

Provincial Infectious
Diseases Advisory
Committee
(PIDAC)

Best Practices For Hand Hygiene

In All Health Care Settings

Ministry of Health and Long-Term Care
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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.

PIDAC acknowledges and endorses the Ministry of Health and Long-Term Care's Hand Hygiene Program for acute care facilities, "*Just Clean Your Hands*", from which much of the materials and tools found in this document have been obtained. This is a comprehensive, multifaceted hand hygiene program developed for Ontario hospitals.

Tools provided from the "*Just Clean Your Hands*" Program will assist in understanding how the recommendations in this best practice document may be implemented. Program documents are available for download via the www.justcleanyourhands.ca website.

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Infection Prevention and Control Subcommittee

Dr. Mary Vearncombe, Chair

Medical Director, Infection Prevention and Control, Microbiology
Sunnybrook Health Sciences Centre and Women's College Hospital

Mary Lou Card

Manager, Infection Prevention and Control
London Health Sciences Centre and St. Joseph's Health Care

Dr. Maureen Cividino

Occupational Health Physician
St. Joseph's Healthcare, Hamilton

Renee Freeman

Infection Control Practitioner
Hospital for Sick Children, Toronto

Dr. Michael Gardam

Director, Infection Control
University Health Network, Toronto

Dr. Beth Henning

Medical Officer of Health
Huron County

Dr. Allison McGeer

Director, Infection Control
Mount Sinai Hospital, Toronto

Pat Piaskowski

Network Coordinator
Northwestern Ontario Infection Control Network

Dr. Virginia Roth

Director, Infection Prevention and Control Program
The Ottawa Hospital

Dr. Dick Zoutman

Professor and Chair, Divisions of Medical Microbiology and of Infectious Diseases
Medical Director of Infection Control, South Eastern Ontario Health Sciences Centre
Queen's University, Kingston, Ontario
Co-Chair, Provincial Infectious Diseases Advisory Committee (PIDAC)

Dr. Erika Bontovics (ex-officio member)

Senior Infection Prevention and Control Consultant
Public Health Division, MOHLTC

Clare Barry (ex-officio member)

Senior Infection Prevention and Control Consultant
Strategic Planning & Implementation Branch, Public Health Division, MOHLTC

Liz Van Horne (ex-officio member)

Infection Prevention and Control Consultant
Strategic Planning & Implementation Branch, Public Health Division, MOHLTC

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Preamble

About This Document

This document deals with the performance of hand hygiene in health care settings across the continuum of care (see below) including, but not limited to, acute care, complex continuing care, rehabilitation facilities, long-term care, chronic care, pre-hospital care and home health care.

This document provides infection prevention and control practices for:

- knowing why and when to perform hand hygiene;
- understanding barriers and enablers that might influence hand hygiene;
- choosing hand hygiene agents; and
- applying the correct hand hygiene techniques.

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.

Evidence for Recommendations

The best practices in this document reflect the best evidence and expert opinion available at the time of writing. As new information becomes available, this document will be reviewed and updated. Refer to Appendix A, “Ranking System for Recommendations”, for grading system used for recommendations.

How and When to Use This Document

The best practices for hand hygiene set out in this document must be practiced in all settings where care is provided, across the continuum of health care. This includes settings where emergency (including pre-hospital) care is provided, hospitals, complex continuing care facilities, rehabilitation facilities, long-term care homes, outpatient clinics, community health centres and clinics, physician offices, dental offices, offices of health professionals, Public Health and home health care.

This document should be used in conjunction with the Ministry of Health and Long-Term Care “Just Clean Your Hands” program, available online at: <http://www.justcleanyourhands.ca>.

Assumptions and General Principles for Infection Prevention and Control

The best practices in this document are based on the assumption that basic infection prevention and control systems are in place in health care settings in Ontario. Collaboration 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), may be necessary to develop evidence-based programs.

In addition to the general assumption (above) about basic infection prevention and control, these best practices are based on the following additional assumptions and principles:

1. Best practices to prevent and control the spread of infectious diseases are routinely implemented in health care settings, including Health Canada's "*Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care*" (*Can Commun Dis Rep. 1999; 25 Suppl 4:1-142*) [under revision].¹ Available online at: <http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/99vol25/25s4/index.html>.
2. Adequate resources are devoted to infection prevention and control in all health care settings. See the Ministry of Health and Long-Term Care's "*Recommendations for Infection Prevention and Control Programs in Ontario*" [in publication].² To be available online at: <http://www.pidac.ca>.
3. Adequate resources are devoted to Environmental Services/Housekeeping in all health care settings, including written procedures for cleaning and disinfection of client/patient/resident rooms and equipment; education of new cleaning staff and continuing education of all cleaning staff; and ongoing review of procedures.
4. A climate that is conducive to following and maintaining Routine Practices in all health care settings is promoted. This includes the set up and organization of the health care setting in order to provide a system that supports and promotes effective hand hygiene.
5. Regular education (including orientation and continuing education) and support to help staff consistently implement appropriate infection prevention and control practices is provided in all health care settings.

Effective education programs emphasize:

- the risks associated with infectious diseases;
- hand hygiene, including the use of alcohol-based hand rubs and hand washing;
- principles and components of Routine Practices as well as additional transmission-based precautions¹;
- assessment of the risk of infection transmission and the appropriate use of personal protective equipment (PPE), including safe application, removal and disposal;
- appropriate cleaning and/or disinfection of health care equipment, supplies and surfaces or items in the health care environment;
- individual staff responsibility for keeping clients/patients/residents, themselves and co-workers safe; and
- collaboration between professionals involved in occupational health and infection prevention and control.

NOTE: 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 community settings.

6. Collaboration between professionals involved in occupational health and infection prevention and control is promoted in all health care settings to implement and maintain appropriate infection prevention and control standards that protect workers.
7. There are effective working relationships between the health care setting and the local public health unit. Clear lines of communication are maintained and public health is contacted for

information and advice as required and the obligations (under the *Health Protection and Promotion Act*, R.S.O. 1990, c.H.7)³ to report reportable and communicable diseases is fulfilled. Public health provides regular aggregate reports of outbreaks of any infectious diseases in facilities and/or in the community to all health care settings.

8. Access to ongoing infection prevention and control advice and guidance to support staff and resolve differences is available to the health care setting.
9. There are established procedures for receiving and responding appropriately to all international, national, regional and local health advisories in all health care settings. Health advisories are communicated promptly to all staff responsible for case finding/surveillance and regular updates are provided. Current advisories are available from local Public Health units, the Ministry of Health and Long-Term Care (MOHLTC), Health Canada and Public Health Agency of Canada websites and local regional infection prevention and control networks.
10. Where applicable, there is a process for evaluating personal protective equipment (PPE) in the health care setting, to ensure it meets quality standards.
11. There is regular assessment of the effectiveness of the infection prevention and control education program and its impact on practices in the health care setting. The information is used to further refine the program.

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.⁴ Employers, supervisors and workers continue to have rights, duties and obligations under the OHSa. To obtain the specific requirements 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 per 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, contact your local Ministry of Labour office. A list of local Ministry of Labour offices in Ontario may be found online at: <http://www.labour.gov.on.ca/>.

Abbreviations

ABHR	Alcohol-Based Hand Rub
DIN	Drug Identification Number
HAI	Health Care-Associated Infection
ICU	Intensive Care Unit
MICU	Medical Intensive Care Unit
MRSA	Methicillin-Resistant <i>Staphylococcus aureus</i>
NICU	Neonatal Intensive Care Unit
PHAC	Public Health Agency of Canada
PIDAC	Provincial Infectious Diseases Advisory Committee
PPE	Personal Protective Equipment
RICN	Regional Infection Control Networks
VRE	Vancomycin-Resistant Enterococci

Glossary of Terms

Alcohol-based Hand Rub (ABHR): A liquid, gel or foam formulation of alcohol (e.g. ethanol, isopropanol) which is used to reduce the number of microorganisms on hands in clinical situations when the hands are not visibly soiled. ABHRs contain emollients to reduce skin irritation and are less time-consuming to use than washing with soap and water.

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.

Antimicrobial Soap/Antiseptic Soap: Soap (detergent) that contains an antimicrobial agent (e.g. chlorhexidine, hexachlorophene, iodine compounds, triclosan, chloroxylenol/PCMX) to reduce the numbers of microorganisms on the skin. Low concentrations of these chemical agents are often used as a preservative in liquid soap, but are not effective as an antimicrobial agent (see also *Plain Soap*, below).

Champions: Health care providers who publicly share their commitment to improving hand hygiene practice in the health care setting.

Client/patient/resident: Any person receiving care within a health care setting.

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.

Contamination: The presence of an infectious agent on hands or on a surface, such as clothing, gowns, gloves, bedding, toys, surgical instruments, client/patient/resident care equipment, dressings or other inanimate objects.

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 health professionals, Public Health and home health care.

Environment of the Client/Patient/Resident^{5, 6}: The immediate space around a client/patient/resident that may be touched by the client/patient/resident and may also be touched by the health care provider when providing care. The client/patient/resident environment includes equipment, medical devices, furniture (e.g. bed, chair, bedside table), telephone, curtains and personal belongings (e.g. clothes, books). In a multi-bed room, the client/patient/resident environment

is the area inside the individual's curtain. In an ambulatory setting, the client/patient/resident environment is the area that may come into contact with the client/patient/resident within their cubicle. In neonatal settings, the patient environment is the inside of the isolette. Refer to Appendix F, "Environment of the Client/Patient/Resident", for a graphical depiction of the environment around a client/patient/resident. See also, *Health Care Environment*, below.

Hand Care: Actions and products that reduce the risk of skin irritation.

Hand Hygiene: A general term referring to any action of hand cleaning. Hand hygiene relates to the removal of visible soil and removal or killing of transient microorganisms from the hands. Hand hygiene may be accomplished using soap and running water or an alcohol-based hand rub. Hand hygiene includes surgical hand antisepsis.

Hand Hygiene Indication^{5,6}: The reason why hand hygiene is necessary at a given moment.

Hand Hygiene Moment^{5,6}: Points in a client/patient/resident care activity during which hand hygiene is essential because the risk of transmission is greatest. For more information refer to Appendix E, "Your 4 Moments for Hand Hygiene".

Hand Hygiene Opportunity^{5,6}: Terminology used when performing an audit of hand hygiene. A hand hygiene opportunity is an observed indication for hand hygiene. Each opportunity must correspond to an action. Several indications for hand hygiene may come together to create an opportunity.

Hand Washing: The physical removal of microorganisms from the hands using soap (plain or antimicrobial) 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 Environment: People and items which make up the care environment (e.g. objects, medical equipment, staff, clients/patients/residents) of a hospital, clinic or ambulatory setting, outside the immediate environment of the client/patient/resident. See also, *Environment of the Client/Patient/Resident*, above.

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

Health Care Provider: Any person delivering care to a client/patient/resident. This includes, but is not limited to, the following: emergency service workers, physicians, dentists, nurses, respiratory therapists and other health professionals, personal support workers, clinical instructors, students and home health care workers. In some settings, volunteers might provide care and would be included as a health care provider. See also *Staff*, below.

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 health professionals and home health care.

Infection: The entry and multiplication of an infectious agent in the tissues of the host. Asymptomatic or sub-clinical 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 (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.

Infectious Agent: A microorganism, i.e. a bacterium, fungus, parasite, virus or prion, which is capable of invading body tissues, multiplying and causing infection.

Joint Health and Safety Committee: An advisory group of worker and management representatives. The workplace partnership to improve health and safety depends on the joint committee. It meets regularly to discuss health and safety concerns, review progress and make recommendations.

Long-Term Care (LTC): 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.

Moistened Towelette: Single-use, disposable towelette that is pre-moistened, usually with a skin antiseptic (e.g. alcohol). It may be used to physically remove visible soil from hands in situations where running water is not available (e.g. pre-hospital care).

Moment: See *Hand Hygiene Moment*, above.

Occupational Health: Health services in the workplace provided by trained occupational health nurses and physicians.

Opportunity: See *Hand Hygiene Opportunity*, above.

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

Plain Soap⁵: Detergents that do not contain antimicrobial agents or that contain very low concentrations of antimicrobial agents that are present only as preservatives.

Point-of-Care⁵: 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 health care provider without the provider leaving the client/patient/resident environment, so they can be used at the required moment.

