

Provincial Infectious
Diseases Advisory
Committee
(PIDAC)

**Best Practices for
Infection Prevention and
Control Programs in
Ontario**

In All Health Care Settings

**Ministry of Health and Long-Term Care
Published September 2008**



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This document was developed by the Provincial Infectious Diseases Advisory Committee (PIDAC). PIDAC is a multidisciplinary scientific advisory body who provide to the Chief Medical Officer of Health evidence-based advice regarding multiple aspects of infectious disease identification, prevention and control. PIDAC's work is guided by the best available evidence and updated as required. Best Practice documents and tools produced by PIDAC reflect consensus positions on what the committee deems prudent practice and are made available as a resource to the public health and health care providers.

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Executive Summary

Health care-associated infections (HAIs) are defined as infections that occur as a result of health care interventions in any health care setting where care is delivered.

Health care-associated infections remain an important patient safety issue and represent a significant adverse outcome of the health care system. The acquisition of occupationally-acquired infections may pose a risk to health care providers. In both acute and long-term care, outbreaks result in significant cost to the organization.

In order to protect clients/patients/residents and staff and to reduce the costs of health care-associated infections, it is necessary to prevent infections before they occur. Recent studies suggest that at least 20% of HAIs could be prevented through infection prevention and control strategies.

Infection prevention and control (IPAC) programs have been shown to be both clinically effective and cost-effective, providing important cost savings in terms of fewer health care-associated infections, reduced length of hospital stay, less antibiotic resistance and decreased costs of treatment for infections.

The responsibility for the infection prevention and control program in the health care setting lies primarily with the senior administration of the organization. Implementation of the program rests not only with the IPAC team, but also with nursing managers, Environmental Services, Occupational Health and Safety, directors of medical services, central reprocessing and other departments and individuals in the facility impacted by the effective delivery of the program.

The purpose of this document is to outline the structure and elements of the IPAC program which include:

- Demonstrable leadership by Senior Administration;
- Presence of an active infection prevention and control committee;
- Clear and current policies and procedures to reduce the risk of transmission of infectious agents;
- Hand hygiene program;
- Surveillance program;
- Education for staff and clients/patients/residents and their families;
- Occupational Health and Safety related to transmission of infectious agents;
- Timely access to microbiology laboratory reports;
- Product review and evaluation;
- Review of practices for reprocessing of equipment;
- Review of practices for environmental cleaning;
- Infection prevention and control input into facility design;
- Effective immunization programs;
- Outbreak detection and management; and
- Adequate resources including adequate IPAC professionals trained and certified in infection prevention and control.

A properly resourced and effectively functioning IPAC program is essential to improving patient and health care provider safety.

Preamble

In the wake of the 2003 outbreak of Severe Acute Respiratory Syndrome (SARS) in Ontario, it was clear that provincial infection prevention and control programs were under-resourced, practices were not standardized across the continuum of care and basic knowledge and training in the fundamentals of infection prevention and control were insufficient. Reports on the condition of the province's infection prevention and control programs highlighted the following:

- In Chapter 2 of the Walker Report, "For the Public's Health: A Plan of Action. Final Report of the Ontario Expert Panel on SARS and Infectious Disease Control, April 2004"¹[available online at: http://www.health.gov.on.ca/english/public/pub/ministry_reports/walker04/chapter_2.pdf] there is a clear mandate to "articulate the core foundational elements for a formal program of infection control in all acute and non-acute facilities, including necessary resources". This outlined the need to develop comprehensive provincial infection control standards of practice for all health care settings in Ontario, including acute and non-acute care hospitals, long-term care facilities and primary care/community settings.
- In 2006 Mr. Justice Archie Campbell, in the final report of the independent SARS Commission, recommended "that the Ministry of Health ensure that all Ontario hospitals have infection control personnel, resources and program components, including surveillance, control and education, consistent with Canadian recommendations and best practices".²[available online at: <http://www.sarscommission.ca/report/index.html>]

In 2004 the Ministry of Health and Long-Term Care responded to many of the interim recommendations by introducing "Operation Health Protection: An Action Plan to Prevent Threats to our Health and to Promote a Healthy Ontario"³, a 3-year action plan to revitalize the public health system. This plan included clear direction regarding infection control and communicable disease capacity in the province. Many of the planned actions have been implemented, such as the formation of the Provincial Infectious Diseases Advisory Committee (PIDAC) and the formation of Regional Infection Control Networks (RICN), but there still are no standards for infection prevention and control programs or for the practice of infection prevention and control in health care settings in Ontario.

Regional Infection Control Networks (RICN) do not replace local infection prevention and control capacity and resources, but support and enhance the planning, coordination and integration being undertaken at the local level. The RICN may strengthen the coordination between IPAC activities at acute and non-acute facilities and public health communicable disease control activities and identify gaps and trends within the region. The RICN may be called upon to assist with mentorship of new infection control professionals or to provide education or training resources to a facility or region. More information on the RICN may be found at: <http://www.ricn.on.ca>.

The infection prevention and control requirements of legislative bodies, such as the Ontario Occupational Health and Safety Act⁴ and the Public Hospitals Act,⁵ must be followed in all health care settings where they apply. See Section II.4, "Compliance with Legislation and Accreditation Standards", for applicable references to legislation.

Health care settings must work with organizations that have infection prevention and control expertise, such as academic health science centres, Regional Infection Control Networks, public health units that have professional staff certified in infection prevention and control and local infection prevention and control associations (e.g. Community and Hospital Infection Control Association – Canada chapters), to develop their infection prevention and control programs.

For a list of recommended infection prevention and control resources, refer to Appendix A, "Resources for Infection Prevention and Control".

About This Document

The purpose of this document is to provide recommendations for:

- specific activities for Infection Prevention and Control (IPAC) programs across the continuum of health care delivery in Ontario; and
- adequate and appropriate resource allocation for IPAC programs across the continuum of health care delivery.

This document is targeted to senior administration in health care settings, medical officers of health, as well as others in a management role, and may be of interest to administrators in local health integration networks. Infection prevention and control programs will also find these best practices useful for prioritizing and developing their programs and engaging in strategic planning activities for the future.

The responsibility for the infection prevention and control program in the health care setting lies primarily with the senior administration of the organization. Implementation of the program rests not only with the IPAC team, but also with nursing managers, Environmental Services, Occupational Health and Safety, directors of medical services, central reprocessing and other departments and individuals in the facility impacted by the effective delivery of the program.

Evidence for Recommendations

The recommendations in this document reflect the best evidence and expert opinion available at the time of writing. These recommendations will be reviewed and updated as new information becomes available and, at a minimum, every two years.

The recommendations in this document are based on Level All evidence unless stated otherwise. Level All evidence is good evidence to support a recommendation for use with evidence from at least one well-designed clinical trial without randomization, from cohort or case-controlled analytic studies, preferably from more than one centre, from multiple time series, or from dramatic results in uncontrolled experiments (source: Public Health Agency of Canada).

How and When to Use This Document

For recommendations in this document:

- “**shall**” indicates mandatory requirements based on legislated requirements;
- “**must**” indicates best practice, i.e. the minimum standard based on current recommendations in the medical literature;
- “**should**” indicates a recommendation or that which is advised but not mandatory; and
- “**may**” indicates an advisory or optional statement.

It is expected that all settings in Ontario where health care is provided, across the continuum of health care, will comply with the basic infection prevention and control practices and principles set out in this document. This includes settings where emergency (including pre-hospital) care is provided, hospitals,^{6,7} long-term care homes, outpatient clinics, community health centres and clinics, physician offices,^{8,9} dental offices, offices of allied health professionals⁸ and home health care.

Access to infection prevention and control expertise is required in all health care settings, including the community and clinics, so that the recommendations in this document may be met. For non-institutional settings, guidance may be sought from other sources of published recommendations (e.g. College of Physicians and Surgeons of Ontario's "*Infection Control in the Physician's Office*").⁹

Occupational Health and Safety

Health care facilities are required to comply with applicable provisions of the *Occupational Health and Safety Act* (OHSA) and its Regulations. Employers, supervisors and workers have rights, duties and obligations under the OHSA. To see what the specific requirements are under the OHSA go to: http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_90o01_e.htm

The *Occupational Health and Safety Act* places duties on many different categories of individuals associated with workplaces, such as employers, constructors, supervisors, owners, suppliers, licensees, officers of a corporation and workers. A guide to the requirements of the *Occupational Health and Safety Act* may be found at:

<http://www.labour.gov.on.ca/english/hs/ohsaguide/index.html>

In addition, the OHSA section 25(2)(h) requires an employer to take every precaution reasonable in the circumstances for the protection of a worker.

Specific requirements for certain health care and residential facilities may be found in the *Regulation for Health Care and Residential Facilities*. Go to:

http://www.e-laws.gov.on.ca/html/regs/english/elaws_regs_930067_e.htm

There is a general duty for an employer to establish written measures and procedures for the health and safety of workers, in consultation with the joint health and safety committee or health and safety representative, if any. Such measures and procedures may include, but are not limited to, the following:

- Safe work practices;
- Safe working conditions;
- Proper hygiene practices and the use of hygiene facilities; and,
- The control of infections.

At least once a year the measures and procedures for the health and safety of workers shall be reviewed and revised in the light of current knowledge and practice. The employer, in consultation with the joint health and safety committee or health and safety representative, if any, shall develop, establish and provide training and educational programs in health and safety measures and procedures for workers that are relevant to the workers' work.

A worker who is required by his or her employer or by the *Regulation for Health Care and Residential Facilities* to wear or use any protective clothing, equipment or device shall be instructed and trained in its care, use and limitations before wearing or using it for the first time and at regular intervals thereafter and the worker shall participate in such instruction and training. The employer is reminded of the need to be able to demonstrate training, and is therefore encouraged to document the workers trained, the dates training was conducted, and materials covered during training. Under the *Occupational Health and Safety Act*, a worker must work in compliance with the Act and its regulations, and use or wear any equipment, protective devices or clothing required by the employer.

For more information, please contact your local Ministry of Labour office. A list of local Ministry of Labour offices in Ontario may be found at <http://www.labour.gov.on.ca/>

Abbreviations

| | |
|------------------------|--|
| ARO | Antibiotic Resistant Organism |
| BSI | Bloodstream Infection |
| CAD | Canadian Dollars |
| CCHSA | Canadian Council on Health Services Accreditation |
| CHICA | Community and Hospital Infection Control Association - Canada |
| CIC[®] | Certified in Infection Control (Certification Board in Infection Control & Epidemiology) |
| CCC | Complex Continuing Care |
| FTE | Full-Time Equivalent |
| FRI | Febrile Respiratory Illness |
| HAI | Health care-Associated Infection |
| HHC | Home Health Care |
| ICP | Infection Control Professional |
| IPACC | Infection Prevention and Control Committee |
| IPAC | Infection Prevention and Control |
| LTC | Long-Term Care |
| MOHLTC | Ministry of Health and Long-Term Care (Ontario) |
| MRSA | Methicillin-Resistant <i>Staphylococcus aureus</i> |
| NHSN | National Healthcare Safety Network (formerly NNIS) |
| NNIS | National Nosocomial Infection Surveillance System (U.S.) |
| OHA | Ontario Hospital Association |
| OMA | Ontario Medical Association |
| PHAC | Public Health Agency of Canada |
| PIDAC | Provincial Infectious Diseases Advisory Committee |
| PPE | Personal Protective Equipment |
| RICN | Regional Infection Control Networks |
| SENIC | Study on the Efficacy of Nosocomial Infection Control |
| SSI | Surgical Site Infection |
| SWOT | Strengths, Weaknesses, Opportunities and Threats Analysis |
| VAP | Ventilator-Associated Pneumonia |
| VRE | Vancomycin-Resistant Enterococci |

Glossary of Terms

Additional Precautions: Additional Precautions (i.e. Contact Precautions, Droplet Precautions, Airborne Precautions) are necessary in addition to Routine Practices for certain pathogens or clinical presentations. These precautions are based on the method of transmission (e.g. contact, droplet, airborne).¹⁰

Adverse event: An adverse event is an unexpected and undesired incident directly associated with the care or services provided to the client/patient/resident.¹¹

Antibiotic-Resistant Organism (ARO): A microorganism that has developed resistance to the action of several antimicrobial agents and that is of special clinical or epidemiological significance (e.g. MRSA, VRE).

Audit: In the context of this document, an audit is a tool used to examine a process for errors or omissions. An audit tool usually consists of a checklist of items which must be completed or be in place in order for a process to be considered to be correct.

Benchmark: A validated figure that may be used for comparison provided data is collected in the same way as that of the benchmark data. Benchmarks are used to compare infection rates to a standardized database that uses the same definitions for infection and is appropriately adjusted for patient risk factors so that meaningful comparisons can be made. Comparing infection rates to a validated benchmark will indicate whether the rates are below or above the recognized average.

Certified in Infection Control (CIC®): A designation obtained from the Certification Board of Infection Control and Epidemiology, Inc. (CBIC) following a minimum of two years (within the most current five year period) and a minimum of 800 hours of practice in infection prevention and control prior to the date of the examination, in addition to the successful completion of a written examination. Re-certification is required every five years to maintain certification. More information may be found on the CBIC website: <http://www.cbic.org/>. CIC is a legal designation and may only be used by those who have attained and maintained certification.

CHICA-Canada: The Community and Hospital Infection Control Association of Canada, a professional organization of persons engaged in infection prevention and control activities in health care settings. CHICA-Canada members include infection prevention and control professionals from a number of related specialties including nurses, epidemiologists, physicians, microbiology technologists, public health and industry. The CHICA-Canada website is located at: <http://www.chica.org>.

Client/patient/resident: Any person receiving health care within a health care setting. In this document the term “patient” refers to client/patient/resident.

Complex Continuing Care (CCC): Complex continuing care provides continuing, medically complex and specialized services to both young and old, sometimes over extended periods of time. Such care also includes support to families who have palliative or respite care needs. It plays an integral role in the treatment offered in Ontario hospitals.

Continuum of Care: Across all health care sectors, including settings where emergency (including pre-hospital) care is provided, hospitals, complex continuing care, rehabilitation hospitals, long-term care homes, outpatient clinics, community health centres and clinics, physician offices, dental offices, offices of allied health professionals, public health and home health care.

Hand Hygiene: A process for the removal of visible soil and removal or killing of transient microorganisms from the hands. Hand hygiene may be accomplished using a 60 to 90% alcohol-based hand rub or soap and running water.

Health Care-associated Infection (HAI): A term relating to an infection that is acquired during the delivery of health care (also known as “nosocomial infection”).

Health Care Facility: A set of physical infrastructure elements supporting the delivery of health-related services. A health care facility does not include a patient’s home or physician offices where health care may be provided.

Health Care Provider: Any person delivering care to a client/patient/resident. In some non-acute settings, volunteers might provide care and would be included as a health care provider. *See also definition below for “Staff”.*

Health Care Setting: Any location where health care is provided, including settings where emergency care is provided, hospitals, complex continuing care, rehabilitation hospitals, long-term care homes, mental health facilities, outpatient clinics, community health centres and clinics, physician offices, dental offices, offices of allied health professionals and home health care.

Hospital-grade Disinfectant: A disinfectant that has a drug identification number (DIN) from Health Canada indicating its approval for use in Canadian hospitals.

Infection: The entry and multiplication of an infectious agent in the tissues of the host. Asymptomatic or subclinical infection is an infectious process running a course similar to that of clinical disease but below the threshold of clinical symptoms. Symptomatic or clinical infection is one resulting in clinical signs and symptoms (i.e., disease).

Infection Prevention and Control: Evidence-based practices and procedures that, when applied consistently in health care settings, can prevent or reduce the risk of transmission of microorganisms to health care providers, other clients/patients/residents and visitors.

Infection Prevention and Control Committee (IPACC): The Infection Prevention and Control Committee is a multidisciplinary committee that serves the health care facility and is responsible for verifying that the infection prevention and control recommendations and standards are being followed in the health care facility.

Infection Prevention and Control Physician: Physician with specific training and expertise in the principles of epidemiology and infection prevention and control, and who incorporates infection prevention and control into his/her continuing professional development.

Infection Prevention and Control Program (IPAC): A health care facility or organization (e.g. hospital, long-term care, continuing complex care, home care) program responsible for meeting the recommended mandate to decrease infections in the patient, health care providers and visitors. The program is coordinated by health care providers with expertise in infection prevention and control and epidemiology.

Infection Prevention and Control Professional(s) (ICPs): Trained individual(s) responsible for a health care setting’s infection prevention and control activities. In Ontario an ICP must receive a minimum of 80 hours of instruction in a CHICA-Canada endorsed infection control program within six months of entering the role and must acquire and maintain Certification in Infection Control (CIC) when eligible. The ICP should maintain a current knowledge base of infection prevention and control information.

Long-Term Care (LTC): Long-term care refers to a broad range of personal care, support and health services provided to people who have limitations that prevent them from full participation in the

activities of daily living. The people who use long-term care services are usually the elderly, people with disabilities and people who have a chronic or prolonged illness.

Methicillin-resistant *Staphylococcus aureus* (MRSA): MRSA is a strain of *S. aureus* that has a minimal inhibitory concentration (MIC) to oxacillin of ≥ 4 mcg/ml and contains the *mecA* gene coding for penicillin-binding protein 2a (PBP 2a). MRSA is resistant to all of the beta-lactam classes of antibiotics, such as penicillins, penicillinase-resistant penicillins (e.g. cloxacillin) and cephalosporins. MRSA has been associated with health care-associated infections and outbreaks.

National Healthcare Safety Network (NHSN): See National Nosocomial Infection Surveillance (NNIS).

National Nosocomial Infection Surveillance (NNIS): The original NNIS System¹², a project of the Centers for Disease Control and Prevention, provides aggregate data compiled since 1992 from 300 USA acute care settings. NNIS infection rates may be used for benchmarking acute care nosocomial infection rates provided that the same standardized definitions for infection are used. NNIS results are stratified by patient risk index. NNIS is currently known as NHSN (National Healthcare Safety Network). More information is available at: http://www.cdc.gov/ncidod/dhqp/nnis_pubs.html.

Nosocomial Infection: Infection acquired during the delivery of health care (also known as “health care-associated infection”).

Occupational Health and Safety: Health and safety services in the workplace regulated by federal and provincial legislation and following the occupational hygiene hierarchy of controls of engineering controls, administrative controls and personal protective equipment.

Outbreak: For the purposes of this document, an outbreak is an increase in the number of cases (colonizations or infections) above the number normally occurring in a particular health care setting over a defined period of time.

Outcome surveillance: Surveillance used to measure client/patient/resident outcomes (changes in the client/patient/resident’s health status that can be attributed to preceding care and service).¹¹ An example of outcome surveillance related to infection prevention and control is surveillance of infection rates. Outcome surveillance reflects the efficacy of the infection prevention and control program in protecting clients/patients/residents, health care providers and visitors from health care-associated infections while decreasing costs from infections.

Personal Protective Equipment (PPE): Clothing or equipment worn for protection against hazards.

Point-of-Care: The place where three elements occur together: the client/patient/resident, the health care provider and care or treatment involving client/patient/resident contact. The concept refers to a hand hygiene product which is easily accessible to staff by being as close as possible, i.e. within arm’s reach, to where client/patient/resident contact is taking place. Point-of-care products should be accessible to the care provider without the provider leaving the zone of care, so they can be used at the required moment.

Precautions: Interventions to reduce the risk of transmission of microorganisms (e.g. patient-to-patient, patient-to-staff, staff-to-patient, contact with the environment, contact with contaminated equipment).

Provincial Infectious Diseases Advisory Committee (PIDAC): A multidisciplinary scientific advisory body who provide to the Chief Medical Officer of Health evidence-based advice regarding multiple aspects of infectious disease identification, prevention and control. More information is available at: http://www.health.gov.on.ca/english/providers/program/infectious/pidac/pidac_mn.html.

Process surveillance: Surveillance used to assess or measure client/patient/resident processes (things done to or for a client/patient/resident during their encounter with the health care system).¹¹ An example of process surveillance related to infection prevention and control is planned audits to verify that procedures and/or standards of practice are being followed.

Public Health Agency of Canada (PHAC): A national agency which promotes improvement in the health status of Canadians through public health action and the development of national guidelines. The PHAC website is located at: http://www.phac-aspc.gc.ca/new_e.html.

