



**COMMUNITY & HOSPITAL INFECTION CONTROL ASSOCIATION - CANADA  
ASSOCIATION POUR LA PRÉVENTION DES INFECTIONS À L'HÔPITAL  
ET DANS LA COMMUNAUTÉ - CANADA**

**Infection Prevention and Control Core Competencies for  
Health Care Workers:  
A Consensus Document  
Compiled by: Dr. Elizabeth Henderson**

**Authors: Elizabeth Henderson, PhD,  
Calgary Health Region and University of Calgary,  
CHICA-Canada Education Committee and  
Members from CHICA-Canada Chapters**

**Contact Information:  
Elizabeth Henderson  
Epidemiologist, Infection Prevention and Control,  
Calgary Health Region  
And  
Associate Professor  
Community Health Sciences  
University of Calgary  
AGW5, 1403-29<sup>th</sup> Street, NW  
Calgary, Alberta  
T2W 2T9**

**Telephone: 403-944-4373  
Fax: 403-944-2484  
elizabeth.henderson@calgaryhealthregion.ca**

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## **ABSTRACT**

Since SARS, concerns have been raised about the education of health care workers in infection control. The purpose of this project was to develop a Canada-wide consensus on a set of common core competencies in Infection Control that apply to all health care workers.

CHICA-Canada Chapters were asked to develop a set of competencies they felt were essential information that a health care worker involved in patient care needed to allow them to work safely and also to prevent transmission of organisms in their institution. The compiled list of competencies was made available for input by individual and groups of infection control professionals. Competencies identified by 80% of responses were included.

A list of competencies was submitted from 37% of the Chapters. The competencies were compiled and categorized into: basic microbiology, hand hygiene, routine practices and transmission-based precautions, personal protective equipment, personal safety, sterilization and disinfection and critical assessment skills. Consensus (100%) was reached for 86% categories. Critical assessment skills category was the only category not listed by all participating Chapters. Input was received from 78 individuals and groups.

There was a high degree of consensus among Canadian infection control professionals. This bodes well for our next challenge of developing a infection control training program for front-line workers that is successful in providing workers with the tools they need to protect themselves and their patients. The infection control community has a substantial amount of work to do to accomplish this task.

## **INTRODUCTION**

Since the SARS outbreak, significant concerns have been raised about the education of health care workers (HCWs) in Infection Prevention and Control.<sup>1-6</sup> Fear of acquiring infections from patients and associated occupational related stress was found during the outbreak and has become rampant among health care workers.<sup>7-9</sup> To address these problems, a comprehensive package with clear learning objectives needed to be developed for the education the health care workers in Infection Control. While different competencies are needed for different kinds of health care workers, the first step in developing an education package would be to develop a set of common core competencies that apply to all health care workers. The basic core competencies would then serve as a platform for adding occupation specific competencies.

The purpose of this initiative was to develop a Canada-wide consensus on a set of common core competencies in Infection Control that apply to all health care workers. The basic core competencies would then serve as a platform for adding occupation specific competencies. The objective was to identify the specific competencies health care workers need to be able to protect themselves in their working environment as well as protecting their patients. There was no attempt to identify who was responsible for ensuring health care workers met these competencies. Some competencies fall directly within the purview of infection control while others were outside. Once a consensus was reached, these competencies will be used to develop training for existing health care workers and will be distributed to institutions across Canada for integration into training programs for future health care workers.

## **METHODS**

Input was obtained in 2 phases of the project. In Phase 1, each CHICA-Canada Chapter was asked to identify and define a set of competencies they felt were essential information that a health care worker involved in patient care needed to allow them to work safely and also to prevent transmission of organisms in their institution. A comprehensive list of competencies from the CHICA-Canada Chapters was compiled from those submitted and the competencies were grouped into major categories.

In Phase 2, the compiled list of core competencies was made available to individual and groups of infection control professionals for input in 2 venues. The first venue was at the annual conference hosted by CHICA-Canada where the competencies were presented by poster and by forms distributed at the Annual General Meeting in May 2005. Following the conference, the compiled list was posted on CHICA-Canada website to allow individuals who did not attend the conference to have input. Infection control professionals were asked to comment on the content of the individual competencies as well to indicate if they felt the competency was an essential component of health care workers training in infection control. Responses were submitted anonymously. Most responses indicated if it was a group or an individual response. Those responses not identified as either was assumed to be a response from an individual.