Pre-hospital Care: Acute emergency client/patient/resident assessment and care delivered in an uncontrolled environment by designated practitioners, performing delegated medical acts at the entry to the health care continuum.

Provincial Infectious Diseases Advisory Committee (PIDAC): A multidisciplinary scientific advisory body that provides 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.pidac.ca>.

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>.

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>.

Reservoir: Any person, animal, substance or environmental surface in which an infectious agent survives or multiplies, posing a risk for infection.

Resident Bacteria: Bacteria found in deep layers or crevices of skin which are resistant to removal with hand hygiene agents. These bacteria do not generally cause health care-associated infection and can be beneficial to the good health of the skin.

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. The full description of Routine Practices¹ to prevent and control transmission of health care-associated 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).

Surgical Hand Antisepsis⁵: The preparation of hands for surgery, using either antimicrobial soap and water or an alcohol-based hand rub, preferably one with residual activity.

Surgical Hand Rub⁵: Surgical hand preparation with an alcohol-based hand rub that has sustained activity.

Surgical Hand Scrub⁵: Surgical hand preparation with antimicrobial soap that has sustained activity and water.

Transient Bacteria: Bacteria found on the upper layers of the skin that are acquired during direct contact with clients/patients/residents, health care providers, contaminated equipment or the environment. Transient bacteria may be removed or killed by hand hygiene agents.

User-friendly Product: Product used for hand hygiene that meets the recommendations in this document and that users have found supports healthy hand care.

Visibly Soiled Hands: Hands on which dirt or body fluids can be seen.

Waterless Antiseptic Agent: Does not require the use of exogenous water (e.g. alcohol-based hand rub).

BEST PRACTICES FOR HAND HYGIENE IN ALL HEALTH CARE SETTINGS

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

Hand hygiene is one of the five key initiatives set out by the World Alliance for Patient Safety's Global Patient Safety Challenge.⁵ The goal of "*Clean Care is Safer Care*" is to reduce the spread of infection and antibiotic-resistant organisms by limiting the acquisition of preventable health care-associated infections (HAIs).

The hands of health care providers are the most common vehicle for the transmission of microorganisms from client/patient/resident-to-client/patient/resident, from client/patient/resident to equipment and the environment, and from the environment to the client/patient/resident. During the delivery of health care, the health care provider's hands continuously touch surfaces and substances including inanimate objects, client/patient/resident's intact or non-intact skin, mucous membranes, food, waste, body fluids and the health care provider's own body. The total number of hand exposures in a health care facility might reach as many as several tens of thousands per day. With each hand-to-surface exposure a bidirectional exchange of microorganisms between hands and the touched object occurs and the transient hand-carried flora is thus continuously changing. In this way, microorganisms can spread throughout a health care environment within a few hours.⁵

Because health care providers move from client/patient/resident-to-client/patient/resident carrying out a number of tasks and procedures, there are many more indications for hand hygiene during the delivery of health care than there are in the activities of daily living outside of the health care setting.

1. Evidence for Hand Hygiene

Health care-associated infection (HAI) occurs worldwide and affects both developed and developing countries. At any time, over 1.4 million people worldwide suffer from infections acquired in hospital. It is estimated that in developed countries 5 to 10% of patients admitted to acute care hospitals acquire an infection. In high risk settings, such as intensive care units, more than one-third of patients can be affected.⁵ In long-term care, both endemic and epidemic infections are common occurrences.^{5, 7, 8}

In health care settings, adherence to hand hygiene recommendations is the single most important practice for preventing the transmission of pathogens in health care and directly contributes to patient safety.

Health care-associated infection remains a client/patient/resident safety issue and represents a significant adverse outcome of the health care system.^{9, 10} In Canada, it has been estimated that 220,000 incidents of HAI occur each year, resulting in more than 8,000 deaths.¹¹

Hand hygiene is the responsibility of all individuals involved in health care.

Hand hygiene is considered the most important and effective infection prevention and control measure to prevent the spread of health care-associated infections. Despite this, compliance with hand hygiene protocols by health care providers has been, and continues to be, unacceptably low

at 20% to 50%.¹²⁻¹⁴ It has been shown that a facility-wide, multifaceted hand hygiene program, which includes administrative leadership, sanction, support and incentives, can be effective at reducing the incidence of health care-associated infections (see Table 1).¹⁴⁻¹⁶

Table 1: Association between Improved Adherence with Hand Hygiene Practice and Health Care-Associated Infection Rates

Year	Authors	Hospital Setting	Significant results	Duration of follow-up	Reference
1977	Casewell & Phillips	Adult ICU	Reduction in HAI caused by <i>Klebsiella spp.</i>	2 years	17
1982	Maki & Hecht	Adult ICU	Reduction in HAI rates	N.S.	18
1984	Massanari & Hierholzer	Adult ICU	Reduction in HAI rates	N.S.	19
1989	Conly et al.	Adult ICU	Reduction in HAI rates	N.S.	20
1990	Simmons et al.	Adult ICU	No effect (hand hygiene improvement did not reach statistical significance)	11 months	21
1992	Doebbeling et al.	Adult ICU	Significant difference in HAI rates between two different hand hygiene agents	8 months	22
1994	Webster et al.	NICU	Elimination of MRSA, when combined with multiple other infection control measures. Reduction of vancomycin use.	9 months	23
1995	Zafar et al.	Newborn Nursery	Elimination of MRSA, when combined with multiple other infection control measures	3.5 years	24
2000	Larson et al.	MICU/NICU	Significant (85%) relative reduction of VRE rate in the intervention hospital; no significant change in MRSA	8 months	25
2000	Pittet et al.	Hospital-wide	Significant reduction in the overall prevalence of HAIs and MRSA rates. Active surveillance cultures and contact precautions were implemented during the same time period	5 years	14
2003	MacDonald et al.	Hospital-wide	Significant reduction in hospital-acquired MRSA cases	N.S.	26
2004	Swoboda et al.	Adult intermediate care unit	Reduction in HAI rates did not reach statistical significance	2.5 months	27
2004	Lam et al.	NICU	No significant reduction in HAI rates	6 months	28
2004	Won et al.	NICU	Significant reduction of HAI rates	3 years	29

ICU = intensive care unit; NICU = neonatal ICU; MICU = medical ICU;

HAI = health care-associated infection; N.S. = not stated

MRSA = methicillin-resistant *Staphylococcus aureus*; VRE = vancomycin-resistant enterococci

Reproduced with permission from "WHO Guidelines on Hand Hygiene in Health Care (Advanced Draft, April 2006)" [Table 1.19.1]⁵

A multifaceted, multidisciplinary hand hygiene program which incorporates the following elements must be implemented in all health care settings^{5, 14, 30}:

- a) a written policy and procedure regarding hand hygiene;
- b) easy access to hand hygiene agents **at point-of-care**;
- c) 70 to 90% alcohol-based hand rubs are preferred and must be provided in the health care setting; for more information about alcohol concentration, see Section 5, "*Alcohol-based Hand Rub*";
- d) education that includes indications for hand hygiene, techniques, indications for hand hygiene agents and hand care;
- e) access to free-standing hand washing sinks dedicated to hand hygiene and used for no other purpose;
- f) a hand care program; and
- g) a program to monitor hand hygiene compliance with feedback to individual employees, managers, chiefs of service and the Medical Advisory Committee via the Infection Prevention and Control Committee.

91% of patients feel more confident about the health care system knowing there is a hand hygiene program in place.

["Just Clean Your Hands", Ontario's Hand Hygiene Program for Hospitals]

The implementation of a multifaceted, multidisciplinary hand hygiene program, which includes education, motivation and system changes, has been shown to be successful and cost-effective,^{25, 31} resulting in sustained improvement in compliance with hand hygiene among health care providers as well as significant reductions in HAI rates^{14, 25} with associated reduction of client/patient/resident morbidity and mortality from health care-associated infection.^{22, 32-35}

2. What is Hand Hygiene?

Hand hygiene is a general term referring to any action of hand cleaning.⁵ Hand hygiene relates to the removal of visible soil and removal or killing of transient microorganisms from the hands while maintaining good skin integrity. Hand hygiene includes surgical hand antisepsis.

All humans carry microorganisms on their skin. These have been divided into two groups – transient and resident bacteria. *Transient* (or contaminating) *bacteria* colonize the upper layers of the skin and are acquired during direct contact with clients/patients/residents, health care providers, contaminated equipment or the environment. Transient bacteria may also be easily passed on to others or to objects in the environment and are a frequent cause of HAI. *Resident bacteria* are found in deeper layers of skin and are more resistant to removal. These bacteria do not generally cause health care-associated infection and can be beneficial to the good health of the skin.

Effective hand hygiene kills or removes transient bacteria on the skin and maintains good hand health.

What is the Difference between Using an Alcohol-based Hand Rub and Washing Hands with Soap and Water?

There are two methods of killing/removing microorganisms on hands:

- a) Hand sanitizing with a 70 to 90% alcohol-based hand rub (ABHR) is the preferred method (when hands are not visibly soiled) for cleaning hands (for more information about alcohol concentration, see Section 5, "*Alcohol-based Hand Rub*"). Using easily-accessible ABHR in health care settings takes less time than traditional hand washing³⁶ and has been shown to be more effective than washing with soap (even using an antimicrobial soap) and water when hands are not visibly soiled.^{14, 36-41}

- b) Hand washing with soap and running water must be performed when hands are visibly soiled.^{5, 37, 38} The effectiveness of alcohol is inhibited by the presence of organic material. The mechanical action of washing, rinsing and drying is the most important contributor to the removal of transient bacteria that might be present.

If hands are visibly soiled and running water is not available, use a moistened towelette to remove the visible soil, followed by alcohol-based hand rub.

II. Best Practices for Hand Hygiene

1. The Hand Hygiene Program

There have been many approaches to improving hand hygiene compliance in health care settings, but the introduction of a multifaceted, multidisciplinary strategy is the most effective.³¹ See Figure 1 for the components of a multifaceted hand hygiene program. Key elements include⁸:

- staff education and motivation programmes;
- adoption of alcohol-based hand rub as the gold standard;
- use of performance indicators; and
- strong commitment by all stakeholders including frontline staff, managers and health care leaders, to add hand hygiene as an essential component of client/patient/resident and staff safety.³⁸

It is imperative that the enablers and barriers to an effective hand hygiene program are assessed and addressed in order to support the health care provider and promote compliance. These include the selection of user-friendly hand hygiene products, providing alcohol-based hand rub at point-of-care and implementing an effective hand care program. For an example of some of the components and tools of a multifaceted hand hygiene program, Refer to Appendix D, “Just Clean Your Hands”, Ontario’s Hand Hygiene Program for Hospitals”.⁶

An integral part of an effective hand hygiene program is the promotion of hand hygiene by champions and role models²⁵ within the health care setting. By being role models for best practices, these champions will have a positive influence on their peers.



FIGURE 1: Components of a Multifaceted Hand Hygiene Program

A multidisciplinary group within the health care facility may facilitate adherence to best practices and provide leadership and decision-making.³⁸ Members of this committee should be actively engaged in the process and should include, but are not limited to:

- senior management representative
- middle management representative(s)
- physician representative(s)
- infection prevention and control representative(s)
- occupational health representative(s)
- environmental services/housekeeping representative
- plant services/maintenance representative
- hand hygiene program champions
- product purchasing representative
- public relations/communications representative

An effective hand hygiene program is based on using the right product in the right place at the right time by health care providers who have received education in appropriate hand hygiene indications and techniques, combined with a good hand care program.

Recommendation:

1.1 A multidisciplinary, multifaceted hand hygiene program must be developed and implemented in all health care settings, [IB] including hand hygiene agents that are available at point-of-care in all health care settings. [IA] In health care facilities the hand hygiene program must also include:

- a) Senior and middle management support and commitment to make hand hygiene an organizational priority;**
- b) Environmental changes and system supports, including alcohol-based hand rub at the point-of-care and a hand care program;**
- c) Education for health care providers about when and how to clean their hands;**
- d) Ongoing monitoring and observation of hand hygiene practices, with feedback to health care providers;**
- e) Client/patient/resident engagement; and**
- f) Opinion leaders and champions modeling the right behaviour.**

2. Hand Hygiene Policies and Procedures

For each health care setting, a written hand hygiene policy and procedures must be developed that include the following:

- a) indications for hand hygiene;
- b) how to perform hand hygiene;
- c) selection of products used for hand hygiene;
- d) management of product dispensing containers;
- e) hand care;
- f) use of alcohol-based hand rubs with appropriate placement of product; and
- g) hand hygiene compliance and feedback.

