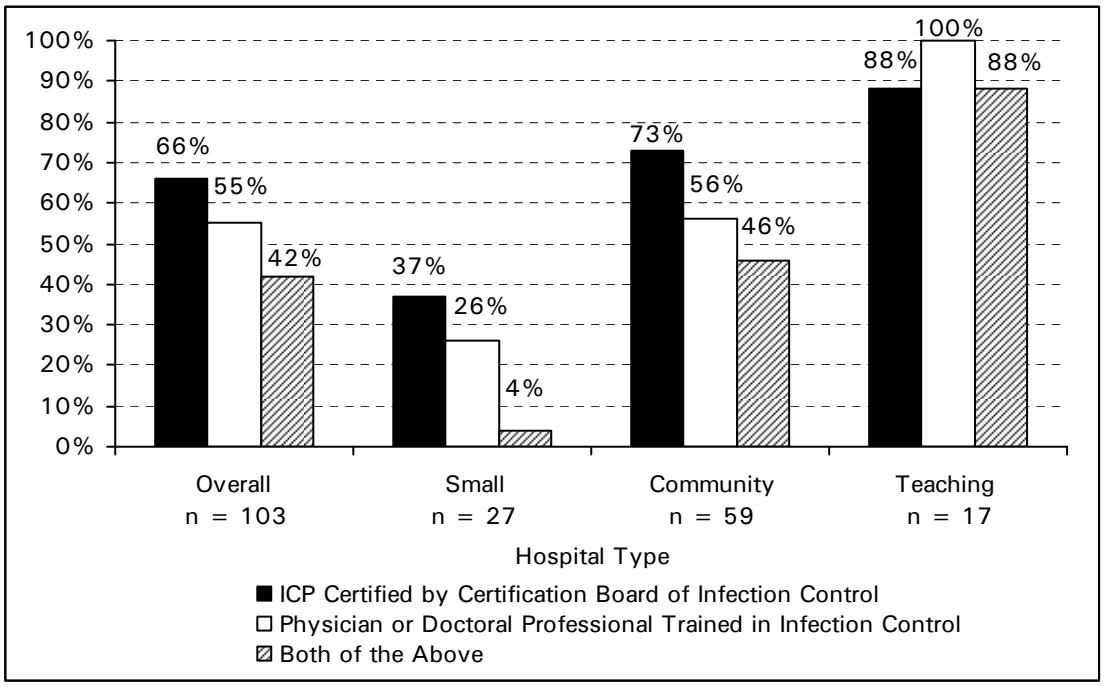
Infection control is an important part of a hospital's patient safety program. An infection control practitioner (ICP) and a physician trained in infection control are key requirements for a hospital's infection control program.[30–32] ICPs are typically health care professionals with infection prevention and control training and expertise. They work with the entire organization to prevent health care–acquired infections by educating staff, planning and implementing infection control practices and evaluating existing health care practices.[33] The MOHLTC recently announced funding for 136 more ICPs for hospitals across Ontario and developed an extensive education program for infection prevention for front-line health care workers and infection control professionals in acute care facilities.[33]

Required Organizational Practices by Accreditation Canada for Infection Control[29]

- Adhere to international, federal and provincial and territorial infection control guidelines
- Deliver education and training on hand hygiene to staff, service providers and volunteers
- Track infection rates, analyze the information to identify clusters, outbreaks and trends, and share this information throughout the organization
- Monitor processes for reprocessing equipment and make improvements as appropriate
- Evaluate compliance with accepted hand hygiene practices (2009)

In 2008, nearly all hospitals (97%) participating in the SIC survey reported that the infection control program at their hospital included an ICP; but only two out of three hospitals (66%) reported that their ICP was certified by the Certification Board of Infection Control. More than half of the hospitals (55%) reported that their infection control program included a physician or doctoral professional trained in infection control. Successful infection control programs emphasize the importance of having both a certified ICP and a physician/doctoral professional.[30–32] While 80% of hospitals reported having either a certified ICP or physician/doctoral professional as part of their infection control program, a smaller percentage reported having both (42%). These results varied by hospital type: all teaching hospitals reported that their infection control program included a physician or doctoral professional trained in infection control, compared to 56% of community hospitals and 26% of small hospitals. Also, a greater proportion of teaching hospitals reported having a certified ICP as part of their infection control program than community and small hospitals (Figure 3).