Regional Infection Control Networks (RICN): The RICN of Ontario coordinate and integrate resources related to the prevention, surveillance and control of infectious diseases across all health care sectors and for all health care providers, promoting a common approach to infection prevention and control and utilization of best-practices within the region. There are 14 regional networks in Ontario. More information is available at: <http://www.ricn.on.ca>.

Routine Practices: The system of infection prevention and control practices recommended by the Public Health Agency of Canada to be used with all clients/patients/residents during all care to prevent and control transmission of microorganisms in health care settings.¹⁰ The full description of Routine Practices to prevent and control transmission of nosocomial pathogens can be found on the Public Health Agency of Canada website: <http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/99vol25/25s4/index.html>. PIDAC's Routine Practices fact sheet is available at: http://www.health.gov.on.ca/english/providers/program/infectious/pidac/fact_sheet/fs_routine_010107.pdf.

Staff: Anyone conducting activities in settings where health care is provided, including health care providers (see *Health Care Providers*, above).

Surveillance: The systematic ongoing collection, collation and analysis of data with timely dissemination of information to those who require it in order to take action.

SWOT Analysis: A strategic planning process to evaluate the Strengths, Weaknesses, Opportunities and Threats involved in a project or situation of an organization or individual requiring a decision in pursuit of an objective.

Syndromic Surveillance: Syndromic surveillance is the detection of individual and population health indicators of illness (i.e., signs and symptoms of infectious disease) that are discernible before confirmed laboratory diagnoses are made.¹³

Vancomycin-resistant Enterococci (VRE): VRE are strains of *Enterococcus faecium* or *Enterococcus faecalis* that have a minimal inhibitory concentration (MIC) to vancomycin of ≥ 32 mcg/ml. They usually contain the resistance genes *vanA* or *vanB*. VRE has been associated with health care-associated infections and outbreaks.

BEST PRACTICES FOR INFECTION PREVENTION AND CONTROL PROGRAMS IN ONTARIO

TERMS USED IN THIS DOCUMENT (see glossary for details and examples)

Health Care Provider: Any person delivering care to a client/patient/resident

Staff: Anyone conducting activities within a health care setting (includes health care providers)

I. Background

1. *What are Health Care-Associated Infections?*

Health care-associated infections (HAIs) are defined as infections that occur as a result of health care interventions in any health care setting where care is delivered. Some examples of health care-associated infections include bloodstream, post surgical, urinary, respiratory, gastrointestinal, skin and soft tissue infections.¹² Factors that increase the risk to clients/patients/residents for development of HAIs include advanced age; underlying illness; complex treatment modalities; the emergence of novel infectious agents; emergence of community-associated communicable diseases¹⁴; prevalence of antibiotic-resistant microorganisms¹⁵; and international travel. All of these factors have heightened the need to identify, prevent, control and treat infections in a systematic fashion in order to improve patient and community safety and to decrease health care costs.

Health care-associated infections remain a patient safety issue and represent a significant adverse outcome of the health care system.^{16,17} With the changing trends in health care that have resulted in the provision of complex treatments outside of the acute care setting (e.g. ambulatory care, physician office and home settings), the need for infection prevention and control programs spans the continuum of health care settings.

The acquisition of occupationally-acquired infections may pose a risk to health care providers; however, following Routine Practices, including an appropriate risk assessment, will minimize this risk.

2. *Adverse Health Care Events and Health Care-Associated Infections*

It is estimated that 5% to 10% of hospitalized patients acquire an infection after admission to hospital.¹⁸ It has also been shown that patients with HAI remain in hospital longer on average than patients without infection,¹⁹ with the longest hospital stay and highest costs associated with multiple infections.

Patients with one or more HAIs during in-patient stay remain in hospital and incur costs on average three times greater than uninfected patients.

Infections and antibiotic-resistant microorganisms result in significant morbidity, mortality and economic costs to the health care system.^{15, 17, 18, 20-}

²³ Based on U.S. estimates of infection⁷ and using the observed incidence of HAIs and the

average number of hospital discharges, it has been estimated that 220,000 incidents of HAI occur each year in Canada, resulting in more than 8,000 deaths.²⁴

The fear of acquiring a health care-associated infection may also impact the client/patient/resident's and community's confidence in the delivery of health care.

3. The Cost of Health Care-Associated Infections

Health care-associated infections have a significant impact on health care spending as a result of prolonged hospital stay,^{19, 25, 26} readmissions,¹⁹ increasing consumption of costly resources^{18, 19, 26} and, occasionally, legal and litigation costs.

The emergence of antibiotic-resistant microorganisms (AROs) has also resulted in increased cost to the health care system. It is estimated that AROs increase the annual direct and indirect costs to patients by an additional \$40 to \$52 million in Canada.^{15, 27} Expenses associated with HAIs include readmission due to infection; prolonged length of stay; prolonged wait times; longer staff hours; requirement for additional treatments, laboratory testing and antibiotic use; and increased surveillance activities, single room accommodation for infection prevention and control purposes, PPE, cleaning supplies and outbreaks, all of which increase the cost of providing health care.^{15, 18, 19, 28-30}

Some cost estimates recently reported in Canada and the U.S. include:

- the median cost associated with methicillin-resistant *Staphylococcus aureus* (MRSA) can be almost two times greater than the cost of methicillin-sensitive *Staphylococcus aureus* in a long-term care facility³¹ and more than twice the cost in acute care facilities³²;
- in acute care, the cost for precautions and management of patients colonized and/or infected with MRSA continues to increase:
 - colonization with MRSA cost CAD \$1,363 per patient in 1997²⁸ and now costs CAD \$8,841 per patient³²;
 - infection with MRSA cost CAD \$14,360 per patient in 1997²⁸ and now costs CAD \$27,661³²;
 - in a 2007 Canadian study, the cost per day for contact precautions was CAD \$172.81 and the cost of MRSA control per patient was CAD \$2,937.³³
- the incremental cost to prevent a case of nosocomial MRSA, from the hospital perspective, is under \$20 (2005 CAD). This figure takes into account the cost of hospital control programs versus the cost of MRSA colonization and infection. It does not take into account societal costs of MRSA, which are significant³²;
- the mean cost of interventions to reduce the rate of extended-spectrum beta lactamase-producing Enterobacteriaceae (ESBL) is CAD \$3,191 per case³⁴;

In long-term care, outbreaks result in significant cost to the organization. Some examples:

- scabies outbreak cost CAD \$200,000 to control³⁵;
- outbreak of adenoviral conjunctivitis cost US \$29,527³⁶;
- VRE outbreak cost CAD \$12,061 to control³⁷;
- The mean cost of a case of Influenza-like illness is US \$968 +/- \$1806.³⁸

In summary, the impact of HAIs on health care delivery efficiencies and client/patient/resident outcomes is significant. An effective infection prevention and control program can reduce this impact and the costs associated with HAIs.³⁹

II. The Infection Prevention and Control (IPAC) Program

Patient Safety and Infection Prevention and Control

Infection prevention and control is a key priority of the patient safety agenda. The strongest evidence for current patient safety initiatives is built upon past infection prevention and control experiences and many patient safety indicators have long been infection prevention and control indicators. Recently, national and international groups have focused their attention on infections as an issue in patient safety with campaigns such as:

- *Safer Healthcare Now!* (Canadian Patient Safety Institute):
<http://www.saferhealthcarenow.ca/Default.aspx>
- *5 Million Lives* (U.S. Institute for Healthcare Improvement):
<http://www.ihl.org/IHI/Programs/Campaign/>
- *Clean Care is Safer Care* (World Health Organization):
http://www.who.int/patientsafety/events/05/global_challenge/en/index.html

In order to protect clients/patients/residents and staff and to reduce the costs of health care-associated infections, it is necessary to prevent infections before they occur. Not all health care-associated infections can be prevented, but a recent systematic review suggests that at least 20% could be prevented through infection prevention and control strategies.⁴⁰

Impact of IPAC Programs

Infection prevention and control (IPAC) programs have been shown to be both clinically effective and cost-effective,^{6, 17, 30, 41} providing important cost savings in terms of fewer health care-associated infections, reduced length of hospital stay, less antibiotic resistance and decreased costs of treatment for infections.^{7, 42-44} The Public Health Agency of Canada (PHAC) has outlined the human and economic perspectives of HAI, demonstrating the rationale and need for appropriate and adequate resources for IPAC programs.²⁷

Prevention and control of HAIs is a legal obligation in many countries, including the Netherlands,⁴⁵ Germany⁴⁶ and Belgium.⁴⁷ Several reliable authorities have published comprehensive guidelines for the practice of infection prevention and control in a variety of health care settings including acute care, long-term care and out-of-hospital settings.⁴⁸⁻⁵⁰ Evidence of the efficacy of infection surveillance and control programs was first established by the Study on the Efficacy of Nosocomial Infection Control (SENIC) project, which was conducted between 1974 and 1983.⁷ This project demonstrated that 32% of nosocomial infections in acute care involving four major sites (bloodstream, surgical wound, urinary tract and respiratory tract) could be prevented with infection surveillance and control programs. Several subsequent studies have supported the efficacy of infection prevention and control activities in reducing the number of infections, improving survival, reducing morbidity and shortening the length of hospital stay.^{44, 51-57} There is also evidence that concerted interventions can substantially reduce MRSA transmission, even in MRSA-endemic settings.⁵⁸

A recent Canadian survey of hospitals identified deficits in several components of effective IPAC programs, including appropriate staffing levels, surveillance activities and access to laboratories.²⁴ To improve health care safety and cost-efficiencies in Ontario, appropriately resourced infection prevention and control programs must be a standard of practice. While the final accountability rests with the administration of the organization, infection prevention and control programs that have the required expertise and resources will assist and support the organization to improve patient safety by protecting clients/patients/residents, health care

providers, visitors and others from health care-associated infections, with the added benefit of reducing costs to the health care system.^{17, 18, 48}

1. Mandate/Goals and Functions of the IPAC Program

The goals of an infection prevention and control program are:

- to protect clients/patients/residents from health care-associated infections, resulting in improved survival rates, reduced morbidity associated with infections, shorter length of hospital stay and a quicker return to good health; and
- to prevent the spread of infections from patient-to-patient, from patients to health care providers, from health care providers to patients, from health care providers to health care providers and to visitors and others in the health care environment.

These goals are relevant to care activities across the spectrum of health care settings including acute care, complex continuing care, rehabilitation hospitals, long-term care homes, ambulatory settings, outpatient surgery facilities and home health care programs.⁴⁸⁻⁵⁰

In order to achieve these goals in a cost-effective manner, an active, effective, organization-wide infection prevention and control program must be developed and continuously supported by senior administration.

The core functions of infection prevention and control in both hospital and non-hospital settings focus on strategies to protect clients/patients/residents, staff and others from exposures to infections. These include:

- a) management of critical data and information, including surveillance for nosocomial and other infections;
- b) implementation of evidence-based practice, standards and guidelines through setting-specific policy and procedure;
- c) direct interventions to prevent the transmission of infection, including outbreak prevention and control;
- d) effective occupational health programs (including healthy workplace policies and immunization services);
- e) education and training of health care providers, clients/patients/residents and their families;
- f) communication of infection-related issues and relevant practices to leaders and staff to facilitate improvement; and
- g) ongoing evaluation and continuous improvement of the IPAC program.

The success of an IPAC program is defined by the organization's effectiveness in preventing the occurrence, or limiting the spread, of health care-associated infections. The selection of appropriate process and outcome surveillance indicators will reflect the specific goals of the organization (see Section II.4, "Surveillance"). In particular, outcome indicators should reflect the efficacy of the organization in protecting clients/patients/residents, health care providers, visitors and others from HAIs as well as determine the cost-effectiveness of the program activities.

Recommendations:

- 1.1 All health care settings in Ontario must assess needs for, develop, provide and evaluate an active, effective infection prevention and control program that meets the mandate and goal to decrease the risk of health care-associated infections and improve health care safety.**

1.2 Continuing support for the infection prevention and control program must be an organizational priority.

2. Structure and Elements of the IPAC Program

Infection prevention and control activities should be based on a continuous quality improvement approach where the processes and outcomes are continuously reviewed and improved. Prior to implementing an IPAC program, and periodically thereafter, there should be an initial review of the entire facility or organization for the strengths, weaknesses, opportunities and threats related to infection prevention and control practices (i.e. SWOT analysis). The results from this analysis may be used to assist in prioritizing the needs of the program.

Structure of the IPAC Program

Individuals with appropriate academic and practice credentials, training and experience related to health care infection prevention and control programs are responsible for directing infection prevention and control activities including implementing, monitoring and evaluating the IPAC program with the support of senior administration and the infection prevention and control committee. The ICP(s) should have direct access to the Senior Management individual who is accountable for the organization's program and who can facilitate the actions that are required.

Elements of the IPAC Program

The elements of the infection prevention and control program must be based on the type of health care setting. Elements of this program will have resource implications for other areas and departments of the facility as well as Infection Prevention and Control (e.g. Occupational Health and Safety, Laboratory Services, Environmental Services).

Infection prevention and control programs should include the following:

- a) a hand hygiene program;
- b) surveillance based on systematic data collection to identify infections, subsequent analysis of data and timely dissemination of results;
- c) a system of precautions to reduce the risk of transmission of infectious agents (i.e. Routine Practices, Additional Precautions);
- d) continuing education for health care providers in infection prevention and control;
- e) a system for detection, investigation and control of health care-associated outbreaks;
- f) infection prevention and control policies and procedures;
- g) process audits;
- h) a resident health program that addresses the prevention and control of infectious disease (e.g. long-term care homes);
- i) elements of an occupational health program for health care providers related to transmission of microorganisms;
- j) a system for antibiotic review and control;
- k) reportable disease reporting to public health authorities;
- l) timely access to microbiology laboratory reports and expertise;
- m) active participation in all phases of facility design and construction/renovation;
- n) product review and evaluation;
- o) review of care policies and procedures for practices impacting on infection prevention and control;
- p) continuous quality improvement activities;
- q) review of practices for reprocessing of equipment;
- r) review of practices for environmental cleaning; and

- s) participation in research activities for programs affiliated with academic health science centres, teaching hospitals and other settings that have the capability of doing these activities.

Recommendations:

- 2.1 Health care settings must evaluate their infection prevention and control needs and then implement an infection prevention and control program suited to those needs.**
- 2.2 Periodic review of the infection prevention and control program must be carried out to reassess the organization's needs and to determine which elements are required to continue to meet the goals of the program for that health care setting.**
- 2.3 Senior administration and the infection prevention and control committee must support the implementation and execution of the infection prevention and control program by the infection prevention and control staff.**

3. The Infection Prevention and Control Committee (IPACC)

The IPACC and its members should act as advocates and role models for the program and for practicing infection prevention and control best practices.

All health care facilities must have a formal committee structure to oversee the activities of the IPAC program. In hospitals this should take the form of an Infection Prevention and Control Committee (IPACC).

Smaller organizations or other health care settings should consider implementing an IPACC or include IPAC issues as a standing agenda item for other

committees. All facilities and agencies accredited by the Canadian Council on Health Services Accreditation (CCHSA) will require an IPACC.

This multidisciplinary committee should report to the Board of Directors through the Medical Advisory Committee (for hospitals) and/or Senior Management for smaller health care settings.

This committee is responsible for:

- a) Review and approve the annual goals of the IPAC program;
- b) evaluating the results of the activities developed to meet those goals;
- c) bringing to the attention of senior administration issues with compliance with relevant legislation;
- d) ensuring that the infection prevention and control recommendations and standards of the Ministry of Health and Long-Term Care, Canadian Standards Association, Public Health Agency of Canada and specific accrediting bodies and other recognized organizations are being followed in the health care setting;
- e) advocating for resources necessary to accomplish the goals of the program; and
- f) patient safety/risk management/quality assurance.

Members of this committee should include⁵⁰:

- a) the Infection Prevention and Control Professional(s) (ICPs);
- b) the Infection Prevention and Control Physician (or the medical director in non-acute facilities);
- c) Occupational Health representative;
- d) public health representative;
- e) Environmental Services representative;
- f) senior nursing representative(s) from key clinical programs;
- g) senior medical representative(s) from key clinical programs;

- h) senior management representative.

Other members may be added depending on the organization's programs and needs. For instance, in acute care settings these might include:

- a) specialist in microbiology;
- b) pharmacy representative;
- c) central equipment reprocessing area(s) representative;
- d) operating room representative;
- e) epidemiologist;
- f) infectious diseases representative;
- g) quality assurance/risk management representative.

The IPACC in hospitals reports to the Medical Advisory Committee (MAC)⁵ and other designated committees as appropriate. Minutes of meetings must be kept and be circulated to Senior Administration and to the Board of Directors via the MAC in acute care; to Senior Administration in non-acute care; and to designated subcommittees. In long-term care settings, consideration should be given to providing the Residents' Council with meeting minutes. For very large organizations there may be variations in committee membership, roles and responsibilities. Focused clinical committees might carry out the mandates of the program in specialized areas, in addition to the formal IPAC Committee (e.g. transplant units, dialysis units and burn units).

The IPACC must meet often enough to meet the objectives of the IPACC and the CCHSA; and to properly discharge its responsibilities to review infection prevention and control surveillance data and related analyses, approve policies and monitor program goals and activities.^{46, 47}

Recommendation:

- 3.1 Each health care facility shall have a multidisciplinary infection prevention and control committee whose responsibilities include annual goal-setting, program evaluation and ensuring that the infection prevention and control program meets current legislated standards and requirements as well as the requirements of the facility.**

4. IPAC Program Functions

Infection prevention and control program functions are a collaboration of a multidisciplinary team that includes infection prevention and control. They require accountability from all areas and organization-wide support.

Surveillance

NOTE: Details regarding surveillance methodology may be found in PIDAC's "Best Practices for Surveillance of Health Care-Acquired Infections in Patients and Residents" [available online at: http://www.health.gov.on.ca/english/providers/program/infectious/diseases/best_prac/bp_hai.pdf].

A well-designed surveillance program is essential for performing all of the other necessary activities of the infection prevention and control program.^{48, 50} The collection, analysis and dissemination of surveillance data has been shown to be an important factor in the prevention of health care-associated infections.⁷ The IPAC program and the IPACC must clearly define what surveillance indicators will be collected, analyzed, benchmarked and reported, then verify that the necessary actions are taken. The type and method of surveillance should be based on the

types of infection most important to the health care setting and to the care or services provided and the population served.⁵⁹

Some surveillance systems (e.g. ventilator-associated pneumonia) are specific to a particular facility or agency. Others (e.g. central line-associated bacteraemia in oncology patients) are specific to a client/patient/resident population, whose members may be cared for by staff from multiple facilities or agencies. Infection prevention and control programs must consider which infections are important sources of morbidity and mortality for their clients/patients/residents, and collaborate with other agencies to support needed surveillance programs.

The outcome of surveillance should be an action plan for improvement.

There are two types of surveillance used in infection prevention and control: **process** surveillance and analysis; and **outcome** surveillance and analysis. Both measures will reflect the efficacy of the program in

protecting the clients/patient/resident, health care provider and visitor from HAIs while decreasing costs from infections.

Process Surveillance

Process surveillance (i.e. ongoing audit of practice) is done to verify that procedures and/or standards of practice are being followed and an action plan is in place to improve practice. One of the advantages of process audits is that the feedback given to providers is immediate. Process audits are based on validated evidence that has been demonstrated to improve outcomes.

Ongoing audits of practices must be done to monitor infection prevention and control processes in health care facilities. Audit results should be analyzed and reported back to the audited area in a timely fashion. A plan for improvement, including organizational accountability, should be developed by the audited area in conjunction with infection prevention and control, based on the results of the audit.

Practice audits are the joint responsibility of the IPAC program and the area delivering the process being audited.

Outcome Surveillance

Outcome surveillance monitors definable events or outcomes, such as surgical site infections, in a specific population. Surveillance must be targeted to the specific needs of the organization. Results should be accompanied by an action plan that will lead to quality improvement.

The goal of outcome surveillance is to be able to identify clusters and outbreaks (i.e. increases above baseline levels) and to compare infection rates to external benchmarks.