For more information visit the “Just Clean Your Hands” website: <http://www.justcleanyourhands.ca>.

Recommendation:

2.1 Each health care setting must have a written hand hygiene policy and procedures.

3. Indications and Moments for Hand Hygiene

Some items in this section are excerpted from the Ministry of Health and Long-Term Care's "Just Clean Your Hands" Program for hospitals. These items and related Appendices are provided for information only, to assist in understanding how the recommendations in this best practice document are being implemented by the Ministry. "Just Clean Your Hands" Program documents are available via the [justcleanyourhands.ca](http://www.justcleanyourhands.ca) website at: <http://www.justcleanyourhands.ca>.⁶

A **hand hygiene indication** is the reason why hand hygiene is necessary at a given moment. There may be several hand hygiene indications in a single care sequence or activity. Examples of hand hygiene indications for health care providers when providing care are:

- a) Before initial contact with a client/patient/resident^{5, 37, 38} or items in their environment⁵; this should be done on entry to the room or bed space, even if the client/patient/resident has not been touched;
- b) Before putting on gloves when performing an invasive/aseptic procedure^{5, 37, 38};
- c) Before preparing, handling or serving food or medications to a client/patient/resident^{5, 37, 38};
- d) After care involving contact with the body fluids of a client/patient/resident,^{5, 37, 38} **even if gloves are worn** (e.g. assisting with blowing the nose, toileting, doing wound care, contact with secretions, excretions, blood, urine), after removing gloves and before moving to another activity;
- e) After contact with a client/patient/resident^{5, 38} or items in their immediate surroundings^{5, 38} when leaving, even if the client/patient/resident has not been touched;
- f) When moving from a contaminated body site to a clean body site during health care^{5, 37, 38}; and
- g) Whenever a health care provider is in doubt about the necessity for doing so.³⁷

The essential indications for hand hygiene can be simplified into **four moments** for training purposes.⁶ This makes it easier to understand the moments where the risk of transmission of microorganisms via the hands is highest, to memorize them, and to assimilate them into the dynamics of health care activities.

For more information about hand hygiene moments refer to Appendix E, "Your 4 Moments for Hand Hygiene", also available online at: http://www.justcleanyourhands.ca/pdf/10_1_4_moment_poster_Eng.pdf.⁶

THE 4 MOMENTS FOR HAND HYGIENE IN HEALTH CARE:

1. **BEFORE** initial patient/patient environment contact
2. **BEFORE** aseptic procedure
3. **AFTER** body fluid exposure risk
4. **AFTER** patient/patient environment contact

Personal hand hygiene for clients/patients/residents is also important and is often overlooked. In clinic settings⁴² and emergency waiting rooms, ABHR should be provided for clients/patients/residents and visitors to reduce the risks of environmental contamination with respiratory viruses⁴³, gastrointestinal viruses and antibiotic-resistant organisms. Clients/patients/residents should be encouraged or assisted to perform hand hygiene after toileting, before leaving their room and prior to eating.³⁷

Recommendations:

3.1 The four moments for hand hygiene in health care are:

- a) **Before initial contact with each client/patient/resident or items in their environment; [IB]**
- b) **Before performing an invasive/aseptic procedure; [IB]**
- c) **After care involving risk of exposure to, or contact with, body fluids; [IA] and**
- d) **After contact with a client/patient/resident or their environment.**

3.2 Provide hand hygiene facilities for clients/patients/residents and visitors in all health care settings. Encourage and assist clients/patients/residents to perform hand hygiene upon arrival, before eating and before leaving their room or clinic area.

4. Hand Care and Hand Adornments

The condition of the hands and the presence of hand adornments can influence the effectiveness of hand hygiene:

a) **Condition of the hands:**

Intact skin is the body's first line of defence against bacteria; therefore careful attention to hand care is an essential part of the hand hygiene program. The presence of dermatitis, cracks, cuts or abrasions can trap bacteria and compromise hand hygiene. Dermatitis also increases shedding of skin squames and, therefore, shedding of bacteria. A common barrier to compliance with hand hygiene is the adverse effects of products on the skin.

Health care providers may clean their hands up to 30 times per shift. It is estimated that approximately 30% of health care providers report symptoms or signs of dermatitis involving their hands,⁴⁴ and as many as 85% give a history of having skin problems.³⁸ Hence, promoting skin integrity through providing good hand hygiene products and teaching the correct techniques for hand hygiene is vital for the safety of both the health care provider and clients/patients/residents.

Occupational hand dermatitis is mostly caused by hand washing and work in occlusion caused by the wearing of gloves.⁴⁵ ABHRs have been shown to be less irritating to skin than soap and water,^{36, 41, 46, 47} despite perceptions to the contrary. If an individual feels a burning sensation following the application of ABHR, it is generally due to pre-irritated skin.⁴⁵ Allergic contact dermatitis associated with ABHRs is uncommon. Staff education relating to the benefits of alcohol-based hand rubs will help to alleviate anxiety and promote their use.³⁸

A hand care program for staff should be a key component of improving effective and safe hand hygiene practices to protect staff and clients/patients/residents from infections. An effective hand care program includes the following:

- i) Hand care assessment of new staff and staff who have developed skin problems related to the use of hand hygiene products and gloves; refer to Appendix D, "Just Clean Your Hands" – Ontario's Hand Hygiene Program for Hospitals" for links to sample tools;
- ii) Staff education on the benefits of using alcohol-based hand rubs and appropriate hand hygiene technique;
- iii) Referring individuals to Occupational Health for assessment if skin integrity is an issue;

ABHRs have been shown to be less irritating to skin than soap and water, despite perceptions to the contrary.

- iv) Providing staff with appropriate hand moisturizing skin care products (and encouraging regular frequent use) to minimize the occurrence of irritant contact dermatitis associated with hand hygiene^{38, 45} (for work that puts a lot of strain on the skin, the cream's fat content should be approximately 70%)⁴⁸; and
- v) Providing an ABHR product that contains an emollient, which can significantly decrease irritant contact dermatitis under frequent-use conditions.⁴⁹

Barrier creams: Unlike hand lotions, which penetrate the skin via pores, barrier creams are adsorbed to the skin and are designed to form a protective layer that is not removed by standard hand washing.³⁸ In certain occupational settings, barrier creams may actually be harmful as they trap agents beneath them, ultimately increasing risk for either irritant or allergic contact dermatitis.⁵ Furthermore, inappropriate barrier cream application may exacerbate irritation rather than provide benefit.⁵⁰ In a recent study, there were no differences in skin condition between an agent applied for skin care (lotion) and an agent applied for skin protection (barrier cream). Both worked equally well to improve skin when applied correctly, regularly and frequently.⁵¹ Another randomized, controlled study yielded a higher percentage of improvement in skin condition in a group that used a lotion compared to a group that used a barrier cream.⁵² It is apparent that more study is required to determine whether barrier creams are effective in preventing irritant contact dermatitis among health care providers.⁵³

- b) **Nails:**
Long nails are difficult to clean, can pierce gloves⁵⁴ and harbour more microorganisms than short nails.⁵⁵ Keep natural nails clean and short.³⁸ The nail should not show past the end of the finger.⁵⁶
- c) **Nail polish:**
Studies have shown that chipped nail polish or nail polish worn longer than 4 days can harbour microorganisms that are not removed by hand washing, even with surgical hand scrubs.^{57, 58} Freshly applied nail polish does not result in increased numbers of bacteria around the nails. Fingernail polish, if worn, must be fresh and in good condition.
- d) **Artificial nails or nail enhancements:**
It has been shown that acrylic nails harbour more microorganisms and are more difficult to clean than natural nails.⁵⁹ Artificial nails and nail enhancements have been implicated in the transfer of microorganisms such as *Pseudomonas* species,^{55, 60} *Klebsiella pneumoniae*⁶¹ and yeast⁶²; and in outbreaks, particularly in neonatal nurseries^{55, 61} and other critical care areas.^{55, 59-66} Surgical site infections^{62, 63} and hemodialysis-related bacteremias⁶⁷ have been linked to artificial nails. They are also associated with poor hand hygiene practices and result in more tears to gloves.⁶⁶ For these reasons, artificial nails and nail enhancements are not to be worn by those having direct contact with a client/patient/resident.
- e) **Rings, other hand jewellery and bracelets:**
It is recommended that rings and bracelets not be worn by those with direct contact with a client/patient/resident. If the health care setting policy allows health care providers to wear hand and/or arm jewellery, it must be limited to a smooth wedding band without projections or mounted stones^{68, 69} and/or a watch.

Impediments to effective hand hygiene include:

- i) Jewellery is very hard to clean and hides bacteria and viruses from the action of the hand hygiene agent⁶⁹⁻⁷¹;
- ii) Rings increase the number of microorganisms present on hands⁷²⁻⁷⁴, although this has not been linked to increases in infections⁷⁵;
- iii) Rings increase the risk of tears in gloves; and

- iv) Eczema often starts under a ring as irritants may be trapped under ring causing irritation.⁷⁶
- f) **Other impediments to effective hand hygiene:**
 - Long sleeves on clothing should not interfere with, or become wet when performing, hand hygiene. Before performing hand hygiene:
 - i) If long sleeves are worn, push sleeves back;
 - ii) If watches and other wrist jewellery are present, remove or push up above the wrist.

Recommendations:

- 4.1 Health care providers should strive to maintain hand skin integrity to enable effective hand hygiene. [IB]**
- 4.2 In all health care settings, implement a hand care program that includes hand assessment, staff education and staff input into product selection. [IB]**
- 4.3 Provide staff with hand moisturizing skin-care products (and encourage regular frequent use) to minimize the occurrence of irritant contact dermatitis associated with hand hygiene. [IA]**
- 4.4 Refer individuals to Occupational Health if skin integrity is an issue.**
- 4.5 To enable effective hand hygiene:**
 - a) nails must be kept clean and short; [II]**
 - b) nail polish, if worn, must be fresh and free of cracks or chips;**
 - c) artificial nails or nail enhancements must not be worn; [IA]**
 - d) it is preferred that rings not be worn; and**
 - e) hand and arm jewellery, including watches, must be removed or pushed up above the wrist by staff caring for clients/patients/residents before performing hand hygiene.**

5. Hand Hygiene Products and Agents

Careful selection of products that influence hand hygiene practice (e.g. alcohol-based hand rubs, soaps, lotions, paper towels) will have a positive impact on hand hygiene compliance. The following should be taken into consideration:

- a) The primary factor influencing hand hygiene product selection should be user acceptability.
- b) Choice of hand hygiene products should be "user-friendly," with staff input into the product choice regarding feel, fragrance and skin tolerance.^{37, 38}
- c) Provide staff with hand hygiene products that have low irritancy potential, particularly when these products are used multiple times per shift.³⁸
- d) Select an alcohol-based hand rub that contains emollients.
- e) Solicit information from manufacturers regarding any effects that hand lotions, creams or alcohol-based hand rubs may have on the persistent effects of antimicrobial soaps being used in the health care setting.³⁸
- f) Solicit information from manufacturers regarding interactions between hand hygiene products or hand care products and gloves used in the health care setting.³⁸
- g) Make manufacturer product information available to staff.
- h) Evaluate the dispenser system of product manufacturers to ensure that dispensers function adequately and deliver an appropriate volume of product.³⁸
- i) Select paper towels that are non-irritating and dispensers where the towel can be accessed without touching the dispenser with the hands.

Staff must be provided with hand hygiene products that are effective and non-irritating to the skin. Staff input into product selection will enhance acceptance and use of the hand hygiene agent.³⁸

Alcohol-based Hand Rub

ABHRs are the first choice for hand hygiene in clinical situations when hands are not visibly soiled.^{37, 38} Alcohol-based hand rubs are less time-consuming to use than washing with soap and water.

Alcohol-based hand rub is the preferred method (when hands are not visibly soiled) 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.

When visible soil is present and running water is not immediately available, use moistened towelettes followed by alcohol-based hand rub.