The responses were collated and competencies that were identified by 80% of the Chapters and participating CHICA-Canada members were automatically included in the core competencies.

Figure 1 shows the process used to obtain consensus from infection control professionals across Canada.

Health care workers were defined as all persons carrying on a specific activity in a health care facility including employees, physicians, students, volunteers, and contract workers. For the purposes of this project, a competency was defined as the knowledge and expertise in Infection Control that was sufficient for a health care worker involved in patient care to protect themselves, their patients and their families from infections.

## **RESULTS**

A list of core competencies that were considered to be essential for health care workers involved in patient care were developed by the members from individual CHICA-Canada Chapters and were submitted and compiled. Consensus documents were submitted by the members from 7 of the 19 (37%) of the regional CHICA-Canada Chapters (listed in alphabetical order).

1. British Columbia Professionals in Infection Control (BCPIC)
2. Eastern Ontario Professionals in Infection Control (EOPIC),
3. Northern Alberta Professionals in Infection Control (NAPIC),
4. Southern Alberta Professionals in Infection Control (SAPIC),

5. Southern Ontario Professionals in Infection Control (SOPIC)
6. Toronto Professionals in Infection Control (TPIC)
7. Vancouver Island Professionals in Infection Control (VIPIC)

After compiling the original list of competencies the competencies were then placed in several major categories as follows: basic microbiology, hand hygiene, routine practices and transmission-based precautions, personal protective equipment, personal safety, sterilization and disinfection and critical assessment skills. Based on the individual lists submitted by the Chapters, total consensus was reached for 6 of 7 (86%) categories. The critical assessment skills category was the only category that was not listed by all the participating Chapters as an essential competency for health care workers. Only 2 of 7 (29%) of the participating Chapters included competencies that fell into this category.

Phase 2 of the project included input from the members from several sources. A total of 78 responses were received from both individuals and groups with infection control expertise. The majority of responses (69 of 78; 88%) were obtained from those who attended the 2005 National Education CHICA-Canada Conference held in Winnipeg in May 2005. Conference attendees had several opportunities to provide input; the information was posted on a poster with forms for input and forms for input were distributed to all attendees at the town hall meeting. After the conference, the competencies were posted on the CHICA-Canada web-page in August 2005 for input from CHICA-Canada Chapters and members. Additional responses were submitted by 9 (of 78; 12%) groups of infection control professionals from across Canada. The overall response rate could not be determined because some responses were from groups while others were from individuals.

Table 1 shows the area of competency, the competency category, the detailed core competencies within each category and the level of consensus reached for each competency.

## **DISCUSSION**

This project is the first step in the process of developing a comprehensive education package in infection prevention and control that will teach health care workers how to protect themselves while also protecting their patients from acquiring infections. There was a high degree of consensus among Canadian

infection control professionals about what should be included in the competencies. This bodes well for our next challenge of developing an Infection Control training program for health care workers.

Six of the seven areas of competency identified were self evident to experts in infection control. These were basic microbiology, hand hygiene, routine practices and transmission-based precautions, personal protective equipment, personal safety, and sterilization and disinfection. Complete consensus was obtained for these, however, it is important to understand that they do not stand-alone. Each area is inter-linked with the others. For example, an understanding of basic microbiology is the key to developing appropriate practices in the other areas of competency. Both hand hygiene and personal protective equipments are stand-alone areas of competency each requiring a unique sets of skills and knowledge. However, both are also essential components of routine practices and transmission-based precautions and personal safety.

The final area of competency, critical assessment skills, was less self-evident to infection control professionals in Canada. Components for this area of competency were only identified by 2 of the 7 CHICA-Canada Chapters who submitted their list competencies and membership consensus was 86%. However, the need to use critical assessment skills related to exposure and management to infectious agents is essential for all health care workers. Critical assessment skills form the foundation for the application of the knowledge and skills that are developed through the other six areas of competency. The assumption is that skill in assessing a given situation is the underlying theme for teaching the applications of all other areas of competency. This assessment skill may be as simple as knowing when to ask a question about an infection control practice or as complex as assessing a patient and determining the appropriate transmission-based precautions to implement.