The outcome surveillance process consists of collecting data on individual cases to determine whether or not a health care-associated infection is present by comparing collected data to standard written criteria (definitions) of infections. The surveillance process should incorporate the following elements⁴⁸:

- a) the identification and description of the problem or event to be studied;
- b) the definition of the population at risk;
- c) the selection of the appropriate methods of measurement, including statistical tools and adjustment for client/patient/resident risk factors;
- d) the identification and description of data sources and methods;
- e) the definition of numerators and denominators;

- f) benchmarks used for comparison;
- g) analysis of results and recommendations for targeted improvements; and
- h) preparation and distribution of reports to appropriate groups for action.

Data Collection and Definitions for Outcome Surveillance Indicators

Individuals performing infection surveillance must have access to all data and information systems required to perform these activities (e.g. laboratory results, admission records, client/patient/resident medical records, imaging results). This should include access to computerized databases that are required for accurate and complete identification and analysis of the infectious complications of health care.

Outcome surveillance data should be used for:

- a) planning infection prevention and control strategies;
- b) detecting outbreaks;
- c) directing continuing education;
- d) identifying client/patient/resident risks for intervention; and
- e) measuring results of targeted improvement strategies.

Outcome surveillance requires objective, valid definitions of infections. The definitions used for surveillance must be relevant to settings inside and outside of the acute care environment.⁶⁰⁻⁶³

Most acute care surveillance definitions are based on the National Nosocomial Infection Surveillance (NNIS) system¹² (currently known as the National Healthcare Safety Network) but there are no standards for outcome surveillance in long-term care, home care, or ambulatory care settings. NNIS definitions⁶⁴ rely heavily on laboratory data and recorded clinical observations.

Outcome surveillance is important in all health care facilities to enable appropriate management and precautions.⁶⁵ In non-hospital facilities, radiology and microbiology data are not readily available and clinical notes may be brief. Detection of health care-associated infections in non-hospital facilities often depends on recognition of signs and symptoms of infection by staff.⁵⁰ Modified long-term care-specific surveillance criteria have been developed by a Canadian consensus panel.⁶³

Facilities must adapt surveillance systems to balance the availability of resources with priorities for data collection, population needs and institutional objectives. Wherever possible, ICPs should use established database systems available in their health care system to obtain denominator data. This can facilitate functional collaboration between and among programs to work together to improve care.

Analysis, Benchmarking and Reporting Outcome Indicators

Infections should always be expressed as a rate, not as a count (i.e. numbers of infections). Baseline infection rates should be established to track progress, determine trends and detect outbreaks and for comparison to other facilities and external benchmarks. Analysis and reporting of infection case data should be done on a regular basis (e.g. monthly, quarterly, annually) to detect trends.

Selection of specific events to be monitored should be guided by validated, nationally and/or internationally, available benchmarks appropriately adjusted for client/patient/resident risks, so that meaningful comparisons can be made. Recognized benchmark data for infection rates outside acute care are not readily available, thus each organization should monitor its own data for trends. Comparison of infection rates among organizations requires:

- a) the same definitions;
- b) careful evaluation of variations in client/patient/resident characteristics in different facilities;
- c) access to, and use of, diagnostic tests; and

- d) resources available in each setting to ensure the completeness and accuracy of the surveillance.

For those facilities that have been doing standardized surveillance for a number of years, current rates may be compared with their own past experience to gauge progress. In acute care settings, the NNIS database¹² for infections with aggregate data collected from 300 USA acute care facilities may be used for benchmarking until such time as there is a Canadian national database for comparison.

Aggregate non-nominal surveillance analyses and information should be reported to the appropriate designated individuals/committees in a timely fashion.⁶⁶ Development of a plan of action to address any issues arising from the surveillance information is vital. The ICP may use reports from nursing staff, chart review, laboratory or radiology reports, treatment review and clinical observations as sources of information to identify trends or issues. Whenever possible, reporting infection rates with the associated cost impact in terms of length of stay and/or additional costs of the infections is recommended.

The development of external comparators should be focused on infections that may be most readily identifiable and preventable and must take into account issues such as confidentiality, uniform definitions, data elements, infrastructure of data management and data quality. Clinical performance and assessment indicators used to support external comparative measurements should meet the criteria developed by the Society for Healthcare Epidemiology of America (SHEA)^{67, 68} and the Association for Professionals in Infection Control and Epidemiology (APIC). These indicators and their analyses must address the following parameters:

- a) relation to outcome or process;
- b) ability to measure variation in quality;
- c) definition of numerators and denominators;
- d) reliability, completeness and feasibility of data collection;
- e) appropriate risk adjustment;
- f) comparability of populations, severity and case-mix adjustments for external comparisons;
- g) training required for indicator implementation; and
- h) applicable benchmarks as standards of care.

In addition to the collection of baseline infection rates, the ICP should investigate sentinel events and unusual pathogens (e.g. Group A streptococcal surgical site infections, nosocomial Legionellosis).

Indicators

Process Surveillance Indicators

Targeted audits should be performed in all health care settings. Recommended specific audits are summarized in Table 1 and include:

- a) **Client/patient/resident process surveillance indicators:**
 - i) adherence to screening protocols for antibiotic-resistant organisms (AROs) according to the MOHLTC document, *“Best Practices for Infection Prevention and Control of Resistant Staphylococcus aureus and Enterococci In All Health care Settings”*⁶⁹;
 - ii) adherence to screening protocols for febrile respiratory illness (FRI) according to the MOHLTC document, *“Preventing Febrile Respiratory Illnesses. Best Practices in Surveillance and Infection Prevention and Control for Febrile Respiratory Illness (FRI), excluding Tuberculosis, in All Ontario Health Care Settings”*⁷⁰;
 - iii) adherence to screening protocols for acute gastrointestinal (GI) illness in clients/patients/residents;

- iv) adherence to screening protocols for tuberculosis in clients and residents in long-term care facilities/homes and home health care⁷¹;
 - v) immunization rates of residents who receive influenza and pneumococcal vaccine⁷²;
 - vi) adherence to screening protocols for hepatitis in hemodialysis patients.⁷³
- b) **Staff process surveillance indicators in collaboration with Occupational Health:**
- i) adherence to screening protocols for employees at risk of occupational exposure to tuberculosis⁷¹;
 - ii) immunization rates in staff, including annual influenza rates⁷²;
 - iii) surveillance for sharps injury^{74, 75};
- c) **Practice audits:**
- i) adherence to practices relating to interventions that reduce the risk of infection associated with central lines⁷⁶⁻⁷⁸;
 - ii) adherence to practices relating to interventions that reduce the risk of infection associated with ventilator use^{79, 80};
 - iii) adherence to practices relating to interventions that reduce the risk of infection associated with surgical procedures^{81, 82};
 - iv) adherence to hand hygiene protocols⁸³⁻⁸⁵;
 - v) adherence to Routine Practices protocols, including wearing of personal protective equipment appropriately and correctly¹⁰;
 - vi) adherence to sterilization and disinfection protocols (including the management of single-use devices) throughout the health care setting to verify that current standards from the MOHLTC,⁸⁶ Canadian Standards Association [website: <http://www.csa.ca>] and the Public Health Agency of Canada⁸³ are being followed with regard to reprocessing of medical equipment;
 - vii) adherence to infection prevention and control protocols related to construction/renovation sites for compliance with the standards and guidelines from the Canadian Standards Association [website: <http://www.csa.ca>] and the Public Health Agency of Canada⁸⁷;
 - viii) adherence to environmental cleaning protocols⁸³; and
 - ix) adherence to practices to limit urinary catheter use.⁸⁸
- d) **Antibiotic utilization** in acute and other settings is reviewed by an appropriate committee, group or delegate and recommendations are made based on current scientific guidelines/recommendations for selection of antibiotics and prudent prescribing of antimicrobial agents. It is recommended that utilization be reported to the IPACC annually.^{50, 89}

Outcome Surveillance Indicators

The infection prevention and control committee should verify that surveillance is done in all health care settings in collaboration with the IPAC program. Recommended surveillance indicators are summarized in Table 2 and include:

- a) **Outcome surveillance indicators to detect clusters:**
- i) surveillance for facility-acquired respiratory illness according to the MOHLTC document, "*Best Practices in Surveillance and Infection Prevention and Control for Febrile Respiratory Illness (FRI), excluding Tuberculosis, for All Ontario Health Care Settings*"⁷⁰; [available online at: http://www.health.gov.on.ca/english/providers/program/infectious/diseases/best_pr_ac/bp_fri_080406.pdf];
 - ii) facility-acquired acute gastrointestinal (GI) illness in clients/patients/residents;
 - iii) facility-acquired Group A streptococcal infection acquisition in clients/patients/residents;

- iv) skin and soft tissue infections in long-term care and complex continuing care; and
 - v) staff tuberculin skin test (TST) conversions⁷¹.
- b) **Outcome surveillance indicators to obtain facility-acquired infection rates:**
- i) surveillance for facility-acquired antibiotic-resistant organisms (AROs), such as MRSA and VRE, according to the MOHLTC document, "*Best Practices for Infection Prevention and Control of Resistant Staphylococcus aureus and Enterococci In All Health care Settings*"⁶⁹ [available online at: http://www.health.gov.on.ca/english/providers/program/infectious/diseases/best_pr/ac/bp_staff.pdf];
 - ii) surveillance for facility-acquired *Clostridium difficile*-associated disease according to the MOHLTC document, "*Best Practices for the Management of Clostridium difficile in All Health Care Settings*".⁹⁰ [available online at: http://www.health.gov.on.ca/english/providers/program/infectious/diseases/best_pr/ac/bp_cdifff.pdf];
 - iii) additional outcome surveillance indicators are required for facilities that perform invasive procedures or other specialized services:
 - Surgical Site Infection (SSI) surveillance^{81, 82} in collaboration with the department or agency that performed the surgery (e.g. acute care, ambulatory care centres that perform in-and-out surgery):
 - outcome surveillance is performed with analysis and benchmarking against recognized databases that use the same definitions for infection and are appropriately adjusted for patient risk factors have been shown to reduce the rate of surgical site infection⁸²;
 - selected procedure-specific rates are to be calculated and analyzed; the surgical procedure(s) to target for surveillance will vary. The decision on which procedure(s) to choose for surveillance is based on:
 - the type of procedure(s) done; and
 - whether high-risk procedure or high-volume procedure (e.g. total hip and knee replacements and cardiac surgical procedures have serious outcomes if infected, so they would be a priority to survey);
 - the surgical site surveillance program should also be able to capture post-discharge information, as the majority of infections develop after discharge from the surgical facility;
 - there should be a system to capture surgical site infections across the continuum of care using consistent definitions;
 - accurate infection rates with an analysis of the data are to be reported to the surgical program; **reporting of SSI rates should be procedure-specific, not overall general surgical infection rates**;
 - confidential surgeon-specific rates should be reported to the individual surgeon.
 - specialized programs such as dialysis, burn, intensive care, transplant, neonatal, oncology and cardiac, as well as free-standing facilities that perform invasive procedures, should do both process audits and outcome surveillance that are pertinent to their area, such as:
 - central line-associated bloodstream infection in collaboration with the department or agency that inserted the central line (e.g. oncology, intensive care, hemodialysis)⁷⁶⁻⁷⁸;
 - facility-acquired hepatitis in hemodialysis patients⁷³;

Additional outcome surveillance should be done on any other procedures that are high risk or high volume for the health care setting.

Table 1: Summary of Recommended Process Surveillance Indicators

| Surveillance Component | Reference # | Acute Care | CCC | LTC | HHC |
|---|-------------|------------|-----|-----|-----|
| Legend: CCC = Complex Continuing Care LTC = Long-term Care HHC = Home Health Care | | | | | |
| Adherence to ARO screening protocols for clients/patients/residents | 69 | X | X | X | |
| Adherence to FRI screening protocols for clients/patients/residents | 70 | X | X | X | X |
| Adherence to screening protocols for tuberculosis in clients/residents | 71 | | X | X | |
| Adherence to screening protocols for acute GI illness in clients/patients/residents | | X | X | X | X |
| Influenza immunization rates (clients/residents) | 72 | | X | X | |
| Pneumococcal vaccine immunization rates (clients/residents) | | | X | X | |
| Adherence to screening protocols for hepatitis in hemodialysis patients | 73 | X | X | X | |
| Staff Tuberculosis screening | 71 | X | X | X | X |
| Staff immunization rates including annual influenza vaccination | 72 | X | X | X | X |
| Sharps injury surveillance | 74, 75 | X | X | X | X |
| Adherence to central line protocols | 76-78 | X | X | X | X |
| Adherence to ventilator use protocols | 79, 80 | X | X | | |
| Adherence to protocols related to surgical procedures (e.g. pre-operative antibiotic use) | 81, 82 | X | | | |
| Adherence to hand hygiene protocols | 83-85 | X | X | X | X |
| Adherence to Routine Practices protocols, including the correct use of PPE | 10 | X | X | X | X |
| Adherence to reprocessing practices protocols | 83, 86, 91 | X | X | X | X |
| Adherence to environmental cleaning protocols | 83 | X | X | X | |
| Adherence to construction/renovation protocols for infection prevention and control | 87 | X | X | X | |
| Regular review of antibiotic utilization | 50, 89 | X | X | X | |

Table 2: Summary of Recommended Outcome Surveillance Indicators

| Surveillance Component | Reference # | Acute Care | CCC | LTC | HHC |
|--|-------------|------------|-----|-----|-----|
| Legend: CCC = Complex Continuing Care LTC = Long-term Care HHC = Home Health Care | | | | | |
| Facility-acquired respiratory infection in clients/patients/residents | 70 | X | X | X | |
| Facility-acquired ARO in clients/patients/residents | 69 | X | X | X | |
| Facility-acquired <i>Clostridium difficile</i> -associated disease in clients/patients/residents | 90 | X | X | X | |
| Facility-acquired acute GI illness in clients/patients/residents | | X | X | X | |
| Facility-acquired Group A streptococcal infections in clients/patients/residents | | X | X | X | |
| TST conversion rates in health care providers | 71 | X | X | X | X |
| Procedure-specific surgical site infections (SSI) | 81, 82 | X | | | X* |
| Central line-associated bloodstream infections in high risk areas | 76-78 | X | | | X* |
| New acquisition of hepatitis in hemodialysis patients | 73 | X | X | X | |
| Skin and soft tissue infections in clients/residents | | | X | X | |

* in collaboration with the agency that inserted the central line/performed the surgery

Recommendations:

- 4.1 *Health care settings must monitor targeted infection prevention and control processes with regular audits of practices.*
- 4.2 *Health care settings must monitor targeted infection prevention and control outcomes using surveillance for health care-associated infections in specific populations.*
- 4.3 *Infection surveillance must include standardized collection of data using written definitions of infections, identification of risk population, methods of measurement, description of data sources and benchmarks used for comparison.*
- 4.4 *Results of process and outcome surveillance must be analyzed and reported back in a timely fashion; a plan for improvements, including organizational accountability, must be developed by the targeted area in conjunction with Infection Prevention and Control based on the results of surveillance.*

Policies and Procedures

An important aspect of infection prevention and control programs is the development and ongoing review of infection prevention and control policies and procedures that must be based on the current scientific literature and authoritative guidelines that have a positive impact on processes and prevention of HAIs. The Regional Infection Control Networks may be used as a resource.

Policies and procedures must be relevant to the setting and be accessible to all staff. In establishing policies and procedures, how these will be implemented must be clearly stated, including responsible individuals.

Policies and procedures must:

- a) be practical to implement;
- b) be reviewed and audited regularly to maintain accuracy, validity and performance/compliance⁴⁸⁻⁵⁰;
- c) follow a standardized template;
- d) be linked to an educational program so that the users understand and follow the policy;
- e) be written to serve as a resource for providers responsible for their implementation; and
- f) be written in collaboration with the targeted group.

Information sources to be consulted during policy development should include:

- a) surveillance data;
- b) scientific literature;
- c) professional practice guidelines and standards; and
- d) legal requirements and regulatory standards.

Health care providers should be made aware of infection prevention and control policies and procedures. A system for monitoring staff compliance with infection prevention and control policies and procedures should be developed and implemented.

All "best practices" guidelines developed by the Provincial Infectious Diseases Advisory Committee (PIDAC) should to be followed where they are applicable in all health care settings.

Recommendations:

- 4.5 Infection prevention and control policies and procedures must be consistent with relevant legislation and standards and based on sound scientific knowledge.**
- 4.6 Policies and procedures must be reviewed and updated as required on a regular basis.**
- 4.7 Policies and procedures must be linked to educational programs and action plans for implementation must be developed.**
- 4.8 A system for monitoring and improving staff compliance with infection prevention and control policies and procedures must be developed and implemented.**

Compliance with Legislation and Accreditation Standards

All health care organizations are subject to regulation and oversight by various agencies, authorities and government bodies. Some regulations may be specific to extended care, home health care, or ambulatory care, whereas others are generally relevant to all health care facilities.

Infection prevention and control program staff should have appropriate access to medical or other relevant records and to staff who can provide information on the adequacy of the institution's compliance with regard to regulations, standards and guidelines.⁴⁸ The infection prevention and control program should collaborate with, and provide liaison to, appropriate local and provincial public health departments for reporting of communicable diseases and related conditions and to assist with the control of infectious diseases.⁴⁸

Health Care Regulations Pertaining to Infection Prevention and Control

Health Protection and Promotion Act (HPPA)⁹²

Health care providers in Ontario shall comply with the *Health Protection and Promotion Act* which states that:

- a) "A physician or registered nurse in the extended class who, while providing professional services to a person, forms the opinion that the person is or may be infected with an agent of a communicable disease shall, as soon as possible after forming the opinion, report thereon to the medical officer of health of the health unit in which the professional services are provided". [R.S.O.1990, c.H.7,s.26; 2007, c.10, Sched. F, s.4]]
- b) "The administrator of a hospital shall report to the medical officer of health of the health unit in which the hospital is located if an entry in the records of the hospital in respect of a patient in or an out-patient of the hospital states that the patient or out-patient has or may have a reportable disease or is or may be infected with an agent of a communicable disease." [R.S.O. 1990, c. H.7, s.27(1)]
- c) "The superintendent of an institution shall report to the medical officer of health of the health unit in which the institution is located if an entry in the records of the institution in respect of a person lodged in the institution states that the person has or may have a reportable disease or is or may be infected with an agent of a communicable disease." [R.S.O. 1990, c. H7, s.27(2)]
- d) "The administrator or superintendent shall report to the medical officer of health as soon as possible after the entry is made in the records of the hospital or institution, as the case may be." [R.S.O. 1990, c.H.7, s.27(3)]

Public Hospitals Act⁵

- a) The Hospital Management Regulation 965, section 4 of the *Public Hospital Act* states: "Every board shall pass by-laws that, ... (b) provide for the organization of the medical staff, set out duties of the medical staff and set out at least, ... (vi) the establishment of one or more committees of the medical staff, including the duties and powers of such committees, to assess... infection control... and all other aspects of medical care and treatment in the hospital,..." [available online at: <http://www.search.e-laws.gov.on.ca/en/isysquery/b2758854-8812-4ad3-88b4-b4496ee3c430/6/frame/?search=browseStatutes&context=>].
- b) The Hospital Management Regulation 965/90 of the *Public Hospitals Act* requires hospital boards to "establish and provide for the operation of a health surveillance program including a communicable disease surveillance program in respect of all persons carrying on activities in the hospital... (as) set out in any applicable communicable disease surveillance protocol published jointly by the Ontario Hospital Association and the Ontario Medical Association for that disease and approved by the Minister". [R.R.O. 1990, Reg. 965, s.4(1-2)]
- c) It is recommended that all health care settings follow the Communicable Disease Surveillance Protocols (*Public Hospitals Act Reg. 965*) and other legislated requirements [available online at: http://www.oha.com/Client/OHA/OHA_LP4W_LND_WebStation.nsf/page/Communicable+Disease+Surveillance+Protocols+for+Ontario+Hospitals+Index].

