

The Canadian Journal of INFECTION CONTROL

Revue canadienne de PRÉVENTION DES INFECTIONS

The official journal of the Community and Hospital Infection Control Association – Canada • Association pour la prévention des infections à l'hôpital et dans la communauté – Canada

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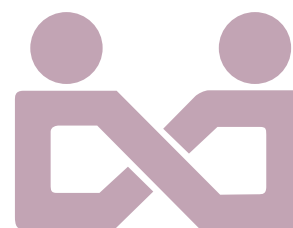
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The ICP as a hub of the organization: mapping your role

The role of the infection control professional (ICP) in settings and facilities along the continuum of care has grown and expanded over the years. There are few roles in any healthcare setting that are so broad in their reach and scope.

The ICP and the Infection Prevention and Control (IPC) department interact and network with virtually every department and service within the healthcare setting or agency, as well as with many outside groups and organizations. In addition, the IPC department and/or ICP may also participate on or lead various committees or teams both within and outside the facility or agency. This may include: patient/resident/client care departments, workplaces, care and support committees or teams, or various facility or agency services and support departments. It may also include various outside groups and organizations such as public health, regional networks and professional associations such as CHICA chapters.

In the busy day-to-day work of the ICP, it may be easy to lose sight of the breadth and scope of this role.

Network maps are a great way to depict these many interactions and networks and illustrate the reach of the ICP role in their organization. The map can also be used to illustrate the reach of the IPC department if there is more than one ICP in the IPC department. The network maps can also identify gaps or needed connections.


The ICP (and the IPC department) can begin mapping their many networks and connections by drawing a small circle labelled "ICP" in the centre of a blank sheet of paper or flip chart paper. The ICP and/or department members then begin adding a series of smaller circles around this circle, labelling them for each group, department, position or service area with whom they interact on a daily basis. Circle sizes can be varied depending on the extent of the interaction (daily, weekly, monthly, more than monthly or rarely). Committees or teams and outside groups or organizations can also be included as circles and drawn in.

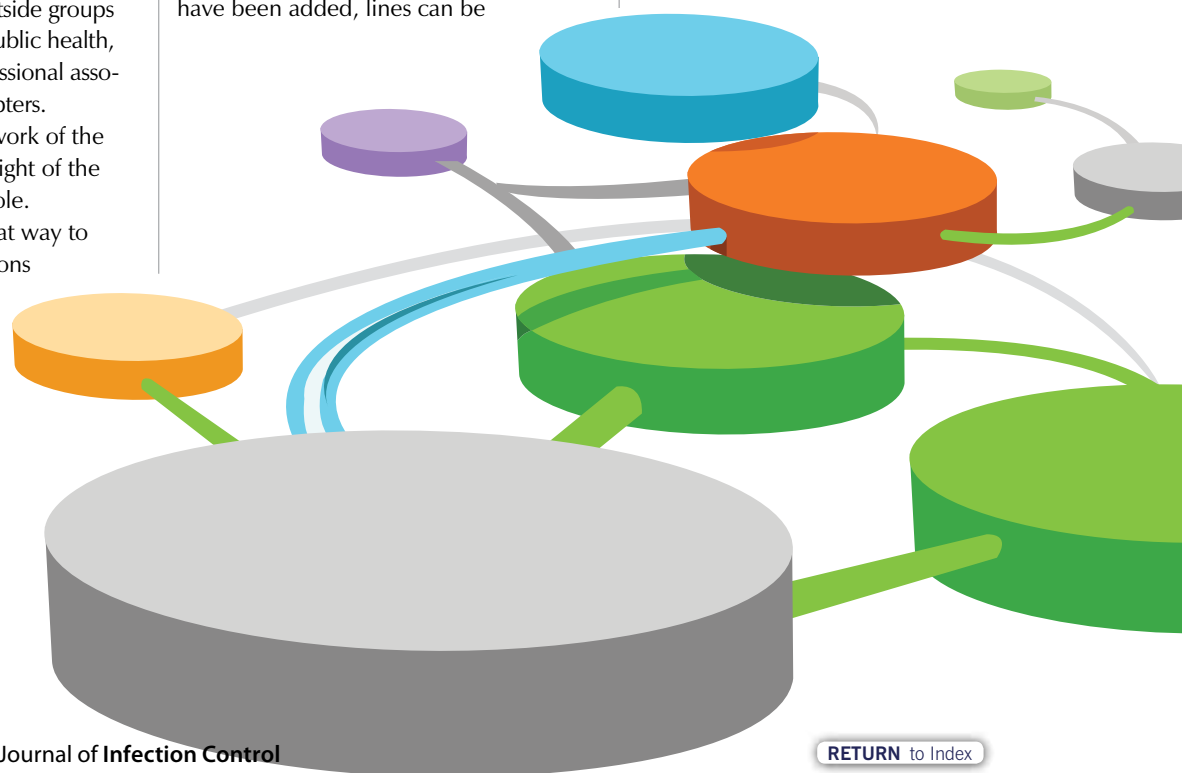
A legend with the circles' colours and their meanings can be developed after the circles are drawn and labelled to further illustrate the network map.

Once the various labelled circles have been added, lines can be

drawn to connect the ICP to the various circles. Solid lines can be used for direct interactions and dotted lines for indirect interactions or connections. The thickness of the lines can be varied to indicate intensity or frequency of the connection or interactions.

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SHARING EXPERTISE

Barriers and bridges to infection prevention and control: results of a case study of a Canadian surgical unit

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ABSTRACT

Infection prevention and control (IP&C) of multidrug-resistant organisms is an increasing challenge in hospitals worldwide.

Objective

In this study, we attempt to identify the barriers and bridges for IP&C on a surgical unit at a large urban Canadian hospital.

Methods

A socio-ecological perspective on health systems was adapted from work in ecological restoration and healthcare to inform the use of multiple participatory research methods including unit observations (n=3), review of relevant policies and procedures, four practitioner-led photo walkabouts of the unit (n=6), three photo elicitation focus groups with practitioners (n=13), and the review of related IP&C data.

Results

The findings indicate that despite active management support for IP&C, many challenges exist in the hospital environment. Key barriers included high patient occupancy rate, hospital design, the use of workarounds to adapt to these challenges, several common problematic practices, and the culture of the team or organization.

Conclusions

These findings confirm many challenges for IP&C that have been outlined in other literature for contemporary acute care environments. For example, to reduce the use of problematic workarounds, staff must be engaged in health system and organizational decision-making processes that affect their workload, workflow, and daily practices on the unit. Yet, the existence of problematic gaps between

clinical, organizational, and health system governance has been identified as an issue for safety in healthcare. Additional research is needed to further our knowledge on how communities of researchers, practitioners, managers, and policy makers can collaboratively engage in studying and assessing their environments to design and implement meaningful, sustainable IP&C improvements.

KEY WORDS:

infection prevention and control, case study, socio-ecological thinking, visual research

INTRODUCTION

Healthcare-associated infections continue to pose formidable challenges to improving the safety of hospital care. In a 2002 point prevalence study of Canadian major teaching hospitals, 10.5% of hospitalized patients were experiencing an infection acquired while in hospital (1). Furthermore, the incidence rate of methicillin-resistant *Staphylococcus aureus* (MRSA) in Canadian hospitals increased from 0.46 to 8.04 per 1,000 admissions between 1995 and 2006 (CNISP, 2007). While MRSA infection rates decreased in US hospitals over a four-year period between 2005 and 2008 (2,3), healthcare-associated infections (HAI) continue to be a cause of increased morbidity, length of stay and cost to healthcare systems (4-6).

The evidence to date supports the use of multiple interventions to prevent and control methicillin-resistant *Staphylococcus aureus* (MRSA), vancomycin-resistant *Enterococci* (VRE) and other multidrug-resistant organisms (MDRO) (7). Recent reviews of hand hygiene interventions (8) and infection prevention and control (IP&C) programs

(9) support earlier calls for the use of a socio-ecological approach to improve our understanding of the system for IP&C as a whole (10,11). The socio-ecological approach invites greater examination of the routines and compromises made in the everyday work environment, as negotiated in a system of actors, policies, regulations, physical surroundings and culture within the hospital environment and within the wider health system and society. To advance the development of a socio-ecological perspective on hospital IP&C, two case studies were conducted, one in April 2008 at a Netherlands hospital, a facility reporting rates of MDRO below 1%, and a second study between September and December 2008 on a surgical unit at a Canadian hospital which reported higher rates of these pathogens. The aim of the research was to better understand the conditions for IP&C practices within this Canadian acute care environment.

OBJECTIVES

The specific objectives of this study were:

1. To observe the overall work environment including IP&C practices on the target surgical unit.
2. To analyze the policies and procedures aimed at the prevention and minimization of MDRO in the hospital and unit environments.
3. To analyze the barriers and bridges to IP&C that practitioners identified in visual narratives of their unit environment.
4. To collect monthly specific IP&C related data, and the acquisition rates of MRSA, VRE, extended spectrum beta-lactamases (ESBLs) and *Clostridium difficile* infections (CDI) on the unit and in the facility overall.

The quantitative data (Objective 4) were collected for further comparative case study work. The purpose of this paper is to discuss the qualitative aspects

(Objectives, 1, 2, 3) of the Canadian case study results.

METHODS

The socio-ecological perspective of this study draws on related work in the fields of ecosystems management and research (12), economics (13), restoration management (14-17) and health systems (18,19). A socio-ecological perspective provides “a framework for understanding the diverse personal and environmental factors and the interrelationships among these factors” (20, p.45). In the present study, this socio-ecological lens was applied to a participatory approach of citizen science aimed at fostering the reciprocal sharing of scientific and local indigenous knowledge, allowing scientists and communities to develop integrative knowledge about local places as well as about systems as a whole (18,21-23). This concept assumes a collaborative process

TABLE 1: Core elements of a proposed socio-ecological framework for studying IP&C (10,11,18,26)

Core Elements	Definitions
Citizen science	The notion of citizen science refers to individuals working collaboratively with communities, governing bodies and others to conduct research and generate evidence (16,18,19,22). This includes using a participatory and collaborative approach to the design, conduct and analysis of infection prevention and control research, involving members of the community in data collection, data analysis and knowledge translation wherever feasible and appropriate and seeking multiple sources of data (including sources of indigenous or local knowledge) and using a variety of methods to develop integrative knowledge about local places as well as the larger system (19,23-25).
Place ethic	According to Buell (51) and Higgs (16,17), a place ethic is “enacted in the ways that we treat each other and the places we share.” Place ethics refers to individuals’ respect for the history, culture, knowledge and rituals. In this research, thinking about place ethics includes inquiring about what people see as important in the care of each other and their environment, how they reinforce and support each other to value infection prevention and control, and whether respect for historical knowledge informs how a place functions over time.
Engaged practice	The concept of engaged practice refers to the creation, implementation and evaluation of sound practices that are evidence-informed (14-18). This includes self monitoring and adjustment of daily infection prevention and control practices (e.g.: audits, equipment checks), using local feedback processes to continually improve workflow, work design, and processes at the individual and team levels.
Adaptive learning and growth	The idea of adaptive learning and growth refers to the development and use of knowledge translation strategies that disseminate learnings across individuals, teams, organizations and system levels to drive sustainable changes (12,15,17,18,25,52). This includes evidenced-informed management of MDRO, screening policies, resource allocation decisions about patient care staffing, housekeeping, availability of equipment and supplies, staff and public education policies and funding.

between researchers and participants in conducting the research, including how the data is collected and analyzed and how research findings are shared (19,23-25). The core elements of a proposed socio-ecological framework for studying IP&C (10,11,18,26) that guided the research design and conduct of the study are described in Table 1.

Setting and case study selection

The hospital is a 1,174-bed multi-site urban tertiary hospital. In 2008, the population of the city where the study was conducted was 898,150. There were a total of 1,598 acute care beds amongst the adult acute care hospitals in the city. The case study was conducted on a 40-bed general surgical, ear, nose and throat (ENT) and ophthalmology unit that also included off service patients due to the overcapacity issues at the hospital.

Design

A case study approach (27,28) using a socio-ecological perspective on health systems was used. Multiple methods were used to explore the conditions for IP&C. The methods included unit observations, practitioner-led photo walkabouts (17,19) and communal photo elicitation forums (18,19,29), review of relevant organizational documents, and collection of other data such as MDRO incidence and prevalence rates, bed occupancy, staffing ratios and governance structure.

The photographic research methods consisted of practitioner-led audio-taped photo walkabouts with photo narration and communal photo elicitation forums. The photographic research methods helped to

engage the local participants to share their ecological knowledge of the unit.

Data collection

Following ethical review and approval, three unit observation sessions were performed to gain a perspective of the environment and the IP&C practices. Subsequently, four practitioner-led photo walkabouts were conducted with an IP&C professional and clinical manager, a senior nurse, a physician and two members of the housekeeping staff (n=6) to obtain individual perceptions of the infection control-related issues and strengths on their unit. Three separate photo elicitation focus groups were conducted to review and further comment on the photographs and narratives collected during the walkabout (n=13). The photo elicitation sessions were held with managers (n=4), health professionals (n=5) and clinical support staff (n=4). During these sessions, participants were asked to provide written comments and also to share with the group their thoughts as select walkabout photographs and related potential themes and issues were presented for discussion. Staff were informed about the unit observations. Field notes were recorded after each photo walkabout and each photo elicitation session to note researcher perceptions about the environment at these times of data collection as well as participant dynamics during data collection. The hospital's infection control policies and procedures were collected. Monthly IP&C surveillance data were collected for January to December 2008.