Studies published following the worldwide SARS outbreak show that many of the health care workers who developed SARS became infected because they failed to use routine practices such as hand hygiene and did not know how to remove personal protective equipment without contaminating themselves.<sup>1-7</sup> Worldwide, 1707 of the 8098 (21%) SARS cases reported during the outbreak occurred in front-line workers who cared for SARS patients.<sup>2</sup> SARS caused a significant number of deaths in health care providers.

As a result of SARS, health care workers are developing work stress related to the fear of exposure to infectious agents and how to manage their work during an outbreak while protecting themselves. Several

studies have shown that health care workers are subjected to feelings of fear and are suffering significant stress related to their potential exposure to infectious risk in the course of their routine duties.<sup>7-9</sup> Providing health care workers with the tools to assess their situation and to be confident in the infection control measure they can use to protect themselves will go a long way towards relieving work related stress and fear of exposure to infectious agents. The skills needed to critically assess a situation play a vital role in the use of proper infection control practices both routinely and in an emergency and their importance must not be underestimated.

In developing a pan-Canadian consensus on the essential infection control core competencies for health care workers, we have taken the first step in developing comprehensive infection control training. While this project represents a significant step forward in providing front-line workers with infection control training, it may well have been the easiest to accomplish. The next step will be developing training programs based on the core competencies.

Both during SARS and in the routine of delivery of care, front-line workers fail to adhere to proper infection control practices; however, it is unlikely this failure was the result of lack of training in proper infection control practices. In Canada, Infection Control Professionals generally spend between 30% and 40% of their time in-servicing health care workers on the use of proper infection control practices. The most common topics covered include hand hygiene, routine practices and transmission-based precautions, use of personal protective equipment and the other areas of competency. It is clear that, despite repeated training, front-line workers still do not understand the principles of good infection control practices or if they do understand they cannot integrate that knowledge into their practice.

The questions that arise are three-fold. Why do front-line workers lack confidence in basic infection control practices as a means to protect them from infectious risk? Why are front-line workers failing to learn the basic principles of infection control practice? How do infection control professionals overcome staff inertia that is the result of complacency (i.e. I already know this) or denial (i.e. if I ignore the problem, it will go away) about infection control practices and effectively engage front-line workers in learning what they need to know to

protect themselves and can practice those skills effectively? These are the challenges we face as we move forward in developing training programs for health care workers.

Health care worker complacency about good infection control practices and their expressed fear of infectious risk are paradoxical. This paradox may well derive from their poor understanding of infectious risk and the differences between actual and perceived infectious risk. To address this paradox, perceived and actual infectious risks must be clearly delineated for front-line workers. Unfortunately, perception of infectious risk varies among front-line workers and must be addressed using a multi-faceted approach. Education that provides clear and accurate information on actual infectious risk will work to alleviate both fear and complacency for some individuals. Some individuals will need to take an additional step beyond education and integrate the idea of infectious risk into their personal vision of the world and their place in that world. A third type of individual who cannot be reached by either of these approaches may require an alternative; a “big stick” approach that incorporates knowledge of risk and behavioral responses that are appropriate to actual risk into work performance assessments and opportunities for promotion. The key for each of these types of individuals will be to maintain a balance between clearly defining actual risk without creating so much fear that they are unable to perform effectively in the workplace.

Innovative approaches to learning must be considered to effectively train front-line workers so that they can integrate good infection control practices into their daily routine of caring for patients. Passive learning (i.e. watching a video or listening to a lecture) has been proven to be an ineffective method for training workers.<sup>10-13</sup> Previous education campaigns promoting behaviour change among health care professionals have been effective only for as long as the campaign lasts.<sup>10,13</sup> Opportunities for learning, reflection and assessment are essential to influencing long-term behaviour change. Shift work and demanding work schedules place significant restraints on the design and delivery of a training program. There are several principles that must be incorporated in training materials for front-line workers to improve learning and change practices. Firstly, training must be time efficient, rich in content with opportunities for extended learning and readily accessible to staff. Secondly, an engaging learning environment is needed that incorporates multiple learning modes and features both interactive and reflective activities. Thirdly, training activities must feature “just in time” learning

to take advantage of that teaching moment that arises when information is needed by the worker to do their job. Finally, the training must include opportunities for the learner to practice skills and to monitor, either through self or peer-monitoring, both perceived or actual behaviours and practices.