Figure 3 Percentage of Hospitals Reporting That Their Infection Control Program Includes a Certified ICP, a Physician or Doctoral Professional Trained in Infection Control, or Both, by Hospital Type



Source
System Integration and Change Survey, 2008.

Monitoring, Surveillance and Reporting

Monitoring and tracking nosocomial infections, in conjunction with prevention activities, acts to reduce the number of infections acquired in hospital.[14, 31]

Nearly all hospitals (98%) participating in the 2008 SIC survey reported that they routinely monitor the incidence of nosocomial infections. Surveillance can be hospital-wide (in all care areas) or targeted to specific units (such as intensive care) or for specific infections that are a priority for the hospital. In 2008, hospital-wide surveillance was reported as the most commonly used approach of surveillance to routinely track and monitor nosocomial infections (74%), whereas one-quarter (26%) of hospitals reported that targeted surveillance was their most commonly used method. These results varied by hospital type: most small (84%) and community hospitals (78%) reported hospital-wide surveillance as their most common surveillance method, while teaching hospitals reported an even split between hospital-wide (47%) and targeted surveillance (53%) (Figure 4).

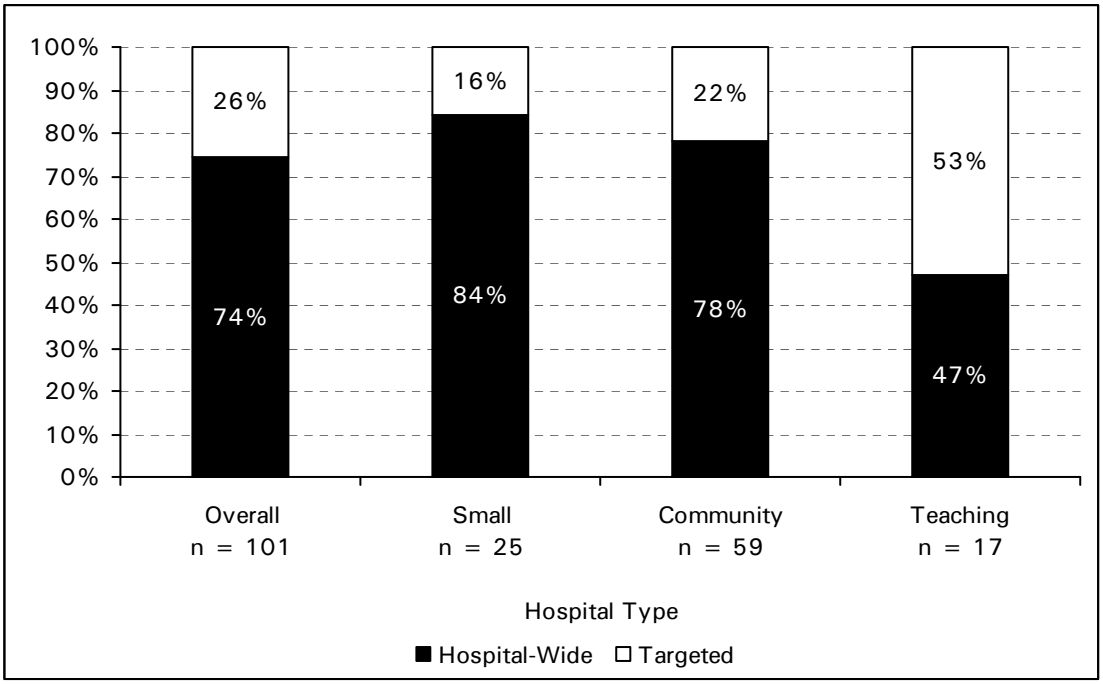
Examples of Infection Surveillance Activities[17]

- Statistics collected for infections by unit, ward or service
- Calculation of surgical site infection rates
- Infection control staff conduct chart reviews of hospitalized and discharged patients to identify new cases of nosocomial infections

Examples of Infection Control Activities[17]

- Educating hospital staff on current infection control practices
- Communicating hospital's infection data to patient care staff
- Implementing policies for isolation precautions for patients with infections