Data analysis

Data analysis was an iterative process. Atlas.ti version 5.3 software (ATLAS.ti Scientific Software Development GmbH, Berlin) was used to support the analysis. Once the themes were identified from the qualitative analysis, other IP&C findings were integrated. The core elements of the proposed socio-ecological framework for studying IP&C (Table 1) informed but did not limit the coding, categorization and theming of the qualitative data.

Multiple methods were used to minimize bias from the researchers' preconceptions. A researcher's journal was used to record reflections on research related activities. Local experts reviewed the data collected. Each photo walkabout and focus group session was audio-taped and transcribed. Study field notes and transcripts were compared with the other data sources where applicable, and commonalities and discrepancies were coded in the Atlas.ti software system.

RESULTS

The themes derived include: (1) Considerable IP&C challenges were inherent to the design of the clinical unit; (2) Nurses and other staff employed a wide variety of workarounds to try to adapt to the design of their care environment; (3) Participants viewed organizational and team cultures as integral to the way they enact IP&C practices in their workplaces; (4) Common practices posed barriers to sound IP&C; and (5) In the face of

FIGURE 1: Alcove outside patient rooms (HK-24)



FIGURE 2: Water splashing on side of sink (MG-59)



numerous system constraints, participants viewed engaged leadership as important for IP&C. Each theme with supporting data is discussed below.

Considerable IP&C challenges were inherent to the design of the clinical unit

Joseph (30), Joseph et al. (31) and Ulrich et al. (32) support the notion that the design of the acute care environment such as the workplace design (e.g. unit layout), the work design (e.g. the organization of work, workflow), and other attributes have an impact on the IP&C practices. On the study unit, an example of a positive workplace design was the location of the hand hygiene materials on the unit (Figure 1). In the alcove between two patient rooms, there was one sink for staff use which was stocked with a wall mounted soap dispenser, paper towels, a garbage container with no lid, and gloves on a rack in various sizes. A wall-mounted alcohol-based hand rub (ABHR) dispenser is located between the doors of two patient rooms. In addition, dispensers are also located near the two clean utility rooms, and elevators (Observations, P1, 30). There is also a container with hydrogen peroxide disinfectant wipes mounted on the wall outside each patient room to clean equipment and surfaces (Observations, P1, 31). During a walkabout, the physician participant explained that:

...we do have sinks outside each pair of rooms and we also have dispensers for ABHR for hand cleaning.

Obviously just looking around doesn't tell us how well they're used or not used, and my understanding from various people I know in the area is that to get good sterilization of your hands you need to wash or use the ABHR, but it would be interesting to see what the utilization of that is... (PW physician, P7, 49).

Based on the results of the hand hygiene observations between April 2008 and March 2009, the hand hygiene compliance rates were 50.3% before patient contact and 64% after patient contact in the hospital overall.

Another design issue on the unit is the shallow sink and gooseneck spout (Figure 2). As one participant identified:

...if you go to all the sinks, they'll have either face cloths or towels next to them because of the splashing... (FC management, P9, 405).

Overall, the unit design presented several inherent challenges to optimal IP&C. In turn, as the next theme illustrates, many of these design challenges appear to be linked to the development of workarounds.

Nurses employed a wide variety of workarounds to try to adapt to the design of their care environment

Amalberti et al. (33) define workarounds as the "adaptation of procedures by workers to deal with the demands of the work" (p. i67). They explain that staff naturally migrate to the boundaries of acceptable practice and deliberately deviate from standard procedures to adapt to deficiencies of complex, over-

burdened healthcare systems that cannot reliably respond to ongoing, competing demands. One relevant workaround at the study site is the storage of a mix of clean and dirty equipment in the hallway in response to the lack of appropriate storage space on the unit (Figure 3). The equipment includes walkers, wheelchairs, chairs, scales, lifts, blood pressure machines, oxygen tanks, bags of dirty linen, carts with pillows and gowns, isolation carts and linen carts in the hallway (Observations, P1, 21). During the walkabout with the physician, the participant explained that:

...as I walk down this corridor, one of the first things that strikes [me] is there's an awful lot of stuff stored in the corridor as opposed to in a discreet area. Some of that stuff is bed linen [that] is going to be used for patients and it's sitting here out in the breeze and I don't know if that's significant or not... (PW physician, P7, 15).

Similarly, another participant pointed out the following:

See all this clutter here? This is because of the lack of storage space that they have to put these carts and poles and pumps in the hallway. On a positive side at least it's all on one side (PW housekeeping manager, P5, 36).

During a focus group, a participant explained that there is:

...no label to say whether [the equipment is] clean or dirty. And usually you get a bad surprise when you pull up the seat and you see, I guess [this commode] has not been cleaned. It's just the general

FIGURE 3: Equipment stored in hallway (NS-04)



FIGURE 4: Isolation cart (MG-18)



principles of the clean should be put away somewhere as opposed to just out there [in the hallway] (FG management, P9, 443).

According to a key informant, housekeeping staff were to put a “clean” label on the equipment and nursing is then to remove it upon use. However, it was also shared that this process has not been audited to see how well this is followed.

Another workaround which participants highlighted was the use of hallway isolation carts on the unit which are not available for every room (Figure 4). During the focus group with management, a participant explained that:

...there are isolation carts for isolation rooms but we always have to come back to routine. You should have [personal protective equipment] available routinely for all patients in an ideal world... (FG management, P9, 359).

During the walkabout with the clinical manager and the infection control professional, the participant explained that:

...if your piece of [personal protective equipment] is not nearby it always makes it [less likely for] people [to] actually go into the main supply room to get [one] so it does seem like a really good idea, to have everything within easy reach because accessibility makes a difference in terms of whether or not it'll be used (PW clinical manager and ICP, P4, 65).

Many other workarounds were identified by participants including the storage of a mix of clean and dirty equipment in the hallway, the constraints of the work space, the access to supplies during the provision of patient care, and leaving equipment in patient rooms. The prevalence of these workarounds suggests that they are seen as inevitable within the overall culture of the unit. This has implications for the next theme, which is that participants see their team and unit cultures as closely linked with IP&C in their care environment.

Participants viewed organizational and team cultures as integral to the way they enact IP&C practices in their workplaces

Siegel et al. (34) argue that a culture of

safety refers to “a work environment in which a shared commitment to safety on the part of management and the workforce is understood and maintained” (p.594). In the Canadian framework of inter-professional safety competencies, Frank et al. (35) describe a culture of patient safety linked with “attitudes, activities and enduring ethical values that are conducive to the safe delivery of patient care” (p. 5). Several exemplars that potentially promote or hinder the organizational and team culture on the study unit are described below.

There was observable tendency of unit staff to congregate in apparent effort to promote teamwork. For example, although there were computers spread around the unit and in some areas outside patient rooms, nurses frequently migrated to the nursing station to chart and share information with each other and other team members (Observations, P1, 34). The first author also observed nurses socializing and eating chocolate received from a family at the nursing station (Observations, P1, 34). During the walkabout with the clinical manager and the infection control professional, the participant explained that:

What I tend to do 'cause I believe in team building...and recognition and things like that, I encourage the staff to use the conference room to have these type of things, either drinks or food and then clean up after please (PW clinical manager and ICP, P4, 712).

During the same walkabout, this participant added that:

Staff are also participating and making sure the environment is clean and welcoming, I mean it's a team effort right? (PW clinical manager and ICP, P4, 1272).

Examples of communication efforts to promote a safety culture were also demonstrated on the unit. For instance, when a patient is discharged, the isolation sign was left up until the housekeeper cleaned the room. The housekeeping manager explained that:

On the bottom of each sign, it says that only housekeeping staff can remove the sign...and then when the housekeeper removes it and he does all his checklists, he hands this in as proof that it was done using the

proper techniques (PW housekeeping P5, 638).

Just as sharing information could contribute to fostering a culture of safety, not sharing necessary information could hinder it. For example, it appeared that not all nurses were aware of the cleaning practices on the unit. During a photo walkabout with a nurse participant, it was noted that:

I think it's varied. I think if you talk to different nurses you're going to get a different impression but most nurses will wipe down their stuff in between patients for sure...but if you're using it just for one patient, I can't take it for granted that it's been done (PW nurse, P6, 487).

Overall, these examples suggest that while appropriate communication was used to promote a healthy team culture on the study unit; some inconsistencies in communicating about cleaning practices and appropriate personal behaviors (eating in certain areas, for example) in patient areas can pose barriers to sound IP&C, along with the following practices.

Common practices posed barriers to sound IP&C

Participants were concerned with some common practices that did not support infection control practices on the unit. For example, a participant explained that:

This is an example of a lift that's been cleaned...Housekeeping has cleaned it and tagged it that it's clean. Staff need to remove [the sign] if it's no longer clean because housekeeping will not re-clean it if that's still on there (PW clinical manager and ICP, P4, 1150) (Figure 5).

However, some participants questioned whether or not the practice of removing the sign before use was being followed.

For example, one participant asked:

Would somebody go out, use it and put it back not noticing that little piece of paper was there? [They should] use it, put it back, and now it's no longer clean and [the sign] stays there (FG health professionals, P10, 995).

Some participants were concerned that the equipment was not cleaned consistently before and after patient use. A nurse explained that:

FIGURE 5: Lift in hallway with clean sign (MG-52)



FIGURE 6: Isolation sign (NS-06)



I do believe that it is housekeeping's responsibility to make sure that the equipment is clean but we don't have time to wait for housekeeping so we end up doing it...because we need that equipment for other patients relatively quick. But I don't believe that it is the nurses' responsibility to have that housekeeping duty (PW nurse, P6, 603).

One nurse observed that the vital signs machines are not always cleaned before use. The participant said:

I don't think that nurses consistently clean in between patients (PW nurse, P6, 505).

During the focus group with the support staff, a participant explained that:

The location of the [isolation] sign is not ideal. Sometimes I've seen [it] across the room, with tape... in the middle of the doorway. So you'll have the sign coming down and then the big piece of tape hanging there, then you can't miss it because it's in your face (FG support staff, P8, 231).

However, the isolation sign is not always in a consistent location. As illustrated in Figure 6:

The sign [is] not [always] visible enough, as a lay person may take it to be the same as other paper work (belonging to staff) and NOT read it (WC health professional, P14, 10).

Overall, many common practices were identified on the study unit as posing barriers to sound IP&C. The need to address these problematic practices relates to the next theme, which is that

participants found engaged leadership important for IP&C.

In the face of numerous system constraints, participants viewed engaged leadership as important for IP&C

Findings suggest a variety of perceived links between the quality of leadership across system levels and the quality of IP&C within the site. The need for responsive, engaged leadership pertained both to internal organizational and unit personnel, programs, and structures and to external health system decision-making and initiatives that are potentially critical to organizational and unit capacity to effectively manage IP&C.

In terms of relationships between overall health system leadership and internal organizational leadership, participant data confirms that system decision-making and organizational decisions with the potential to affect IP&C are linked. An issue that management struggles with is a mismatch between bed capacity and service demands.

The average occupancy rate in 2008 was 98.5%, with frequent occurrences of overcapacity. Bed management meetings are held daily. A clear policy and procedure has been developed to ensure communication and a consistent approach to the issues. Although there were no over-capacity or full-capacity patients admitted to the unit during the study period, when hallway admissions are needed, they have a great impact on the clutter in the hallway, patient crowding, and equipment sharing.

Another IP&C concern that a participant elaborated on was the increased use of shared bathroom facilities in conditions of overcapacity, stating that:

Shared bathrooms which [are] another major issue for communicable or spread of infection; with the bed pressures we have ... a very mixed group of patients in one area, it's not as if we're able to segregate... particular groups of patients... there's a lot of overflow from one area to the other (PW physician, P7, 45).

On the unit, the patient-to-toilet ratio varied from 1:1 up to 4:1 ratio in the four bed rooms. This ratio is a key factor in VRE and CDI transmission (30,32). A participant explained that:

... the infection control recommendation, I know for any new renovations and building that we go on, there's always a cost issue associated with that. I think the cost, for the new parts that are being built, the hospital agreed with one bathroom for two patients, which is a huge improvement over four beds per bathroom (PW clinical manager and ICP, P4, 1384).

The importance of engaged leadership is illustrated in recent organizational decision-making regarding IP & C. Specifically, in 2008, the prevalence rates ranged between 3.9-7.1% for MRSA, 0-1.1% for VRE, 0.2-0.7% for ESBL and 2.0-4.6% for CDI, respectively. A local leadership decision supported the introduction of MRSA and VRE universal screening for all patients admitted at the hospital in that same year. All patients

admitted for an inpatient stay were tested at time of admission. Ongoing surveillance systems supported by management are also in place for other pathogens. In particular, there is ongoing clinical surveillance for new onset diarrhea where-upon patients are promptly put on isolation precautions without waiting for their results.

DISCUSSION

The findings indicate that despite active local leadership for IP&C and ongoing regional, provincial and national initiatives, many challenges exist in the hospital environment. Key barriers included high patient occupancy rate, hospital design, the use of workarounds to adapt to these challenges, several common problematic practices and the culture of the team or organization. At least some of these barriers require linked leadership across unit, organizational, and provincial levels, if not beyond.