We face significant challenges in developing a infection control training program for front-line workers that is successful in providing workers with the tools they need to protect themselves as well as their patients. The infection control community has a substantial amount of work to do to accomplish this task.

## REFERENCES

1. Muller, MP; McGeer, A. Febrile respiratory illness in the intensive care unit setting: an infection control perspective. *Current Opinion in Critical Care*. 12(1):37-42, February 2006.
2. Nicas, M; Harrison, R; Charney, W; Borwegan, B. Respiratory Protection and Severe Acute Respiratory Syndrome. *Journal of Occupational & Environmental Medicine*. 46(3):195-197, March 2004.
3. Thorne,C; Khozin, S; McDiarmid, M. Using the Hierarchy of Control Technologies to Improve Healthcare Facility Infection Control: Lessons From Severe Acute Respiratory Syndrome. *Journal of Occupational & Environmental Medicine*. 46(7):613-622, July 2004.
4. Yassi, A; Moore, D; FitzGerald, JM; Bigelow, P; Hon, C-Y; Bryce, E; other members of The BC Interdisciplinary Respiratory Protection Study Group Research Gaps in Protecting Healthcare Workers. From SARS and Other Respiratory Pathogens: An Interdisciplinary, Multi-Stakeholder, Evidence-Based Approach. *Journal of Occupational & Environmental Medicine*. 47(1):41-50, January 2005.
5. Bauch, C; Lloyd-Smith, J; Coffee, MP; Galvani, AP. Dynamically Modeling SARS and Other Newly Emerging Respiratory Illnesses: Past, Present, and Future. *Epidemiology*. 16(6):791-801, November 2005.
6. Booth, C; Stewart, TE. Severe acute respiratory syndrome and critical care medicine: The Toronto experience. *Critical Care Medicine*. 33(1) Supplement:S53-S60, January 2005.

7. Maunder, RG.; Lancee, WJ.; Rourke, S; Hunter, JJ; Goldbloom, D; Balderson, K; Petryshen, P; Steinberg, R; Wasylenki, D; Koh, D; Fones, CS. Factors Associated With the Psychological Impact of Severe Acute Respiratory Syndrome on Nurses and Other Hospital Workers in Toronto. *Psychosomatic Medicine*. 66(6):938-942, November/December 2004.
8. Chan, S; Leung, G; Tiwari, AF; Salili, F; Leung, S; Wong, D; Wong, A; Lai, A; Lam, TH. The Impact of Work-related Risk on Nurses During the SARS Outbreak in Hong Kong. *Family & Community Health. Promoting Health in the Workplace*. 28(3):274-287, July/August 2005.
9. Koh, D; Lim, MK; Chia, SE; Ko, SM; Qian, F; Ng, V; Tan, BH; Wong, KS; Chew, WM; Tang, H K; Ng, W; Muttakin, Z; Emmanuel, S; Fong, NP; Koh, G; Kwa, CT; Tan, KB-C; Fones, C. Risk Perception and Impact of Severe Acute Respiratory Syndrome (SARS) on Work and Personal Lives of Healthcare Workers in Singapore: What Can We Learn? *Medical Care*. 43(7):676-682, July 2005.
10. Centers for Disease Control and Prevention (CDC). (2002). Guideline for hand hygiene in health-care settings: Recommendations of the healthcare infection control practices advisory committee and the HICPAC/SHEA/APIC/IDSA hand hygiene task force. *Morbidity and Mortality Weekly Report*, 51(No. RR-16), 1-56
11. Lankford, M.G., Zembower, T.R., Trick, W.E., Hacek, D.M., Noskin, G.A., & Peterson, L.R. (2003). Influence of role models and hospital design on hand hygiene of health care workers. *Emerging Infectious Diseases*, 9(2), 217-223.
12. Larson, E., & Kretzer, E.K. (1995). Compliance with handwashing and barrier precautions. *Journal of Hospital Infections*, 30(Suppl), 88-106
13. Pettit, D. (2001). Improving adherence to hand hygiene practice: A multidisciplinary approach. *Emerging Infectious Diseases*, 7(2), 234 – 240.