The efficacy of the alcohol-based hand rub depends on the quality of the product, the amount of product used, the time spent rubbing and the hand surface rubbed.⁸ **ABHR should not be used with water, as water will dilute the alcohol and reduce its effectiveness.** ABHR should not be used after hand washing with soap and water as it will result in more irritation of the hands.^{5, 38} For maximum efficacy and use, health care providers should perform hand hygiene at the appropriate moment of care.⁸ ABHRs should be located at **point-of-care**,^{5, 14, 38, 77} i.e. the place where three elements occur together: the client/patient/resident, the health care provider and care or treatment involving

client/patient/resident contact. Point-of-care products should be accessible without leaving the client/patient/resident.

a) **Antimicrobial Action of Alcohols**

i) Alcohols provide for a rapid kill of most transient microorganisms due to their ability to denature proteins.^{36, 39, 40} The most common types of alcohols used for hand hygiene include ethanol, isopropanol or combinations of these.

ii) The antimicrobial action of ethanol and isopropanol are similar, however ethanol has greater activity against viruses than isopropanol.³⁸ Ethanol is the primary agent used in North America; isopropanol is the primary agent used in Europe.

For maximum efficacy, alcohol-based hand rubs must be available at point-of-care, i.e. the place where three elements occur together: the client/patient/resident, the health care provider and care or treatment involving patient contact.

b) **Alcohol Concentration**

ABHRs available for, and widely used in, health care settings range in concentration from 60 to 90% alcohol. Concentrations higher than 90% are less effective because proteins are not denatured easily in the absence of water.

However, norovirus and other non-enveloped viruses (e.g. rotavirus, enterovirus) cause acute gastroenteritis in humans and are a frequent cause of outbreaks in health care facilities. A recent study⁷⁸ suggests that norovirus is inactivated by alcohol concentrations ranging from 70% to 90%. Since norovirus is a concern in all health care settings, this should be taken into consideration when choosing an ABHR product. **It is preferable that a minimum concentration of 70% alcohol be chosen.**

Alcohol-based hand rub products being considered for purchase must have a Drug Identification Number (DIN) or Natural Product Number (NPN) from Health Canada. The

active concentration of alcohol in products may be checked by searching on the DIN number in the Health Canada Drugs and Health Products Database, located at: http://cpe0013211b4c6d-cm0014e88ee7a4.cpe.net.cable.rogers.com/dpdonline/startup.do?applanguage=en_CA.

c) **ABHR Formulations**

Alcohol-based hand rubs are available as rinses, gels and foams. There are limited data available regarding the relative efficacy of various formulations.

d) **Fire Hazards Related to the Use of Alcohol-based Hand Rubs**

The risk of fire related to the use of ABHR is very small.^{79,80} Hands must be **fully dry** before touching the client/patient/resident or their environment/equipment for the ABHR to be effective and to eliminate the extremely rare risk of flammability in the presence of an oxygen-enriched environment⁸¹ or static electricity from carpeting.⁸²

Placement and storage of ABHR must be in compliance with fire prevention guidelines⁸³:

- i) Client/patient/resident rooms may have up to two litres of product per room.
- ii) Special settings with an open concept patient care area (e.g. ICU, NICU) may have ABHR at each bedside.
- iii) ABHR that is attached to the wall must not be installed directly over a source of ignition (i.e. electrical outlet); in addition, the wall space between the dispenser and the floor must remain clear and unobstructed.
- iv) ABHR that is placed on the bed itself should be secured in an approved holder made for this purpose. The product should be placed so that the spout faces outward from the bed to reduce the risk of excess alcohol dripping on the bed linen.

Where optimal placement or storage of alcohol-based hand rub for hand hygiene adherence appears to conflict with local fire safety regulations or guidelines, the fire Marshall and the infection prevention and control team must be consulted to resolve the issue.

Hand Washing Soaps

a) **Plain Soap**

- i) Plain soaps act on hands by emulsifying dirt and organic substances (e.g. blood, mucous) which are then flushed away with rinsing.
- ii) Plain soaps do not have antimicrobial activity even when they contain low concentrations of antimicrobial agents used as a preservative.
- iii) The physical action of scrubbing and rinsing are important for effective removal of material from the hands and it has been shown that at least 15 seconds of lathering with soap is required to remove transient flora.
- iv) Liquid and foam soaps may become contaminated if open bottles are stored too long. Liquid products must be dispensed in a disposable pump dispenser that is discarded when empty. They should never be "topped-up" or refilled.³⁸
- v) Bar soaps for hand hygiene must not be used in health care facilities except for the personal use of a single client/patient/resident. In this case, the soap should be supplied in small pieces that are single-use, or the bar must be stored in a soap rack to allow drainage and drying. It should be discarded on discharge.³⁸

b) **Antimicrobial Soap**

Antimicrobial soaps have residual antimicrobial activity and are not affected by the presence of organic material. Studies have shown that antimicrobial soap is more effective than plain soap and water⁸⁴⁻⁸⁸ in critical care settings such as intensive care units and burn units.

Since the advent of ABHR, there have been no head-to-head comparisons between ABHR and antimicrobial soap in critical care settings. The best evidence suggests that antimicrobial soap is equivalent to ABHR in terms of microorganism reduction but harsher on the hands and more time-consuming.⁸⁹

- i) Antimicrobial soap may be considered for use in acute care critical care areas but is not required and not recommended in any other client/patient/resident care areas.³⁸
- ii) Disadvantages of antimicrobial soap:
 - Antimicrobial soaps are harsher on hands than plain soaps and frequent use may result in skin breakdown.
 - Frequent use of antimicrobial soap may lead to resistance.
- iii) Antimicrobial soap is not required in clinical laboratories.

Surgical Hand Preparation

A surgical hand preparation must eliminate the transient flora and reduce the resident flora of the hands. It should also inhibit growth of bacteria under the gloved hand. The spectrum of antimicrobial activity for a surgical hand preparation should be as broad as possible, so that it is active against bacteria and fungi.⁵

Due to the rapid multiplication of bacteria under surgical gloves and the high percentage of glove punctures found after surgery, a hand hygiene product with a prolonged antiseptic effect on the skin is desirable.³⁸ In an operative setting, an alcohol-based hand rub (*surgical hand rub*) or an antimicrobial soap (*surgical hand scrub*) with persistent activity should be used.

The antimicrobial activity of ABHRs is superior to that of all other currently available methods of preoperative surgical hand preparation.

Alcohols are effective for preoperative cleaning of the hands of surgical staff.³⁸ Several alcohol-based hand rubs have been licensed for use as a surgical hand rub and

many formulations also contain long-acting compounds such as chlorhexidine gluconate. The antimicrobial activity of ABHRs is superior to that of all other currently available methods of preoperative surgical hand preparation.⁵

Non-alcohol-based waterless antiseptic agents

At the present time, there is no evidence for efficacy of non-alcoholic, waterless antiseptic agents in the health care environment. Non-alcohol-based waterless antiseptic agents are not recommended for hand hygiene in health care settings **and should not be used.**³⁸

Recommendations:

- 5.1 The use of 70 to 90% alcohol-based hand rub is preferred for hand hygiene if hands are not visibly soiled. [IB]**
- 5.2 Wash hands with soap and water if there is visible soiling with dirt, blood, body fluids or other body substances. [IA] If hands are visibly soiled and running water is not available, use moistened towelettes to remove the visible soil, followed by alcohol-based hand rub.**
- 5.3 In all health care settings, provide hand hygiene products at point-of-care for use by staff and clients/patients/residents. [IB]**
- 5.4 All hand hygiene and hand care products must be dispensed in a disposable dispenser that delivers an appropriate volume of the product. [II]**

- 5.5 Single-use product dispensers are preferred and must be discarded when empty; containers must not be “topped-up” or refilled. Responsibility for maintaining product dispensers must be clearly defined. [IA]**
- 5.6 Bar soap for hand hygiene is not acceptable in health care settings except for individual client/patient/resident use. [II]**
- 5.7 Alcohol-based hand rub or antimicrobial soap may be used in critical care areas or in other areas where invasive procedures are regularly performed. [IB]**
- 5.8 Non-alcoholic, waterless antiseptic agents should NOT be used as hand hygiene agents in any health care setting.**
- 5.9 User acceptability should be a factor in hand hygiene product selection. [IB]**
- 5.10 Hand hygiene and hand care products with low irritant potential should be chosen. [IB]**
- 5.11 Hand hygiene products must not interfere with glove integrity or with the action of other hand hygiene or hand care products. [II]**
- 5.12 Evaluate the dispenser system of product manufacturers to ensure that dispensers function adequately and deliver an appropriate volume of product. [IA]**

6. Techniques for Performing Hand Hygiene

Technique for Using an Alcohol-based Hand Rub

The following procedure should be used for cleaning hands with ABHR (refer to Appendix B, “Techniques for Performing Hand Hygiene” for more information):

- a) Ensure hands are visibly clean (if soiled, follow hand washing steps).
- b) Remove hand and arm jewellery. If a watch is worn, it must be worn above the wrist and fit snugly. Clothing or other items that impede frequent and effective hand hygiene should be removed. A simple and practical solution allowing effective hand hygiene is for health care providers to wear their rings around their neck on a chain as a pendant.⁵
- c) Apply one to two full pumps of product, or squirt a 35 mm-sized amount (about the size of a “loonie”), onto one palm.
- d) Spread product over all surfaces of hands³⁸, concentrating on finger tips, between fingers, back of hands, and base of thumbs. These are the most commonly missed areas.
- e) Rub hands until product is dry.^{38, 45} This will take a minimum of 15 seconds if sufficient product is used.

Hands must be fully dry before touching the client/patient/resident or the care environment/equipment for the alcohol-based hand rub to be effective and to eliminate the extremely rare risk of flammability in the presence of an oxygen-enriched environment.⁸⁰

Technique for Hand Washing

The following procedure should be used for hand washing (refer to Appendix B, “Techniques for Performing Hand Hygiene” for more information):

- a) Remove hand and arm jewellery. If a watch is worn, it must be worn above the wrist and fit snugly. Clothing or other items that impede frequent and effective hand hygiene should be removed or pushed back. A simple and practical solution allowing effective hand hygiene is for health care providers to wear their rings around their neck on a chain as a pendant.⁵
- b) Wet hands with warm (not hot) water. Hot water is hard on the hands, and will lead to dryness.
- c) Apply liquid or foam soap. Do not use bar soap in health care settings as it may harbour bacteria that can then be spread to other users.
- d) Vigorously lather all surfaces of hands for a minimum of 15 seconds.³⁸ Removal of transient or acquired bacteria requires a minimum of 15 seconds of mechanical action. Pay particular attention to finger tips, between fingers, backs of hands and base of the thumbs. These are the most commonly missed areas.
- e) Using a rubbing motion, thoroughly rinse soap from hands. Residual soap can lead to dryness and cracking of skin.
- f) Dry hands thoroughly by blotting hands gently with a paper towel. Rubbing vigorously with paper towels can damage the skin.
- g) Turn off taps with paper towel, to avoid recontamination of the hands.^{5, 37}
- h) If hand air dryers are used, hands-free taps are required.
- i) DO NOT use ABHR immediately after washing hands, as skin irritation will be increased.⁵

If running water is not immediately available, use moistened towelettes to remove the visible soil, followed by alcohol-based hand rub.