The first barrier that transcends local leadership, the overcrowding of patients, is a significant issue in Canadian hospitals. This may be due to the number of hospital beds available for the population served. In 2008, there were 1.77 beds per 1,000 population in this city, virtually half the Canadian average of 3.5 beds per 1,000 population, and lower than the average in the Netherlands (4.3 beds/1,000 population) and in the United States (3.1 beds/1,000 population) (36). Lower occupancy rates for acute care beds should facilitate the control of HAI transmission, as research has shown that high occupancy rates are linked to higher infection rates (37-41). Adding more acute care beds to increase the total number of acute care beds per capita is one obvious but expensive response. However, the ongoing debate over emergency and hospital overcrowding suggests there is merit in exploring a more complex mix of measures that includes better access to public health and primary health care, community care, assisted living, and long term care to not only address hospital overcapacity issues in a more sustainable manner, but to also provide more effective IP&C.

Hospital design is another barrier

found in this study which crosses local and broader health system levels of leadership and decision-making, combining the effects of building codes, funding decisions, and other external requirements with local governance regarding specific environmental design issues and resource allocations, such as how much money will be spent on providing single rooms as opposed to other competing design features. The hospital's challenging design elements, including few single patient rooms, multi-bed rooms and sizes, low patient-toilet ratio, lack of storage, no housekeeping closet and no dirty utility room on the unit can have an impact on MDRO transmission.

The patient equipment stored in the hallway due to the lack of storage space on the unit can also have an influence on MDRO transmission. The evidence shows that "patient care devices may transmit pathogens if devices contaminated with blood or body fluids are shared between patients without cleaning and disinfecting between patients" (34, p. 578). Single-bed rooms with private washrooms and sinks and adequate storage space on the unit could help to reduce cross contamination (30,32).

Another barrier to IP&C at the hospital is the communication among members of the staff and family about patient on isolation precautions. The isolation signs are often found in different locations near the room door which may hinder its usefulness. Furthermore, porters or transport personnel are not always aware of the patient's precaution status until they reach the patient's room. Clear and effective communication is needed in order to foster a culture of safety. It is reasonable to question whether nationally or even provincially or regionally standardized signage and signage placement would assist practitioners and the public to collaboratively learn about and use appropriate precautions in a more consistently reliable manner. In addition, we do not currently know the impact of the limited availability of translated IP&C information in multi-cultural Canadian cities.

Despite the many barriers, some bridges to IP&C exist. In 2008, universal

MRSA and VRE screening strategies were implemented. All patients admitted for an inpatient stay were swabbed for MRSA and VRE on admission. Ideally, early identification of patients colonized with MDRO will facilitate prevention of transmission. Most MRSA and VRE guidelines recommend some form of universal (all patients) or targeted (high risk patients) screening on admission (7, 42-44) to identify patients who are colonized with MRSA or VRE.

Another bridge is the availability of hand washing sinks and ABHR on the unit. Hand hygiene is the most important practice to prevent healthcare-associated infections (45). Despite the importance of hand hygiene, research has shown poor compliance with hand hygiene practices among health professionals (46). One of the barriers to adherence with hand hygiene practices is the inaccessibility to hand hygiene products. Suresh and colleagues (47) have developed an ergonomic hand hygiene evaluation tool for organizations to assess their environment for appropriate structural characteristics. On the study unit of this Canadian hospital, sinks and ABHR are located outside of each patient room as well as other areas on the unit. Suresh et al. (47), Creedon (48), and Harbarth et al. (49) support the placement of ABHR in many convenient locations on the unit; however, according to WHO (50), ABHR dispensers should also be placed at point of care for each in-patient bed. At the same time, further research is required to determine the precise mix and dose of hand hygiene interventions that will be most effective for various specific hospital and unit contexts (8).


Clear communication and accountability processes that have been incorporated into the workflow for housekeeping and clinical staff are another bridge to IP&C. On the back of the isolation signs there are clear guidelines about the cleaning process for housekeeping staff. This not only provides instructions to the housekeeping staff, it also informs staff that as long as the sign is up, the room is not clean. Once the cleaning process is complete, the housekeeping staff removes the sign and submits it to their supervisor after completion providing accountability

for the work done. When the sign is removed, this also communicates to the staff that the room has now been cleaned. This novel, yet simple idea creates clear expectation and defines the responsibilities of the staff, thus, promoting a desirable safety competency, which is effective communication amongst team members to contribute to safe patient care (35).

Strengths of this study include the rich qualitative detail that was generated by the participatory visual approach, the active engagement of practitioners and managers in the research process and knowledge translation of the findings, and the consistency of responses and recurrence of themes between study participants with very different roles and backgrounds. A limitation to this research is that it is possible staff may have altered their behavior during the unit observations. Another limitation to the rigor of data collection is that the incidence and prevalence rates and the hand hygiene observations were collected by other hospital personnel not supervised by the researcher. Attempts were made to address these limitations by incorporating multiple methods of data collection, and checking for corroboration and discrepancy. In addition, the focus of this study was on a specific clinical unit of the hospital. While this last limitation was addressed by taking a broad socio-ecological system approach to study IP&C on the unit, future case studies involving entire organizations or perhaps even regions would provide a more comprehensive picture of some aspects of the complex phenomena of IP&C. In the absence of significant research funding, however, the larger contexts would necessarily yield less site-specific qualitative detail.

CONCLUSION

This in-depth case study provided findings related to existing socio-ecological conditions for IP&C on a surgical unit at a Canadian hospital. Many challenges to mounting an effective, sustainable IP&C program were evident in this acute care environment. Further research using a socio-ecological

perspective is needed to better understand IP&C practices as a whole, to meet the goals of improving clinical IP&C practices and reducing multidrug-resistant organism infections. Specifically, additional research is needed to further our knowledge on how communities of researchers, practitioners, managers, and policy makers can collaboratively engage in studying and assessing their environments to design and implement meaningful, sustainable IP&C improvements. 

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Hand hygiene recommendations for schools

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ABSTRACT

Infectious diseases are commonly encountered in school-age children, and schools can be important foci of infection. While elimination of pathogen transmission is not realistic, practices to reduce the risk and incidence of transmission are important. Hand hygiene is a proven infection control tool, and despite the known positive impact of hand hygiene in schools, there is a lack of guidelines to assist schools and teachers. Further, this lack of information may play a role in questionable decisions such as banning alcohol-based hand sanitizers, as has happened in some jurisdictions. As a result, the Science Teachers' Association of Ontario/Association des professeurs de sciences de l'Ontario (STAO/APSO) has developed recommendations for hand hygiene practices in schools.

INTRODUCTION

Infectious diseases are commonly encountered in school-age children, and schools are an excellent environment for transmission of infectious agents between students and between students and teachers. In addition to illness (and rarely death), infectious diseases are important causes of student and teacher absenteeism. Outbreaks of disease can occur within schools (1-3), and have large impacts on students, teachers and their families. Schools can also be foci of infection for the community and an important location for amplification of infectious diseases in community outbreaks, including pandemics.

While infectious disease transmission can never be eliminated in schools, measures can and should be undertaken to reduce the risk and incidence of disease transmission. One area of clear importance is hand hygiene. The hands are an important source of pathogen transmission in community settings and hand hygiene is a well-recognized infection control tool. Despite the potential effectiveness of improved hand hygiene and the relative ease and low cost of facilitating hand

hygiene in schools, there have been few formal efforts to improve hand hygiene and there is a lack of specific and detailed resources to guide decision-making.

Evidence of hand hygiene efficacy in schools

Good hand hygiene practices have been associated with a decreased likelihood of gastrointestinal disease or absenteeism in students and teachers in retrospective studies (4), supporting a role of routine hand hygiene in disease prevention in schools. Stronger evidence is available from controlled intervention studies, which have reported a protective effect of hand hygiene in schools (Table 2), although the quality of some studies has been questioned (5). Most studies evaluating the effect of hand hygiene on student and teacher health have involved hand washing or use of alcohol-based hand sanitizers as part of multimodal interventions, typically combined with educational programs. While such studies are limited in their ability to determine the direct impact of hand hygiene alone, multimodal interventions are a common and effective infection control tool. Care must be taken, however, to ensure that the complete intervention is considered when evaluating available studies and applying interventions, since the efficacy of a single component may not be the same as the entire intervention.

There has been controversy in some regions regarding the use of alcohol hand sanitizers in schools, and some schools or school boards have banned their use, based on minimal evidence of adverse effects (as discussed below). There has been limited direct comparison between hand washing and hand sanitizer use in classrooms. One study reported no significant difference in absenteeism between students that used hand sanitizers versus hand washing (6). In that study, school nurses and teachers indicated that they preferred hand sanitizers over hand washing, in large part because of the time required for proper hand washing. The authors concluded that hand sanitizers

TABLE 1: Indications for hand washing versus hand sanitizer use

Situation	Hand hygiene method
After using the washroom	Hand washing
Before eating	Either
Before the school day	Either
Before going home	Either
After having contact with animals or animal products	Either, unless there is visible soiling of the hands, in which case hand washing is required
After having diarrhea or vomiting	Hand washing
After having contact with vomit or diarrhea, or contact with someone that is vomiting or has diarrhea	Hand washing
After contact with someone with respiratory tract disease	Either
Open sores on the hands	Hand washing
After blowing the nose, sneezing or coughing	Either
After handling garbage	Either
When hands are visibly soiled	Hand washing
After contact with dirt	Either, unless hands are visibly soiled
Any other routine use	Either

were an appropriate alternative to hand washing and may offer additional benefits. While care must be taken when interpreting a single study, there is precedent from the human healthcare field in recommending hand sanitizers over hand washing.

Potential adverse effects

Hand washing. There has been limited assessment of potential adverse effects. In one study, 3/290 students withdrew from a mandatory hand washing program because of skin problems (7), although little information was provided explaining what problems occurred and whether affected individuals had any underlying dermatologic disease. While hand washing cannot be considered benign, it is certainly reasonable to conclude that the risk of adverse effects from periodic and proper hand washing is low.

Alcohol-based hand sanitizers. The incidence of adverse skin reactions to alcohol-based hand sanitizer use is low. Because they contain a high concentration of alcohol, intoxication is a potential problem following ingestion of hand

sanitizers. Most reports documenting ingestion of alcohol hand sanitizers have been case reports involving adults with a history of alcohol abuse intentionally ingesting entire contents of hand sanitizer bottles (8-11). This has led to a recommendation to replace removable bottles and pumpettes with self-contained dispensers in areas where these individuals might be present (12), something that can presumably reduce the risk of intentional ingestion of hand sanitizers in other settings.

Recently, there was a report of intoxication of a four-year-old child following ingestion of alcohol-based hand sanitizer (13). While the child recovered, the potential for exposure to alcohol-based hand sanitizers should not be dismissed, be it from unknowing ingestion by young children or intentional ingestion for the purposes of intoxication. The risk of intoxication should, however, be taken in context. There are few reports of intoxication, only one involving a child, and none involving schools, despite the near ubiquitous nature of these products in the community. While the existence of few published reports

does not necessarily indicate few actual events, the relative risk and the potential to reduce the risk must be considered.

Another potential adverse effect is irritation to the eye, through inadvertent spraying of alcohol into the eyes or from touching the eyes immediately after applying alcohol to the hands, before it has evaporated.

There are potential fire risks with placement of alcohol-based hand sanitizers in science laboratories close to open flames, or use of products in close proximity to open flames. These risks can be reduced by proper placement and use, as is described below.

RECOMMENDATIONS

There is currently little direct guidance regarding hand hygiene in schools. The committee is unaware of guidelines from national or regional governmental agencies dealing with an overall hand hygiene program for schools. Some guidance is available for post-secondary facilities and boarding schools, and those are focused on specific circumstances such as preventing or containing outbreaks (e.g., influenza, norovirus). This information gap needs to be addressed to provide clearer guidance to schools and school boards, especially regarding the safety and appropriateness of alcohol-based hand sanitizers. Accordingly, the Science Teachers' Association of Ontario/Association des professeurs de sciences de l'Ontario (STAO/APSO) coordinated guideline development, based on a review of the available scientific literature and hand hygiene guidelines. Considering issues pertaining to efficacy, safety and practicality, the committee has developed the following recommendations for hand hygiene in schools.

1. Hand hygiene should be recognized as an important life skill for students.

Fostering an improved awareness of hand hygiene and a culture of hygiene and infection control is important to help students properly develop this important life skill.

2. Hand hygiene should be taught as a routine practice that is performed regularly throughout the day.

Hand hygiene should always be performed at situations outlined in Table 1. Teachers should facilitate identification of situations when hand hygiene is required and ensure that students have the opportunity to properly perform an appropriate hand hygiene technique.

3. Hand washing with soap and water is preferable to the use of waterless hand sanitizers in some situations, but waterless hand sanitizers should be a component of a school's hand hygiene program.

Hand sanitizing and hand washing are not necessarily equivalent. Hand washing is the preferred method in certain situations while hand sanitizers are acceptable in other situations (Table 1). The potential for improved hand hygiene compliance because of the ease of use of hand sanitizers and the ability to cost-effectively place hand sanitizers in areas where sinks are not available must be considered.

4. Measures should be implemented to increase hand hygiene compliance and quality in schools. These measures should be ongoing activities, not single or sporadic efforts.

Hand hygiene rates are generally poor in schools. Observational studies have reported compliance rates of 32-85% after using the washroom or before eating lunch (14-16), with higher rates in female students compared to male students (16) and in younger students compared to older students (15). Decreasing hand hygiene compliance through increasing primary school grades has also been noted (15).