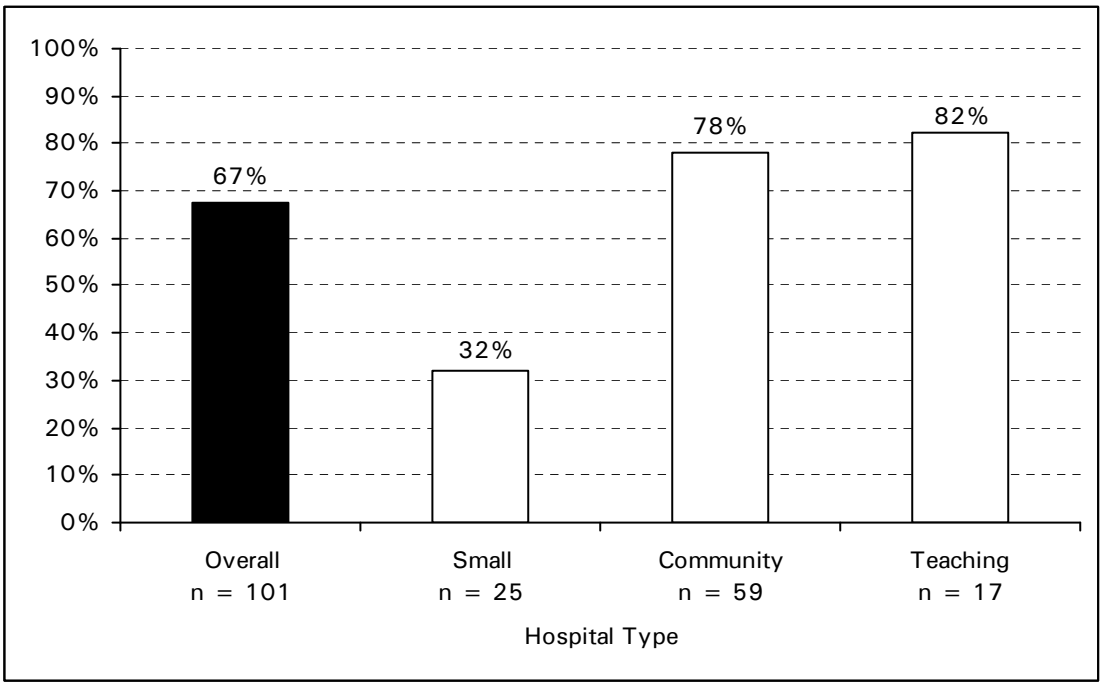
Figure 4 Percentage of Hospitals Using Hospital-Wide or Targeted Surveillance to Routinely Monitor the Incidence of Nosocomial Infections, Among Hospitals With a Surveillance Method, by Surveillance Type and Hospital Type



Source
System Integration and Change Survey, 2008.

Of hospitals with a surveillance method, 67% reported daily surveillance. The majority of community and teaching hospitals reported that they had a daily surveillance method for nosocomial infections, compared to one-third of small hospitals (Figure 5).

Figure 5 Percentage of Hospitals With a Surveillance Method Reporting Daily Surveillance, by Hospital Type