Technique for Surgical Hand Antisepsis in Operative Settings

The following considerations must be incorporated into procedures used for surgical hand antisepsis (refer to Appendix B, “Techniques for Performing Hand Hygiene” for more information):

- a) Surgical hand antisepsis using either an antimicrobial soap (“*surgical hand scrub*”) or an alcohol-based hand rub with persistent activity (“*surgical hand rub*”) is recommended before donning sterile gloves when performing surgical procedures.^{5, 38} See Section 5 for more information about types of hand hygiene agent used for surgical hand antisepsis.
- b) When performing surgical hand antisepsis using an antimicrobial soap, scrub hands and forearms for the length of time recommended by the manufacturer, usually two to five minutes. Long scrub times are not needed (e.g. 10 minutes).^{5, 38} When using an alcohol-based surgical hand-rub product with persistent activity, follow the manufacturer’s instructions. Apply the product to dry hands only. Do not sequentially combine a surgical hand scrub with a surgical hand rub.⁴⁵
- c) After application of the alcohol-based product as recommended, allow hands and forearms to dry thoroughly before donning sterile gloves.^{38, 45}

Recommendations:

- 6.1 When using an alcohol-based hand rub, apply sufficient product such that it will remain in contact with the hands for a minimum of 15 seconds before the product becomes dry (usually one to two pumps). [IB]**
- 6.2 When using soap and water, a minimum of 15 seconds of mechanical lathering is required before rinsing. [IB]**
- 6.3 Dry hands using a method that does not recontaminate the hands. [IB]**
- 6.4 Dry hands completely before donning gloves. [IB]**

- 6.5 Do not use alcohol-based hand rub immediately after washing hands with soap and water. [II]**
- 6.6 Perform surgical hand antisepsis using either an antimicrobial soap or an alcohol-based hand rub, with a product ensuring sustained activity, before donning sterile gloves. [IB]**
- 6.7 When performing surgical hand antisepsis using an antimicrobial soap, scrub hands and forearms for the length of time recommended by the manufacturer, usually two to five minutes. Long scrub times (e.g. 10 minutes) are not required. [IB]**

7. Considerations With Gloves

Several studies provide evidence that wearing gloves can help reduce transmission of pathogens in health care settings.^{90, 91} However, gloves do not provide complete protection against hand contamination.^{92, 93} The use of gloves does not replace the need for hand hygiene.

The barrier integrity of gloves varies on the basis of type and quality of glove material, intensity of use, length of time used, manufacturer, whether gloves were tested before or after use and method used to detect glove leaks. It is preferable to provide more than one type of glove to health care providers, because it allows the individual to select the type that best suits their care activities.^{5, 38}

Because gloves are not completely free of leaks, and tears/punctures can occur, hands must be cleaned before donning gloves for an aseptic/clean procedure and after glove removal. Gloves must be removed immediately and discarded after the activity for which they were used and before exiting the environment of a client/patient/resident. Gloves should not be washed or reused. Gloves should never be re-worn between clients/patients/residents. Gloves may be adversely affected by petroleum-based hand lotions or creams.⁵

To reduce hand irritation related to gloves:

- a) Wear gloves for as short a time as possible⁴⁵;
- b) Hands must be clean and dry before donning gloves⁴⁵; and
- c) Gloves should be intact and clean and dry inside.

For more information about standards for gloves, visit the Canadian General Standards Board's Certification and Qualification Programs web page at:

<http://www.pwgsc.gc.ca/cgsb/prgsrv/certprg/program/astm-5250-e.html>.

Detailed information about the indications and appropriate use of gloves will be included in the Ministry of Health and Long-Term Care's best practices document, "*Routine Practices and Additional Precautions in All Health Care Settings*" (currently in draft).

Recommendations:

- 7.2 The use of gloves does not replace the need for hand hygiene. [IB]**
- 7.3 Wear gloves when it is anticipated that the hands will be in contact with mucous membranes, non-intact skin or body fluids. [IC]**
- 7.4 The same pair of gloves must not be used for the care of more than one client/patient/resident. [IB]**
- 7.5 Remove gloves immediately and discard after the activity for which they were used, then perform hand hygiene. [II]**

7.6 Change or remove gloves if moving from a contaminated body site to a clean body site within the same client/patient/resident. [II]

7.7 Change or remove gloves after touching a contaminated environmental surface and before touching a client/patient/resident or a clean environmental surface. [II]

7.8 Do not wash or re-use gloves. [IB]

8. Hand Hygiene Considerations in Facility Design

Hand hygiene facilities must be readily available in all clinical areas.³⁷ Hand washing facilities which are not immediately accessible are one of the main reasons that health care providers do not comply with hand hygiene protocols.⁹⁴ Studies offer convincing and important evidence that providing a conveniently located sink in each client/patient/resident room reduces health care-associated infection rates.⁹⁵ See Table 2 for a summary of hand washing sink indications and placement criteria for health care settings, which should be taken into consideration for any renovation or new construction.

Hand Washing Sinks

There must be sufficient sinks to encourage and assist staff to readily conform to hand hygiene protocols.⁹⁴ Nearby surfaces should be nonporous to resist fungal growth⁹⁶ and must be protected from splashes with impermeable back/side splashes.

Improper sink placement and design can add to the environmental reservoir of contaminants. Sinks need to be convenient and accessible and follow criteria regarding placement and design:

a) **Placement criteria**

- i) Sinks must not be used for both hand washing and any other purpose (e.g. cleaning of equipment, emptying intravenous and other solutions), as this will significantly increase the risk of subsequent hand contamination.
- ii) Sinks should be located at least one metre (three feet) from clients/patients/residents, clean supplies and adjacent counters.⁹⁶
- iii) Foot pedal-operated waste bins, with a waste bag, should be provided by each hand washing sink.^{94, 97}
- iv) To avoid recontamination of the hands, there should be single-use towels available to turn off faucets.³⁷
- v) Paper towel waste container should be located near the exit door for disposal of the paper towel used on the door hardware.⁹⁸

b) **Design criteria**

- i) Hand washing sinks must be free-standing,⁹⁴ made of non-porous material, with no storage underneath (due to proximity to sanitary sewer connections and risk of leaks or water damage).⁹⁶ They are not inserted into, or immediately adjacent to a counter.
- ii) The design of hand washing sinks (e.g. depth, position of drain) should prevent splash back that may contaminate hands or faucets.
- iii) Backsplashes must extend a minimum 0.6 metres/two feet above sink level and a minimum of 25 cm./10 inches below sink level.⁹⁴
- iv) Backsplashes must be seam-free. All edges must be sealed with a waterproof barrier. Backsplashes must include the area under the paper towel dispenser and soap dispenser.^{94, 96, 97, 99}
- v) Controls (faucets) should be hands-free. Electric eye operation or foot, elbow or knee operated handles/blades are acceptable.

- vi) Faucets should not swivel (e.g. gooseneck taps).^{98, 100}
- vii) Water temperature must be able to be adjusted. Electric eye technology should have a means for manual adjustment of water temperature. Automatic temperature control or ultrasonic controls are not acceptable.
- viii) If electric eye-triggered devices are used, there must be a contingency to deal with power failure (e.g. tie in to emergency power system).

Table 2: Indications for/Placement of Hand Washing Sinks in Health Care Facilities

Indication and Sink Placement	Reference
Inside each client/patient/resident room, adjacent to the entrance, and in addition to sink in client/patient/resident washroom.	94, 96, 101
If three or more clients/patients/residents share a room, then at least one sink is required for every three clients/patients/residents, with a sink being no more than 6.1 metres/20 feet from each individual bed space.	94, 96, 101
Inside any room where treatment is provided or procedures or physical examinations are performed.	101
Inside any room with a toilet.	101
Inside or within 6.1 metres/20 feet of each nursing station.	
Inside each soiled utility/soiled holding room (in addition to sinks or hoppers that are used for contaminated material).	101
Inside each area where unbagged, soiled linen is handled.	101
Inside or within 6.1 metres/20 feet of each staff lounge.	
Within 7.6 metres/25 feet of each laboratory workstation.	101
Inside each room in which medication is prepared (including in pharmacies) or within 6.1 metres/20 feet of room entrance.	101
Inside any room in which food (e.g. infant formula, breast milk, nourishment) or health care items (e.g. tray) are prepared. This includes, but is not limited to, clean utility rooms used for equipment preparation, nourishment centres and rooms where infant formula is prepared.	101
Inside each clinical laboratory and morgue.	101, 102
In areas where hands are likely to be contaminated, such as in goods receiving areas, chemical storage and waste storage and disposal areas.	99
For airborne precautions rooms there should be one hand washing sink in the ante-room, one in the room itself, and one in the client/patient/resident bathroom.	94

Placement of Alcohol-based Hand Rub Dispensers

The scientific evidence suggests that installing alcohol-based hand rub dispensers at the point-of-care improves adherence to hand hygiene.^{14, 77, 95} *Point-of-care* is the place where three elements occur together: the client/patient/resident, the health care provider and care or treatment involving client/patient/resident contact. Hand hygiene products available at point-of-care are 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 without leaving the client/patient/resident.⁸

There should be an assessment and workflow pattern when making the decision about where to place products. A **point-of-care risk assessment** will also help to guide placement of ABHR for clients/patients/residents who do not have the mental capacity to realize the negative effects of ingestion or misuse of any kind, such as paediatrics, units with cognitively-impaired clients/patients/residents and mental health units. Consideration should also be given to dispensers protruding in a way that could cause injuries and product leaking on surfaces that could cause falls or other injuries. For a sample assessment tool visit the “*Just Clean Your Hands*” website: http://www.justcleanyourhands.ca/pdf/8_4_Placement_Tool.pdf.

The multidisciplinary team and end users should be involved in this decision so that products are placed in the pattern of the workflow and are convenient to use. The following should also be considered:

- a) ABHR dispensers should be placed at point-of-care;
- b) ABHRs should not be placed at, or adjacent to, hand washing sinks;
- c) ABHR dispensers should be mounted on the external wall immediately adjacent to the entrance to each client/patient/resident room⁹⁴, unless contraindicated by the risk assessment; this facilitates situations in which health care is given in hallways and allows visitors and others who are not providing health care to easily access ABHR;
- d) Dispensers should be placed so that they minimize splashing or dripping onto adjacent wall and floor surfaces;
- e) ABHR dispensers should be available immediately adjacent to the entrance to every health care area (e.g. outpatient clinic room, emergency department);
- f) ABHR dispensers should not be installed over or directly adjacent to an ignition source such as an electrical outlet or switch, or over carpeted areas¹⁰³;
- g) In each health care area, the responsibility for replacing dispensers of alcohol-based hand rub (who and when) should be clearly delineated;
- h) ABHR should be dispensed in a non-refillable bottle; and
- i) Placement of ABHR should facilitate hand hygiene when donning and doffing personal protective equipment (PPE) and should ensure compliance with best practices.

Hand Hygiene Product Dispensers (soap, lotions, ABHR)

Liquid product dispensers must be mounted to permit unobstructed access and minimize splashing or dripping onto adjacent wall and floor surfaces.^{94, 97} Liquid dispensers should be dispensed in a non-refillable bottle³⁷ and must be placed to prevent splash-up contamination.^{94, 97}

Hand Drying (paper towel dispensers, air dryers)

Effective hand drying is important for maintaining hand health.⁹⁴ Considerations include:

- a) Disposable paper hand-towels provide the lowest risk of cross-infection and should be used for drying hands in clinical practice areas.^{94, 97}
- b) Cloth drying towels must not be used.³⁸
- c) Towel dispensers must be mounted such that access to them is unobstructed and splashing or dripping onto adjacent wall and floor surfaces is minimized.^{94, 97}
- d) Towel dispenser design should be such that only the towel is touched during removal of towel for use.
- e) Hot-air dryers must not be used in clinical areas as warm air currents dry hands slowly and can be used by only one individual at a time. This results in queues and the temptation to dry hands on clothing.⁹⁴
- f) Where hot-air dryers are used in non-clinical areas, hands-free taps are required.
- g) If hot-air dryers are used in non-clinical areas, there must be a contingency for power interruptions.

Recommendations:

- 8.1 Before installing hand washing sinks and dispensers, prepare a workflow pattern and risk assessment to facilitate the decision about where to place sinks and products. [BIII]**
- 8.2 Hand washing sinks must be hands-free, free-standing and used only for hand washing. [AIII]**
- 8.3 There should be sufficient hand washing sinks such that staff do not need to walk more than 6.1 metres/20 feet to reach the sink. [BIII]**
- 8.4 Locate alcohol-based hand rub dispensers at point-of-care and at the entrance to each client/patient/resident room, unless contraindicated by the risk assessment. [BIII]**
- 8.5 Use disposable paper towels for drying hands in clinical areas. [BIII]**
- 8.6 Towel dispenser design should be such that only the towel is touched during removal of towel for use. [BIII]**
- 8.7 Where hot-air dryers are used in non-clinical areas, hands-free taps are required. [BIII]**
- 8.8 There must be a contingency to deal with power interruptions and temperature regulation when hot-air dryers or sink controls based on electric-eye technology are used. [BIII]**

9. Hand Hygiene Motivation and Behaviour

Patterns of hand hygiene behaviour are developed and established in early life.¹⁰⁴ As most health care providers do not begin their careers until their early twenties, improving compliance means modifying a behaviour pattern that has already been practiced for decades and continues to be reinforced in community situations.⁵ These patterns of hand washing are carried into the health care setting. Sustained alteration to this ritualized behaviour is difficult to achieve.^{104, 105}

Behavioural studies have shown that there are two types of hand hygiene practice^{5, 104}:

- a) The health care provider's internalized need about when hand hygiene is necessary (*inherent hand hygiene practice*):
 - i) Health care providers generally clean hands when one's hands are visibly soiled, sticky or gritty, or for personal hygiene purposes (e.g. after using the toilet), leading one to wash the hands.
 - ii) Usually these indications require hand washing with soap and water.
- b) Other hand hygiene indications (*non-inherent hand hygiene practice*) not triggered by an intrinsic need to cleanse the hands:
 - i) Examples of non-inherent practice include touching a client/patient/resident, taking a pulse or blood pressure, or touching the environment.
 - ii) This type of hand hygiene is frequently omitted in health care settings.