**TABLE 1: Core Competencies in Infection Prevention and Control for Health Care Workers and CHICA-Canada Chapter and Membership Consensus**

Area of Competency	Core Competency Category	Detailed Core Competency A health care worker competent in Infection Control can:	Consensus
<b>Basic Microbiology</b>	<b>Understands basic microbiology and how infections can be transmitted in health care settings.</b>	<ul style="list-style-type: none"> <li>Identify the three components required for infection transmission (presence of an organism, route of transmission of the organism from one person to another, a host that is susceptible to infection).</li> </ul>	100%
		<ul style="list-style-type: none"> <li>Recognize that microorganisms can be bacteria, viruses, etc and that they are not all the same (ie. some are normal, some pathogenic).</li> </ul>	
		<ul style="list-style-type: none"> <li>Describe the routes of transmission of infectious organisms (how they move from one person to another) i.e. Contact, droplet, airborne routes</li> </ul>	
		<ul style="list-style-type: none"> <li>Recognize a susceptible person.</li> </ul>	
		<ul style="list-style-type: none"> <li>Identify of reportable/notifiable diseases</li> </ul>	
		<ul style="list-style-type: none"> <li>Define Antibiotic Resistant Organisms including local protocols etc</li> </ul>	
		<ul style="list-style-type: none"> <li>Describe Respiratory Etiquette and its importance</li> </ul>	
<b>Hand Hygiene</b>	<b>Understands the importance of Hand Hygiene/Hand washing</b>	<ul style="list-style-type: none"> <li>Recognize that hand hygiene is the best method of preventing transmission of potentially infectious organisms.</li> </ul>	100%
		<ul style="list-style-type: none"> <li>Identify when it is necessary to perform hand hygiene.</li> </ul>	
		<ul style="list-style-type: none"> <li>Identify the steps to proper hand hygiene and hand hygiene product use.</li> </ul>	
		<ul style="list-style-type: none"> <li>Demonstrate appropriate hand hygiene with waterless hand rub product as primary method of decontaminating hands and hand washing when hands are visibly soiled.</li> </ul>	

Area of Competency	Core Competency Category	Detailed Core Competency A health care worker competent in Infection Control can:	Consensus
<b>Routine Practices and Transmission-based Precautions</b>	<b>Understands the activities of Routine Practices/Standard Precautions.</b>	<ul style="list-style-type: none"> <li>Assess the need for Routine Practices based on what activities are to be done with a patient.</li> </ul>	<p>100%</p>
		<ul style="list-style-type: none"> <li>Appreciate that Routine Practices are the minimum practice standards/activities.</li> </ul>	
		<ul style="list-style-type: none"> <li>Understand that routine/standard precautions are the key to preventing transmission of organisms among health care workers, physicians, patients and visitors</li> </ul>	
	<b>Understands Transmission Based Precautions (Additional Precautions): why and when they are used</b>	<ul style="list-style-type: none"> <li>Identify that additional precautions, as well as Routine Practices are necessary for clinical presentations or certain pathogens.</li> </ul>	
		<ul style="list-style-type: none"> <li>Identify that the route of transmission of the organism determines which type of precaution category is needed (i.e. Contact Precautions for organisms spread by the contact route of transmission)</li> </ul>	
		<ul style="list-style-type: none"> <li>Knows how to operate a negative pressure room</li> </ul>	
<b>Personal Protective Equipment</b>	<b>Knows and selects appropriate Personal Protective Equipment (PPE) for their job(s).</b>	<ul style="list-style-type: none"> <li>List the appropriate and required PPE items for specific activities, clinical presentations and specific diseases.</li> </ul>	<p>100%</p>
	<b>Demonstrates appropriate use of PPE.</b>	<ul style="list-style-type: none"> <li>Demonstrate how to put on and take off non-sterile, disposable gloves, protective eyeglasses, face shields, protective gowns, and regular and high filtration masks (as per job activity requirement).</li> <li>Demonstrate the use of a NIOSH equivalent high filtration mask.</li> </ul>	<p>100%</p>