These protocols include: Adenovirus conjunctivitis,⁹³ Antibiotic-resistant organisms,⁹⁴ Blood-borne diseases,⁷⁴ Cytomegalovirus,⁹⁵ Enteric diseases,⁹⁶ Group A streptococcal

disease,⁹⁷ Herpes simplex,⁹⁸ Influenza,⁹⁹ Measles,¹⁰⁰ Meningococcal disease,¹⁰¹ Pertussis,¹⁰² Rubella,¹⁰³ Scabies,¹⁰⁴ Tuberculosis¹⁰⁵ and Varicella/Zoster.¹⁰⁶

Long-Term Care Homes Act¹⁰⁷

The *Long-Term Care Homes Act* requires that “the licensee must ensure that there is an infection prevention and control program in the long-term care home to detect the presence of infection and prevent the transmission of infections. The program must comply with any standards or requirements, including required outcomes, provided for in the regulations”. [Section 84]

Canadian Council on Health Services Accreditation (CCHSA)¹⁰⁸

New standards for infection prevention and control introduced by the CCHSA’s accreditation program include a number of surveillance requirements; process audit requirements; education of staff/patients/visitors in infection prevention and control; and plans for the control of outbreaks and pandemics.

Occupational Health & Safety Act and Ontario Regulations

Staff safety is addressed in these documents, such as the use of personal protective equipment; regulations pertaining to the proximity of food and drink to infectious materials; needle safety; and ceiling exposure values for biological and chemical agents.

- a) *Ontario Regulation 67/93* under the *Ontario Occupational Health and Safety Act¹⁰⁹* states that “every employer in consultation with the joint health and safety committee or health and safety representative, if any, ...shall develop, establish and put into effect measures and procedures for the health and safety of workers “[O. Reg. 67/93, S. 8], and “...such measures and procedures may deal with...**the control of infections**” [O. Reg. 67/93, S. 9(1)]. In health care settings, effective infection prevention and control is important both for the safety of those who carry on activities in the health care setting and for the clients/patients/residents receiving care in those settings. [Available online at: http://www.e-laws.gov.on.ca/html/regs/english/elaws_regs_930067_e.htm]
- b) *Ontario Regulation 474/07¹¹⁰*: Needle safety is addressed in this Regulation. [Available online at: http://www.e-laws.gov.on.ca/html/source/regs/english/2007/elaws_src_regs_r07474_e.htm]

Recommendations:

- 4.9 Health care settings shall be in compliance with all legal and accreditation standards that pertain to the practice of infection prevention and control.**
- 4.10 The IPAC program should collaborate with, and provide liaison to, appropriate local and provincial public health departments for reporting of communicable diseases and respiratory and gastrointestinal outbreaks to assist with the control of infectious diseases.**

Occupational Health and Safety Issues

Infection Prevention and Control and Occupational Health and Safety programs must work collaboratively and closely to decrease the risk of infections in health care providers. Health care providers are exposed to infectious diseases and may also pose a risk to clients/patients/residents and other health care providers if they work while ill with a communicable disease. Non-acute health care providers, such as those working in home health care, nursing homes, clinics and emergency medical services, should also be considered as being at risk. Health care organizations have the dual responsibility of preventing transmission of infections from clients/patients/residents to health care providers and of interrupting the

spread of infections from health care providers to both clients/patients/residents and other health care providers.

While reviewing the need for infection prevention and control resources it is also important to consider the impact on Occupational Health and Safety services. There must be sufficient resources to implement recommended best practices successfully. Key elements of an occupational health service include preplacement assessment; immunization review and update; staff influenza immunization program; TB status screening and surveillance based on facility and activity risk assessment; exposure prevention and management and post-exposure prophylaxis; as well as health and safety education. Ideally, information on health care provider immunization status should be easily accessible and kept in a confidential, electronic database. Pregnant and immunocompromised health care providers may require additional considerations. Staff who provide care to clients/patients/residents requiring airborne precautions need to participate in a respiratory protection program with respirator fit testing at least biannually. Close liaison between the ICP and the occupational health service is essential to ensure proper exposure and outbreak management, including contact tracing. Education regarding prevention of blood borne pathogen exposures and access to timely post-exposure prophylaxis and follow-up is essential. There needs to be adequate resources to implement an annual influenza vaccine program. In an acute care setting, an occupational health service should have access to occupational physician expertise and ideally will have a certified occupational health nurse on site (CCOHN). Other health care settings should review their human resource requirements to ensure that key program elements can be accomplished.

Joint Health and Safety Committee

Infection Prevention and Control should be represented on the facility's Joint Health and Safety Committee.

Policies and Procedures

The infection prevention and control component of the Occupational Health and Safety program should be developed jointly with Infection Prevention and Control, including policies and procedures that address the diagnosis, treatment and prevention of infections in health care providers.

Examples of occupational health policies that may require IPAC involvement include^{48, 111}:

- a) pre-placement evaluations;
- b) immunization programs;
- c) evaluation of potentially harmful infectious exposures and implementation of appropriate preventive measures;
- d) coordination of plans for managing outbreaks involving health care providers;
- e) provision of care to health care providers for work-related infections or exposures;
- f) education regarding infection risks related to employment or special conditions; and
- g) development of guidelines for work restrictions when a health care provider has an infectious disease.

Although the Communicable Diseases Surveillance Protocols were written for acute care settings, and are mandated for hospitals under the Public Hospitals Act, they should be followed in all health care settings.

Occupational health and safety policies relating to infection prevention and control in all health care settings should comply with the OHA/OMA Communicable Diseases Surveillance Protocols^{74, 93-106} as well as the Public Health Agency of Canada's occupational health guidelines^{112, 113}. The Communicable Diseases Surveillance Protocols define the tests, examinations and immunizations that must be done when an individual begins work in health care facilities.

Communicable Disease Status

At the time of employment, all health care providers should be evaluated by an occupational health and safety clinician for conditions relating to communicable diseases. The evaluation should include the following^{48, 50, 100, 105, 106}:

- a) medical history, including immunization status and assessment for conditions that may predispose staff to acquiring or transmitting communicable diseases;
- b) tuberculin skin testing (TST); and
- c) serologic screening for select vaccine-preventable diseases, if indicated.

Post-exposure Prophylaxis

Occupational health policies and procedures should address post-exposure follow-up and prophylaxis when indicated.⁷⁴

Work Restrictions

All health care settings should establish a clear expectation that staff do not come into work when ill, and support this expectation with appropriate attendance management policies.⁵⁰ Staff carrying on activities in a health care setting who develop a communicable disease may be subject to some work restrictions. The Communicable Diseases Surveillance Protocols state: *“Health care workers have a responsibility to their patients and colleagues regarding not working when ill with symptoms that are likely attributable to an infectious disease. This includes staff with influenza-like illness, febrile respiratory illness, gastroenteritis and conjunctivitis”*.¹¹⁴

The Occupational Health and Safety program in both acute care and long-term care must develop policies and procedures for the evaluation of health care providers which include:

- a) assessment of disease communicability;
- b) management of health care providers who have been exposed to infectious diseases, including post-exposure prophylaxis and work restrictions;
- c) indications for work restrictions:
 - i) health care providers with infected skin lesions should not have direct contact with clients/patients/residents or with food consumed by others⁵⁰;
 - ii) health care providers with symptoms of gastroenteritis should not work while symptomatic⁹⁶;
 - iii) health care providers with respiratory symptoms of influenza-like illness or other febrile respiratory illness should not work while symptomatic^{70, 99};
 - iv) health care providers with acute conjunctivitis should not have direct contact with clients/patients/residents or other staff⁹³;
 - v) staff susceptible to the vaccine-preventable diseases measles, mumps, rubella and varicella should not care for clients/patients/residents who have those diseases.^{100, 103, 106}
- d) a program to deal with staff exposures which includes:
 - i) collection and analysis of exposures, including assessment of the exposure, determination of exposure risk, follow-up of exposed health care providers and other staff, and preventive actions that may be put into place;
 - ii) policies to deal with spills and staff exposure to blood or body fluids; and
 - iii) a sharps injury prevention program (e.g. CDC Workbook for Designing, Implementing, and Evaluating a Sharps Injury Prevention Program, available at: <http://www.cdc.gov/sharpssafety/pdf/WorkbookComplete.pdf>).^{74, 75}

Personal Protective Equipment (PPE)

Health care settings should have a process for evaluating PPE to ensure it meets quality standards where applicable, including a respiratory protection program compliant with the Ministry of Labour requirements.¹¹⁵ PPE should be appropriate and accessible.

Staff Education

A program should be in place to offer ongoing education in the MOHLTC Infection Prevention and Control Core Competency Education Program (e.g. hand hygiene, use of personal protective equipment, Routine Practices and Additional Precautions, healthy workplace policies, equipment cleaning and others as deemed appropriate). Occupational Health and Infection Prevention and Control should collaborate on educational programs.

See below, “*Education and Training*”, for more information regarding education.

Recommendations:

- 4.11 Infection Prevention and Control must be represented on the facility’s Joint Health and Safety Committee.**
- 4.12 The infection prevention and control component of the Occupational Health and Safety program must be developed jointly by Occupational Health and Infection Prevention and Control.**
- 4.13 All health care providers must be evaluated by Occupational Health for conditions relating to communicable diseases that can be spread in the health care setting.**
- 4.14 Attendance management policies shall discourage health care providers from working while ill with a communicable disease that can be spread in the health care setting.**
- 4.15 If any worker acquires an occupational illness, or a claim in respect of an occupational illness has been filed with the Workplace Safety and Insurance Board, a notice in writing shall be made to the Ministry of Labour.**

Education, Training and Evaluation of Infection Prevention and Control Programs

One of the most important roles of the ICP is educating staff in infection prevention and control principles. The goal of a quality education and training program in infection prevention and control is to develop a culture wherein all health care providers follow the recommended policies and “best practices” at all times and take pride in practicing good infection prevention and control as part of their daily routine. Health care settings must provide regular education and support to help staff consistently implement appropriate infection prevention and control practices.

In order for changes in practice to occur, the organization must review enablers and barriers that support or impede putting guidelines into practice and provide the necessary tools to effect the change. Uptake and retention of education will only occur when the tools required to carry out the practice are readily available and there is a plan for implementation (e.g. hand hygiene compliance may improve if point-of-care product is in place).

Education and Training in Infection Prevention and Control

The prevention of HAIs requires an organized education and training program regarding proper infection prevention and control procedures in the health care setting, aimed at health care providers, clients/patients/residents and their caregivers.^{116, 117} A coordinated, effective educational program will result in improved infection prevention and control activities.¹¹⁸

Education programs should be flexible enough to meet the diverse needs of the range of health care providers and other staff who work in the health care setting. The local public health unit and Regional Infection Control Networks may be a resource and can provide assistance in developing and providing education programs for all health care settings.

Infection prevention and control education should be provided to all staff, especially those providing direct client/patient/resident care,⁶⁶ at the initiation of employment as part of their orientation and as ongoing continuing education.

Regulated health care professionals should be aware of the infection prevention and control standards of their regulatory college.

As a minimum, the **MOHLTC Infection Prevention and Control Core Competency Education Program** should be delivered to all health care providers, with adherence to infection prevention and control practices being part of staff performance review.

Effective infection prevention and control education programs should emphasize¹¹⁹:

- a) disease transmission, the risks associated with infectious diseases and basic epidemiology of health care-associated infections specific to the setting;
- b) the benefits of case finding/surveillance and the extent and nature of existing and potential problems related to infection in the organization (e.g. MRSA, VRE);
- c) hand hygiene and basic personal hygiene, including the use of alcohol-based hand rubs and hand washing;
- d) principles and components of Routine Practices as well as additional transmission-based precautions;
- e) assessment of the risk of infection transmission and the appropriate use of personal protective equipment (PPE), including safe application, removal and disposal;
- f) appropriate cleaning and/or disinfection of health care equipment, supplies and surfaces or items in the health care environment (e.g. beds, bed tables, call bells, toilets, privacy curtains);
- g) aseptic practices;
- h) the importance of proper and prudent use of antibiotics;
- i) individual staff responsibility for keeping clients/patients/residents, themselves and co-workers safe;
- j) prevention of blood and body fluid exposure; and
- k) education in early problem or symptom recognition.

Infection prevention and control professionals with knowledge of epidemiology and infectious diseases should be active participants in the planning and implementation of these educational programs.⁴⁸

Infection prevention and control education must be given:

- a) at orientation of new staff;
- b) on an ongoing scheduled basis (e.g. annually, biannually);
- c) if a situation demonstrates a specific need (e.g. during outbreaks; to provide information on a new emerging infections; when required based on results of audits); and
- d) for all trainees prior to the start of their clinical placements.

Infection Prevention and Control may assist staff in education of clients/patients/residents and visitors through developing and/or reviewing educational materials such as information sheets pertaining to IPAC.

Education techniques must be applicable to adult learning styles. The teaching methods used must be sensitive to language, cultural background and educational level. Teaching formats should be varied through the use of individualized programmed educational units using video and computer technology, face-to-face discussions with infection prevention and control

professionals and practical demonstrations. Infection prevention and control education should be simple, clear and relevant to the policies of the health care facility.

Evaluation of Infection Prevention and Control Education Programs

Educational programs should be evaluated periodically for effectiveness and attendance should be monitored and reported back to the employee's manager for incorporation into the performance review.⁴⁸ Process audits of practices and monitoring of client/patient/resident care practices may be used to identify areas of continued concern and to assess the effectiveness of educational interventions. Surveillance information should be available to inform the facility about problems occurring in their setting. Feedback serves as an educational tool to stimulate change in client/patient/resident care practices and to refine programs.

Recommendations:

- 4.16 Education in infection prevention and control must span the entire health care setting and be directed to all who work in that setting.**
- 4.17 Orientation programs for staff new to the health care setting must include an infection prevention and control component.**
- 4.18 Health care facilities should have appropriate policies and procedures that ensure:**
- a) mandatory attendance at infection prevention and control training/education**
 - b) attendance recorded and reported back to the manager to become a part of the employee's performance review.**
- 4.19 Continuing education must address the infection prevention and control needs of the organization with regard to content, target audience and timing of the education (e.g. scheduled continuing education, special education based on specific needs such as outbreaks).**
- 4.20 There must be evaluation of the infection prevention and control education program to ensure that it is current, relevant and effective.**
- 4.21 The resources required to carry out the IPAC education program must be allocated to achieve the educational goals of the program.**

Other Key Components of the IPAC Program

Hand Hygiene

Hand hygiene is considered the most important and effective infection prevention and control measure to prevent the spread of health care-associated infections.^{83, 120} Despite this, compliance with hand hygiene protocols by health care providers has been, and continues to be, unacceptably low at 20% to 50%.¹²¹⁻¹²⁵ It has been shown that a facility-wide hand hygiene program, which includes administrative leadership, sanction, support and rewards, can be effective at reducing the incidence of health care-associated infections.^{84, 125}

To make it possible for health care providers to clean their hands at the right time, alcohol-based hand rub must be provided at the point-of-care, where busy health care providers can clean their hands without leaving the client/patient/resident. Clients/patients/residents who see

the health care provider performing hand hygiene are reassured that everything is being done to protect them from unnecessary infections.

All health care settings must implement a hand hygiene program which incorporates the following elements:

- a) a written policy and procedure regarding hand hygiene;
- b) easy access to hand hygiene agents **at point-of-care**;
- c) 60-90% alcohol-based hand rubs are preferred and must be provided by the health care setting;
- d) education that includes indications for hand hygiene, techniques, indications for hand hygiene agents and hand care;
- e) a hand care program; and
- f) a program to monitor hand hygiene compliance with audits of hand hygiene practices and feedback to individual employees, managers, chiefs of service and the Medical Advisory Committee via the Infection Prevention and Control Committee.

Hand Hygiene Policies and Procedures

A hand hygiene policy and procedure should be developed by each health care setting that includes the following:

- a) indications for hand hygiene;
- b) selection of hand hygiene agent;
- c) management of soap containers;
- d) hand lotion use;
- e) use of alcohol-based hand rubs; and
- f) hand hygiene monitoring and compliance audits.

Refer to “PIDAC’s Hand Hygiene Fact Sheet for Health Care Settings” for a description of items that must be included in a hand hygiene policy [available online at: http://www.health.gov.on.ca/english/providers/program/infectious/pidac/fact_sheet/fs_handwash_010107.pdf].

Hand Hygiene Agents

At the present time only 60-90% alcohol-based hand rubs are recommended as waterless agents for hand hygiene.

Alcohol-based hand rubs:

- c) are recommended to routinely decontaminate hands in clinical situations when hands are not visibly soiled;
- d) provide for a rapid kill of most transient microorganisms⁸⁴;
- e) contain a variety of alcohols in concentrations from 60 – 90%;
- f) are not used with water;
- g) reduce skin irritation,¹²⁶⁻¹²⁹ often with the use of emollients; and
- h) are less time-consuming than cleaning with soap and water.^{129, 130}

Alcohol-based hand rub is the preferred method for decontaminating hands.

Using alcohol-based hand rub is more effective than washing hands (even with an antibacterial soap) when hands are not visibly soiled.

Where hand washing facilities are not immediately available, alcohol-based hand rub should be used.

Hand washing with soap and running water must be performed when hands are visibly soiled. If running water is not available, use moistened towelettes to remove the visible soil, followed by an alcohol-based hand rub.

Liquid or Foam Soap:

- a) Soap must be dispensed in a disposable pump dispenser.
- b) Soap containers are not to be topped up, as there is a risk of contamination.
- c) Bar soaps are not acceptable in health care settings except for individual client/patient/resident personal use.
- d) Antibacterial soaps may be used in critical care areas such as ICU, or in other areas where invasive procedures are performed.

Hand Care Program

The health care setting should have a hand care program to assess and maintain the skin integrity of health care providers who perform frequent hand hygiene. If the skin integrity of a health care provider cannot be maintained, the health care provider should be offered modified work that does not require frequent hand hygiene.

Products chosen for hand hygiene should be of proven benefit to skin. Hand care lotion should be readily available to staff free of charge and products chosen should not interfere with glove integrity or with other hand hygiene products.

Education

Education should include:

- a) indications for hand hygiene;
- b) factors that reduce compliance with hand hygiene;
- c) hand hygiene agents;
- d) hand hygiene techniques; and
- e) hand care to promote skin integrity.

Compliance

Strategies for hand hygiene promotion include education, performance feedback on hand hygiene adherence and encouragement and provision of role models from key members in the work unit.⁸⁴

At the institutional level, strategies for improvement include written guidelines, selection of hand hygiene agents, hand care promotion and agents, hand hygiene facilities and efforts to prevent high workload, downsizing and understaffing.

Facilities where results of monitoring and feedback identify issues relating to compliance should provide ongoing educational and motivational activities to encourage long-lasting improvement in hand hygiene practices.¹³¹

A plan of action should be evident for persistent failure with compliance of hand hygiene. Non-compliance should not be tolerated, as this is a patient and health and safety issue. Compliance results should be part of the performance appraisal.

For more information regarding hand hygiene, refer to the MOHLTC website on hand hygiene at: <http://www.justcleanyourhands.ca>.

Recommendations:

4.22 All health care settings must develop and implement a hand hygiene program, including hand hygiene agents available at the point-of-care in acute care settings and easily accessible in all other health care settings. In health care facilities this program must also include:

- a) **demonstrable senior administration commitment;**
- b) **written policies and procedures;**
- c) **education in hand hygiene indications and techniques;**

- d) a hand care program; and
- e) a program to measure hand hygiene compliance.

4.23 Hand hygiene policies must reflect the information described in “PIDAC’s Hand Hygiene Fact Sheet for Health Care Settings” [available online at:

http://www.health.gov.on.ca/english/providers/program/infectious/pidac/fact_sheet/fs_ha ndwash_010107.pdf]

4.24 Infection Prevention and Control and Occupational Health must be consulted and involved in all hand hygiene product selection and trials in the health care setting.

Routine Practices and Additional Precautions

Routine Practices refer to infection prevention and control practices to be used for the routine care of all clients/patients/residents to prevent transmission of microorganisms from person-to-person in the health care setting. The full description of Routine Practices¹⁰ to prevent and control transmission of nosocomial pathogens can be found on the Public Health Agency of Canada website: <http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/99vol25/25s4/index.html>.