An understanding of these concepts should assist in driving hand hygiene education programs. Behavioral beliefs may be strongly in favor of hand hygiene, but adherence is driven by peer pressure and the perception of high self-efficacy, rather than by reasoning about the impact of hand hygiene on client/patient/resident safety.¹⁰⁵ While health care providers must be schooled in how, when and why to clean hands, emphasis on the derivation of their community and occupational hand hygiene behaviour patterns may assist in altering attitudes.⁵

Leadership, role-modeling and a hospital-wide commitment are essential to improving hand hygiene compliance rates. Staff compliance is significantly influenced by the behaviour of other health care

providers.¹⁰⁶ Having hand hygiene *champions* and role models will have a positive impact on the motivation of staff.^{25, 38} Champions are health care providers who publicly share their commitment to improving hand hygiene practice in the health care setting.

It has been clearly demonstrated that sustainable success at improving hand hygiene adherence is achieved when several critical factors are in place. These include^{5, 8}:

- a) Demonstrable organizational commitment to improvement;
- b) Multidisciplinary leadership;
- c) Hand hygiene role models and *champions*;
- d) Presence of drivers for improvement;
- e) Program adaptability;
- f) Involvement of front-line staff;
- g) Local ownership;
- h) Availability of finances; and
- i) Links to health care regulation.

Recommendations:

9.1 Focus promotional programs for health care providers on factors known to influence behaviour. [IB]

9.2 Incorporate peer role models and “champions” into the hand hygiene program.

10. Hand Hygiene Education

An important and integral part of an effective hand hygiene program is education of all staff about the importance of hand hygiene in a health care setting. General education should include:

- a) indications for hand hygiene (see Section 3 and Appendix E);
- b) factors that influence hand hygiene (see Section 4);
- c) hand hygiene agents (see Section 5);
- d) hand hygiene techniques (see Section 6 and Appendix B); and
- e) hand care to promote skin integrity (see Section 4 and Appendix D).

It must be kept in mind, however, that educational programs alone are inadequate and other behaviour modifying strategies must be included in a multifaceted approach to achieve change.⁵

Education for Health Care Providers

It has been shown that valid information and knowledge on hand hygiene do influence good practices among health care providers.¹⁰⁷ A successful educational program must provide facts that are supported by evidence from the medical literature.⁵

All health care providers should receive basic training and periodic retraining to reinforce their practice. For health care providers, education must include the clinical indications/moments for hand hygiene during client/patient/resident care (see Section 3, “*Indications and Moments for Hand Hygiene*” and refer to Appendix E, “*Your 4 Moments for Hand Hygiene*”).

Basic training materials are available from the Ministry of Health and Long-Term Care.⁶ Information about the Ministry of Health and Long-Term Care’s hand hygiene program, tools and educational materials may be found at the “*Just Clean Your Hands*” website:

<http://www.justcleanyourhands.ca/index.html>.

Education for Clients/Patients/Residents and Visitors

Education aimed at clients/patients/residents and their families and visitors should be provided. Encouraging partnerships between clients/patients/residents, their families and health care providers to promote hand hygiene in health care has been shown to be successful.⁵ Information fact sheets, brochures and posters may be used along with instructions regarding when and how to perform hand hygiene.

Recommendations:

10.1 Educate health care providers about [II]:

- a) **Indications for hand hygiene;**
- b) **Factors that influence hand hygiene;**
- c) **Hand hygiene agents;**
- d) **Hand hygiene techniques; and**
- e) **Hand care to promote skin integrity.**

10.2 Encourage partnerships between clients/patients/residents, their families and health care providers to promote hand hygiene in health care. [II]

11. Hand Hygiene Monitoring and Feedback

Monitoring hand hygiene practices and the provision of immediate feedback are vital to improve motivation and compliance. The use of a standardized observation tool for trained “observers” allows ongoing evaluation and comparison of data between facilities. Components of a standardized observation audit include:

- a) Trained observers (using CD-ROM, practice scenarios);
- b) Standardized observation tool with clear instructions;
- c) Quality control checks of data entry; and
- d) Periodic inter-rater reliability testing.

Feedback must be bilateral. Staff should have input on the hand hygiene program, product selection and availability, and the education provided.

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. 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 client/patient/resident safety and occupational health issue. Aggregate unit compliance results should be part of the performance appraisal of the unit manager.

Details regarding the Ministry of Health and Long-Term Care’s Hand Hygiene Program, including tools and training materials for monitoring and providing feedback, may be found on the “*Just Clean Your Hands*” website: <http://www.justcleanyourhands.ca>.

Recommendations:

11.1 Routinely monitor hand hygiene compliance with the provision of timely feedback by using a reliable, validated observer audit tool and training process. [II]

11.2 Monitoring should assess compliance with each of the four moments to direct education and provide reliability.

11.3 Review results of hand hygiene compliance as part of the ongoing safety agenda of facility committees, such as Joint Health and Safety, Infection Prevention and Control, Medical Advisory Committee and Senior Management.

12. Other Issues Relating to Hand Hygiene

Hand Hygiene and *Clostridium difficile*

Clostridium difficile is a spore-forming bacterium that causes serious diarrhea and intestinal illness in individuals following treatment with antibiotics. When *C.difficile* is diagnosed or suspected:

- a) Observe meticulous hand hygiene with either alcohol-based hand rub or soap and water;
- b) Soap and water is more effective in removing spores than alcohol-based hand rub;
- c) When a hand washing sink is immediately available, hands should be washed with soap and water after glove removal;
- d) When a hand washing sink is not immediately available, hands should be cleaned using an alcohol-based hand rub, after glove removal;
- e) Hand hygiene should not be performed at a client/patient/resident's sink, as this may re-contaminate the health care provider's hands;
- f) Education should be provided to the client/patient/resident regarding the need and procedure to be used for hand hygiene. Clients/patients/residents who are unable to perform hand hygiene independently should be assisted by the health care provider.

For more information relating to *C. difficile* and hand hygiene, refer to the Ministry of Health and Long-Term Care's "*Best Practices Document for the Management of Clostridium difficile in all health care settings*",¹⁰⁸ available online at:

http://www.health.gov.on.ca/english/providers/program/infectious/diseases/ic_cdifff.html.

Systemic Alcohol Absorption

Some ethnic groups, which ban alcohol use on the basis of religious beliefs, have raised concerns about the possibility of ABHR being absorbed systemically through the skin, resulting in increased levels of alcohol in the system. However, a recent study showed that the frequent use of alcohol-based hand rubs does not raise serum blood alcohol levels.^{109, 110}

It should also be noted that the Muslim Scholar Board of the World Muslim League has declared: "*It is allowed to use medicines that contain alcohol in any percentage that may be necessary for manufacturing, if it cannot be substituted. Alcohol may be used as an external wound cleanser, to kill germs and in external creams and ointments*".⁵

III. Summary of Best Practices for Hand Hygiene in All Health Care Settings

(See complete text for rationale. This summary may be used as an audit tool for compliance.)

	Recommendation	Compliant	Partial Compliance	Non-compliant	Action Plan	Accountability
BEST PRACTICES FOR HAND HYGIENE IN ALL HEALTH CARE SETTINGS						
1. The Hand Hygiene Program						
1.1	<p><i>A multidisciplinary, multifaceted hand hygiene program must be developed and implemented in all health care settings, [IB] including hand hygiene agents that are available at point-of-care in all health care settings. [IA] In health care facilities the hand hygiene program must also include:</i></p> <ul style="list-style-type: none"> <i>a) Senior and middle management support and commitment to make hand hygiene an organizational priority;</i> <i>b) Environmental changes and system supports, including alcohol-based hand rub at the point-of-care and a hand care program;</i> <i>c) Education for health care providers about when and how to clean their hands;</i> <i>d) Ongoing monitoring and observation of hand hygiene practices, with feedback to health care providers;</i> <i>e) Client/patient/resident engagement; and</i> <i>f) Opinion leaders and champions modeling the right behaviour.</i> 					

	Recommendation	Compliant	Partial Compliance	Non-compliant	Action Plan	Accountability
2. Hand Hygiene Policies and Procedures						
2.1	<i>Each health care setting must have a written hand hygiene policy and procedures.</i>					
3. Indications and Moments for Hand Hygiene						
3.1	<p><i>The four moments for hand hygiene in health care are:</i></p> <ul style="list-style-type: none"> a) <i>Before initial contact with each client/patient/resident or items in their environment; [IB]</i> b) <i>Before performing an invasive/aseptic procedure; [IB]</i> c) <i>After care involving risk of exposure to, or contact with, body fluids; [IA] and</i> d) <i>After contact with a client/patient/resident or their environment.</i> 					
3.2	<i>Provide hand hygiene facilities for clients/patients/residents and visitors in all health care settings. Encourage and assist clients/patients/residents to perform hand hygiene upon arrival, before eating and before leaving their room or clinic area.</i>					
4. Hand Care and Hand Adornments						
4.1	<i>Health care providers should strive to maintain hand skin integrity to enable effective hand hygiene. [IB]</i>					
4.2	<i>In all health care settings, implement a hand care program that includes hand assessment, staff education and staff input into product selection. [IB]</i>					

	Recommendation	Compliant	Partial Compliance	Non-compliant	Action Plan	Accountability
4.3	Provide staff with hand moisturizing skin-care products (and encourage regular frequent use) to minimize the occurrence of irritant contact dermatitis associated with hand hygiene. [IA]					
4.4	Refer individuals to Occupational Health if skin integrity is an issue.					
4.5	To enable effective hand hygiene: <ul style="list-style-type: none"> a) nails must be kept clean and short; [II] b) nail polish, if worn, must be fresh and free of cracks or chips; c) artificial nails or nail enhancements must not be worn; [IA] d) it is preferred that rings not be worn; and e) hand and arm jewellery, including watches, must be removed or pushed up above the wrist by staff caring for clients/patients/residents before performing hand hygiene. 					
5. Hand Hygiene Products and Agents						
5.1	The use of 70-90% alcohol-based hand rub is preferred for hand hygiene if hands are not visibly soiled. [IB]					
5.2	Wash hands with soap and water if there is visible soiling with dirt, blood, body fluids or other body substances. [IA] If hands are visibly soiled and running water is not available, use moistened towelettes to remove the visible soil, followed by alcohol-based hand rub.					