In one study of first and fourth grade students, introduction of alcohol-based hand sanitizer wipes in bathrooms, an educational program and a combination of introducing wipes and an educational program, all significantly increased hand hygiene rates (14). However, when the first three weeks of the two-month study period were compared to the last three weeks, compliance rates decreased in the education-only group. The short-term impact of educational programs indicates a need for ongoing active interventions to truly have an impact on hand hygiene. While passive educational programs such as the presence of pictures and signs to remind students to wash their hands and

to reinforce proper hand hygiene practices may have a short-term effect, active methods may be more effective. Mandatory, scheduled hand hygiene multiple times per day could be considered in classrooms (17), although this is more time consuming and perhaps does not develop and support the desired self-initiated hand hygiene behaviour. Developing a culture of hand hygiene is critical and should be considered when planning and evaluating any intervention. This is perhaps demonstrated by a mandatory hand hygiene intervention study where 22% of students never washed their hands at the required times (7). Mandatory hand hygiene is probably most appropriate for young students and ideally (but perhaps impractically) is teacher-supervised.

While there is not currently a well-defined, standard program for improving hand hygiene rates, practical and successful programs should be considered when designing a hand hygiene program. Consultation with public health personnel, school nurses and other relevant experts, is ideal.

Quality of hand hygiene is another problem. In one study, only 28% of female students and 8% of male students used soap when washing their hands, and only 50% of female and 23% of male students washed their hands for even five seconds (16). Improving hand hygiene rates without a corresponding increase in quality cannot provide the optimal effect. There is no information regarding improving hand hygiene quality in schools.

5. Teachers must set a good example by performing hand hygiene when required, and doing so properly.

Teacher-directed hand hygiene, with the teacher washing their hands in front of students, was part of a successful hand hygiene intervention program (15). The potential impact of teachers must not be dismissed and teachers must set an example by performing hand hygiene when required, and by doing so properly.

6. Schools must ensure that students have adequate access to washrooms with sinks and hand hygiene supplies, and that there are no barriers to proper use of washrooms.

In one survey of four- to 15-year-old students in the UK, 98% of respondents indicated that hand washing facilities were always available in washrooms, with the remainder indicating facilities were sometimes available (18). An American study of first and fourth grade students reported availability of sink with running water in 100% of bathrooms (14~). This is not surprising and sinks should be considered mandatory in all washrooms.

Availability of sinks alone does not, however, necessarily indicate the ability to perform appropriate hand hygiene measures. Inadequate availability of hand hygiene supplies is a potential barrier. All washrooms should be equipped with liquid soap and disposable paper towels, something that is not always done, as evidenced by a study reporting the presence of filled and functional soap dispensers in only 34-89% of student washrooms, and paper towels or hand dryers in 91-92% (14,19). Liquid hand soap should be provided at all hand washing locations. Antimicrobial soaps are not recommended.

Supplies should be evaluated and restocked on a regular basis to ensure that adequate supplies are always available. Additionally schools should ensure that washrooms are always adequately stocked with toilet paper (18). Inadequate toilet paper can lead to increased likelihood of contamination of the hands, and inadequate access to toilet paper and hand washing facilities was implicated in an outbreak of hepatitis A in a school that ultimately resulted in 23 infections (3). A general lack of access to adequate hand washing facilities was implicated in another hepatitis A outbreak in a school (20).

While the physical availability of sinks in washrooms should come without question, other potential barriers to proper use must be considered. In a UK study, 22% of students indicated that bullying was sometimes or always a problem when using the washroom (18).

Alcohol-based hand sanitizers should not be located in washrooms, since hand washing is the preferred method for hand hygiene in those situations (19). Hand sanitizers are more appropriate in cafeterias and classrooms, and should be considered in other general school locations. Alcohol-based hand sanitizers should contain at least 60% alcohol, and preferably 70-90%.

TABLE 2: Studies evaluating the effect of hand hygiene interventions in schools

Age group	Intervention	Results	Reference
5-12 yr old students	Alcohol-free (benzalkonium chloride) hand sanitizer in individual bottles provided to each student, with instructions when to use it	42% fewer illness-related absence days. 29% decrease in gastrointestinal illnesses. 50% decrease in respiratory illnesses. No adverse effects	24
Elementary school students	Education program plus hand sanitizer dispenser in the classroom	51% lower absences in the intervention group. Estimated \$24300 net cost savings for school because of reduced illnesses and associated remedial teaching time and other costs.	22
Kindergarten through grade 6	Alcohol-based hand sanitizer dispensers mounted on walls in classrooms. Students instructed by teachers to use hand sanitizers.	20% reduction in absenteeism. 10% (but not statistically significant) reduction in teacher absenteeism	25
Grades 1-4	Mandatory, scheduled hand washing at least 4 times a day	Decreased absenteeism from infectious diseases (overall) and specifically from gastrointestinal diseases. No significant decrease of respiratory diseases	17
Kindergarten through grade 3	Education, daily reminders, alcohol hand sanitizers in classrooms	43% reduction in absences from infectious diseases.	26
5-15 yr olds	Mandatory hand washing before 1st class, before lunch and before going home	Reduced infections: 0.97 infection episodes and 1.95 infections days in the intervention group versus 1.24 periods and 2.65 days in the control group.	7
Grades 3-5	Disinfectant (quaternary ammonium) wipes in classrooms to disinfect desks after lunch. Alcohol hand sanitizers in classroom and instruction to use them before and after lunch and after using the washroom	Significantly lower gastrointestinal illness, but not respiratory illness, rate in intervention group. Norovirus detected on fewer classroom desks and computer mice.	27
Grades 1-6	Teachers told students to wash their hands before lunch and then immediately went and washed their own hands; a single 30-minute guest educator provided an information session followed by directed hand hygiene	Increasing hand hygiene rates with both interventions	15
1st grade	Hand washing program, soap for sinks, peer hygiene monitors	Significant reduction in absence days	28
2nd grade students	Hand washing education program, with use of training devices and agar plate finger imprint demonstration	34% reduction in school absenteeism	29
2nd and 3rd grade students	Comparison of hand washing with alcohol hand sanitizer use	No difference in absenteeism rates	6
5-12 yr old students	Non-alcohol based hand sanitizer (benzalkonium chloride)	33% reduced absenteeism	30

7. Basic safety measures should be implemented to reduce the risk of adverse effects of alcohol-based hand sanitizers.

While objective information is lacking regarding risk factors for adverse effects, some basic measures could reasonably be assumed to reduce the likelihood of adverse effects.

These include:

- Alcohol-based hand sanitizers should be placed in wall-mounted units that are locked to reduce the risk of ingestion of large volumes of alcohol because the sanitizer cannot be removed to another (unobserved) location and the tops cannot be removed to drink the sanitizer. The use of wall-mounted hand sanitizers also ensures that sanitizers are not inadvertently misplaced or accidentally placed close to open flames in science laboratories, thereby decreasing fire hazards associated with alcohol.
- The height of mounted hand sanitizer units should be age-appropriate for students that will have access to them. The height of students should be considered for ease of access and to reduce the risk of inadvertent spraying into the eyes. Hand sanitizers should be mounted below the eye level of all students expected to have access to the area.
- Wall-mounted hand sanitizer dispensers in science laboratories should be placed such that they are not close to areas where open flames might be used. In particular, attention should be paid to dispensers that dispense a spray of alcohol solution, to ensure that there is no chance that alcohol could be sprayed in the vicinity of open flames.

8. While agar plate demonstrations, whereby students are able to see what bacteria grow off their hands, have been used as part of successful multimodal interventions, this practice should only be performed in schools that are able to fulfill Biosafety Level 2 (BSL-2) containment. Accordingly, this practice is not recommended.

Demonstrations whereby students touch agar plates and subsequently see bacterial growth can be educational, how-

ever, they are associated with a high likelihood of isolating BSL-2 pathogens such as *Streptococcus spp.*, *E. coli* and *Staphylococcus aureus* (including methicillin-resistant *S. aureus*, MRSA). Any bacterial culture activities in classrooms must be performed with the adequate level of biocontainment for pathogens that might be isolated. Accordingly, BSL-2 (containment level 2) protocols are required for any experiments or demonstrations involving culturing samples from any human body site. This is possible in some science laboratories with proper facilities, protocols and supervision, but is unlikely to be possible in the vast majority of classrooms (21). Products such as GloGerm™ can be used to demonstrate hand hygiene efficacy without the need to grow bacteria.

9. Schools and school boards that have banned alcohol-based hand sanitizers should reconsider their position based on the proven benefits of hand sanitizers and the ability to reduce the risks through basic measures.

While there are potential adverse effects, there are also obvious benefits of alcohol-based hand sanitizers. STAO/APSO believes that the positive aspects of hand sanitizers clearly outweigh the potential risks, particularly if measures are implemented to reduce risks. The very limited number of published and anecdotal reports of alcohol intoxication must be considered but should not outweigh the positive effects of hand sanitizer use on a range of infectious diseases, some of which can be serious.

10. Funding should not be a deciding factor when determining appropriate hand hygiene measures.

Costs associated with proper hand hygiene should be considered a mandatory and basic cost that must be met regardless of financial pressures. Alcohol-based hand sanitizers are relatively inexpensive. Costs associated with improving access to hand washing are more substantial and the ability to address this may be variable.

Schools should also recognize the potential financial benefits of improved infection control. Studies have shown financial benefits of successful hand hygiene intervention programs, even

when costs of the program are included (7,22). Cost savings to schools can include decreased supply teacher costs from corresponding decreases in infectious disease absences of teachers. More difficult to quantify is the impact of student absences on teachers, through the potential need for remedial efforts for students that miss school (22). There can also be significant broader societal cost benefits when one considers the economic impacts of working parents being required to stay home to tend sick children. One study estimated that the identified 0.7 day decrease in student absenteeism over a three-month period resulted in savings of approximately US\$70 902 for 290 students, based on the estimated average daily salary of private sector workers (7). This was accomplished with an estimated cost of only US\$1164. Other financial benefits that have been inadequately investigated include decreased healthcare and prescription costs, although those may certainly be substantial (23).

11. School personnel should report adverse effects associated with hand hygiene activities.


The lack of objective data on adverse effects and a system to record such effects complicates assessment of safety and, correspondingly, cost-benefit analysis of different hand hygiene activities. To provide required information and allow for ongoing assessment of risks and required protocols, school boards should develop a formal reporting mechanism, whereby teachers can report the circumstances and outcomes of any incidents. Designated school or school board personnel should review these reports to determine whether any protocol changes are required should review these reports. Ideally, summary data should be collected by the Ministry of Education or equivalent.

12. Hand hygiene access should be considered as part of the design of new schools and for major renovations.

Careful consideration must be given to the ease of access to hand washing facilities, access by students with physical limitations and access in areas that would be more likely to require hand hygiene (i.e. washrooms, science laboratories, green-

houses, food preparation and consumption areas).

CONCLUSIONS

Hand hygiene is an important infection prevention tool and an equally important life-skill. By their nature, schools are important foci for pathogen transmission as well as places where life-skills and behaviours can be developed and fostered. Teachers, administrators and regulators all play a role in fostering and facilitating hand hygiene practices in schools, and these recommendations can be used as a basis for design, implementation and review of hand hygiene programs. 

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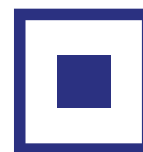
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The efficacy of mandatory online modules in training residents in the proper use of personal protective equipment

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ABSTRACT

Background

The prevention of nosocomial infections is increasingly becoming a priority for healthcare institutions. The Ontario Ministry of Health has three core competency modules in Infection Prevention and Control to establish a standardized approach to infection prevention and control. The course uses graphics, text and videos to teach the principles of infection control, hand hygiene, and PPE use. Acute care providers in our hospital were required to complete these modules online to develop competency in infection control, and to receive credentials to work in the hospital. The purpose of this study was to determine whether the Infection Prevention and Control Core Competency Education modules were effective in training pediatric residents in the proper use of personal protective equipment (PPE).

Methods

Following completion of the three modules and during the H1N1 pandemic, pediatric residents were asked to demonstrate the proper use of hand hygiene and PPE in an Objective Structured Clinical Examination.

Results

The donning of PPE was passed by 47% of residents, and the removing by 27%. No one achieved a perfect score.

Interpretation

While online teaching is convenient, it does not allow for practical skills. Effective methods to teach infection

control skills to physicians need to be developed and evaluated.

KEY WORDS: PPE, Online teaching, hospital infection control, hospital policies, infection control education

INTRODUCTION

The emergence of the novel H1N1 influenza virus triggered an unprecedented global disease response. The establishment of infection was recognised in Canada in late April 2009, and community outbreaks were confirmed by early May 2009. By June of 2009, the World Health Organization had declared the start of the 2009 H1N1 influenza pandemic (12).

As part of Ontario's response to the outbreak, emergency response and pandemic plans were activated, and focused efforts were aimed at encouraging the use of personal protective equipment (PPE) in healthcare workers. Physical interventions, including hand washing and the use of eye protection, masks and gloves, have all been shown to be effective in reducing the transmission of many respiratory viruses (7). Some studies have suggested that some infections incurred by healthcare workers during the severe acute respiratory syndrome (SARS) epidemic in 2003 may have resulted from the improper use of PPE (8; 4).