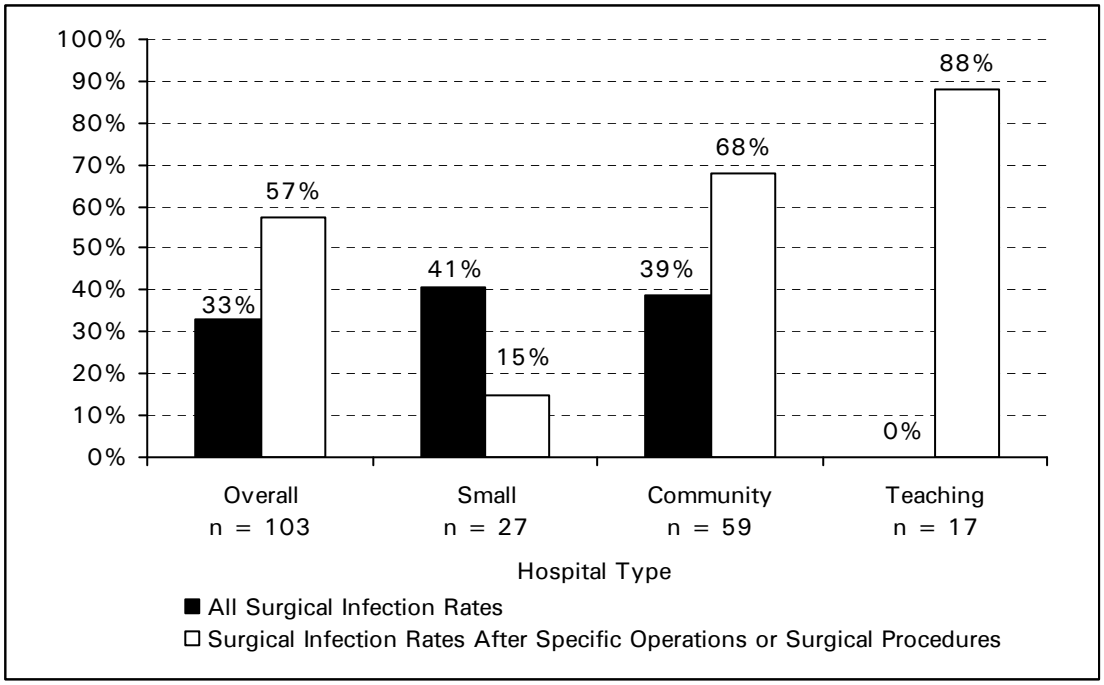
Source
System Integration and Change Survey, 2008.

Almost all hospitals with a surveillance method indicated that they report the incidence of superbug infections within their organization. In 2008, 96% of hospitals reported for MRSA, 95% for VRE and 95% for *C. Difficile*.[i] This will increase with the MOHLTC's current patient safety reporting requirements.[33]

Another important component of infection monitoring and reporting relates to infections that occur after surgery. Of hospitals that participated in the 2008 SIC survey, about one-third indicated that they report on all surgical infection rates. The proportion was higher in small hospitals than in community and teaching hospitals. Conversely, the proportion of teaching and community hospitals that report on surgical infection rates after specific operations or surgical procedures is greater than in small hospitals (Figure 6).[i]

i. The 2008 SIC survey results do not specify if reporting of infections is for internal or public reporting.

Figure 6 Percentage of Hospitals Reporting on All Surgical Infection Rates and on Infection Rates After Specific Surgical Procedures, by Hospital Type



Source
System Integration and Change Survey, 2008.

Reusing Single Use Medical Devices

The reuse of single use medical devices after sterilization has been debated for many years. In some cases, it is seen as a safe alternative to discarding the medical device, providing an opportunity to reduce costs and environmental waste. However, there is some concern about the risks this practice may pose to patient health.

Provincial and territorial ministries of health and hospital boards are responsible for developing single use policies or guidelines.[34] There is considerable variation among these provincial policies and guidelines. For example, Manitoba has not permitted the reuse of critical contact