	Recommendation	Compliant	Partial Compliance	Non-compliant	Action Plan	Accountability
5.3	<i>In all health care settings, provide hand hygiene products at point-of-care for use by staff and clients/patients/residents. [IB]</i>					
5.4	<i>All hand hygiene and hand care products must be dispensed in a disposable dispenser that delivers an appropriate volume of the product. [II]</i>					
5.5	<i>Single-use product dispensers are preferred and must be discarded when empty; containers must not be “topped-up” or refilled. [IA] Responsibility for maintaining product dispensers must be clearly defined.</i>					
5.6	<i>Bar soap for hand hygiene is not acceptable in health care settings except for individual client/patient/resident use. [II]</i>					
5.7	<i>Alcohol-based hand rub or antimicrobial soap may be used in critical care areas or in other areas where invasive procedures are regularly performed. [IB]</i>					
5.8	<i>Non-alcoholic, waterless antiseptic agents should NOT be used as hand hygiene agents in any health care setting.</i>					
5.9	<i>User acceptability should be a factor in hand hygiene product selection. [IB]</i>					
5.10	<i>Hand hygiene and hand care products with low irritant potential should be chosen. [IB]</i>					
5.11	<i>Hand hygiene products must not interfere with glove integrity or with the action of other hand hygiene or hand care products. [II]</i>					

	Recommendation	Compliant	Partial Compliance	Non-compliant	Action Plan	Accountability
5.12	<i>Evaluate the dispenser system of product manufacturers to ensure that dispensers function adequately and deliver an appropriate volume of product. [IA]</i>					
6. Techniques for Performing Hand Hygiene						
6.1	<i>When using an alcohol-based hand rub, apply sufficient product such that it will remain in contact with the hands for a minimum of 15 seconds before the product becomes dry (usually one to two pumps). [IB]</i>					
6.2	<i>When using soap and water, a minimum of 15 seconds of mechanical lathering is required before rinsing. [IB]</i>					
6.3	<i>Dry hands using a method that does not recontaminate the hands. [IB]</i>					
6.4	<i>Dry hands completely before donning gloves. [IB]</i>					
6.5	<i>Do not use alcohol-based hand rub immediately after washing hands with soap and water. [II]</i>					
6.6	<i>Perform surgical hand antisepsis using either an antimicrobial soap or an alcohol-based hand rub, with a product ensuring sustained activity, before donning sterile gloves. [IB]</i>					
6.7	<i>When performing surgical hand antisepsis using an antimicrobial soap, scrub hands and forearms for the length of time recommended by the manufacturer, usually two to five minutes. <u>Long scrub times (e.g. 10 minutes) are not required.</u> [IB]</i>					
7. Considerations with Gloves						

	Recommendation	Compliant	Partial Compliance	Non-compliant	Action Plan	Accountability
7.1	<i>The use of gloves does not replace the need for hand hygiene. [IB]</i>					
7.2	<i>Wear gloves when it is anticipated that the hands will be in contact with mucous membranes, non-intact skin or body fluids. [IC]</i>					
7.3	<i>The same pair of gloves must not be used for the care of more than one client/patient/resident. [IB]</i>					
7.4	<i>Remove gloves immediately and discard after the activity for which they were used, then perform hand hygiene.</i>					
7.5	<i>Change or remove gloves if moving from a contaminated body site to a clean body site within the same client/patient/resident. [II]</i>					
7.6	<i>Change or remove gloves after touching a contaminated environmental surface and before touching a client/patient/resident or a clean environmental surface. [II]</i>					
7.7	<i>Do not wash or re-use gloves. [IB]</i>					
8. Hand Hygiene Considerations in Facility Design						
8.1	<i>Before installing hand washing sinks and dispensers, prepare a workflow pattern and risk assessment to facilitate the decision about where to place sinks and products. [BIII]</i>					
8.2	<i>Hand washing sinks must be hands-free, free-standing and used only for hand washing. [AIII]</i>					
8.3	<i>There should be sufficient hand washing sinks such that staff do not need to walk more than 6.1 metres/20 feet to reach the sink. [BIII]</i>					

	Recommendation	Compliant	Partial Compliance	Non-compliant	Action Plan	Accountability
8.4	Locate alcohol-based hand rub dispensers at point-of-care and at the entrance to each client/patient/staff room, unless contraindicated by the risk assessment. [BIII]					
8.5	Use disposable paper towels for drying hands in clinical areas. [BIII]					
8.6	Towel dispenser design should be such that only the towel is touched during removal of towel for use. [BIII]					
8.7	Where hot-air dryers are used in non-clinical areas, hands-free taps are required. [BIII]					
8.8	There must be a contingency to deal with power interruptions and temperature regulation when hot-air dryers or sink controls based on electric-eye technology are used. [BIII]					
9. Hand Hygiene Motivation and Behaviour						
9.1	Focus promotional programs for health care providers on factors known to influence behaviour. [IB]					
9.2	Incorporate peer role models and “champions” into the hand hygiene program.					
10. Hand Hygiene Education						
10.1	Educate health care providers about [II]: a) Indications for hand hygiene; b) Factors that influence hand hygiene; c) Hand hygiene agents; d) Hand hygiene techniques; and e) Hand care to promote skin integrity.					

	Recommendation	Compliant	Partial Compliance	Non-compliant	Action Plan	Accountability
10.2	Encourage partnerships between clients/patients/residents, their families and health care providers to promote hand hygiene in health care. [II]					
11. Hand Hygiene Monitoring and Feedback						
11.1	Routinely monitor hand hygiene compliance with the provision of timely feedback by using a reliable, validated observer audit tool and training process. [III]					
11.2	Monitoring should assess compliance with each of the four hand hygiene moments to direct education and provide reliability.					
11.3	Review results of hand hygiene compliance as part of the ongoing safety agenda of facility committees, such as Joint Health and Safety, Infection Prevention and Control, Medical Advisory Committee and Senior Management.					

Appendix A: Ranking System for Recommendations

Categories for strength of each recommendation	
CATEGORY	DEFINITION
A	Good evidence to support a recommendation for use.
B	Moderate evidence to support a recommendation for use.
C	Insufficient evidence to support a recommendation for or against use
D	Moderate evidence to support a recommendation against use.
E	Good evidence to support a recommendation against use.
Categories for quality of evidence on which recommendations are made	
GRADE	DEFINITION
I	Evidence from at least one properly randomized, controlled trial.
II	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.
III	Evidence from opinions of respected authorities on the basis of clinical experience, descriptive studies, or reports of expert committees.

Source: Public Health Agency of Canada/Health Canada Guidelines

Appendix B: Techniques for Performing Hand Hygiene

To clean hands properly, rub all parts of the hands and wrists with an alcohol-based hand rub or soap and water. Pay special attention to fingertips, between fingers, backs of hands and base of the thumbs.

- Keep nails short and clean
- Remove bracelets
- Do not wear artificial nails
- Remove chipped nail polish
- Make sure that sleeves and watches are pushed up and do not get wet

- Clean hands for minimum 15 seconds
- Clean wrists and forearms if they are likely to have been contaminated
- Dry hands thoroughly
- Apply lotion to hands frequently

Cleaning with alcohol-based hand rub

How to handrub

Rub hands for 15 seconds



1 Apply 1 to 2 pumps of product to palms of dry hands.



2 Rub hands together, palm to palm.



3 Rub in between and around fingers.



4 Rub back of each hand with palm of other hand.

Rub hands for 15 seconds



5 Rub fingertips of each hand in opposite palm.



6 Rub each thumb clasped in opposite hand.



7 Rub hands until product is dry. Do not use paper towels.



8 Once dry, your hands are safe.

JUST CLEAN YOUR HANDS



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Hand washing with soap and water

How to handwash

Lather hands for 15 seconds



1 Wet hands with warm water.



2 Apply soap.



3 Lather soap and rub hands palm to palm.



4 Rub in between and around fingers.

Lather hands for 15 seconds



5 Rub back of each hand with palm of other hand.



6 Rub fingertips of each hand in opposite palm.



7 Rub each thumb clasped in opposite hand.



8 Rinse thoroughly under running water.



9 Pat hands dry with paper towel.



10 Turn off water using paper towel.



11 Your hands are now safe.

JUST CLEAN YOUR HANDS



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Reproduced with permission from “Just Clean Your Hands”, Ontario’s hand hygiene program for hospitals.⁶ Available online at: http://justcleanyourhands.ca/training_and_education.php.

Technique for Performing Surgical Hand Antisepsis

Practice	Rationale
<p>General Considerations</p> <ul style="list-style-type: none"> ▪ Details of the surgical hand scrub procedure shall be posted in the scrub sink area. ▪ The skin of the hands and arms shall be intact. ▪ A broad-spectrum antimicrobial agent, or an alcohol-based surgical hand antiseptic approved by infection control, shall be used. ▪ Each surgical hand antisepsis/scrub procedure (water or waterless) should follow a standardized protocol established and approved by the health care facility and the manufacturers' written instructions for use. ▪ Scrub personnel who have an identified allergy or sensitivity to antimicrobial agents should be directed by Occupational Health and Infection Control staff regarding appropriate hand scrub antiseptic agents. ▪ Hands shall be washed as soon as gloves are removed. 	<ul style="list-style-type: none"> ▪ A posted surgical hand scrub procedure assists in ensuring a standardized scrub method. ▪ Cuts, abrasions, burns and dermatitis are sources of infection and pose a risk to clients/patients/residents and staff. ▪ A broad-spectrum antimicrobial solution inhibits microbial growth. ▪ The manufacturer's written instructions should prevail because scrub procedures may differ. ▪ Hand perspiration contains high levels of microorganisms. Hands may be contaminated from hole(s) in the gloves. Washing hands immediately may decrease the risk of latex allergy.
<p>Preparation for Surgical Scrub</p> <ul style="list-style-type: none"> ▪ Nails shall be clean, short, natural and healthy. Natural nail tips shall be less than 0.6 cm (1/4-inch) long. ▪ Artificial nails, extenders or artificial enhancers shall not cover natural fingernails. ▪ All jewellery should be removed. 	<ul style="list-style-type: none"> ▪ The subungual region harbours the majority of microorganisms on the hands. Damaged nails, chipped or peeling polish may provide a harbour for microorganisms. ▪ Artificial nails and tips harbour higher numbers of organisms, and have been associated with client/patient/resident death. Artificial nails are known to promote the growth of <i>Staphylococcus aureus</i>, gram-negative bacilli and yeast.

Practice	Rationale
<ul style="list-style-type: none"> ▪ Each health care facility's infection control policy should dictate the use of nail polish. ▪ Special attention should be given to nails and subungual areas. Cleaning under each fingernail shall be done before performing the first scrub of the day. Nail cleaners shall be used to remove soil from nails. 	<ul style="list-style-type: none"> ▪ The majority of flora on the hands is found under and around the fingernails. Orangewood sticks are not to be used to clean under fingernails because the wood may splinter and harbour <i>Pseudomonas</i> organisms.
<p>Protocol for Surgical Scrub with an Antimicrobial Soap</p> <ul style="list-style-type: none"> ▪ When using water-facilitated scrub methods, hands shall be held above the elbows at all times during the surgical hand scrub and while drying the hands and arms with a sterile towel. The direction of the scrubbing procedure is from the hands to the elbows, without returning to the cleaned hands. ▪ Avoid splashing water on surgical attire during the surgical hand scrub because moisture may contaminate the sterile gown. ▪ Hands and arms shall be dried with a sterile towel prior to gowning. 	<ul style="list-style-type: none"> ▪ Water should be allowed to run off the elbows as the hands are considered the cleanest area. ▪ Residual moisture increases the risk of strike-through which contaminates the gown and surgical field.
<p>Protocol for Surgical Scrub with an Alcohol-based Hand Preparation</p> <ul style="list-style-type: none"> ▪ Hands and arms shall be dry following the surgical hand rub. 	<ul style="list-style-type: none"> ▪ Residual moisture increases the risk of strike-through which contaminates the gown and surgical field.

Reproduced with permission from the Operating Room Nurses Association of Canada, "Recommended Standards, Guidelines and Position Statements for Perioperative Registered Nursing Practice". Module 2, Item 6: "Scrubbing, Gowning, Gloving", page 29-32.¹¹¹ [August 2006]

Appendix C: PIDAC'S Hand Hygiene Fact Sheet for Health Care Settings

In health care settings, hand hygiene is the single most important way to prevent infections.

Hand hygiene is the responsibility of the organization and all individuals involved in health care. Hand hygiene is a core element of client/patient/resident safety for the prevention of health care-associated infections and the spread of antimicrobial resistance. There are two methods of performing hand hygiene:

1. ALCOHOL-BASED HAND RUB (ABHR)

Alcohol-based hand rub is the preferred method for decontaminating hands. Using ABHR is better than washing hands (even with an antibacterial soap) when hands are not **visibly soiled**:

- ABHRs provide for a rapid kill of most transient microorganisms
- ABHRs contain a variety of acceptable alcohols in concentrations from 60 to 90%; 70 to 90% is preferred for health care settings
- ABHRs are not to be used with water
- ABHRs contain emollients to reduce hand irritation
- ABHRs are less time-consuming than washing with soap and water
- If running water is not available, use moistened towelettes to remove the visible soil, followed by ABHR

2. HAND WASHING

Hand washing with soap and running water must be performed when hands are visibly soiled. Antimicrobial soap may be considered for use in critical care areas but is not required and not recommended in other care areas. Bar soaps are not acceptable in health care settings except for individual client/patient/resident personal use.