In 2007, the Ontario Ministry of Health launched three modules in the Infection Prevention and Control Core Competency Education (IPCCCE) program for acute care professionals in an attempt to establish a standardized approach to infection prevention and control. These modules included

hand hygiene training, routine practices (including the use of PPE, and chain of transmission) (10). The course uses graphics, text and videos to teach the principles of infection control, hand hygiene, and PPE use. Acute care providers in our hospital were required to complete these modules online to develop competency in infection control, and to receive credentials to work in the hospital. The course has been used in clinical staff orientations, and prior to granting hospital privileges to residents and physicians. Countless physician hours and healthcare dollars were spent to complete these education modules. Studies have shown that online courses are as effective as traditional teaching methods (3). However, few studies have been done to investigate the effectiveness of this educational method on the use of PPE in a hospital setting. The purpose of this study was to determine whether the Infection Prevention and Control Core Competency Education modules were effective in training pediatric residents in the proper use of PPE. Also, though the use of N95 respirators was not specifically taught in the online modules, Ontario had mandated their use in the H1N1 pandemic for the care of all patients with influenza-like symptoms. All staff had a fit test, had been shown the correct use of the N95 respirator, and should have been using them several times a day in the routine care of patients.

METHODS

All hospital staff, including residents, were required to complete the three educational modules in the IPCCCE program. These modules were to be completed on the physician's own time, at their convenience, by June of 2009. Each module included teaching slides, followed by a self-assessment quiz, which could be done as many times as required to receive a score of 100%. The three modules together took a total of approximately 45 minutes to finish. Following completion, each user was required to submit an online form, indicating to hospital administration that a passing mark on each of the three modules was achieved.

In October 2009, following completion of the three IPCCCE education modules and in the midst of the H1N1 pandemic, a group of pediatric residents were asked to demonstrate the proper use of hand hygiene and personal protective equipment in an Objective Structured Clinical Examination (OSCE). As the H1N1 pandemic was occurring, it was expected that these physicians would be using PPE several times daily, and were somewhat anxious for their personal safety. The exam station was a surprise, so they did not specifically prepare for it.

They were highly motivated to do well, as it was an examination, and marks were recorded.

Residents were supplied with hand sanitizer, sterile and non-sterile gloves, N95 respirators, surgical masks, gowns and protective eye wear. They were asked to demonstrate how they would use the PPE prior to entering a patient room that was under airborne isolation precautions. The scenario reflected typical events in healthcare and was designed to initiate the required steps in using PPE during the H1N1 epidemic

FIGURE 1: Standardized scoring sheet for donning and removing PPE

PERSONAL PROTECTIVE EQUIPMENT STATION

Donning PPE

1. Hand hygiene with alcohol based hand rub or liquid soap and water
 - Cleaned back of hand
 - Thumb technique
 - Cleaned between the fingers
 - Dry before proceeding
2. Gown
3. N95 mask
 - Pre-stretched both straps
 - Correct placement of straps
 - Used both hands to mould nose piece
4. Seal check
5. Goggles or disposable face shield
6. Gloves
 - Correct technique
 - Pulled gloves over cuff of gown
7. Done in proper order

Removing PPE

1. Removing gloves
 - Grasp outside of one glove and remove
 - Hold glove in opposite gloved hand
 - Slide un-gloved finger under wrist of remaining glove and peel it off
 - Turn gloves inside out in process
2. Removing gown
 - Unfasten ties, grasp at shoulders and pull over arms
 - Turn inside out and roll
3. Hand hygiene
4. Removing protective eyewear
5. Removing N95 mask
 - Bend forward while removing
 - Remove bottom strap, then top one and discard
6. Hand hygiene
7. Done in proper order

in Ontario. One physician observer was in the room with each examinee and marked according to a standardized scoring system (see Figure 1). Observers were two pediatricians who were trained in the use of PPE and trained on the scoring system by an infectious disease physician. Residents were given one point for completing each step in donning the PPE and one point for performing certain steps with proper technique. Sixty percent was set as a passing score. However, the resident would fail automatically if they did not demonstrate hand hygiene prior to donning the PPE.

The residents were then asked to remove the PPE. This was scored in the same manner with one point for completing a step and one point for certain steps being done correctly. In this scenario, the resident would fail if they did not demonstrate hand hygiene after they removed all of their PPE.

RESULTS

Of the 29 residents in the pediatric program, 20 residents were eligible to write the OSCE. Reasons for ineligibility included being in their first year of residency (8), and away on leave (1). Five of the eligible candidates were absent for the exam due to illness (2), away on electives (2), and unexplained absence (1). With a total of 15 pediatric residents, categorical data were summarized as percentages with 95% confidence intervals (CI), and the median (range) was used to describe the total score out of a possible 10 points.

Donning PPE

Of the 15 physicians examined, only 47% (95% CI: 25% to 70%) passed the station. Twenty percent (95% CI: 7% to 47%) did not perform hand hygiene prior to putting on their equipment, and therefore, automatically failed the station. The most common errors observed were improper technique when performing hand hygiene (73%), improper technique in donning the N95 respirator (80%), not performing a seal check after donning the N95 respirator (14/15 or 93%), and not donning the equipment in the correct order (67%). No one achieved a perfect

score of 10 out of 10, with scores ranging from four to nine out of 10 (median: 6/10). Of note, there was no important difference in the pass rate when comparing residents of different years (1/4, 4/7 and 1/3 for second, third, and fourth year, respectively).

Removing PPE

Of the 15 physicians examined, only 27% (4/15) passed the station. Four of the 15 residents (27%) failed because they did not perform hand hygiene after all of the PPE was removed. The most common errors observed included improper technique when removing gloves (36%), not performing hand hygiene after removing gloves and gown and before removing protective eyewear (13/15 or 87%), and not removing equipment in the proper order (73%). The scores ranged from one to 10 out of 10, with a median score of 5/10. Again, there was no difference in pass rate when comparing residents of different years (1/4, 3/7, and 0/4 for second, third, and fourth year, respectively).

DISCUSSION

The use of PPE is required in healthcare settings both to protect healthcare workers, and to reduce the rate of transmission from patient to patient (7). However, in order to be effective, the appropriate PPE items must be selected, and the items must be donned and removed with correct technique and in the correct sequence to minimize the risk of exposure. While all participants did use the correct equipment (non-sterile gloves, gown, N95 respirator as required in Ontario for H1N1, and protective eyewear), many failed to demonstrate proper technique and did not don or remove PPE in the appropriate order. Of note, only one resident examinee performed a seal check after donning an N95 respirator. This is disconcerting particularly as a seal check has been reported to be potentially as important as the fit test in assuring a proper facial seal (6).

Numerous studies have shown that hand hygiene significantly reduces the risk of transmission of viral respiratory tract infections (13; 2), and optimal hand hygiene is considered the corner-

stone of healthcare-associated infection prevention (11). Seventy-three percent of examinees in this study did not demonstrate proper technique in hand hygiene. These errors included not washing the back of the hands and between the fingers, and not allowing hands to dry prior to donning gloves. Of equal or greater concern, only 73% of paediatric residents cleaned their hands following the removal of PPE. This puts not just the healthcare provider themselves at risk, but also risks transmission of infection to everyone (e.g. patients, colleagues, visitors) and everything (e.g. doors, hand rails, elevator buttons) they come in contact with following contact with a potentially infected patient.


The prevention of nosocomial infections is increasingly becoming a priority for healthcare institutions, partly due to such initiatives as "Safer Health Care Now!" (14) and the 100,000 Lives campaigns (15). Ontario mandates the public reporting of some rates of nosocomial infection as part of the provincial government's accountability program. More and more resources are being committed to infection prevention and control education. This frequently involves education modules such as the IPCCCE. Though completion of the module allows the institution to document that it has done its duty in trying to educate workers, if there is no increase in effective use of infection control practices, the exercise is a waste of resources and leaves legislators and administrators with a false sense of institutional safety. In theory, examinees had been given the educational tools to appropriately use PPE.

In this study, it was expected that examinees would have great motivation to perform well, given that the timing of the OSCE was in the midst of the H1N1 outbreak. It was, therefore, alarming that performance was so poor. This begs the question of whether or not the IPCCCE program and N95 teaching were effective in teaching physicians about infection control. In our institution, the completion of these modules was tied to physician privileges: a physician could have been denied the ability to work if these modules had not been completed. With 1427 physicians in our institution

(including 699 residents and fellows), it is estimated that the completion of the modules required over 1000 physician hours. Assuming that seasoned physicians would perform as well as the medical residents, this single prong approach to education has proven expensive and inadequate.

Internet-based education is attractive for both practical and theoretical reasons. Compared with traditional programs, online learning may offer greater flexibility in training times, improved access, and greater adaptability to individual learner styles (3). Previous studies have shown that online learning courses can effectively transfer knowledge on PPE selection and removal, (5; 1). In these studies, healthcare staff were invited to participate in a structured observation of PPE use before and after completing an online module. In contrast to our study, participants were aware that they would be examined and observed prior to taking the online infection control course. It may be that the knowledge that one will be observed and evaluated was a more immediate and apparent motivator than the idea of infection prevention itself. While online teaching is convenient, it does not allow for practical skills. In addition, the threat of an infection may be too distant and conceptual an idea to motivate learners to retain the information while going through the online material.

We suggest that a more effective approach may be to observe the physician doing a trial of donning and removing PPE with constructive feedback immediately following the completion of the on-line modules. Recertification could perhaps be every two years. Another method such as the posting of donning and removing PPE wall posters outside patient rooms is another strategy in infection control. In this way, the steps in the proper use of PPE can be clearly followed, and need

not be committed to memory. These methods and others should be put to scientific testing to validate if they are effective ways to learn and if they result in the desired behaviours in healthcare professionals. 

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Donna Wiens, RN, BN, CIC
Présidente, CHICA-Canada

Rising to the challenge

For many years, CHICA-Canada members have been rising to meet and overcome the challenges of preventing and controlling healthcare-associated infections (HAI) and infectious diseases. We have faced SARS, pandemic influenza, the dramatic increase in antibiotic resistance, and increasingly virulent organisms. Every day we are challenged by inadequate resources, complex care systems, and the age-old problem of low hand hygiene rates.

Despite these challenges, MRSA rates are levelling off, influenza-like illness and other infectious diseases are recognized and controlled more quickly than in the past. Across the spectrum of healthcare organizations there is increased focus on preventing adverse events and improving quality of care. CHICA members have been at the forefront of the quality movement from the beginning. The number of infection prevention and control professionals has steadily grown in the last decade as HAIs have been recognized as a patient safety and quality issue.

For 35 years, CHICA-Canada has been our support as we rise to meet both everyday and new challenges. Dedicated staff and volunteers lead all facets of the organizations; chapters, interest groups, committees and the boards of directors. They work hard to ensure that member education, practice standards and communication supports are in place.

This year, CHICA has risen to the challenge of ensuring adequate resources are in place for our future. Late in 2010, the board set a plan in motion to cut expenses to end the trend of budget deficits which had eaten into our contingency funds. The plan was

successful in balancing the budget in 2011 (projected).

The next challenge was to have funds available for future growth and services to support members. Again, CHICA and its members rose to a difficult situation – the decision to increase membership fees so that we can move forward on our strategic goals. I listed some of the planned initiatives in my fall 2011 article.

What an honour it has been to serve as the president of an organization with so much heart and passion for our work! We are blessed with people who rise to whatever challenge comes along by working together and supporting each other. I am grateful to have worked with this group, who strive daily to be

the national and international leader in infection prevention. Thank you so much.

Now it is time for me to pass the torch to the new faces of CHICA-Canada, your new president, Jim Gauthier, and president-elect, Bruce Gamage. I see exciting times ahead as we grow for the future... which leads me to invite all of you to join us in my hometown, Saskatoon, as CHICA and SASKPIC host the 2012 national education conference, June 16-21, *Growing for the Future*. Watch for the registration brochure and updated program on the website in December – the scientific committee has created a stimulating experience for all of us. Come, learn, have some down-home fun! ☺



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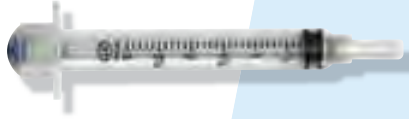
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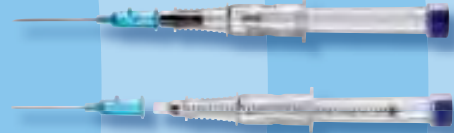
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À la hauteur des défis

Depuis de nombreuses années, les membres de CHICA-Canada se montrent à la hauteur des défis qui se posent dans la prévention et le contrôle des infections d'origine hospitalière et des maladies infectieuses, défis qu'ils ont relevés avec brio. Nous avons surmonté le SRAS, la grippe pandémique, l'augmentation fulgurante de la résistance aux antibiotiques et des organismes de plus en plus virulents. Chaque jour, nous devons composer avec le manque de ressources, la complexité des systèmes de santé et l'éternel problème que pose une hygiène des mains inadéquate.

Malgré ces difficultés, le taux de SARM se stabilise, les maladies qui ressemblent à la grippe et d'autres maladies infectieuses sont reconnues et contrôlées plus rapidement que par le passé. Dans tout le spectre des organisations de soins de santé, on met davantage l'accent sur la prévention de telles situations négatives et sur l'amélioration de la qualité des soins. Dès le début de ce mouvement en faveur de la qualité, les membres de CHICA se sont trouvés sur la ligne de front. Le nombre de professionnels en prévention et contrôle des infections a augmenté de façon régulière au cours de la dernière décennie, à mesure que l'on a reconnu que les maladies d'origine hospitalière constituaient un enjeu pour le patient, tant du point de vue de la sécurité que de la qualité des soins.

Depuis 35 ans, CHICA-Canada nous soutient dans nos démarches en vue de relever les défis quotidiens et les nouveaux défis qui surgissent. Le personnel et des bénévoles dévoués pilotent les multiples facettes de l'organisation : sections régionales, groupes d'intérêt, comités et conseil d'administration. Tous travaillent avec ardeur afin que les membres aient accès à de la formation, à des normes de pratique et à des services de communication.