Area of Competency	Core Competency Category	Detailed Core Competency A health care worker competent in Infection Control can:	Consensus
<b>Personal Safety</b>	<b>Knows how to appropriate manage sharps and blood and body fluids and recognizes the appropriate first aid activities for exposures to blood and body fluids.</b>	<ul style="list-style-type: none"> <li>• Explain how to safely manage blood and body fluids</li> </ul>	100%
		<ul style="list-style-type: none"> <li>• Describe how to safely manages sharps</li> </ul>	
		<ul style="list-style-type: none"> <li>• Describe the first aid for puncture exposures.</li> </ul>	
		<ul style="list-style-type: none"> <li>• Describe the first aid for fluid exposures to the eyes, nose or mouth.</li> <li>• Recognize that prompt assessment is required for any work-acquired blood or body fluid exposure.</li> </ul>	
	<b>Understands the role of vaccines in preventing certain infections including annual influenza immunizations for health care workers.</b>	<ul style="list-style-type: none"> <li>• Appreciate that vaccines can prevent infection in vulnerable persons.</li> </ul>	100%
	<ul style="list-style-type: none"> <li>• Explain why annual influenza immunization is recommended and important.</li> </ul>		
	<b>Knows the infectious conditions that require absence from work or work restrictions</b>	<ul style="list-style-type: none"> <li>• Recognize that a staff member with an infectious condition can pose a risk to other health care workers, patients, and visitors</li> </ul>	100%
<ul style="list-style-type: none"> <li>• Know where to access information on infectious conditions that require absence from work or work restrictions</li> </ul>			

Area of Competency	Core Competency Category	Detailed Core Competency A health care worker competent in Infection Control can:	Consensus
<b>Sterilization and Disinfection</b>	<b>Recognizes that reusable equipment that has been in direct contact with a patient should be cleaned and reprocessed before use in the care of another patient. Appreciates the differences between clean, disinfected (low, medium, and high-level) and sterile items.</b>	<ul style="list-style-type: none"> <li>• Distinguish between patients care items that:               <ul style="list-style-type: none"> <li>○ Do not ordinarily touch the patient or touch only intact skin require cleaning with soap and water or a hospital-grade detergent disinfectant between patients. This will physically remove organic material or soil from the objects.</li> <li>○ Come into contact with intact mucous membranes require thorough cleaning to remove organic material followed by treatment with an appropriate chemical disinfectant or pasteurization to remove or destroy harmful microorganisms.</li> <li>○ Are introduced directly into the bloodstream or other normally sterile body sites must be thoroughly cleaned to remove organic material and then sterilized to destroy all forms of microbial life.</li> </ul> </li> <li>• Recognize that not all cleaning products or disinfectants are the same.</li> </ul>	<p>100%</p>
	<b>Knows the difference between regular and biohazard wastes.</b>	<ul style="list-style-type: none"> <li>• Identify where items are disposed of (regular garbage in a landfill and biohazard items are incinerated).</li> <li>• Identify selected items as regular garbage or items for biohazard disposal.</li> <li>• Identify which containers are used for regular and biohazard wastes.</li> </ul>	<p>100%</p>
	<b>Critical Assessment Skills</b>	<b>Critical assessment skills related to exposure to infectious agents, awareness to local outbreaks and use of infectious disease specific protocols</b>	<ul style="list-style-type: none"> <li>• Demonstrate knowledge relating to access of infection control resources including an IPC manual.</li> <li>• Identify locally used descriptors for high risk patients (e.g., Leaky, Drippy, Goopy) and how to manage them.</li> <li>• Demonstrate problem solving and critical thinking ability when presented with infection control case studies and situations</li> <li>• Identify unusual clusters of illnesses (aware of person, time, place epidemiology principles)</li> <li>• Demonstrate the ability to implement disease protocols and alerts as directed by IPC</li> <li>• Provide leadership and act as role model to other health care workers, physicians, patients and visitors by adhering to Infection Prevention and Control principles</li> <li>• Demonstrate work practices that reduce risk of infection (e.g., immunization, not coming to work sick)</li> </ul>

**Figure 1: Process Used to Obtain Consensus on HCW Core Competencies in Infection Control**