YOUR 4 MOMENTS FOR HAND HYGIENE

1. Before initial client/patient/resident or environment contact

When? Clean your hands when entering:

- before touching client/patient/resident or
- before touching any object or furniture in the client/patient/resident's environment.

Why? To protect the client/patient/resident and their environment from harmful germs carried on your hands.

2. Before aseptic procedure

When? Clean your hands immediately before any aseptic procedure.

Why? To protect the client/patient/resident from harmful germs, including his/her own germs, entering his or her body.

3. After body fluid exposure risk

When? Clean your hands immediately after an exposure risk to body fluids (and after glove removal).

Why? To protect yourself and the health care environment from harmful client/patient/resident germs.

4. After client/patient/resident or environment contact

When? Clean your hands when leaving:

- after touching client/patient/resident or
- after touching any object or furniture in the client/patient/resident's environment.

Why? To protect yourself and the health care environment from harmful client/patient/resident germs.

FACTORS THAT REDUCE THE EFFECTIVENESS OF HAND HYGIENE

The following factors reduce the effectiveness of hand hygiene:

- **Condition of the skin:** See Section 4, "Hand Care", for information about maintaining skin integrity.
- **Nails:** Long nails are difficult to clean, can pierce gloves and harbour more microorganisms than short nails. Nails must be kept clean and short.
- **Nail polish:** Only nail polish that is fresh and free of cracks or chips is acceptable.
- **Artificial nails or nail enhancements** are not to be worn by those giving care.
- **Jewellery:** Hand and arm jewellery hinder hand hygiene. Rings increase the number of microorganisms present on hands and increase the risk of tears in gloves. Arm jewellery, including watches, should be removed or pushed up above the wrist before performing hand hygiene.
- Products must be dispensed in a disposable pump container that is not topped-up, to prevent contamination

Appendix D: “Just Clean Your Hands”: Ontario’s Hand Hygiene Program for Hospitals

“Just Clean Your Hands” is the Hand Hygiene Program that was developed by the Ministry of Health and Long-Term Care for Ontario hospitals to improve hand hygiene compliance in health care providers, reduce negative impacts on clients/patients/residents due to health care-associated infections, and increase the performance of Ontario’s health system. The provincial hand hygiene program is patterned on the World Health Organization’s initiative, “Clean Care is Safer Care”, launched in 2005 [website: <http://www.who.int/gpsc/en/index.html>] and is a good example of a multifaceted hand hygiene program. More information about the Ontario program may be found at: <http://www.justcleanyourhands.ca>.

The links to tools in this Appendix and in Appendices E and F are available from the “Just Clean Your Hands” Program. These tools are provided to assist in understanding how the recommendations in this best practice document can be implemented using the “Just Clean Your Hands” Program. Program documents are available via the program website at: <http://www.justcleanyourhands.ca>. **Please note that the tools listed here are not all-inclusive and new tools are being added on an ongoing basis.**

SOME TOOLS AVAILABLE FROM THE “JUST CLEAN YOUR HANDS” PROGRAM:

1. Environmental Changes/Support System:

http://www.justcleanyourhands.ca/environmental_changes.php

- **Hand Assessment Tool**

- http://www.justcleanyourhands.ca/pdf/8_HandCare_Tool.pdf

- **Hand Care Program**

- http://www.justcleanyourhands.ca/pdf/8_7_Hand_Care_program_04Mar08.PDF

- **Placement Tool for Hand Hygiene Products**

- http://www.justcleanyourhands.ca/pdf/8_4_Placement_Tool.pdf

2. Training and Education: http://www.justcleanyourhands.ca/training_and_education.php

- **How to Handwash**

- http://www.justcleanyourhands.ca/pdf/10_11_Hand_wash_7Feb08.pdf

- **How to Handrub**

- http://www.justcleanyourhands.ca/pdf/10_14_Handrub_07Feb08.pdf

- **Your 4 Moments for Hand Hygiene**

- http://www.justcleanyourhands.ca/pdf/5_21_Training-4_Moments.ppt

- **Education Module**

- <http://www.health.gov.on.ca/english/providers/program/pubhealth/handwashing/flash/handhygiene.html>

3. Observation and Evaluation: http://www.justcleanyourhands.ca/observation_tool.php

- **Hand Hygiene Compliance Observation and Analysis**

- http://www.justcleanyourhands.ca/pdf/5_18_Training_Observation_and_Analysis.ppt

- **Hand Hygiene Perception Survey for Senior Management**
 - http://www.justcleanyourhands.ca/pdf/9_6_Perception_for_management.pdf
 - **Baseline Hand Hygiene Perception Survey**
 - http://www.justcleanyourhands.ca/pdf/9_9_Baseline_HH_perception_Survey.pdf
 - **Followup Hand Hygiene Perception Survey**
 - http://www.justcleanyourhands.ca/pdf/9_10_Follow_up_HH_perception.pdf
 - **Hand Hygiene Knowledge Test for Health Care Providers**
 - http://www.justcleanyourhands.ca/pdf/9_11_Knowledge_test_for_HCP.pdf
 - **Observation Tool**
 - http://www.justcleanyourhands.ca/pdf/9_5_Observation_Tool_19Feb08.pdf
 - **Unit Structure Baseline Survey**
 - http://www.justcleanyourhands.ca/pdf/9_12_Baseline_Unit_Structures.pdf
 - **Unit Structure Followup Survey**
 - http://www.justcleanyourhands.ca/pdf/9_13_Unit_Structures_follow_up.pdf
 - **Facility Level Assessment**
 - http://www.justcleanyourhands.ca/pdf/9_8_Facility-Level_Assessment_15Feb08.pdf
4. **Workplace Reminders:** http://www.justcleanyourhands.ca/reminders_in_the_workplace.php
- **How to Create a Champion Poster**
 - http://www.justcleanyourhands.ca/pdf/10_9_Champion_Poster_Booklet.pdf
 - **Pocket Card**
 - http://www.justcleanyourhands.ca/pdf/10_12_Pocket_card_Eng.pdf
 - **How to Handwash Poster**
 - http://www.justcleanyourhands.ca/pdf/10_11_Hand_wash_7Feb08.pdf
 - **How to Handrub Poster**
 - http://www.justcleanyourhands.ca/pdf/10_14_Handrub_07Feb08.pdf
5. **Implementation Guide:** http://www.justcleanyourhands.ca/pdf/13_5_ImplementationGuide.pdf

Appendix E: Your 4 Moments for Hand Hygiene

Your 4 Moments for Hand Hygiene

1	BEFORE initial patient / patient environment contact	<p>WHEN? Clean your hands when entering:</p> <ul style="list-style-type: none"> • before touching patient or • before touching any object or furniture in the patient's environment <p>WHY? To protect the patient/patient environment from harmful germs carried on your hands</p>
2	BEFORE aseptic procedure	<p>WHEN? Clean your hands immediately before any aseptic procedure</p> <p>WHY? To protect the patient against harmful germs, including the patient's own germs, entering his or her body</p>
3	AFTER body fluid exposure risk	<p>WHEN? Clean your hands immediately after an exposure risk to body fluids (and after glove removal)</p> <p>WHY? To protect yourself and the health care environment from harmful patient germs</p>
4	AFTER patient / patient environment contact	<p>WHEN? Clean your hands when leaving:</p> <ul style="list-style-type: none"> • after touching patient or • after touching any object or furniture in the patient's environment. <p>WHY? To protect yourself and the health care environment from harmful patient germs</p>

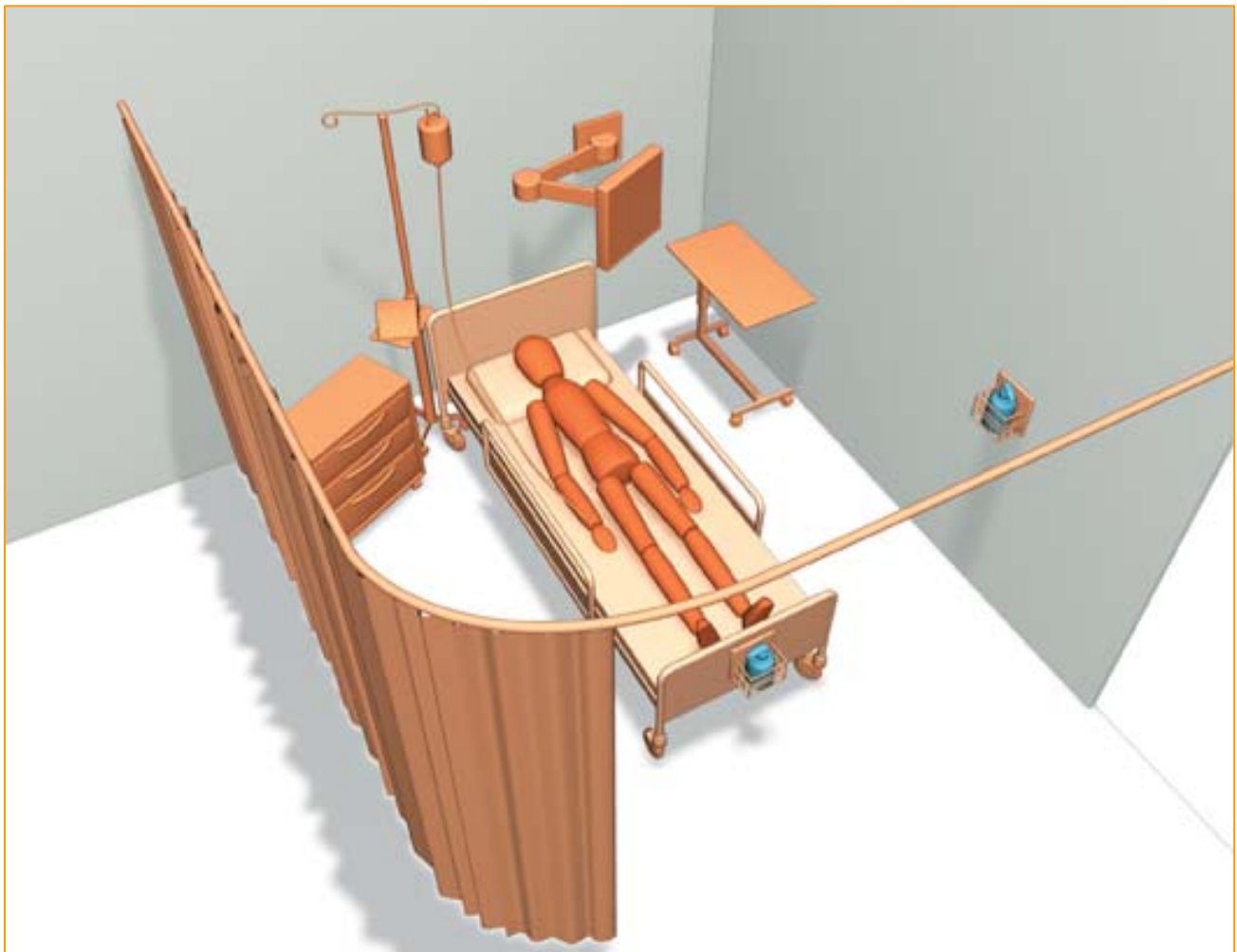
Adapted from WHO poster "Your 5 moments for Hand Hygiene" 2006.

Reproduced with permission from "Just Clean Your Hands", Ontario's hand hygiene program for hospitals.⁶ Available online at:

http://www.justcleanyourhands.ca/pdf/10_1_4_moment_poster_Eng.pdf.

Appendix F: Environment of the Client/Patient/Resident

The environment of the client/patient/resident is the space around a client/patient/resident that may be touched by the client/patient/resident and may also be touched by the health care provider when providing care. The client/patient/resident environment includes equipment, medical devices, furniture (e.g. bed, chair, bedside table), telephone, curtains and personal belongings (e.g. clothes, books). In a multi-bed room, the client/patient/resident environment is the area inside the individual's curtain. In an ambulatory setting, the client/patient/resident environment is the area that may come into contact with the client/patient/resident within their cubicle. In neonatal settings, the patient environment is the inside of the isolette.



This image is reproduced with permission from “*Just Clean Your Hands*”, Ontario’s hand hygiene program for hospitals.⁶ Available online at: <http://www.justcleanyourhands.ca>.

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