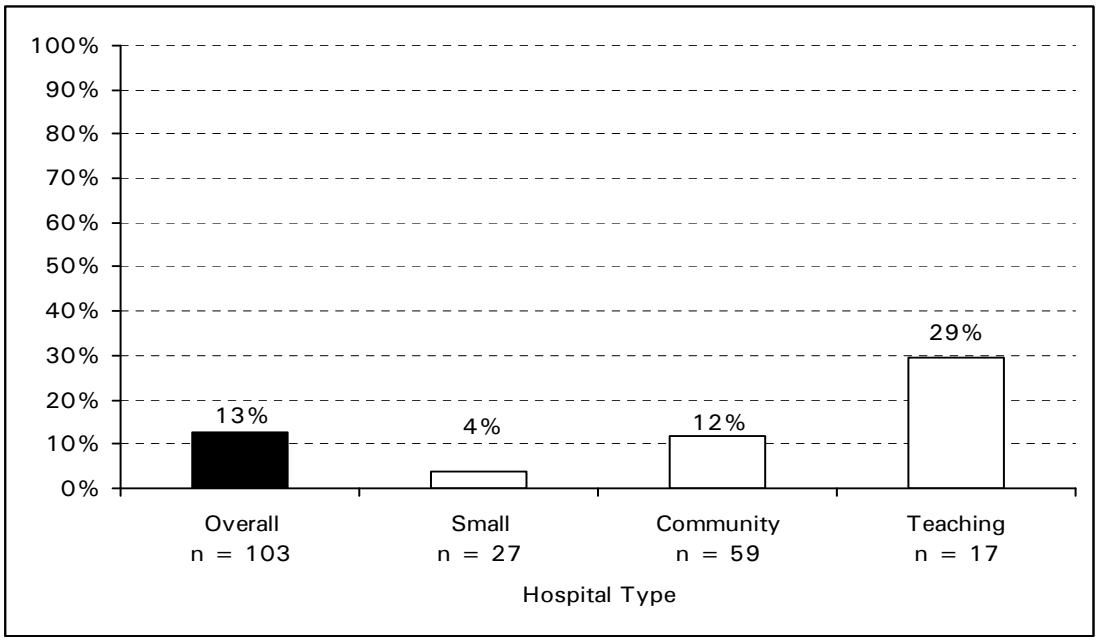
Single Use Medical Devices

- Medical devices labelled by the manufacturer as single use and meant to be discarded after one use[34]
- Some examples include masks, ventilator circuits and biopsy forceps[38]
- Classified by the type of device and contact they have with the patient's body:[37]
  - **Critical**—penetrate skin, enter sterile body cavity, have contact with blood and/or body fluids
  - **Semi-critical**—make contact with non-intact skin or mucous membranes but do not penetrate
  - **Non-critical**—intact skin contact or no contact with patient

single use devices by its hospitals since 1999, and the Northwest Territories' *Hospital and Health Care Facility Standards Regulations* state that "a disposable device intended to be used on a patient during a single procedure shall not be used on a patient for more than one procedure and shall not be used on another patient."[34, 35] In British Columbia and Ontario, reuse is accepted for critical and semi-critical single use medical equipment that is reprocessed (that is, sterilized) by a licensed operator.[36, 37] In Ontario, it is the responsibility of the hospital to ensure that a reasonable standard of care is followed and that there is no increased risk to the patient related to reusing single use devices.[37]

In 2008, the majority of Ontario hospitals (87%) participating in the SIC survey reported that their organization did not permit reusing single use medical devices.[ii] Teaching hospitals were the most likely to permit the reuse of single use medical devices with sterilization (29%), followed by community hospitals (12%) and small hospitals (4%) (Figure 7). Similar results were also found in a Canadian national survey by Polisena and colleagues, where larger and academic acute care hospitals were more likely to reprocess single use devices than smaller hospitals.[38] The potential cost savings associated with reprocessing may explain the variation in reprocessing use.[39]

Figure 7 Percentage of Hospitals That Report Permitting Reuse of Single Use Medical Devices With Sterilization, by Hospital Type



Source
System Integration and Change Survey, 2008.

ii. The 2008 SIC survey did not specify whether the reuse of single use medical devices was permitted among critical, semi-critical or non-critical devices.

Patient Safety Culture

It is important for organizations to have policies and processes in place, such as hand hygiene auditing and infection surveillance, that promote patient safety. But to ensure that these initiatives are successful, a strong organizational culture that fosters patient safety is necessary. A strong patient safety culture is one in which everyone—including management, front-line providers, housekeeping services and others—sees patient safety as their responsibility.

In other words, organizational culture implies a shared value system and a collective sense of how things should be done within an organization.[40] Patient safety culture places the safety of patients at the core of this collective value system.

The importance of culture has been formally recognized by many leading Canadian health organizations. In 2005, Accreditation Canada included the promotion of a positive culture of safety among its required organizational practices—practices that organizations must have in place to enhance patient safety and minimize risk.[29] Nearly all Ontario acute care hospitals participating in the 2008 SIC survey recognized the importance of this priority and reported that patient safety was adopted as a written strategic priority or goal within their organization (Table 1).