Cette année, CHICA a relevé le défi de

voir à ce que les ressources adéquates pour l'avenir soient mises en place. À la fin de 2010, le conseil d'administration a entrepris de réduire les dépenses afin de contrer les déficits budgétaires, qui constituaient une tendance et ont grevé notre fonds de prévoyance. Cette démarche a porté fruit : 2011 marque le retour à l'équilibre budgétaire (projection).

Le défi suivant sur la liste consistait à garantir la disponibilité de fonds pour la croissance future et les services à fournir aux membres. Là aussi, CHICA et ses membres ont bien réagi devant cette situation difficile – la décision de hausser la cotisation des membres pour concrétiser nos objectifs stratégiques. Dans mon article de l'automne 2011, j'avais dressé une liste partielle des initiatives prévues à cet égard.

Quel honneur ce fut pour moi d'assumer la présidence d'une organisation qui met tant de cœur et de passion à soutenir notre travail! Nous sommes choyés de pouvoir compter sur des personnes prêtes à relever les défis, quels

qu'ils soient, collaborant les uns avec les autres et se soutenant mutuellement. Je suis reconnaissante d'avoir eu l'occasion de travailler avec ce groupe, qui s'efforce chaque jour d'agir en leader national et international dans le milieu de la prévention des infections. Merci beaucoup.

Il est maintenant temps pour moi de passer le flambeau à ceux qui représenteront le nouveau visage de CHICA-Canada : votre nouveau président, Jim Gauthier, et le président désigné, Bruce Gamage. J'entrevois des jours fort passionnants au fur et à mesure que l'organisation croîtra dans les années à venir... Ce qui m'amène à vous inviter à vous joindre à nous dans ma ville natale, Saskatoon, où CHICA et SASKPIC seront les hôtes du congrès national de formation, du 16 au 21 juin 2012, sous le thème *Growing for the Future*. La brochure d'inscription et le programme seront versés sur le site Web en décembre – le comité scientifique a concocté une expérience qui promet d'être très stimulante pour nous tous. Venez en grand nombre pour apprendre et vous divertir! ☺



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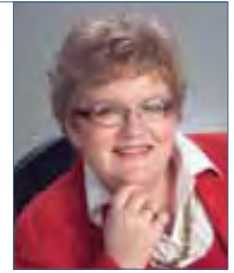


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Gerry Hansen, BA

Executive Director, CHICA-Canada

What is CHICA's role?

We recently received an email from a well-respected member of CHICA-Canada who has seen CHICA go through changes, challenges and successes over the years. She expressed concerns that CHICA's role as an educator of Infection Prevention and Control Professionals (ICPs) is being usurped by other organizations and agencies. Where does CHICA fit into all of this?

The board of directors considered her concerns and sent the following message back to her. We hope that this thoughtful response creates constructive dialogue amongst all our members. We look forward to hearing from you.

(CHICA-Canada) would like to be the association with the money, infrastructure, government support, and bling, but we are not. With a couple of exceptions, CHICA is all volunteers and we have to accept that the better funded organizations will be putting more out there and we may not always agree with it.


What can we do? Encourage members to point out errors in content when they attend these sessions. Double check content when it doesn't seem to agree with what they know (there could be a conflict or it may also be that they need to learn the new information). Continue to work with whatever boards/agencies we can when we can. The bottom line is to continue doing what can do and do it well.

CHICA's main purpose is to facilitate communication among IP&C professionals and act as their professional organization, promoting best practice and professionalism, and providing education to that group. We have always strived to partner with other organizations to promote excellence in infection prevention

in whatever way we can. In some ways we should see the efforts of these other organizations as a success for CHICA. Our ability to influence people to understand the impact of infection and the need for prevention has been vital to the work they undertake.

We collaborate with partners like CPSI and APIC because of exactly that – they have the bigger capacity to make things happen. We are certainly growing in profile and we want our members to see our logo there as a collaborating partner but we can only do what we can to ensure that education is being provided and that we are a part of it. We can offer important education opportunities in our own way and they are certainly growing. We have the ear and support of other organizations and agencies. We need to continue to present ourselves as a go to group for endorsement and expertise and inclusion in the planning of these initiatives.

CHICA does not have the corner on education nor on what best practices are or should be. The education content that ICPs use has usually been based on guidelines and standards from other agencies. We have worked together on how to move that out into the community and hospitals, making sure that Canadians are getting the best possible adherence to guidelines, or to say that the guidelines don't work for whatever evidence-based reason. We have never been alone in providing infection prevention and related education. Our public health colleagues have been providing these services far longer. Now other agencies have joined us in the fight against infection. That bodes well for the health of Canadians.

We need to continue to move forward steadily but carefully while still leaving our mark on Canadian health care. 

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CHICA-HANDIC Infection Control Week activities



CHICA-HANDIC provides financial assistance to chapter members to support Infection Prevention and Control Week activities. Members apply for the funding and receive \$100 which they typically use for prizes, refreshments, or supplies to create displays and poster boards. Each year CHICA-HANDIC members work hard to make IPAC fun and engaging. This year was no exception; here are some of our activities:

- **Joseph Brant Memorial Hospital** held an Amazing Race for Prevention that lasted from Wednesday-Friday. The goal was to target prevention using creative and interactive methods. This was followed by a midway-themed fair.
- **Norfolk General Hospital's** IPAC




Norfolk General Hospital's CEO receives her flu shot.

team provided different activities each day during IPAC Week. The activities included staff challenges on hand hygiene, PPE, and routine practices. In addition, flu shots were promoted and staff were asked to sign a hand hygiene pledge.

- **Niagara Health System, Grand River Hospital, and Macassa/Wentworth Lodges** created displays to provide IPAC education on various topics.
- **Grand River Hospital** celebrated housekeeping staff.
- **Cambridge Memorial Hospital** waged a week long War on Bugs. The events targeted staff, patients and visitors.
- **Central South Infection Control Network** issued daily newsletters,



Norfolk General Hospital's hand hygiene winners.

Infection Control...Timeless, featuring historical infectious diseases that are still significant today. An open house was held on Halloween that featured character interviews with special guests like Eleanor Roosevelt, Hippocrates, Dr. Leone Farrell, Edith the plague ship nurse, and Debari, an African orphan. The event was also attended by Dr. Christopher Ruttly, a medical historian, who brought his display on polio. 



Joseph Brant Hospital's Amazing Race participants.



Grand River Hospital's celebration for their housekeeping team.

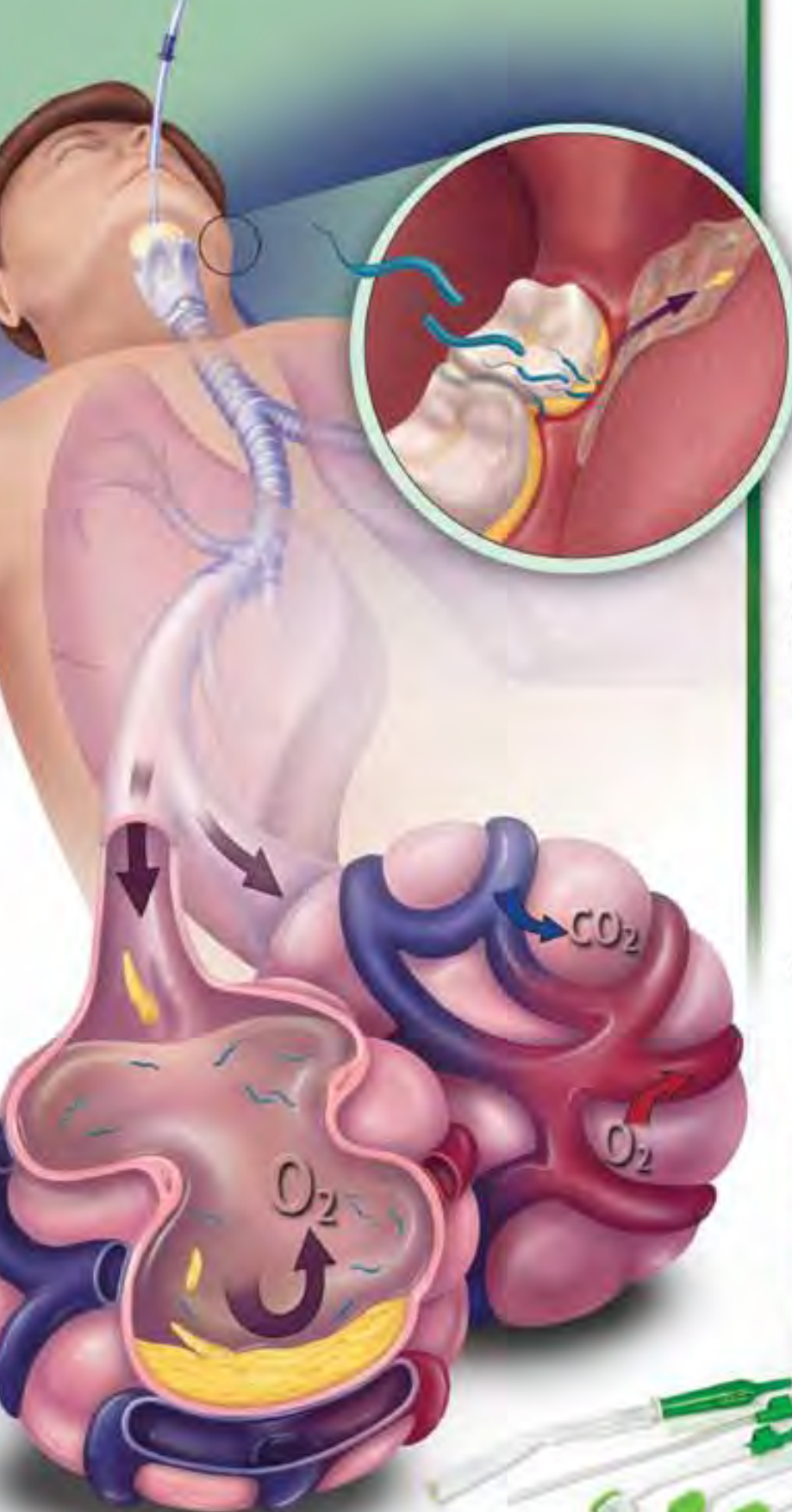
2012 VIROX TECHNOLOGIES SCHOLARSHIP

Through the financial support of Virox Technologies and their 2011 Partners Deb Canada, Diversey (JohnsonDiversey), Steris and Webber Training, 19 CHICA-Canada members were awarded scholarships to attend the 2011 CHICA National Education Conference in Toronto. CHICA-Canada and its members thank the 2011 Virox Technologies Partnership for their initiative to make the national education conference accessible to those who may not have otherwise been able to attend.

In partnership with CHICA-Canada, Virox Technologies will again provide scholarships to assist CHICA-Canada members with attending the 2012 National Education Conference in Saskatoon (June 16-21, 2012). The 2012 Virox Technologies Scholarship application is now online at www.chica.org.

The deadline for applications is January 31, 2012.





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1. GPR Trend Report (Dental), 3rd Qtr. 2010. Hospitalized patients based on last 8 quarters data.



Terrie B. Lee, RN, MS, MPH, CIC

2011 Certification Board of Infection Control and Epidemiology, Inc. (CBIC) President

The infection prevention and control expert as leader

I was fortunate to have the opportunity to work with a talented group of colleagues this year as the president of the Certification Board of Infection Control and Epidemiology (CBIC). All CBIC members, except for the consumer member and executive director, had obtained their Certification in Infection Prevention and Control (CIC®) before their appointment to CBIC. They have served as leaders for all those who hold or aspire to hold the CIC designation. This certification is a statement to the public, to their employer, to their peers, and coworkers, that they have mastered the essential knowledge required to provide competent infection prevention services. It's not surprising that CBIC members are required to earn their CIC designation in order to be considered for this leadership role; furthermore, many other leadership opportunities exist for certified professionals in infection prevention and control.


For example, most members of the CHICA-Canada board of directors are certified. Having certification gives IPs the confidence that comes from knowing they have been measured against current standards, and have been successful in passing the CBIC exam. One can identify many CHICA colleagues and leaders with the CIC designation.

Each certified IP has an opportunity to serve as a leader, and the need for leadership is ever-present. A manager or director of infection prevention at a healthcare organization is in one obvious leadership role; these individuals are responsible for setting goals, planning and prioritizing work, communicating agendas, implementing plans, directing others, and achieving long- and short-term objectives. However, many other certified IPs play critical leadership roles in an organization's infection prevention program. Those roles may include the following:

- Serving as a formal leader or member of a performance improvement team.
- Assisting with coaching others to obtain successful outcomes.
- Providing informal leadership with expert knowledge of infection prevention standards and data analysis.
- Coaching clinical care providers with application of standards to everyday practice to achieve optimal patient outcomes and improve organizational performance.
- Collaboratively leading with partners in infection prevention and realizing that greater success can often be achieved as a team, rather than by acting alone.
- Providing credible, understandable information to legislators and

regulators about healthcare-associated infection prevention methods.

- Helping to educate the public about their role in infection prevention by sharing information, for example, about the importance of vaccinations.
- Mentoring colleagues by setting the example of obtaining certification.
- Helping others improve their understanding of infection prevention standards and assisting them in preparing for their own achievement of the CIC® credential.

There are many reasons to achieve certification, and one of these is to serve as a confident and prepared infection prevention and control leader for any healthcare organization. As leaders, we have the opportunity to advance patient safety agendas and to improve the lives of those we work with and serve. Certification is commitment to excellence in infection prevention and to an improved future for all of our patients. I hope that you will join us in these exciting leadership opportunities. 