Routine Practices include:

- a) risk assessment of the client/patient/resident and the subsequent interaction;
- b) hand hygiene before and after physical contact with any client/patient/resident or with a contaminated environment (refer to “PIDAC’s Hand Hygiene Fact Sheet for Health Care Settings”, available online at: http://www.health.gov.on.ca/english/providers/program/infectious/pidac/fact_sheet/fs_handwash_010107.pdf)^{83, 84};
- c) additional barrier precautions to prevent health care provider contact with blood, body fluids, secretions, excretions, non-intact skin or mucous membranes (e.g. gloves, gown, mask, eye protection). Refer to “PIDAC’S Routine Practices Fact Sheet for Health Care Settings” for more information [available online at: http://www.health.gov.on.ca/english/providers/program/infectious/pidac/fact_sheet/fs_routine_010107.pdf];
- d) single room and private toileting facilities for clients/patients/residents who soil the environment¹⁰;
- e) safe handling of sharps to prevent injury including the use of safety-engineered devices and the provision of sharps containers at point-of-care where required^{10, 75, 113};
- f) safe handling of soiled linen and waste to prevent exposure and transmission to others⁸³; and
- g) cleaning and disinfection of equipment that is being used by more than one client/patient/resident between uses.^{83, 86}

Consistent use of Routine Practices with all clients/patients/residents is critical to preventing transmission of microorganisms from patient-to-patient, from staff-to-patient and from patient-to-staff.

Additional Precautions (i.e. Contact Precautions, Droplet Precautions, Airborne Precautions) refer to infection prevention and control interventions to be used **in addition to** Routine Practices for certain pathogens or clinical presentations. These precautions are based on the method of transmission (e.g. contact, airborne or large droplet).¹⁰ The full description of Additional Precautions to prevent and control transmission of nosocomial pathogens can be found on the Public Health Agency of Canada website: <http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/99vol25/25s4/index.html>.

Additional Precautions include:

- a) appropriate accommodation based on the mode of transmission (e.g. single room for Droplet Precautions, single room with inward directional air flow (i.e. “negative pressure”) for Airborne Precautions, single room with individual toileting facilities for Contact Precautions)^{10, 69};
- b) modified or enhanced environmental cleaning procedures for Contact Precautions⁶⁹;
- c) limiting transport of client/patient/resident and using appropriate barriers during transport^{10, 69}; and
- d) equipment dedicated to the client/patient/resident on Contact Precautions wherever possible.⁶⁹

Recommendations:

4.25 Staff in all health care settings must follow Routine Practices and Additional Precautions and facilities must implement a program that includes:

- a) **written policies and procedures;**
- b) **staff education and training in indications and techniques for Routine Practices and Additional Precautions; and**
- c) **a program to measure compliance with Routine Practices and Additional Precautions.**

4.26 Health care facilities should ensure that appropriate policies and procedures are in place to ensure mandatory attendance at training/education in Routine Practices and Additional Precautions (including hand hygiene) and that attendance is recorded and reported back to the manager to become a part of the employee’s performance review.

Immunization

Client/Patient/Resident Immunization

One of the most effective preventive measures to protect clients/patients/residents and staff from acquiring communicable diseases is immunization. All health care settings should have an age-appropriate immunization program.

One of the major functions of a resident health program is the immunization of the elderly resident.⁵⁰ In long-term care homes, resident health programs are believed to be important in the prevention of nosocomial infections.⁶³ Residents of long-term care facilities should be immunized against tetanus, diphtheria, pneumococcus and influenza. The influenza vaccine should be given annually in the fall.

Staff Immunization

Immunization programs are highly effective and are a critical component of the Occupational Health and Safety program.^{111, 112, 132, 133} Health care providers must be offered appropriate immunizations for communicable diseases. Immunizations should be based on requirements such as OHA/OMA/MOHLTC surveillance protocols^{74, 99-103, 106} and consistent with recommendations from the National Advisory Committee on Immunization for health care providers.⁷² Appropriate vaccine use protects the health care provider, colleagues and the client/patient/resident.

It has been demonstrated that annual influenza immunization of staff protects clients/patients/residents from acquiring influenza infection, thus reducing morbidity and mortality in residents of long-term care homes.^{72, 134, 135}

Health care provider vaccinations should include^{48, 50, 72}:

- a) tetanus;
- b) diphtheria;
- c) influenza (annually)⁹⁹;
- d) hepatitis B (HBV) (if occupational exposure is a possibility)⁷⁴;
- e) varicella vaccine is indicated if a health care provider is not immune¹⁰⁶;
- f) measles/mumps/rubella (MMR)^{100, 103};
- g) acellular pertussis¹⁰²; and
- h) other vaccines that might be required in specific situations (e.g. meningococcal).

Recommendations:

4.27 All health care settings must have an immunization program in place appropriate to their clients/patients/residents.

4.28 Residents of non-acute care facilities must have immunization programs that also include pneumococcal and annual influenza immunization.

4.29 Health care providers must be offered appropriate immunizations to protect them from occupationally-relevant communicable diseases.

Cluster/Outbreak Management and Investigation

All facilities should have appropriate facilities to manage an outbreak. The facility should assess its capabilities for the management of different types of infections and the institution of different types of precautions systems.

All health care facilities must have a program with the capacity to identify the occurrence of clusters or outbreaks of infectious diseases.^{48, 50} This may be accomplished by:

- a) using baseline surveillance data on the incidence of health care-associated infections in order to identify increases (see section II.4, "Surveillance");
- b) having health care providers report any clusters or potential outbreaks to the IPAC program immediately;
- c) having ICPs review microbiology reports in a timely manner to identify unusual clusters or a greater than usual incidence of certain species or strains of microorganisms.^{48, 50}

Epidemic health care-associated infections are defined as HAIs that represent an increase in incidence over expected rates ("cluster" or "outbreak"). Early intervention to prevent outbreaks or limit the spread of infections once an outbreak has been identified will interrupt transmission of disease, decreasing the impact on clients/patients/residents' health, patient care and cost.^{50, 136-140}

Additional facility expertise and resources may be required for outbreaks. In these cases, expertise may be obtained from:

- a) public health units;
- b) formal consultation arrangement with experts in infection prevention and control and health care epidemiology (i.e. contracted services);
- c) regional infection control networks;
- d) academic health sciences centres; and/or
- e) linkages with other facilities.

Outbreak Management Team

In the event of an outbreak, the IPAC Committee shall convene an Outbreak Management Team, consisting of members which might include as appropriate to the facility:

- a) Infection Prevention and Control Physician

- b) Infection Prevention and Control Professional(s)
- c) Microbiologist
- d) Epidemiologist
- e) Occupational Health manager or delegate
- f) Medical Officer of Health or delegate (mandatory member for outbreaks of reportable diseases and for respiratory and enteric outbreaks)
- g) Nursing manager(s) and staff from the affected area
- h) Environmental Services representative
- i) Physician representative from the affected area
- j) Senior administrator(s) or delegate
- k) Public Relations representative
- l) Other ad hoc members as dictated by the circumstances

The outbreak management team must have the authority to institute changes in practice or take other actions that are required to control the outbreak.^{48, 50} All health care facilities should have an administrative protocol for dealing with infectious disease outbreaks, including the authority to relocate clients/patients/residents, cohort clients/patients/residents and staff, confine clients/patients/residents to their rooms, restrict admissions and transfers, restrict visitors, obtain cultures and administer relevant prophylaxis or treatment.⁵⁰

Role of the Microbiology Laboratory in an Outbreak

Appropriate microbiology laboratory capacity is essential to the detection and investigation of outbreaks. In an outbreak, the microbiology laboratory must be capable of providing timely results to the outbreak management team and, for some outbreaks, should have timely access to typing results for the microorganism causing the outbreak.

Clinical microbiology staff must be able to perform or obtain appropriate testing to make a determination of microorganism species. Appropriate clinical specimens must be obtained and sent for culture. Microbiology laboratory records must be kept in a manner that permits retrieval of information, preferably from a computerized database, by type of microorganism, antibiotic susceptibility pattern, type of clinical specimen, ward service, attending physician or surgeon and date the culture was obtained. Where laboratory services are contracted out, these provisions must be included in the contract.

All registered staff must have the authority to initiate Additional Precautions without a physician's order upon consultation with their supervisor, Infection Prevention and Control and/or Public Health.

Role of the ICP in an Outbreak

Policies must define what authority the ICP has during an outbreak. To investigate an outbreak fully and identify all possible cases as well as attempt to identify the source of the outbreak, infection prevention and control staff must have unrestricted access to all necessary information, including medical, nursing, laboratory and administrative records within the health care setting.

The ICP should have the authority to implement outbreak management measures up to, and including, closure of the affected unit.

Recommendations:

4.30 All health care facilities must have the ability and the capacity to identify and manage clusters or outbreaks of infectious diseases.

4.31 Outbreaks in health care facilities should be managed by a multidisciplinary team which includes the Infection Prevention and Control Professional(s).

4.32 All registered staff must have the authority to initiate Additional Precautions without a physician's order upon consultation with their supervisor, Infection Prevention and Control and/or Public Health.

4.33 The ICP should have the authority to implement outbreak management measures up to, and including, closure of the affected unit.

Communications

All health care settings should develop a communications policy addressing both internal and external communication on infection prevention and control issues. Health professionals play a key role in communicating relevant health information within their institution, to public health and to other health care providers. Timely communication assists health care settings in determining priorities, preventing further cases of infection, effective control of clusters/outbreaks and minimizing the impact of the event. Health information communicated must comply with the requirements of the Personal Health Information Privacy Act (PHIPA).

All health care settings should have established procedures for receiving and responding appropriately to all international, national, provincial, regional and local health notices. They should communicate health notices promptly to all staff responsible for case finding/surveillance and provide regular updates. Current health notices are available from local public health units; the MOHLTC; Health Canada and Public Health Agency of Canada websites [http://www.phac-aspc.gc.ca/tmp-pmv/pub_e.html] and Important Health Notices (IHN) issued by the Ministry of Health and Long-Term Care in response to abnormal events that require ministry direction or instruction. In the absence of these events, Important Health Notices are issued on a bi-annual basis to provide health care providers with appropriate updates on emergency-related activities and information and are posted at: <http://www.health.gov.on.ca/english/providers/program/emu/ihn.html>.

Recommendations:

4.34 All health care settings must ensure the development and implementation of communication and reporting policies.

4.35 All health care settings must ensure reception, appropriate response and prompt communication of Important Health Notices.

Environment

Maintaining a clean and safe health care environment is an essential component of infection prevention and control. Health care settings must devote adequate resources to Environmental Services/Housekeeping that include human resources; written procedures for cleaning and disinfection of client/patient/resident rooms and equipment; education and continuing education of cleaning staff; procedures and increased capacity for outbreak management; and ongoing review of procedures.

Policies and procedures should address the environmental aspects of areas when the role of the environment may be a significant factor in the prevention of HAIs, particularly in the following areas:

- a) Environmental Cleaning
 - i) Housekeeping in the health care facility should be performed on a routine and consistent basis to provide for a safe and sanitary environment. Environmental cleanliness should be monitored.⁵⁰

- ii) Cleaning and disinfecting products used in the health care setting must be approved by the ICP or the Infection Prevention and Control Committee and Occupational Health. Manufacturers' recommendations for use and dilution must be followed.^{141, 142}
- iii) Cleaning practices in the health care setting must be monitored and results reported back appropriately to become a part of the employee's performance review.
- b) Laundry
- i) Policies and procedures should address the collection, transport and handling of soiled linen, including protection of staff and hand hygiene.⁸³
- ii) Laundry regulations should be addressed if the facility does its own laundry.⁸³
- c) Waste Management
- Policies and procedures for management of waste from health care settings should be developed based on provincial regulations and local bylaws and should address issues such as the collection, storage, transport, handling and disposal of contaminated waste, including sharps and biomedical waste.^{4, 83, 143-145}
- d) Medical and Surgical Equipment Reprocessing
- Policies and procedures for disinfection and sterilization should be developed and should address issues such as sterile supplies, reuse of disposable items, reprocessing of equipment and cleaning of non-critical items.^{83, 86, 146-148}
- For more information see PIDAC's "*Best Practices for Cleaning, Disinfection and Sterilization in All Health Care Settings*", available at:
http://www.health.gov.on.ca/english/providers/program/infectious/diseases/best_prac/bp_cds_2.pdf.
- e) Food Preparation
- Policies and procedures for food preparation and delivery must be in compliance with food premise regulations and should address the handling, cooking and storage of food; cleaning of food preparation areas; and staff health and hygiene issues.^{92, 149}
- f) Facility Design
- All construction and renovation work must be assessed for potential impact at the planning stage by infection prevention and control professionals. Where required, work must be performed under appropriately controlled conditions. The ICP should be knowledgeable regarding evidence-based issues relating to facility design and the prevention of HAIs.^{87, 150, 151}
- Refer to the following guideline regarding infection prevention and control related to facility design in health care facilities:
- American Institute of Architects: "*2006 Guidelines for Design and Construction of Health Care Facilities*" (information online at:
http://www.aia.org/aah_gd_hospcons)
- g) Construction and Containment Issues
- Infection prevention and control must assess construction and maintenance projects during planning, work, and after completion to verify that infection prevention and control recommendations are followed throughout the process.^{87, 152}
- IPAC involvement may also be required in the event of facility damage due to flooding, loss of steam pressure, shutdown of ventilation systems etc.

Refer to the following guidelines regarding infection prevention and control related to construction in health care facilities:

- Public Health Agency of Canada: “Construction-related Nosocomial Infections in Patients in Health Care Facilities” (available online at: <http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/01vol27/27s2/index.html>)
- Canadian Standards Association: “CAN/CSA-Z317.13-03 Infection Control During Construction or Renovation of Health Care Facilities” (information online at: <http://www.csa-intl.org/onlinestore/GetCatalogItemDetails.asp?mat=2013947&Parent=3392>)

Recommendations:

- 4.36 Health care settings should have policies and procedures addressing infection prevention and control in environmental settings, specifically: cleaning; handling of laundry and waste; reprocessing of medical equipment; food handling and storage; and facility design and construction.**
- 4.37 There must be adequate numbers of staff with appropriate training to provide a clean and safe environment, including extra environmental cleaning capacity during outbreaks.**
- 4.38 Cleaning practices in the health care setting must be monitored and results reported back appropriately to become a part of the employee’s performance review.**
- 4.39 Infection Prevention and Control must have input at all stages of construction and renovation, from design to commissioning, and have the authority to halt projects if there is a risk to client/patient/resident or staff safety.**

III. Resources for the IPAC Program

1. Human Resources

Several documents have outlined the human resources required for effective infection prevention and control programs in a variety of settings.^{48-50, 153} There is evidence that indicates that all health care facilities must have Infection Prevention and Control Professionals (ICPs) and should have access to a trained infection prevention and control physician as well as administrative support staff appropriate to the IPAC program. In addition to a trained ICP, there is evidence that establishing a relationship with IPAC champions in clinical programs and departments aids the infection prevention and control team in carrying out their mandate.¹⁵⁴

The Infection Prevention and Control Professional (ICP)

All health care settings should have access to a certified ICP or trained individuals to implement the infection prevention and control program and resources that are proportional to the size, sophistication, case mix and estimated risk of the populations served by the health care setting.⁴⁸ The infection prevention and control program must clearly be the responsibility of at least one designated person. In some organizations, such as long-term care homes or ambulatory care settings, this person may also have other responsibilities.

Regardless of the size of the facility, the expected number of hours per week that are devoted to infection prevention and control must be clearly stated and protected.

Education, Training and Certification of ICPs

It is recommended that certain qualifications be met by professionals in infection prevention and control¹⁵⁵:

- a) ICPs must obtain Certification in Infection Prevention and Control (CIC) from the Certification Board of Infection Control and Epidemiology (CBIC) when eligible (see below for more information about certification);
- b) ICPs must pass a CHICA-Canada endorsed education program which comprises a minimum of 80 hours of instruction. Eligible programs may be accessed from the CHICA-Canada website at: <http://www.chica.org>;
- c) ICPs should have knowledge and experience in^{156, 157}:
 - i) areas of patient care practices;
 - ii) microbiology;
 - iii) asepsis;
 - iv) disinfection/sterilization;
 - v) adult education;
 - vi) infectious diseases;
 - vii) communication;
 - viii) program administration; and
 - ix) epidemiology;
- d) ICPs must have a health sciences background with teaching, problem-solving, communication and analytical skills that will allow them to plan, implement and evaluate their programs. Refer to Appendix B, "APIC/CHICA-Canada/CBIC Infection Control and Epidemiology: Professional and Practice Standards" for qualifications for ICPs.

Certification in Infection Prevention and Control (CIC)

All health care facilities and organizations providing IPAC consultation (e.g. public health units) should have an Infection Prevention and Control Professional(s) (ICP) who has, or who will obtain, Certification in Infection Prevention and Control (CIC) from the Certification Board of Infection Control and Epidemiology (CBIC), when eligible. Other health care settings should have access to a certified ICP.

ICPs must become CBIC certified in infection prevention and control and must maintain certification.

To be eligible for certification a candidate must:

- a) have a current license or registration certification as a medical technologist or clinical laboratory scientist, physician or registered nurse; OR have a minimum of a baccalaureate degree;
- b) have worked in infection prevention and control for a minimum of two years (within the most current five year period); and
- c) have completed a minimum of 800 hours of practice in infection prevention and control prior to the date of the examination.

A written examination must be taken to acquire certification. More information about Certification in Infection Control may be found on the CBIC website at: <http://www.cbic.org/>.

Ongoing Professional Competency of ICPs

Infection control has a rapidly developing and expanding knowledge base. The certified ICP must acquire and maintain current knowledge and skills in infection prevention and control and epidemiology through continuing education relevant to their professional practice and re-certification every five years. While the infection control professionals themselves have a responsibility to achieve this, they must be provided support from the administration and have a job description which requires continuing education.⁴⁸

The ICP maintains a knowledge base of current infection prevention and control information through:

- a) peer networking;
- b) internet access to published literature;
- c) attendance at professional meetings including, as a minimum, annual attendance at an infection prevention and control-related conference;
- d) membership and time to participate in the Community and Hospital Infection Control Association – Canada (CHICA-Canada), including local chapter activities; information about joining CHICA-Canada may be found on the national website at: <http://www.chica.org>.

ICPs are encouraged to participate in research and quality improvement projects that will result in improved client/patient/resident care in their health care setting and prevention of infections in their patient population, leading to advancements in the field of infection prevention and control.

Roles and Responsibilities of ICPs

The Infection Prevention and Control Professional serves as a leader, mentor and role model for the profession, based on accepted professional and practice standards.¹⁵⁵ The ICP in a health care setting:

- a) acquires and maintains current knowledge and skills in infection prevention and control and epidemiology;
- b) makes decisions and performs activities in an ethical manner; and
- c) is responsible for the development, evaluation and improvement of his/her own practice in relation to the practice standards for infection prevention and control.

Some practices that are common to most ICPs include:

- a) effective prevention and control activities that are specific to the health care setting, the population served and the continuum of care;
- b) application of epidemiological principles and statistical methods, including risk stratification, to identify target populations, analyze trends and risk factors, and design and evaluate prevention and control strategies;
- c) using a systematic surveillance approach to monitor the effectiveness of prevention and control strategies that are consistent with the organization's goals and objectives;
- d) acting as an educational resource for infection prevention and control and health care epidemiology;
- e) providing expert knowledge and guidance in epidemiology and infection prevention and control-related issues;
- f) incorporating fiscal responsibility into the IPAC program; and
- g) applying relevant research findings to infection prevention and control practice.

The responsibilities of the ICP will vary with the health care setting, but may include any or all of the following:

- a) education of staff and clients/patients/residents;
- b) review of equipment design and reprocessing practices;
- c) involvement with facility design, maintenance and construction projects;
- d) management and surveillance for febrile respiratory illnesses, AROs, device-related infections, surgical infections and other targeted infections;
- e) development of policies and procedures related to infection prevention and control;
- f) involvement in product selection related to agents for hand hygiene and disinfection;
- g) management of clusters and outbreaks;
- h) review of environmental cleaning practices;
- i) involvement in patient safety issues relating to infection prevention and control;

- j) internal and external communications regarding infection prevention and control and communicable disease issues; and
- k) participation in planning activities for emerging pathogens, bioterrorism and pandemics.