Some of the key strategies that experts suggest for supporting a patient safety culture include creating an open environment that encourages reporting of all adverse events and near misses; providing feedback on safety issues to all front-line staff; building a strong sense of respect within the organization, where teamwork and communication are encouraged and rewarded; and maintaining manageable and flexible staff workloads.[41–44] These strategies were suggested as a result of recent evidence linking serious adverse events with breakdowns in communication, lack of information sharing and worker fatigue and stress.[45, 46]

Ontario hospitals are implementing various initiatives to enhance a strong organizational and patient safety culture (Table 1). More than 90% of hospitals reported having a hospital-wide non-punitive reporting policy, and 85% have a hospital-wide reporting system to collect information on near misses or adverse events. A smaller proportion of hospitals reported other strategies, such as relaying information on high-risk situations at staff shift changes (47%) and providing further training to physicians to identify and manage adverse events (36%). Such strategies encourage the reporting of actual or potential patient safety issues in order to learn from them, identify areas for further improvement and ultimately provide the safest health care possible.

Table 1 Percentage of Hospitals Implementing Select Patient Safety Strategies

Patient Safety Strategy	Percentage
Patient safety is a written strategic priority or goal	96%
Hospital-wide non-punitive reporting policy	94%
Hospital-wide reporting system to collect information on near misses or adverse events	85%
Hospital-wide adverse event team/patient safety steering committee	67%
Hospital-wide relaying of information about high-risk situations (such as patients having the same last name or trials of new equipment) at staff shift changes	47%
Majority of physician staff with administrative roles participating in training to identify and manage adverse events	36%

Source
System Integration and Change Survey, 2008 (n = 103).

What We Know

The results presented in this Analysis in Brief reveal that Ontario acute care hospitals have demonstrated initiative and commitment in the areas of hand hygiene, infection control and organizational culture. Key findings from the 2008 SIC survey include the following:

- Almost all participating Ontario acute care hospitals (99%) have a policy on hand hygiene. Monitoring compliance with these policies through hand hygiene audits is important to assess how well these policies are working. In 2008, 38% of Ontario acute care hospitals reported having a fully implemented formal mechanism for auditing hand hygiene, and more than half of the remaining hospitals planned full implementation in 2009.
- Nearly all Ontario acute care hospitals (98%) reported that they routinely monitor the incidence of nosocomial infections through surveillance. Approximately three out of four hospitals reported that that their most commonly used method of surveillance was hospital-wide surveillance; one-quarter of hospitals (26%) used targeted surveillance most commonly.
- In Ontario, 97% of acute care hospitals reported having an infection control practitioner (ICP) as part of their infection control program, and 66% of hospitals reported that their ICP was certified by the Certification Board of Infection Control. Fewer hospitals (55%) had a physician or doctoral professional trained in infection control in their program.

- In Ontario, the reuse of critical and semi-critical single use medical equipment/ devices is accepted when reprocessing (sterilization) is done by a licensed operator; however, the majority of Ontario acute care hospitals (87%) do not permit the reuse of single use devices.
- Patient safety was reported as a written strategic priority or goal among 96% of Ontario acute care hospitals.
- The great majority of hospitals have a hospital-wide non-punitive reporting policy (94%) or a reporting system for collecting adverse events and near misses (85%), but less than half (47%) report that information on high-risk situations is relayed at staff shift changes.
- The implementation of hand hygiene, infection control and surveillance practices and policies varies by hospital type (teaching, community and small hospitals).

What We Don't Know

Many questions remain about the status of patient safety policies and practices in hospitals in Ontario and across Canada and about their effectiveness in improving patient safety. Some of the key questions are:

- How does the implementation of patient safety policies and practices in Ontario compare to those in other Canadian hospitals?
- Which policies and practices are most effective in improving patient safety and preventing adverse events?
- How well are hand hygiene policies being followed, and have these policies and hand hygiene audit programs helped to reduce the number of hospital-acquired infections?
- What is the overall economic burden associated with hospital-acquired infections?
- What are the success factors driving implementation and improvements in patient safety with these initiatives?
- How can health care decision-makers increase the uptake of patient safety strategies among hospitals and hospital staff?

Conclusion

Hospital-acquired infections are an important patient safety concern. Monitoring and reporting infection control practices to determine what processes are implemented and how is key to identifying areas for quality improvement, promoting safe care in hospitals and informing health care decision-makers where to target infection control implementation efforts. Better information on what works to ensure that these processes are implemented, and how they can reduce adverse events, will provide further direction for the development of effective infection control policies and procedures.

About CIHI

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