If you have questions about how to obtain your CIC®, go to the CBIC website: www.cbic.org, call the CBIC office at 414-918-9796, or email at info@cbic.org. You can also contact me directly at tlee@cbic.org.

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CHICA-CANADA Toys Practice Recommendations

Developed By: CHICA-Canada's Paediatric Interest Group, May 28, 2011

Published November 20, 2011

French document available at www.chica.org

Contacts: Louise Holmes, Chair CHICA-Canada Paediatric Interest Group (mlholmes@cw.bc.ca)
Laurie Streitenberger, Co-chair CHICA-Canada Paediatric Interest Group (Laurie.streitenberger@sickkids.ca)

Toys can be a reservoir for potentially pathogenic microorganisms that can be present in saliva, respiratory secretions, feces or other body substances. The purpose of this practice review is to provide infection prevention and control recommendations to ensure that patients, siblings and families have access to clean and safe play equipment and toys.

Toys referred to in this practice review include infant and toddler toys, dolls, games, books, puzzles, cards, craft supplies, electronic equipment and teaching toys/dolls. Therapeutic toys are *not* included.

Infection prevention and control practice recommendations for toys

1. Hand hygiene

- Before and after playing with toys, children should be encouraged or assisted to clean their hands with alcohol-based hand rub (ABHR) or soap and water.
- Playrooms should have access to both ABHR and a hand wash station.
- Play areas (e.g., physician's office) should have an ABHR station.
- Hand hygiene with ABHR must be supervised.

2. Toy materials/design

- Toys that are shared must be easily cleanable or dedicated to a single child.
- Toys should be nonporous and able to withstand rigorous mechanical cleaning.
- Smooth/non-textured toy surfaces are preferred, to facilitate cleaning.
- Water-retaining bath toys should not be used.

3. Frequency and responsibility for toy cleaning and disinfection

- There should be written procedures regarding the frequency and method for cleaning the toys.
- There should be assigned responsibility for cleaning and disinfecting toys.
- Staff cleaning and disinfecting toys should receive training.
- All toys should be cleaned and disinfected between users.

- Toys utilized or stored in individual patient rooms (including rooms where a child is on Additional Precautions) should be cleaned, at minimum, when visibly soiled and once per week. They should be cleaned sooner if a child has mouthed the toy.
- Playhouses/climbers should have their high touch surfaces cleaned on a daily basis. A thorough cleaning of the entire playhouse/climber should be done according to a regular schedule based on frequency of use and when visibly soiled.
- Shared electronic games, video equipment and computers should be cleaned between users. Computer keyboards should be either of the immersible type, have a keyboard cover or be made of a material that can be cleaned and disinfected. These should be wiped down prior to leaving the room (including the keyboard cover and all attachments). For a child on Additional Precautions, the items are to be assigned and terminally cleaned upon discharge or when precautions are discontinued.
- In waiting rooms, shared books, magazines, puzzles, cards and comics should be discarded when visibly soiled. These items should be dedicated to children on Additional Precautions and discarded afterwards if they cannot be cleaned.
- Toys should be removed from general waiting rooms if an adequate process cannot be established to ensure their daily inspection, cleaning and disinfection.

4. Toy storage

- Playrooms or play areas that are used by more than one child should have an area for segregation of dirty toys (e.g., a bin into which children/parents/staff can place used toys).
- Clean toys should be stored in a manner that prevents contamination (e.g., dust and water splatter) and


should be clearly marked as clean.

- Toy storage boxes/cupboards should be emptied and cleaned weekly or when visibly soiled.

5. Procedure for toy cleaning and disinfection

- Toys must be inspected for damage, cracked or broken parts, as these may compromise cleaning. Any toy that is found to be damaged, cracked or broken should be discarded.
- Toys must be cleaned according to the manufacturer's instructions or local practices (e.g., in hot, soapy water) prior to disinfection.
- Disinfection options include:
 - Use of a commercial dishwasher/cart washer (must reach 82°C).
 - Hospital-grade, approved low-level disinfectant (follow manufacturer's recommendations regarding dilution and contact times).
 - 70% alcohol solution.
 - 1/100 dilution of sodium hypochlorite (bleach).
- Ensure that the disinfectant being used is safe and suitable for the intended purpose and that the manufacturer's directions for dilution and contact times are followed.
- If a disinfectant is used, toy must be rinsed thoroughly prior to use.
- Allow toys to air-dry prior to storing.

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3. Hale CM, Polder JA. The ABC's of Safe and Healthy Child Care: A Handbook for Child Care Providers. Atlanta, GA: Centers for Disease Control and Prevention; 1997. 



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BRUCE GAMAGE, PRESIDENT-ELECT



Bruce Gamage, RN, BSN, CIC is Manager, Provincial Infection Control Network – BC. He has been in infection prevention and control and a member of CHICA-Canada for 14 years. He reports to the co-directors of PICNet and provides overall management and coordination of the PICNet Management Office. He is responsible for facilitating

a provincial program focused on the prevention and control of healthcare-associated infections. He oversees network operations including coordination of all committees, groups, and projects including financial and contract management. He is the media spokesperson for issues related to infection prevention and control. Bruce obtained his bachelor of science (microbiology) and bachelor of science in nursing from the University of British Columbia. He successfully completed certification in infection control and epidemiology (CIC) in 1999 and has recertified in 2004 and 2009. He is a member of CHICA British Columbia, having held the position of president in 2000-2001. He has co-chaired the CHICA-Canada Network of Network Interest group since 2007. He previously served on the CHICA-Canada board of directors in 2001-2006 as Director of Programs & Projects.

Philosophy: *With a background in both microbiology and critical care nursing and certification as an infection control professional, I have a wealth of experience in the practice of infection prevention and control. In the past four years I have honed my communication and networking skills to provide strong, province-wide leadership as manager of the Provincial Infection Control Network of British Columbia. Working with the broader infection prevention and control community, I am committed to bringing excellence in principles, resources, and education to all areas across the continuum of healthcare. I look forward to the opportunity to expand my contributions to CHICA-Canada both nationally and internationally.*

MICHAEL GARDAM, PHYSICIAN DIRECTOR



Michael Gardam, MSc, MD, CM, FRCPC is the current Physician Director of CHICA-Canada. He has served since 2009, and has been re-elected for a second term. His responsibilities are to advise the board on scientific and clinical matters in infection prevention and control and infectious diseases, as well as to represent CHICA-Canada at

Accreditation Canada and, with the president of CHICA-Canada, to media. He has supported CHICA-Canada through participation on national committees, and has made many presentations at CHICA-Canada conferences, chapter events, and other educa-

tional opportunities. He is chair of the CHICA-Canada Corporate Relations Committee. Dr. Gardam is Medical Director of the Infection Prevention and Control Unit at University Health Network, Toronto, with clinical responsibilities for TB and infectious diseases. He has led several Safer Healthcare Now! initiatives and currently is chair of the Stop Infections Now! Collaborative. He is also the lead for infection control resource teams in Ontario, and leads a large infection control consulting team. He oversees several active research projects.


Philosophy: *I got into infection control because I wanted to make a difference in patient lives. Patients trust us, and unfortunately we sometimes unwittingly cause infections that they did not need to get. This needs to stop. Being a member of CHICA and holding this position is one of the ways that I can help improve our patient safety record.*

JUDI LINDEN, DIRECTOR OF FINANCE



Judi Linden, RN, BN, COHN(C), CIC has been elected to her second term as Director of Finance. She is addressing the challenges of a growing association and its financial demands. Judi has been an infection control professional for 28 years, and a CHICA member for 20 years. She is currently the Regional Infection Prevention and Control Coordinator at the Regional

Health Authority (RHA) of Central Manitoba. Her responsibilities include providing IP&C resource to RHA Central facilities and programs, developing training and education programs, and acts as a resource to RHA Central community programs. She is a founding member of the Provincial Network of Infection Control Practitioners. She received her baccalaureate degree in nursing from the University of Manitoba and is certified in infection control, occupational health and medical device reprocessing techniques. An active member of CHICA Manitoba, Judi has served as chapter president and has chaired many chapter committees.

Philosophy: *Working within a rural setting is challenging. Through CHICA I have built strong relationships with professionals from a wide range. These passionate and accomplished professionals have been, and continue to be, of great value and assistance, demonstrating leadership while promoting the prevention and control of infection. Their example has strengthened in me the desire to give back to the organization. I have spent the past three years in the challenging role of CHICA-Canada's Director of Finance, and I am excited to continue. The financial challenges ahead will be less daunting through the collaborative efforts and commitment of members involved locally and nationally. Ongoing financial support through membership fees and conference involvement, together with support from our industry partners, will allow us to move forward in the commitment to improve health and promote excellence. *



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Antimicrobial Stewardship

The following article was written by CHICA-Canada members Christopher Okeahialam and Dr. Michael Gardam for Antibiotic Awareness Day 2011. This and other fact sheets can be found at antibioticawareness.ca

Antimicrobial stewardship can be described as a process or system that ensures patients receive the right antimicrobial agent for their illness, at the right time, and for the right length of time. The global consensus is that much of antimicrobial prescribing is unnecessary or sub-optimal, and that practice in Canada is no exception.


A number of factors have been shown to be associated with inappropriate antimicrobial use. These include: insufficient knowledge of infectious diseases; optimal antimicrobial dosing and duration; and limited appreciation of adverse effects among prescribers. Patient demand or expectation for antimicrobials may also contribute to their misuse. This may be particularly applicable to the general practice setting where physicians may not always have the time to discuss the appropriateness of antimicrobials with their patients.

To date antimicrobial stewardship programs (ASPs) have employed two core strategies: 1) Formulary restriction and preauthorization; and 2) Prospective audit with intervention and feedback. ASPs may also include supplemental strategies such as education, implementation of guidelines and clinical pathways, streamlining or de-escalation of therapy, dose optimization, parenteral to oral conversion, and computer-assisted decision support.

The patient safety and cost benefits of ASPs are sufficiently evident to support their implementation in healthcare facilities; essentially savings in antibiotic use typically pay for the stewardship program. Nevertheless studies indicate a variety of implementation barriers that may operate at both the individual (healthcare professional) and organizational level. Therefore a healthcare setting wishing to introduce a stewardship programme would be well advised to seek input from key stakeholder groups including physicians in order to establish up a system that is sufficiently sensitive to local conditions to be effective within that setting. Bluntly put, a heavy-handed approach to changing prescribing practices will likely fail to make an impact even though the advice is scientifically sound.

At the present time the majority of ASPs exist in acute care hospitals and in these settings are limited to only a few departments such as intensive/critical care. Where ASPs are non-existent, lack of funding and personnel are the most frequently cited barriers. It could be argued, however, that such barriers are sometimes more apparent than real. The fact is that at least some elements of antimicrobial stewardship could feasibly be introduced to any healthcare setting without necessarily requiring extensive financial or other resource commitment. For example, setting up a process to review positive blood cultures to ensure patients are on appropriate antibiotics, or identifying inappropriate antimicrobial combinations e.g., 2 IV anti-anaerobic agents. In addition a hospital pharmacy replacing its open formulary with one that aligns with local susceptibility data would be making

an effective and important step towards antimicrobial stewardship. Healthcare settings lacking an infectious disease physician or pharmacist trained in infectious diseases may initially need to engage an external consultant to assist with this implementation. The associated costs would well be absorbed by the long term savings in antimicrobial expenditure.

In summary antimicrobial misuse is a Canadian and global reality that has been shown to be related to the emergence and persistence of multidrug-resistant bacteria in hospital and community settings and undoubtedly causes patient harm and unnecessarily increases healthcare costs. Antimicrobial prescribing is a complex phenomenon that may be related to the norms of a specific healthcare context as well as individual physician perceptions and preferences, and stewardship interventions will need to take this into consideration. 

Christopher Okeahialam, MSc, CIC is Infection Control Manager at Toronto Rehabilitation Institute. Dr. Michael Gardam, MD, CM, MSc, FRCPC is Director of the Infection Prevention and Control Unit at University Health Network, Toronto. Dr. Gardam is Physician Director of CHICA-Canada.

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CHICA-Canada and its members have long understood the value of certification in our special field of practice. Certification displays to our employers, co-workers and the public that we have attained a certain level of expertise, demonstrated our knowledge during the testing process and place importance on continued learning and skill enhancement. Certification increases our credibility and demonstrates our commitment to enhancing the professional association to which we belong.

The following list, provided by the Certification Board of Infection Control, names those who have obtained or renewed their Board Certification in Infection Prevention and Control (CIC) from June 1-November 1, 2011. Congratulations to all of you for taking this important step to further your careers – we celebrate your success!

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Barbara A. Long, CIC, Windsor, ON
Dawn Major, CIC, Parry Sound, ON
T. Christine Moore, CIC, Toronto, ON
Deborah M. Paton, CIC, Barrie, ON
Lyne St. Martin, CIC, Blainville, QC
Laurie Streitenberger, RN, BSc, CIC, Toronto, ON
Katherine Ursula-Ann Wadas, CIC, Beaconsfield, QC
Rhoda M. Wiens, CIC, Edmonton, AB 

CHICA-CANADA online novice infection prevention and control course

SEPTEMBER 2012-JUNE 2013

In September 2012, CHICA-Canada will once again be offering the Novice Infection Prevention and Control (IP&C) course.

Preference for admission to this interactive online distance education course will be given to the novice infection prevention and control practitioner (less than two years' experience) currently working in IP&C. Applications will also be considered from others working in healthcare and/or exploring opportunities in IP&C.