The role of the Infection Prevention and Control Professional in an emergency or disaster is to reduce the risk of transmission or incidence of infection. Crucial elements of the ICP role are associated with participation in planning for a potential event, advising on prevention of infectious consequences of the event and management of infectious consequences if they occur.¹⁵⁸

ICP Staffing Levels

There have been a number of reports and studies published in recent years dealing with the complex issue of ICP staffing levels in health care settings. A review of different processes in North America used to develop the recommendations for ICP staffing ratios include^{7, 153, 159-163}:

- a) Quebec Health and Social Services [2005]^{159, 163}:
Following an outbreak of *Clostridium difficile* in the province of Quebec, Quebec Health and Social Services (Santé et Services sociaux Québec) issued recommendations for the prevention and control of nosocomial infections in health care facilities. The recommendations called for one ICP per 100 beds in areas of higher acuity and one ICP per 133 beds in areas of lesser acuity in hospitals. In long-term care the recommended ratio was one ICP per 250 beds.
- b) Canadian Consensus Panels [2001]¹⁶¹:
The Canadian Consensus panels have suggested appropriate staffing levels for infection prevention and control programs as follows:
 - i) The acute care group projected that, in the absence of hemodialysis, endemic antimicrobial-resistant microorganisms and major surgical sub-specialty programs, three full-time equivalent ICPs are required per 500 beds.
 - ii) The long-term care group estimated that one full-time equivalent position is required per 150 to 250 beds.
 - iii) In LTC facilities with resident groups who are ventilator-dependent, have spinal cord injuries, are colonized or infected with antimicrobial-resistant organisms, or who require dialysis, one dedicated full-time equivalent ICP per 150 beds is required.
 - iv) The home care group identified essential supports for the community or home care ICP including access to external infection prevention and control experts, secretarial/database staff and laboratory support. The increasing numbers and acuity of clients/patients/residents in this setting stresses the need for qualified ICPs.
- c) The Delphi Project [2002]¹⁶⁰:
The Delphi project surveyed both USA and some Canadian ICPs and found that infection prevention and control responsibilities have expanded beyond the traditional acute care setting. Respondents represented acute care, long-term care and community settings and recommendations for staffing were based not only on the number of occupied beds, but also on the scope of the IPAC program, the complexity of the health care setting, the characteristics of the client/patient/resident population and the unique needs of the facility and community. Recommended staffing ratios were one ICP for every 100 occupied care beds regardless of the type of setting.
- d) National Nosocomial Infections Surveillance (NNIS) system [1999]¹²:
The NNIS system was developed in the early 1970s in the U.S. to monitor the incidence of health care-associated (nosocomial) infections and their associated risk factors and pathogens in participating acute care facilities. Participation in the program required meeting the minimum requirement of one full-time equivalent ICP for the first 100

occupied beds and 1 full-time equivalent ICP for each additional 240 beds. A survey of hospitals involved in the NNIS system found that the median number of occupied beds per ICP was 115 and most ICP infection prevention and control activities took place on acute inpatient wards (60%).¹⁶² Most hospitals reported that ICPs were also involved in non-infection prevention and control activities such as occupational health, quality management and clinical or administrative activities. The range of non-infection prevention and control activities accounted for approximately 40% of the ICP's time.¹⁶²

e) **SENIC Study [1985]⁶:**

In 1985 the landmark SENIC study suggested that a minimum of one ICP per 250 occupied beds was required in order to have effective infection prevention and control programs. This ratio was established prior to the expansion of the ICP's role into such diverse areas as preparedness for bioterrorism and pandemics; surge capacity; increased management and surveillance of antibiotic resistant organisms; emerging pathogens; patient safety issues; surveillance for Febrile Respiratory Illness (FRI); involvement with facility design and construction containment; and review of equipment design and reprocessing. The volume and complexity of the modern ICP's work has also increased in direct proportion to increases in the intensity and complexity of client/patient/resident care; increased severity of illness of the patient population at risk; and increased activity in health care delivery beyond the hospital.

Most of the ratios from the Canadian Consensus recommendations and others do not take into account the expanded role of the IPAC program to include issues regarding bioterrorism, surge capacity, increases in AROs, FRI surveillance, patient safety issues, facility design and construction input, core competency education, reprocessing of equipment, etc.

Staffing will be further impacted by factors such as:

- a) the number and type of ambulatory clinics;
- b) presence of oncology, dialysis, intensive care and burn units;
- c) provision of day surgery or emergency medical services;
- d) construction and facility design projects;
- e) health care settings located in rural areas where ICPs must travel to many sites for the provision of services; and
- f) other activities that require infection prevention and control resources.

Minimum recommendations for staffing should not be based exclusively on bed numbers. The ratio of ICPs will vary according to the acuity and activity of the health care setting and the volume and complexity of the ICP's work.

The Infection Prevention and Control Physician

The SENIC study⁶ showed that IPAC programs that did not have trained physicians with infection prevention and control expertise were less effective than those that did. All facilities should have access to an infection prevention and control physician. Acute care facilities must have a dedicated in-house or contract physician with knowledge and expertise in infection prevention and control.⁴⁸ Long-term care facilities should consider an infection prevention and control-trained physician on at least a consultative basis.⁵⁰ This person should have an MD as well as formal postgraduate training in infection prevention and control.

The ICP and the infection prevention and control physician oversee the infection prevention and control program and ensure that the minimum infection prevention and control core competencies and surveillance programs are implemented. The infection prevention and control physician will:

- a) attend IPACC meetings;
- b) review policies and procedures and provide input and support for implementation;

- c) provide expertise and advise on complex medical issues related to IPAC;
- d) champion and support the IPAC program to senior administration and medical staff; attend or present IPAC education;
- e) liaise with public health on complex IPAC issues and related medical issues;
- f) review antimicrobial utilization in the facility as well as resistance monitoring and reporting;
- g) support ICP(s) and provide leadership with the ICP(s) during outbreaks;
- h) speak to IPACC minutes and IPAC issues at MAC meetings.

Professional development in infection prevention and control should be part of the physician's continuing medical education.

Administrative Assistant

Administrative assistance is essential for the infection prevention and control program, to allow the ICP to carry out their duties outside the office. The number of administrative assistants must be commensurate with the complexity of the program and the numbers of ICPs supported.

Support staff should have skills in, and may assist with, the following:

- a) document development and control;
- b) surveillance data entry;
- c) arranging meetings and recording meeting minutes;
- d) copying, faxing, mailing;
- e) billing and ordering supplies;
- f) responding to telephone calls; and
- g) filing.

Other Human Resources

In addition to infection prevention and control staff and physician support, an effective IPAC program requires:

- a) laboratory staff sufficient to carry out program activities (e.g. surveillance);
- b) environmental services/housekeeping staff sufficient to carry out program activities (e.g. effective implementation of Additional Precautions and outbreak management); and
- c) occupational health staff sufficient to carry out program activities (e.g. immunization).

Increases to staffing levels may be required in some cases for effective program management.

Recommendations:

- 1.1 All health care facilities must have trained Infection Prevention and Control Professional(s) (ICP) and resources to implement the infection prevention and control program that are proportional to the size, complexity, case mix and estimated risk of the populations served by the health care facility. Other health care settings should have access to infection control expertise.**
- 1.2 The expected number of hours per week that are devoted to infection prevention and control must be clearly stated and protected.**
- 1.3 All health care facilities must have an ICP(s) who has, or who will obtain and maintain, Certification in Infection Control (CIC[®]) when eligible.**
- 1.4 Health care facilities must ensure that infection prevention and control professionals maintain their knowledge and skills through continuing education relevant to their professional practice.**

- 1.5 Financial resources must be provided for the continuing professional education of ICP(s).**
- 1.6 ICP staffing levels must be appropriate to the size and complexity of care of the health care facility. Recommendations for staffing should not be based exclusively on bed numbers. The ratio of ICPs will vary according to the acuity and activity of the health care facility and the volume and complexity of the ICP's work. This includes high risk ambulatory care centres such as oncology and dialysis.**
- 1.7 Recommendations for staffing and resources in Ontario health care facilities include the following:**
 - a) a minimum ratio of 1.0 FTE ICP per 115 acute care beds**
 - b) a minimum ratio of 1.0 FTE ICP per 100 occupied acute care beds if there are high risk activities (e.g. dialysis)**
 - c) it is recommended that an additional ratio of 1.0 FTE ICP per 30 intensive care beds be considered where ventilation and hemodynamic monitoring are routinely performed**
 - d) 1.0 FTE ICP per 150 occupied long-term care beds where there are ventilated patients, patients with spinal cord injuries and dialysis or other high acuity activities**
 - e) 1.0 FTE ICP per 150-200 beds in other settings depending on acuity levels**
- 1.8 Each facility's infection prevention and control program should have a physician with an interest and training in infection prevention and control to support and play a leadership role in the IPAC program.**
- 1.9 Health care settings must provide the appropriate human and material resources to support the infection prevention and control program.**
- 1.10 Health care settings must provide administrative assistance to the infection prevention and control program.**

2. Other Program Resources

Laboratory Support

All health care settings should have access to an accredited microbiology laboratory that can provide analysis of single or multiple strains of infectious organisms. As a minimum, the laboratory should have a system to alert the infection prevention and control program when targeted microorganisms are isolated or detected and provide assistance with surveillance information including microorganism identification and typing capabilities. The ICP must be provided with laboratory reports in a timely fashion and have the ability to obtain customized reports when required.

Ideally there should be an established relationship between Infection Prevention and Control and the Microbiology Laboratory, to support the IPAC program. This includes appropriate utilization of laboratory facilities, the ability to process screening specimens in a timely fashion and laboratory support during outbreaks. A microbiology budget sufficient for investigation of outbreaks should be available to the infection prevention and control team.

Program Administrative Support

Material Resources

Health care settings should provide material resources to support the infection prevention and control program. This should include⁴⁸:

- a) Sufficient-sized, suitably located office space and equipment, including furniture and lockable filing cabinets for confidential records in order to protect the privacy of individual clients/patients/residents;
- b) communication tools sufficient to support the program (at minimum this should include telephone, pager, fax and copying services, and basic office supplies);
- c) access to library services; and
- d) access to a laptop and data projector for educational presentations.

Information Technology Resources

The IPAC program requires:

- a) a computer system that includes a password-protected desktop or laptop computer and a printer;
- b) word processing, presentation and spreadsheet software and training including the ability to generate statistical reports;
- c) access to the electronic record, preferably through direct linkages to health information systems;
- d) access to electronic laboratory records, preferably through direct linkages to laboratory information systems;
- e) resources that enable access or linkages to other health information systems and programs; and
- f) internet access, including electronic mail.

Education Resources and Activities

Maintaining current educational resources is essential for the IPAC program in order to develop policies and guidelines, participate in professional organizations and serve as an educational resource for infection prevention and control and health care epidemiology. The IPAC program must have an annual budget allocated to the provision and maintenance of current educational resources such as:

- a) current textbooks;
- b) national and provincial guidelines and standards (e.g. Canadian Standards Association, Public Health Agency of Canada, PIDAC);
- c) communicable disease surveillance protocols (OHA/OMA/MOHLTC);
- d) infection prevention and control journals (e.g. Infection Control and Hospital Epidemiology, Canadian Journal of Infection Control, American Journal of Infection Control);
- e) APIC curriculum; and
- f) funding for participation in annual conferences and other appropriate education.

Refer to Appendix A for a list of basic educational resources that IPAC programs should have available to ICPs.

Recommendations:

- 2.1 All health care settings must have access to an accredited microbiology laboratory that can alert the infection prevention and control program to microorganisms of importance and provide assistance to the program with surveillance information in a timely fashion.**
- 2.2 Health care settings must support the infection prevention and control program with an annual budget for the maintenance of current educational resources.**

IV. Summary of Recommendations

Recommendations in this document have been summarized in this section as a tool for easily assessing compliance with program elements, documenting action and assigning institutional accountability for the action.

The Infection Prevention and Control (IPAC) Program Elements

| Recommendation | Applies to: | | | | | Action Plan | Accountability |
|---|---|--------------------|---------------|--|--|-------------|----------------|
| | Compliant | Partial Compliance | Non-compliant | | | | |
| <p>Legend:</p> <p>A = acute care L = long-term care C = complex continuing care H = home health care AM = ambulatory care X = all health care settings</p> | | | | | | | |
| THE INFECTION PREVENTION AND CONTROL (IPAC) PROGRAM | | | | | | | |
| 1. Mandate/Goals and Functions of the IPAC Program | | | | | | | |
| 1.1 | <i>All health care settings in Ontario must assess needs for, develop, provide and evaluate an active, effective infection prevention and control program that meets the mandate and goal to decrease the risk of health care-associated infections and improve health care safety.</i> | X | | | | | |
| 1.2 | <i>Continuing support for the infection prevention and control program must be an organizational priority.</i> | X | | | | | |
| 2. Structure and Elements of the IPAC Program | | | | | | | |
| 2.1 | <i>Health care settings must evaluate their infection prevention and control needs and then implement an infection prevention and control program suited to those needs.</i> | X | | | | | |
| 2.2 | <i>Periodic review of the infection prevention and control program must be carried out to reassess the organization's needs and to determine which elements are required to continue to meet the goals of the program for that health care setting.</i> | X | | | | | |

| Recommendation | | Applies to: | | | | Action Plan | | Accountability |
|--|--|-------------|--------------------|---------------|--|-------------|--|----------------|
| | | Compliant | Partial Compliance | Non-compliant | | | | |
| <p>Legend:</p> <p>A = acute care L = long-term care C = complex continuing care H = home health care AM = ambulatory care</p> <p>X = all health care settings</p> | | | | | | | | |
| <p>3. The Infection Prevention and Control Committee (IPACC)</p> | | | | | | | | |
| 3.1 | Each health care facility shall have a multidisciplinary infection prevention and control committee whose responsibilities include annual goal-setting, program evaluation and ensuring that the infection prevention and control program meets current legislated standards and requirements as well as the requirements of the facility. | A, L, C | | | | | | |
| <p>4. IPAC Program Functions</p> | | | | | | | | |
| 4.1 | Health care settings must monitor targeted infection prevention and control processes with regular audits of practices. | X | | | | | | |
| 4.2 | Health care settings must monitor targeted infection prevention and control outcomes using surveillance for health care-associated infections in specific populations. | A, L, C, H | | | | | | |
| 4.3 | Infection surveillance must include standardized collection of data using written definitions of infections, identification of risk population, methods of measurement, description of data sources and benchmarks used for comparison. | A, L, C, H | | | | | | |

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|--|---|-------------|--------------------|---------------|--|-------------|--|----------------|
| | | Compliant | Partial Compliance | Non-compliant | | | | |
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| 4.4 | Results of process and outcome surveillance must be analyzed and reported back in a timely fashion; a plan for improvements, including organizational accountability, must be developed by the targeted area in conjunction with Infection Prevention and Control based on the results of surveillance. | A, L, C, H | | | | | | |
| 4.5 | Infection prevention and control policies and procedures must be consistent with relevant legislation and standards and be based on sound scientific knowledge. | X | | | | | | |
| 4.6 | Policies and procedures must be reviewed and updated as required on a regular basis. | X | | | | | | |
| 4.7 | Policies and procedures must be linked to educational programs and action plans for implementation must be developed. | X | | | | | | |
| 4.8 | A system for monitoring staff compliance with infection prevention and control policies and procedures must be developed and implemented. | X | | | | | | |
| 4.9 | Health care settings shall be in compliance with all legal and accreditation standards that pertain to the practice of infection prevention and control. | X | | | | | | |

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|----------------|--|---|--------------------|---------------|--|--|-------------|--|----------------|
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| | | X = all health care settings | | | | | | | |
| 4.10 | <i>The IPAC program should collaborate with, and provide liaison to, appropriate local and provincial public health departments for reporting of communicable diseases and respiratory and gastrointestinal outbreaks to assist with the control of infectious diseases.</i> | X | | | | | | | |
| 4.11 | <i>Infection Prevention and Control must be represented on the facility's Joint Health and Safety Committee.</i> | A, L, C, H | | | | | | | |
| 4.12 | <i>The infection prevention and control component of the Occupational Health and Safety program must be developed jointly by Occupational Health and Infection Prevention and Control.</i> | A, L, C, H | | | | | | | |
| 4.13 | <i>All health care providers must be evaluated by Occupational Health for conditions relating to communicable diseases that can be spread in the health care setting.</i> | X | | | | | | | |
| 4.14 | <i>Attendance management policies shall discourage health care providers from working while ill with a communicable disease that can be spread in the health care setting.</i> | X | | | | | | | |
| 4.15 | <i>If any worker acquires an occupational illness, or a claim in respect of an occupational illness has been filed with the Workplace Safety and Insurance Board, a notice in writing shall be made to the Ministry of Labour.</i> | X | | | | | | | |

| Recommendation | | Applies to: | | | | | Action Plan | | Accountability |
|--|--|-------------|--------------------|---------------|--|--|-------------|--|----------------|
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| 4.16 | Education in infection prevention and control must span the entire health care setting and be directed to all who work in that setting. | X | | | | | | | |
| 4.17 | Orientation programs for staff new to the health care setting must include an infection prevention and control component. | X | | | | | | | |
| 4.18 | Health care facilities should have appropriate policies and procedures that ensure: <ul style="list-style-type: none"> a) mandatory attendance at infection prevention and control training/education b) attendance recorded and reported back to the manager to become a part of the employee's performance review. | A, L, C, H | | | | | | | |
| 4.19 | Continuing education must address the infection prevention and control needs of the organization with regard to content, target audience and timing of the education (e.g. scheduled continuing education, special education based on specific needs such as outbreaks). | X | | | | | | | |
| 4.20 | There must be evaluation of the infection prevention and control education program to ensure that it is current, relevant and effective. | X | | | | | | | |

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| 4.21 | The resources required to carry out the IPAC education program must be allocated to achieve the educational goals of the program. | X | | | | | | | |
| 4.22 | All health care settings must develop and implement a hand hygiene program, including hand hygiene agents available at the point-of-care in acute care settings and easily accessible in all other health care settings. In health care facilities, this program must also include: <ul style="list-style-type: none"> a) demonstrable senior administration leadership; b) written policies and procedures; c) education in hand hygiene indications and techniques; d) a hand care program; and e) a program to measure hand hygiene compliance. | X | | | | | | | |
| 4.23 | Hand hygiene policies must reflect the information described in "PIDAC's Hand Hygiene Fact Sheet for Health Care Settings" [available online at: http://www.health.gov.on.ca/english/providers/program/infectious/pidacifact_sheet/ifs_handwash_010107.pdf] | X | | | | | | | |

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| 4.24 | <i>Infection Prevention and Control and Occupational Health must be consulted and involved in all hand hygiene product selection and trials in the health care setting.</i> | X | | | | | | |
| 4.25 | <i>Staff in all health care settings must follow Routine Practices and Additional Precautions and facilities must implement a program that includes:</i> <ul style="list-style-type: none"> a) <i>written policies and procedures;</i> b) <i>staff education and training in indications and techniques for Routine Practices and Additional Precautions; and</i> c) <i>a program to measure compliance with Routine Practices and Additional Precautions.</i> | X | | | | | | |
| 4.26 | <i>Health care facilities should ensure that appropriate policies and procedures are in place to ensure mandatory attendance at training/education in Routine Practices and Additional Precautions (including hand hygiene) and that attendance is recorded and reported back to the manager to become a part of the employee's performance review.</i> | A, L, C, H | | | | | | |
| 4.27 | <i>All health care settings must have an immunization program in place appropriate to their clients/patients/residents.</i> | X | | | | | | |

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| 4.28 | Residents of non-acute care facilities must have immunization programs that also include pneumococcal and annual influenza immunization. | L, C | | | | | | |
| 4.29 | Health care providers must be offered appropriate immunizations to protect them from occupationally-relevant communicable diseases. | X | | | | | | |
| 4.30 | All health care facilities must have the ability and the capacity to identify and manage clusters or outbreaks of infectious diseases. | A, L, C | | | | | | |
| 4.31 | Outbreaks in health care facilities should be managed by a multidisciplinary team which includes the Infection Prevention and Control Professional(s). | A, L, C | | | | | | |
| 4.32 | All registered staff must have the authority to initiate Additional Precautions without a physician's order upon consultation with their supervisor, Infection Prevention and Control and/or Public Health. | X | | | | | | |
| 4.33 | The ICP should have the authority to implement outbreak management measures up to, and including, closure of the affected unit. | A, L, C | | | | | | |
| 4.34 | All health care settings must ensure the development and implementation of communication and reporting policies. | X | | | | | | |

| Recommendation | | Applies to: | | | | | Action Plan | | Accountability |
|----------------|--|------------------------------|--------------------|--------------------|-----------------------------|----------------------|----------------------|--|----------------|
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| | | A = acute care | | L = long-term care | C = complex continuing care | H = home health care | AM = ambulatory care | | |
| | | X = all health care settings | | | | | | | |
| 4.35 | All health care settings must ensure reception, appropriate response and prompt communication of Important Health Notices. | X | | | | | | | |
| 4.36 | Health care settings should have policies and procedures addressing infection prevention and control in environmental settings, specifically: cleaning; handling of laundry and waste; reprocessing of medical equipment; food handling and storage; and facility design and construction. | X | | | | | | | |
| 4.37 | There must be adequate numbers of staff with appropriate training to provide a safe environment, including extra environmental cleaning capacity during outbreaks. | A, L, C | | | | | | | |
| 4.38 | Cleaning practices in the health care setting must be monitored and results reported back appropriately to become a part of the employee's performance review. | A, L, C, AM | | | | | | | |
| 4.39 | Infection Prevention and Control must have input at all stages of construction and renovation, from design to commissioning, and have the authority to halt projects if there is a risk to client/patient/resident or staff safety. | A, L, C | | | | | | | |