The course consists of six modules and a 12-hour practicum. The duration of each module is approximately one month with a week break between modules. There is a longer break scheduled over the December holiday period. The course will run from September 2012-June 2013.

Student evaluation consists of online discussions, a final take-home exam, and may include assignments. Graduates will receive a certificate of completion from CHICA-Canada on successful completion of the six modules (with a minimum grade 65% in each module) and successful completion of the practicum.

Students must be able to dedicate 12-15 hours per week to read course material, participate in discussions, and complete assignments and exams.

Please refer to <http://www.chica.org> for a detailed description of course content, schedule, and tuition.

Tuition: Tuition is \$1700.00 CDN for all six modules and the practicum. Tuition is paid in two installments of \$850.00 due August 1, 2012 and \$850.00 due February 1, 2013. Tuition can be paid through post-dated cheques or credit card (VISA, MasterCard or American Express).

Inquiries: Questions about the course should be directed to Heather Candon or Jane Van Toen, CHICA-Canada Course Coordinators at hcandon@baycrest.org or jvantoen@baycrest.org.

Application: Interested individuals should complete the application form located on the CHICA website and submit to either hcandon@baycrest.org or jvantoen@baycrest.org. Completed application forms should be forwarded no later than **March 23, 2012**. Students will be notified of their acceptance by mid-June. A waitlist will be maintained and late applications may be accepted if space is available. Spaces are limited and competitive so apply soon!

Community and Hospital Infection Control Association
PO Box 46125 RPO Westdale, Winnipeg MB R3R 3S3
Telephone: 1-866-999-7111/Fax: 1-204-895-9595
<http://www.chica.org>

IFIC continues with its aim to provide up-to-date, scientifically sound tools and educational materials that can be used by professionals the world over. A new edition of *IFIC Basic Concepts of Infection Control* is now available on its website. Most chapters have been reviewed and brought up to date by an international panel of experts, and new ones have been added to ensure it provides a sound comprehensive knowledge base. <http://www.theific.org>.

IFIC 2012 Congress Scholarships

IFIC invites applications for scholarships to the Twelfth Congress of the International Federation of Infection Control (IFIC2012) to be held in Zagreb, Croatia October 10-12, 2012.

One full scholarship will be granted, consisting of:

- free registration to the conference
- travel expenses (based on the cheapest economy itinerary)
- accommodation on bed and breakfast basis to cover the full duration of the conference.

In addition a number of smaller bursaries will also be awarded, covering:


- free conference registration
- accommodation on bed and breakfast basis to cover the full duration of the conference.

In addition, all scholarship and bursary recipients will also be invited to submit a write-up of their paper/poster (at least 1500 words in English) by the end of July 31, 2012. If it is deemed to be satisfactory for publication in the *International Journal of Infection Control* (www.ijic.info), an additional award of €200 will be made at the conference.

Abstracts will be assessed on the following criteria:

- i. Is the subject directly related to infection prevention and control (IPC) rather than infectious diseases/therapeutics/diagnostic microbiology?
- ii. Is the topic equally applicable to low resource backgrounds/developing countries?
- iii. How innovative are the aims?
- iv. Are the methods/interventions clearly stated and reproducible?
- v. Are the results presented accurately?
- vi. Are the correct conclusions reached?
- vii. Does the abstract present information that other delegates will find useful to improve their own IPC practice?

Only online applications will be accepted, which must be submitted at: <http://www.theific.org/scholarship2012.asp>.

Closing date for submission is 15 April 2012. 

2012 CHAMPIONS OF INFECTION PREVENTION AND CONTROL

In collaboration with 3M Canada, CHICA-Canada has developed the prestigious Champions of Infection Prevention and Control Award. The 2011 recipients were Pat Piskowski and Marion Yetman who received their awards at the 2011 conference. Applications are being accepted for the 2012 Champions of Infection Prevention and Control Award. This award will acknowledge the extraordinary accomplishments of the front line Champions of Infection Prevention and Control. The Award will recognize CHICA-Canada members who work beyond what is expected as part of their employment, tirelessly, and creatively, to reduce infection, raise awareness, and improve the health of Canadians. Awards will be presented at the 2012 National Education Conference in Saskatoon. The deadline for the 2011 nominations is **March 1, 2012**.

Award criteria and nomination form has been posted to www.chica.org.



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2012 National Education Conference – June 16-21, 2012, Saskatoon, SK



See the Preliminary Program at www.chica.org.

Registration brochure to be posted in December 2011 and distributed in January 2012.

2012 Host Chapter – CHICA Saskatchewan Professionals in Infection Prevention and Control (CHICA SASKPIC)

CONFERENCE HOTELS

Deadline date for reservations: May 12, 2012

Mention Community and Hospital Infection Control Association when making reservations. Plus 5% GST, 5% PST and 2% Destination Marketing Fee. **Rates to be confirmed November 2011**

Hotel	Rate	Reservations	Website
Hilton Garden Inn Headquarter Hotel	\$209.00 Single/Double \$309.00 Spa, King	1-306-244-2311 1-877-STAY-HGI	www.hiltongardeninn.hilton.com
Delta Bessborough	\$209.00 Single/Double	1-306-244-5521 1-800-268-1133	www.deltahotels.com/en/hotels/saskatchewan/delta-bessborough
Radisson Hotel Saskatoon	\$154.00 Corner Queen \$149.00 Queen/Queen	1-306-665-3322 1-800-333-3333	www.radisson.com/saskatoon-hotel-sk-s7k6x6/sksaskat
Sheraton Cavalier Saskatoon	\$199.00 Single/Double	1-306-652-6770 1-800-325-3535	www.sheratoncavaliersaskatoon.com

YOU COULD WIN FREE HOTEL ACCOMMODATION!

The Hilton Garden Inn, the Sheraton Cavalier, the Delta Bessborough, and the Radisson Hotel Saskatoon have been chosen as the guest hotels for the CHICA-Canada National Education Conference (Saskatoon, June 16-21, 2012). If you register at any of the designated guest hotels before the deadline of May 12, 2012 and complete your stay, you will qualify to WIN the cost of your stay FREE (maximum three nights)!

The winner will be randomly chosen from the hotel guest lists of those who have stayed at one of the guest hotels for the conference. The winner will be announced at the Closing

Ceremonies, June 21, 2012.

The winner will have their room and taxes PAID, for a maximum of three nights' accommodation. The cost for up to three nights at one of the official conference hotels will be credited to the credit card used to book the stay. This prize is not transferrable.

This prize applies only to the winner's stay at the one of the four guest hotels for the duration of the conference and does not apply to any coupon for a future stay at any of the hotel brands.

GOOD LUCK!

CALL FOR ABSTRACTS

Abstracts are to be submitted online through www.chica.org. Abstract guidelines available in Preliminary Program, www.chica.org.

Deadline for submission:
February 24, 2012

SPECIAL EVENT

Saskatoon Western Development Museum
A Walk Through Boomtown
Wednesday, June 20 2012
6:00-11:30 p.m. (to be confirmed)

Cash bars/light refreshments in Boomtown
BBQ dinner: family style
Entertainment: dancing
Buses to leave all four hotel sites, starting at 6:00 p.m., returning at approx. 11:30 p.m.
Special event fee TBA.

2012 SCIENTIFIC PROGRAM COMMITTEE

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2012 Scientific Program Chair

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Wascana Rehabilitation Centre
Regina, Saskatchewan

Moira Walker Memorial Award for International Service



About the International Service Award

This award honors an individual or group that has demonstrated extraordinary

efforts to bring about change or improvement related to infection prevention and control in parts of the world that are under developed or under resourced. The annual award is in honour of Moira Walker, RN, CIC, a Past President of CHICA-Canada and Past Honourary Secretary of the International Federation of Infection Control. Moira's life was dedicated to enhancing the physical and spiritual health of her many friends and colleagues.

Nomination guidelines

- **Who is eligible**
Preferred: Current CHICA-Canada members in good standing. The award may be presented to individuals, prior nominees, or a group of individuals, but not past award recipients, who have demonstrated international cooperation in the field of infection prevention and control or public health. Fundraising efforts alone will not be sufficient criteria for this award.
- **Who may nominate**
Any member of CHICA-Canada may submit a nomination. The CHICA-Canada Board of Directors (the Board) also has discretion to name an award winner in the event nominations do not result in a winner of the award. The nomination form is available at www.chica.org (Opportunities).
- **How to nominate**
A completed nomination form and covering letter outlining the nominee's projects that have resulted in this nomination must be forwarded to the Membership Services Office no later than March 1st of each year.


- **Selection process**
The nomination forms and covering letters will be summarized by the Executive Director and forwarded to the Board for review. The Board will select the recipient(s).

Award

A plaque that will include a First Nations and Inuit art theme and the CHICA-Canada logo. The plaque will announce the recipient's award. In addition, award winner(s) will be provided with a complete

waived registration for the national education conference at which the award is presented. In the case of a group award, one representative of the group will be provided a complete waived registration.

Announcement and presentation

The award winner(s) will be advised by May 1 of each year. The award will be presented at the Opening Ceremonies of the CHICA-Canada National Education Conference. 

2012 ECOLAB® POSTER CONTEST

An annual poster contest is sponsored by Ecolab and supported by a chapter of CHICA-Canada to give infection prevention and control professionals (ICPs) an opportunity to put their creative talents to work in developing a poster which visualizes the Infection Control Week theme.

YOU ARE INVITED to design a poster that will be used for Infection Control Week 2012 using the following theme:

Spread Knowledge, Not Infection



Prize: Waived registration to 2012 CHICA-Canada National Education Conference or \$500.

REMINDER: Posters should have meaning for patients and visitors as well as all levels of staff in acute care, long term care and community settings. The poster should be simple and uncluttered, with strong visual attraction and few if any additional words.

Judging will be on overall content. Artistic talent is helpful but not necessary. The winning entry will be submitted to a graphic designer for final production. Your entry will become the property of CHICA-Canada.

HOST CHAPTER: CHICA New Brunswick/Prince Edward Island

Send submissions to:

Submissions will only be accepted by email.
chicacanada@mts.net or chicacanada@mymts.net

Submission format:

Electronic file in Word or PDF format only.
File size: must print out to 8.5"x11.0" paper
Name, address and telephone number must be included in the covering email. DO NOT include identifiers in the poster submission.

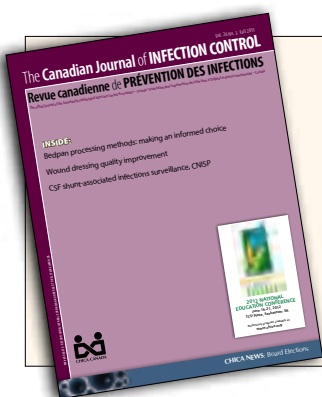
DEADLINE: January 31, 2012



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AMG Medical Inc.	IBC	(800) 363-2381	Info@medprodefense.com	www.medprodefense.com
Angus Medical, Inc.	226	(866) 418-1689	bruce.robertson@angusmedical.com	www.angusmedical.com
Association for Professionals in Infection Control & Epidemiology, Inc.	242	(202) 789-1890	apicinfo@apic.org	www.apic.org
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Glo Germ Company	263, 265	(800) 842-6622	moabking@gmail.com	www.glogerm.com
GOJO Industries, Inc.	258	(800) 321-9647	healthcare@GOJO.com	www.GOJOCanada.ca
Hygie Canada Inc.	281	(866) 588-2221	mbelanger@hygiecanada.com	www.hygiecanada.com
Johnson & Johnson (Ethicon, Inc.)	274	(905) 946-3685	ksingh8@ITS.JNJ.com	www.jjmp.ca
Medco Equipment, Inc.	280	(800) 717-3626	medcoequipment@msn.com	www.medcoequipment.com
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Medline Canada Corporation	231	(800) 396-6996	canada@medline.com	www.medline.ca
Metrex Corp.	276	(800) 841-1428	steve.fanning@metrex.com	www.metrex.com
Palmero Health Care	278	(800) 344-6424	info@palmerohealth.com	www.palmerohealth.com
Professional Disposables International, Inc.	268	(845) 365-1700	info@pdipdi.com	www.pdipdi.com
Retractable Technologies, Inc.	264	(888) 703-1010	rtipr@vanishpoint.com	www.vanishpoint.com
Sage Products Inc.	270	(800) 323-2220	jdiedrich@sageproducts.com	www.sageproducts.com
SciCan Ltd.	266	(800) 667-7733	aschalk@scican.com	www.scican.com
STERIS Canada Inc.	257	(800) 661-3937	ian_pequegnat@steris.com	www.steris.com
The Clorox Company of Canada Ltd.	225,228	(800) 499-1210	Maurica.MacDonald@clorox.com	www.cloroxprofessional.com
The Stevens Company Limited	250	(800) 268-0184	stevens@stevens.ca	www.stevens.ca
Vernacare Canada Inc.	243, 252	(800) 268-2422	glenn_duncan@vernacare.com	www.vernacare.com
Virox Technologies Inc.	IFC, 260-261	(905) 813-0110	info@virox.com	www.virox.com
Wood Wyant Inc.	251	(819) 758-2889	jessie.harding@woodwyant.com	www.woodwyant.com



To reach infection control professionals across Canada through the *Canadian Journal of Infection Control* and its targeted readership, please contact me directly at
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Methods of using the DAZO fluorescent marking gel may be covered by one or more of US Patent Nos. 7,718,395; 7,780,453; and 7,785,109.

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