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| <p>Legend:</p> <p>A = acute care L = long-term care C = complex continuing care H = home health care AM = ambulatory care</p> <p>X = all health care settings</p> | | | | | | | | | |
| RESOURCES FOR THE IPAC PROGRAM | | | | | | | | | |
| 1. Human Resources | | | | | | | | | |
| 1.1 | <i>All health care facilities must have trained Infection Prevention and Control Professional(s) (ICP) and control program that are proportional to the size, complexity, case mix and estimated risk of the populations served by the health care facility. Other health care settings should have access to infection control expertise.</i> | X | | | | | | | |
| 1.2 | <i>The expected number of hours per week that are devoted to infection prevention and control must be clearly stated and protected.</i> | X | | | | | | | |
| 1.3 | <i>All health care facilities must have an ICP(s) who has, or who will obtain and maintain, Certification in Infection Control (CIC®) when eligible.</i> | A, L, C | | | | | | | |
| 1.4 | <i>Health care facilities must ensure that infection prevention and control professionals maintain their knowledge and skills through continuing education relevant to their professional practice.</i> | A, L, C | | | | | | | |
| 1.5 | <i>Financial resources must be provided for the continuing professional education of ICP(s).</i> | A, L, C | | | | | | | |

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| <p>Legend:</p> <p>A = acute care L = long-term care C = complex continuing care H = home health care AM = ambulatory care</p> <p>X = all health care settings</p> | | | | | | | | |
| 1.6 | <p>ICP staffing levels must be appropriate to the size and complexity of care of the health care facility. Recommendations for staffing should not be based exclusively on bed numbers. The ratio of ICPs will vary according to the acuity and activity of the health care facility and the volume and complexity of the ICP's work. This includes high risk ambulatory care centres such as oncology and dialysis.</p> | A, L, C | | | | | | |
| 1.7 | <p>Recommendations for staffing and resources in Ontario health care facilities include the following:</p> <ul style="list-style-type: none"> a) a minimum ratio of 1.0 FTE ICP per 115 acute care beds b) a minimum ratio of 1.0 FTE ICP per 100 occupied acute care beds if there are high risk activities (e.g. dialysis) c) it is recommended that an additional ratio of 1.0 FTE ICP per 30 intensive care beds be considered where ventilation and hemodynamic monitoring are routinely performed d) 1.0 FTE ICP per 150 occupied long-term care beds where there are ventilated patients, patients with spinal cord injuries and dialysis or other high acuity activities e) 1.0 FTE ICP per 150-200 beds in other settings depending on acuity levels | A, L, C | | | | | | |

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| <p>Legend:</p> <p>A = acute care L = long-term care C = complex continuing care H = home health care AM = ambulatory care</p> <p>X = all health care settings</p> | | | | | | | | |
| 1.8 | <i>Each facility's infection prevention and control program should have a physician with an interest and training in infection prevention and control to support and play a leadership role in the IPAC program.</i> | A, L, C | | | | | | |
| 1.9 | <i>Health care settings must provide the appropriate human and material resources to support the infection prevention and control program.</i> | X | | | | | | |
| 1.10 | <i>Health care settings must provide administrative assistance to the infection prevention and control program.</i> | X | | | | | | |
| 2. Other Program Resources | | | | | | | | |
| 2.1 | <i>All health care settings must have access to an accredited microbiology laboratory that can alert the infection prevention and control program to microorganisms of importance and provide assistance to the program with surveillance information in a timely fashion.</i> | X | | | | | | |
| 2.2 | <i>Health care settings must support the infection prevention and control program with an annual budget for the maintenance of current educational resources.</i> | A, L, C, H | | | | | | |

Appendix A: Resources for Infection Prevention and Control

RECOMMENDED OFFICE/LIBRARY RESOURCES

The following basic educational materials are recommended for ICPs in their health care setting in order to maintain current knowledge and to act as a resource for infection prevention and control in their health care setting. Depending on patient care programs in a health care setting, additional resources may be required.

Textbooks

1. Association for Professionals in Infection Control and Epidemiology (APIC). **APIC text of infection control and epidemiology**. 2005 ed. Washington (DC): Association for Professionals in Infection Control and Epidemiology (APIC); 2005. Available for purchase from APIC online store at: <http://www.apic.org/AM/Template.cfm?Section=Store>
2. National Advisory Committee on Immunization. **Canadian immunization guide**. 7th ed. Ottawa (ON): Canadian Medical Association; 2006. Available online at: <http://www.phac-aspc.gc.ca/publicat/cig-gci/index.html>
3. **Canadian Tuberculosis Standards**. 5th ed. Ottawa (ON): Canadian Lung Association; 2000. Available online at: http://www.lung.ca/tb/TBStandards_Eng.pdf
4. Heymann D, editor. **Control of Communicable Diseases Manual**. 18th ed. Washington (DC): American Public Health Association; 2004. Available for purchase from the APHA online store at: https://secure.apha.org/source/orders/index.cfm?ETask=1&Task=1&SEARCH_TYPE=FIN&FindIn=3&FindSpec=0-87553-034-6&x=10&y=11
5. American Academy of Paediatrics. **Guidelines for perinatal care**. 6th ed. Elk Grove Village (IL): American Academy of Paediatrics; 2008. Available for purchase from the AAP Bookstore at: https://www.nfaap.org/netforum/eweb/dynamicpage.aspx?site=nf.aap.org&webcode=aapbks_productdetail&key=cad82169-74fe-47e1-af75-5f9aed20706a.
6. Chinnes LF, Dillon AM, Fauterbach LL, editors. **Home care handbook of infection control**. Washington (DC): Association for Professionals in Infection Control and Epidemiology (APIC); 2002. Available for purchase from APIC online store at: <http://www.apic.org/source/orders/index.cfm?section=store>
7. Mayhall G. **Hospital Epidemiology and Infection Control**. 3rd edition. Baltimore, MD: Williams and Wilkins; 2004. Available at: <http://www.lww.com/product/?978-0-7817-4258-0>.
8. Bennett JV, Brachman PS. **Hospital Infections**. 5th edition. Baltimore, MD: Lippincott Williams & Wilkins; 2007. Available at: <http://www.lww.com/search/advancedsearch/?rowStart=1&title=Hospital+Infections&author=&ISBN=&keyword=&exactTerm=1&allFields=1&yearFrom=&yearThru=&productTypes=&mediaTypes=&source=qs&action=search>
9. Friedman C, Peterson K. **Infection control in ambulatory care**. Washington (DC): Association for Professionals in Infection Control and Epidemiology (APIC); 2004. Available for purchase from APIC online store at: <http://www.apic.org/source/orders/index.cfm?section=store>
10. Rhinehart E, McGoldrick-Friedman M. **Infection control in home care and Hospice**. 2nd edition. Washington (DC): Association for Professionals in Infection Control and Epidemiology (APIC); 2005. Available for purchase from APIC online store at: <http://www.apic.org/source/orders/index.cfm?section=store>
11. Lynch P, Jackson M, Preston GA, Soule BM. **Infection Prevention with Limited Resources. A Handbook for Infection Committees**. Chicago; ETNA Communications; 1997. Available at: <http://www.etnacom.com/limited.html>.

12. Arias KM. **Outbreak investigation and control in health care facilities**. Washington (DC): Association for Professionals in Infection Control and Epidemiology (APIC); 2000. Available for purchase from APIC online store at: <http://www.apic.org/source/orders/index.cfm?section=store>
13. Wenzel RP. **Prevention and Control of Nosocomial Infections**. 4th edition. Baltimore, MD: Williams and Wilkins; 2003.
14. Mandell GL, Bennett JE, Dolin R. **Principles and Practice of Infectious Diseases**. 6th edition. New York, NY: Churchill Livingstone; 2004. Available at: <http://intl.elsevierhealth.com/catalogue/title.cfm?ISBN=0443066434>.
15. Committee on Infectious Diseases. **The red book 2006: report of the Committee on Infectious Diseases**. 27th ed. Elk Grove Village (IL): American Academy of Paediatrics; 2006. Available for purchase online at: <http://aapredbook.aappublications.org/current.shtml>

Journals

1. **Canadian Journal of Infection Control** (CJIC). Available from CHICA-Canada: <http://www.chica.org>.
2. **American Journal of Infection Control** (AJIC). Available online at: <http://www2.us.elsevierhealth.com/scripts/om.dll/serve?action=searchDB&searchDBfor=home&ID=ic>
3. **Infection Control and Hospital Epidemiology** (ICHE). Available online at: <http://www.journals.uchicago.edu/ICHE/home.html>
4. **Canada Communicable Disease Report** (CCDR). Available online at: <http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/index.html>
5. **Canadian Journal of Infectious Diseases and Medical Microbiology** (CJIC). Available online at: <http://www.pulsus.com/Infdis/home2.htm>
6. **Clinical Infectious Diseases** (CID). Available online at www.journals.uchicago.edu/CID/journal
7. **Emerging Infectious Diseases** (EID). Available online at: www.cdc.gov/ncidod/eid/index.htm
8. **Hospital Infection Control** (HIC). Available online at: <http://www.hiconline.com/>
9. **Journal of Hospital Infection** (JHI). Available online at: www.harcourt-international.com/journals/jhin
10. **Journal of Infectious Diseases** (JID). Available online at: www.journals.uchicago.edu/JID
11. **Morbidity and Mortality Weekly Report** (MMWR). Available online at: <http://www.cdc.gov/mmwr/>
12. **Pediatric Infectious Disease Journal**. Available online at: www.pidj.com

Standards & Guidelines

Ontario Ministry of Health and Long-Term Care (MOHLTC) [<http://www.health.gov.on.ca>]

Ontario Ministry of Health and Long-Term Care. **Ontario Health Pandemic Influenza Plan**. Available online at:

http://www.health.gov.on.ca/english/public/pub/ministry_reports/pandemic/pandemic_plan04_mn.html

Ontario Ministry of Health and Long-Term Care. **Provincial Infectious Diseases Advisory Committee (PIDAC)** - best practices and fact sheets for infection prevention and control are published by the Ontario Ministry of Health and Long-Term Care on the PIDAC website at: http://www.health.gov.on.ca/english/providers/program/infectious/pidac/pidac_mn.html.

1. **Preventing Febrile Respiratory Illnesses: Protecting Patients and Staff**. Available online at: http://www.health.gov.on.ca/english/providers/program/infectious/diseases/ic_fri.html

2. **Best Practices Document for the Management of Clostridium difficile in all health care settings.** Available online at:
http://www.health.gov.on.ca/english/providers/program/infectious/diseases/ic_cdifff.html
3. **Best Practices for Cleaning, Disinfection and Sterilization in All Health Care Settings.** Available online at:
http://www.health.gov.on.ca/english/providers/program/infectious/diseases/ic_cds.html
4. **Best Practices for Infection Prevention and Control of Resistant Staphylococcus aureus and Enterococci in All Health Care Settings.** Available online at:
http://www.health.gov.on.ca/english/providers/program/infectious/diseases/ic_staff.html
5. **Fact Sheet: "PIDAC'S Hand Hygiene Fact Sheet for Health Care Settings".** Available online at:
http://www.health.gov.on.ca/english/providers/program/infectious/pidac/fact_sheet/fs_han_dwash_010107.pdf
6. **Fact Sheet: "Routine Practices Fact Sheet for Health Care Settings".** Available online at:
http://www.health.gov.on.ca/english/providers/program/infectious/pidac/fact_sheet/fs_routine_010107.pdf

Public Health Agency of Canada (PHAC) [<http://www.phac-aspc.gc.ca>]

The Public Health Agency of Canada publications are available at no charge from their website. An alphabetical list of **all publications** may be found at: http://www.phac-aspc.gc.ca/publications_e.html. The listing includes the following:

1. Public Health Agency of Canada. **Health Alerts – Travel Medicine Program.** Available online at: <http://www.phac-aspc.gc.ca/tmp-pmv/index.html>.
2. **Infection control guidelines** may be found at: http://www.phac-aspc.gc.ca/dpg_e.html#infection:
 - **Hand washing, cleaning, disinfection and sterilization in health care.** *Can Commun Dis Rep.* 1998;24 Suppl 8:i-xi, 1-55, i-xi, 1-57. Available online at: <http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/98pdf/cdr24s8e.pdf> [NOTE: This guideline is currently under revision]
 - **Routine practices and additional precautions for preventing the transmission of infection in health care.** *Can Commun Dis Rep.* 1999;25 Suppl 4:1-142. Available online at: <http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/99pdf/cdr25s4e.pdf>
 - **Controlling antimicrobial resistance. An integrated action plan for Canadians.** *Can Commun Dis Rep.* 1997;23 Suppl 7: 1-32. Available online at: <http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/97vol23/23s7/index.html>.
 - **Laboratory Biosafety Guidelines.** 3rd ed. Ottawa (ON): Public Health Agency of Canada; 2004. Available online at: http://www.phac-aspc.gc.ca/publicat/lbg-ldmbl-04/pdf/lbg_2004_e.pdf
 - **Construction-related Nosocomial Infections in Patients in Health Care Facilities: Decreasing the Risk of Aspergillus, Legionella and Other Infections.** Available online at: <http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/01vol27/27s2/index.html>.
 - **Prevention and control of occupational infections in health care.** *Can Commun Dis Rep.* 2002;28 Suppl 1:1-264. Available online at: <http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/02pdf/28s1e.pdf>
 - **Classic Creutzfeldt-Jakob Disease in Canada.** *Can Commun Dis Rep.* 2002;28 Suppl 5:1-84. Available online at: <http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/02pdf/28s5e.pdf>
 - **Foot care by health care providers.** *Can Commun Dis Rep.* 1997;23 Suppl 8:i-iv, 1-8. Available online at: <http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/97vol23/23s8/fcindexe.html>

- **Preventing infections associated with indwelling intravascular access devices.** *Can Commun Dis Rep.* 1997;23 Suppl 8:i-iv, 1-32. Available online at: http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/97vol23/23s8/iiadinde_e.html
- **Infection prevention and control practices for personal services: tattooing, ear/body piercing, and electrolysis.** *Can Commun Dis Rep.* 1999;25 Suppl 3:1-73. Available online at: <http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/99pdf/cdr25s3e.pdf>
- **Preventing the spread of vancomycin-resistant enterococci (VRE) in Canada.** *Can Commun Dis Rep.* 1997;23 Suppl 8:i-iv, 1-16, i-iv, 1-19. Available online at: <http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/97vol23/23s8/vreindex.html>
- **Guidelines for the prevention and control of meningococcal disease.** *Can Commun Dis Rep.* 2005;31 Suppl 1:i-ii, 1-21. Available online at: http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/05pdf/31s1_e.pdf
- **Canadian contingency plan for viral hemorrhagic fevers and other related diseases.** *Can Commun Dis Rep.* 1997;23 Suppl 1:i-iii, 1-13; i-iii, 1-13. Available online at: <http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/97vol23/23s1/index.html>
- **Guidelines for preventing the transmission of tuberculosis in Canadian Health Care Facilities and other institutional settings.** *Can Commun Dis Rep.* 1996;22 Suppl 1:i-iv, 1-50, i-iv, 1-5. Available online at: <http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/96vol22/22s1/index.html>

Canadian Standards Association (CSA) [<http://www.csa.ca>]

Canadian Standards are available for purchase on the CSA website at <http://www.csa.ca/Default.asp?language=English> or from:

Canadian Standards Association
5060 Spectrum Way, Suite 100
Mississauga, Ontario L4W 5N6
Phone: (416) 747-4044

Centers for Disease Control and Prevention (CDC) [<http://www.cdc.gov>]

The CDC publishes infection prevention and control guidelines in *Infection Control and Hospital Epidemiology (ICHE)*, the *American Journal of Infection Control (AJIC)* and *Morbidity and Mortality Weekly Report (MMWR)*. A listing of infection prevention and control guidelines may be downloaded from the CDC website at: <http://www.cdc.gov/ncidod/dhqp/guidelines.html>. The listing includes the following:

1. **CDC Definitions of Nosocomial Infections [excluding Pneumonia].** Available online at: <http://www.cdc.gov/ncidod/dhqp/pdf/nis/NosInfDefinitions.pdf>.
2. **Guideline for Hand Hygiene in Healthcare Settings – 2002.** *MMWR Recomm Rep.* 2002;51(RR-16):1-56. Available online at: <http://www.cdc.gov/mmwr/PDF/rr/rr5116.pdf>.
3. **Guidelines for Environmental Infection Control in Health-care Facilities.** *MMWR Recomm Rep.* 2003; 52(RR-10): 1-42. Available online at: <http://www.cdc.gov/mmwr/PDF/rr/rr5210.pdf>.
4. **Guideline for Isolation Precautions in Hospitals.** *Infect Control Hosp Epidemiol.* 1996; 17(1):53-80. Available online at: http://www.cdc.gov/ncidod/dhqp/gl_isolation.html. NOTE: Currently under revision
5. **Guidelines for the Prevention of Intravascular Catheter-Related Infections, 2002.** *MMWR Recomm Rep.* 2002;51(RR-10):1-36. Available online at: <http://www.cdc.gov/mmwr/PDF/rr/rr5110.pdf>.
6. **Guidelines for Preventing Health-care-associated Pneumonia, 2003.** *MMWR Recomm Rep.* 2004 Mar 26;53(RR-3):1-36. Available online at: <http://www.cdc.gov/mmwr/PDF/rr/rr5303.pdf>

7. **Guideline for the Prevention of Surgical Site Infection, 1999.** *Infect Control Hosp Epidemiol.* 1999;20(4):1-32. Available online at: <http://www.cdc.gov/ncidod/dhqp/pdf/guidelines/SSI.pdf>.
8. **Guideline for Prevention of Catheter-associated Urinary Tract Infections, 1981.** Available online at: http://www.cdc.gov/ncidod/dhqp/gl_catheter_assoc.html#.
9. **Management of Multidrug-Resistant Organisms in Healthcare Settings, 2006.** Available online at: <http://www.cdc.gov/ncidod/dhqp/pdf/ar/mdroGuideline2006.pdf>.
10. **Guideline for Infection Control in Healthcare Personnel, 1998.** *Infect Control Hosp Epidemiol.* 1998 Jun;19(6):407-63. Available online at: <http://www.cdc.gov/ncidod/dhqp/pdf/guidelines/InfectControl98.pdf>.
11. **Guidelines for the Management of Occupational Exposures to Hepatitis B, Hepatitis C, and HIV and Recommendations for Postexposure Prophylaxis.** *MMWR Recomm Rep.* 2001;50(RR-11):1-67. Available online at: <http://www.cdc.gov/mmwr/PDF/rr/rr5011.pdf>.
12. **Guidelines for Preventing Opportunistic Infections Among Hematopoietic Stem Cell Transplant Recipients.** *MMWR Recomm Rep.* 2000;49(RR-10):1-147. Available online at: <http://www.cdc.gov/mmwr/PDF/rr/rr4910.pdf>.
13. **Guidelines for Preventing the Transmission of Mycobacterium tuberculosis in Health-Care Settings, 2005.** *MMWR Recomm Rep.* 2005;54(RR-17):1-141. Available online at: <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5417a1.htm>.
14. **Prevention and Control of Tuberculosis in Facilities Providing Long-Term Care to the Elderly.** Recommendations of the Advisory Committee for Elimination of Tuberculosis. *MMWR Recomm Rep.* 1990;39(RR-10):7-20. Available online at: <http://wonder.cdc.gov/wonder/prevguid/p0000185/P0000185.asp>.
15. **Guidelines for the Investigation of Contacts of Persons with Infectious Tuberculosis.** *MMWR Recomm Rep.* 2005;54(RR-15):1-37. Available online at: <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5415a1.htm>.
16. **Guidelines for Infection Control in Dental Health-Care Settings, 2003.** *MMWR Recomm Rep.* 2003;52(RR-17):1-61. Available online at: <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5217a1.htm>.
17. **Workbook for Designing, Implementing and Evaluating a Sharps Injury Prevention Program, 2004.** Available online at: <http://www.cdc.gov/sharpsafety/pdf/WorkbookComplete.pdf>.

Other Sources of Published Guidelines

1. **Position Papers from the Society for Healthcare Epidemiology of America (SHEA)**
Position Statements are developed by the Guidelines Committee of SHEA to assist infection control and epidemiology professionals in policy development and decision making in areas that are unclear or controversial. Position papers may be accessed from the SHEA website at: <http://www.shea-online.org/>.
2. **Association for Professionals in Infection Control and Epidemiology (APIC)**
A number of Position Statements, Guidelines and State-of-the-Art reports have been published by APIC and may be accessed on their website at: <http://www.apic.org>.
3. **Ontario Hospital Association (OHA)**
Ontario Hospital Association. **Communicable Diseases Surveillance Protocols.** Available online at: http://www.oha.com/client/OHA/OHA_LP4W_LND_WebStation.nsf/page/Communicable+Diseases+Surveillance+Protocols
4. **Other Guidelines**
 - **WHO Guidelines on Hand Hygiene in Health Care (Advanced Draft): A Summary.**
World Alliance for Patient Safety, "Clean Hands are Safer Hands", 2005. Available online at: http://www.who.int/patientsafety/events/05/HH_en.pdf
 - **Treatment of Tuberculosis: Guidelines for National Programmes.** WHO Global Programme on Tuberculosis, Third Edition (WHO/CDS/TB/2003.313). Available online at: http://whqlibdoc.who.int/hq/2003/WHO_CDS_TB_2003.313_eng.pdf.

- **Diagnostic Standards and Classification of Tuberculosis in Adults and Children.** Am J Respir Crit Care Med 2000;161:1376-1395. Available online at: <http://www.cdc.gov/nchstp/tb/pubs/PDF/1376.pdf>.
- American Institute of Architects (AIA); Facility Guidelines Institute (FGI). **Guidelines for design and construction of hospital and health care facilities.** 2006 ed. Washington (DC): American Institute of Architects; 2006. Available for purchase from AIA online store at: https://aia-timssnet.uapps.net/timssnet/products/tnt_products.cfm.
- **AAMI Standards**
The Association for the Advancement of Medical Instrumentation (AAMI) publishes standards, recommended practices, technical information reports and other resources covering sterilization, dialysis, biological evaluation of medical devices, quality systems and medical equipment. The standards must be purchased. NOTE: These standards might not be applicable to all Canadian settings, but may be used as an extra resource. Standards are available at: <http://www.aami.org/publications/standards/index.html>.
- College of Physicians and Surgeons of Ontario. **Infection Control in the Physician's Office.** 2004 Edition. Available online at: <http://www.cpso.on.ca/Publications/infectioncontrolv2.pdf>.

REGULATIONS

Health Protection and Promotion Act. R.S.O. 1990, Chapter H.7.

Available online at: <http://www.search.e-laws.gov.on.ca/en/isysquery/23dadf4f-d122-49a5-b727-a1cfb91a127a/5/frame/?search=browseStatutes&context=>.

Long-Term Care Homes Act. S.O. 2007, Chapter 8.

Available online at: <http://www.search.e-laws.gov.on.ca/en/isysquery/d24f98da-f3b0-429c-87c8-d967b20a787a/1/frame/?search=browseStatutes&context=>.

Nursing Homes Act. R.S.O. 1990, Chapter N.7. Available online at: <http://www.search.e-laws.gov.on.ca/en/isysquery/cf43e2bb-9bab-4062-b95a-0500ade661fe/4/frame/?search=browseStatutes&context=>.

Occupational Health and Safety Act. R.S.O.1990, Chapter O.1. Available online at:

<http://www.search.e-laws.gov.on.ca/en/isysquery/8b40b2aa-6f58-476b-b3be-f983861c346a/10/frame/?search=browseStatutes&context=>.

Occupational Health and Safety Act. Ontario Regulation 67/93. Health Care and Residential Facilities. Available online at: <http://www.search.e-laws.gov.on.ca/en/isysquery/8b40b2aa-6f58-476b-b3be-f983861c346a/7/frame/?search=browseStatutes&context=>.

Occupational Health and Safety Act. R.R.O. 1990, Regulation 860 Amended to O. Reg. 36/93.

Workplace Hazardous Materials Information System (WHMIS). Available online at:

<http://www.search.e-laws.gov.on.ca/en/isysquery/8b40b2aa-6f58-476b-b3be-f983861c346a/32/frame/?search=browseStatutes&context=>.

Public Hospitals Act. R.S.O. 1990, Chapter P.40. Available online at: <http://www.search.e-laws.gov.on.ca/en/isysquery/3499bda9-6455-48f2-b206-13331e758022/2/frame/?search=browseStatutes&context=>.

PROFESSIONAL ASSOCIATIONS

The following professional associations are also a source for guidelines, standards, best practices and position statements that the ICP may use when preparing policies. Membership in these organizations will often include a subscription to the organization's journal as well as discounted registration at annual conferences.

Community and Hospital Infection Control Association – Canada (CHICA-Canada)

Website: <http://www.chica.org/>

Canadian Journal of Infection Control. The publication of CHICA-Canada is available to members online at: <http://www.chica.org/journal.html>.

APIC/CHICA-Canada Infection Control and Epidemiology: Professional and Practice Standards. Available online at: <http://www.chica.org/pdf/PPS.pdf>.

Association for Professionals in Infection Control and Epidemiology (APIC)

Website: <http://www.apic.org>

American Journal of Infection Control. The official journal of the Association for Professionals in Infection Control and Epidemiology, Inc. (APIC). Available online at: <http://www2.us.elsevierhealth.com/scripts/om.dll/serve?action=searchDB&searchDBfor=home&ID=ic>

Association for Professionals in Infection Control and Epidemiology (APIC). APIC Text of Infection Control and Epidemiology, 2005 Edition. Available for purchase from APIC online store at: <http://www.apic.org/AM/Template.cfm?Section=Store>

Society for Healthcare Epidemiology of America (SHEA)

Website: <http://www.shea-online.org/>

Infection Control and Hospital Epidemiology. The Official Journal of the Society for Healthcare Epidemiology of America. Available online at: <http://www.ichejournal.com/>

OTHER RESOURCES

Canadian Committee on Antibiotic Resistance

Website: <http://www.ccar-ccra.org>

Conly J. **Antimicrobial resistance in Canada: An update on activities of the Canadian Committee on Antibiotic Resistance.** Canadian Journal of Infectious Diseases and Medical Microbiology 2001; 12(4). Available online at: http://www.pulsus.com/Infdis/12_04/conl_ed.htm

Barton M HM, Moore D, Conly J, Nicole OL, Allen U et al. **Guidelines for the prevention and management of community-associated methicillin-resistant *Staphylococcus aureus* (CA-MRSA): A perspective for Canadian Health care practitioners.** Can J Infect Dis Med Microbiol 2006;17 Suppl C:4-19.

Canadian Patient Safety Institute

Website: <http://www.saferhealthcarenow.ca>

The Safer Healthcare Now! Intervention kits are designed to engage your teams and clinicians in a dynamic approach to quality improvement. Three of the kits relate to infection prevention and control:

1. **Prevention of Central Line-Associated Bloodstream Infection.** Available online at: <http://www.saferhealthcarenow.ca/Default.aspx?folderId=82&contentId=184>

2. **Prevention of Surgical Site Infection.** Available online at:
<http://www.saferhealthcarenow.ca/Default.aspx?folderId=82&contentId=182>
3. **Prevention of Ventilator-Associated Pneumonia.** Available online at:
<http://www.saferhealthcarenow.ca/Default.aspx?folderId=82&contentId=180>

Important Health Notices

Updates on emergency-related activities and information and will be posted at:

<http://www.health.gov.on.ca/english/providers/program/emu/ihn.html>

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

Website: <http://www.cbic.org>

Become certified in infection control (CIC) when eligible by taking the examination available from this Board. The CBIC examination is recognized in both the U.S. and Canada.

ProMED-Mail

Website: <http://www.promedmail.org>

Sign up for regular emails on emerging infectious diseases from around the globe

PubMed

Website: <http://www.ncbi.nlm.nih.gov/entrez/query.fcgi>

A service of the U.S. National Library of Medicine that includes over 16 million citations from MEDLINE and other life science journals for biomedical articles. PubMed includes links to full text articles and other related resources.

TRAINING

Infection Prevention and Control courses sanctioned by the Community and Hospital Infection Control Association-Canada: http://www.chica.org/educ_education.html

Epidemiology and skills enhancement online training from the Public Health Agency of Canada: <https://skills.phac-aspc.gc.ca/>

Epidemiology courses offered from the Centers for Disease Control and Prevention: <http://www.cdc.gov/phtrain/epidemiology.html>

Appendix B: APIC/CHICA-Canada/CBIC Infection Control and Epidemiology: Professional and Practice Standards

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APIC/CHICA-Canada/CBIC infection prevention, control and epidemiology: Professional and practice standards

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The Association for Professionals in Infection Control and Epidemiology, Inc (APIC) and the Community and Hospital Infection Control Association-Canada (CHICA-Canada) collaborated to craft this document, Infection prevention, control and epidemiology: Professional and practice standards. Both professional organizations affirm their responsibility to their memberships and the public they serve to provide professional and practice standards. This document replaces the 1999 edition.

Standards are authoritative statements that reflect the expectations, values, and priorities of the profession. While voluntary, these standards provide direction and a dynamic framework for the evaluation of practice to address the needs of the customers served. Standards also define the profession's accountability in terms of desired outcomes for which infection prevention and control professionals (ICPs) are responsible. These standards are designed to be used in identifying areas for professional growth, developing job descriptions, and providing criteria for performance evaluations.

These standards encompass a broad spectrum of practice settings and professional backgrounds and include key indicators that are designed to be used in evaluating both the competency of the individual and their practice. The key indicators represent multiple skills considered necessary to meet the demands of the evolving health care environment. It is expected that the ICP will meet or exceed the indicators associated with both the Professional and Practice Standards.

In general, the standards will remain stable over time as they reflect each organization's philosophy and values; however the indicators will be reviewed periodically to ensure that they incorporate and address current scientific knowledge, clinical practice, global issues, and technology.

I. PROFESSIONAL STANDARDS

Professional Standards describe a level of individual competence in the professional role. ICPs strive to maintain integrity and a high degree of competency through education, training, and certification. Professionals are expected to incorporate these standards appropriate to their role and practice setting. Key indicators for each standard are designed for use in professional performance evaluation.

1. Qualifications

Meets recommended qualifications to practice in the profession.

Indicators

- Experienced healthcare professional with a health sciences background
- Becomes certified in infection prevention and control when eligible through the Certification Board of Infection Control and Epidemiology
- Maintains certification

2. Professional development

Acquires and maintains current knowledge and skills in the area of infection prevention, control and epidemiology.

Indicators

- Completes a basic infection prevention and control training course within the first 6 months of entering the profession
- Demonstrates basic knowledge and advances his/her education, knowledge and skills as it relates to infection prevention and control in the following areas:
 - Epidemiology, including outbreak management
 - Infectious diseases
 - Microbiology
 - Patient care practices
 - Asepsis
 - Disinfection/sterilization
 - Occupational health
 - Facility planning/construction
 - Emergency preparedness
 - Learning/education principles
 - Communication
 - Product evaluation
 - Information technology
 - Program administration
 - Legislative issues/Policy making
 - Research
- Incorporates and disseminates research findings into practice, education, and/or consultation
- Collaborates with other professional organizations and academic entities to further the prevention of infection
- Participates in professional organizations and networking opportunities
- Maintains current knowledge and functions well with electronic media, e.g., computers and hand held devices, with which to communicate in the IPC environment

3. Ethics

Makes decisions and performs activities in an ethical manner.

Indicators

- Complies with laws and regulations
- Holds paramount the confidentiality, safety, health and welfare of all persons in the performance of professional duties
- Practices in a nonjudgmental, nondiscriminatory manner with sensitivity to diversity
- Acts in such a manner as to uphold and enhance personal and professional honor, integrity, and dignity.
- Engages in infection prevention and control research in a professional manner
- Collaborates with and supports others to improve competency in the science of infection prevention, control, and epidemiology

- Ensures transparency and disclosure in performing research or applying for grants
- Builds professional reputation on personal merit
- Refrains from competing unfairly with others
- Refuses gratuities, gifts, or favors that might impair or appear to impair professional judgment, or offer any favor, service, or thing of value to obtain special advantage

4. Professional accountability

Responsible for the development, evaluation, and improvement of his/her own practice in relation to the Practice Standards.

Indicators

- Establishes and works toward professional goals and objectives
- Performs regular self-evaluations to identify strengths and areas for improvement
- Seeks constructive feedback regarding professional practice
- Keeps current on best practices through evidence-based research, consensus and guidelines
- Participates in professional organizations
- Acknowledges the commitment to protect clients through the support of safe practices and policies

5. Leadership

Serves as a leader, mentor, and role model.

Indicators

- Provides direction and works collaboratively with others
- Shares knowledge and expertise
- Mentors less experienced health care providers/ancillary personnel
- Recognizes and supports the importance of research in shaping the practice of infection prevention, control, and epidemiology
- Brings creativity and innovation to practice
- Seeks opportunities to influence and educate policymaking bodies and the public
- Collaborates and/or educates self with regard to the global infection prevention and control community

II. PRACTICE STANDARDS

ICPs strive to incorporate relevant components of these standards in their own practice. Key indicators for each standard are designed to be used in personal and program development, evaluation, and enhancement.

1. Infection prevention and control practice

Incorporates into practice effective activities that are specific to the practice setting, the population served, and the continuum of care.

Indicators

- Integrates surveillance findings into formal plans for improvement of practice and patient outcomes in various health care settings
- Reviews, analyzes, and implements regulations, standards and/or guidelines of applicable governmental agencies and professional organizations
- Integrates relevant local, national and global public health issues into practice
- Analyzes and applies pertinent information from current scientific literature and publications
- Develops and implements policies and procedures based on currently accepted infection prevention and control best practices
- Ensures that findings, recommendations, and policies of the program are disseminated to appropriate groups or individuals

- Provides knowledge on the function, role, and value of the program to customers

2. Surveillance

Uses a systematic approach to monitor the effectiveness of prevention and control strategies that are consistent with the organization's goals and objectives.

Indicators

- Develops a surveillance plan based on the population(s) served, services provided, and previous surveillance data
- Selects indicators and designs surveillance based on the projected use of the data
- Integrates pertinent regulatory requirements
- Uses standardized definitions for the identification and classification of events, indicators, or outcomes
- Utilizes information technology and systems applications
- Reports epidemiologically significant findings to appropriate customers
- Ensures requirements for communicable disease reporting are met
- Periodically evaluates the effectiveness of the surveillance plan and modifies as necessary

3. Epidemiology

Applies epidemiologic principles and statistical methods, including risk stratification and benchmarking, to identify target populations, determine risk factors, design prevention and control strategies, analyze trends, and evaluate processes.

Indicators

- Uses epidemiologic principles to conduct surveillance and investigations
- Employs statistical techniques to describe the data, calculate risk-adjusted rates, and benchmark
- Incorporates information technology and systems applications in the analysis and dissemination of data
- Critically evaluates significance of findings and makes recommendations for improvement based on those findings

4. Education

Serves as an educator and educational resource for health care providers, ancillary staff, patients, families and the general public.

Indicators

- Assesses the needs of customers and develops educational objectives and strategies to meet those needs
- Utilizes learning principles appropriate to the target audience
- Utilizes appropriate information technology in educational design and delivery
- Collaborates in the development and delivery of educational programs and/or tools that relate to infection prevention, control, and epidemiology
- Evaluates the effectiveness of educational programs and learner outcomes

5. Consultation

Provides expert knowledge and guidance in infection prevention, control, and epidemiology

Indicators

- Stays current with developments in infection prevention, control, and epidemiology
- Integrates into practice, policies, and procedures:
 - Pertinent regulatory requirements
 - Accreditation standards
 - Guidelines

- Supports patients/families, administration, committees, health care providers, and ancillary staff in infection prevention, control, and epidemiology issues
- Provides input into patient safety and healthcare quality initiatives
- Collaborates with community health organizations

6. Occupational Health

Collaborates with occupational health in the development of strategies that address the risk of disease transmission to health care providers and ancillary staff.

Indicators

- Participates in development/review of occupational health policies and procedures related to infection prevention and control.
- Assists in the development of an immunization program.
- Consults on post-exposure protocols and activities related to communicable diseases.

7. Program administration and evaluation

Systematically evaluates the effectiveness of the program appropriate to the practice setting.

Indicators

- Develops and reviews the effectiveness of the program goals and objectives
- Assures that customer needs/expectations are considered in the development and continuous improvement of processes, products and services
- Determines resource needs to accomplish the proposed goals and objectives
- Communicates resource needs to administration based on goals and objectives

8. Fiscal responsibility

Practices in a fiscally responsible and accountable manner

Indicators

- Considers financial implications, safety and clinical outcomes when:
 - Making recommendations
 - Evaluating technology and products
 - Developing policies and procedures
- Incorporates fiscal assessments into program evaluation and/or reports, as applicable
- Develops and maintains a departmental budget, as appropriate

9. Performance improvement

Functions as an integral part of performance improvement initiatives to promote positive patient and employee outcomes.

Indicators

- Identifies opportunities for improvement based on observations, process and outcome indicators, and other findings
- Acts as an agent of change and participates in the change process
- Directs the organization's infection prevention and control improvement activities
- Participates in the organization's multidisciplinary improvement strategies
- Utilizes established measurement tools and techniques, e.g., outbreak investigation, root cause analysis, brainstorming, etc.
- Contributes epidemiologic skills to improvement processes

10. Research

Conducts, participates, evaluates and/or applies relevant research findings to infection prevention, control, and epidemiology practice. Research includes informal epidemiologic studies, e.g., outbreak/cluster investigations, surveillance findings, etc.

Indicators

- Critically evaluates published research and incorporates appropriate findings
- Disseminates relevant research findings through practice, education, and/or consultation
- Participates in infection prevention and control related research independently or collaboratively
- Organizes and shares findings from surveillance activities and/or outbreak investigations
- Publishes or presents research findings to assist in advancing the field of infection prevention, control and epidemiology
- Incorporates cost analysis into infection prevention and control research when possible

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2. Friedman C, Barnette M, Buck AS, Ham R, Harris JA, Hoffman P, et al. Requirements for infrastructure and essential activities of infection control and epidemiology in out-of-hospital settings: a Consensus Panel report. *Am J Infect Control* 1999; 27(5):418-30.
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3. Ontario Ministry of Health and Long-Term Care. Operation Health Protection. An Action Plan to Prevent Threats to our Health and to Promote a Healthy Ontario. Toronto: Ministry of Health and Long-Term Care; 2004. Available online at: http://www.health.gov.on.ca/english/public/pub/ministry_reports/consumer_04/oper_healthprotectio n04.pdf. Accessed December 10, 2007.
4. *Occupational Health & Safety Act*, R.S.O. 1990, c.0.1. Includes Health Care and Residential Facilities *Ontario Regulation 67/93*; 2006. Available online at: http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_90o01_e.htm. Accessed December 10, 2007.
5. *Public Hospitals Act* : Revised Statutes of Ontario, 1990, chapter P.40, amended to 2004, chapter 3, sched. A, s. 96 ; and, the following regulations: Capital grants and loans (*O. Reg. 459/93*); Classification of hospitals (R.R.O. 1990, *Reg. 964*); Financial reports by hospital subsidiaries (*O. Reg. 553/96*); Hospital management (R.R.O. 1990, *Reg. 965*). Available online at: <http://www.search.e-laws.gov.on.ca/en/isysquery/6c2a804d-9669-4e59-8720-92cbea329eb5/2/frame/?search=browseStatutes&context=>. Accessed December 10, 2007.
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