Best Practices for Hand Hygiene

In All Healthcare Settings and Programs

THIS DOCUMENT IS INTENDED TO PROVIDE BEST PRACTICES ONLY.

HEALTHCARE SETTINGS AND PROGRAMS ARE ENCOURAGED TO WORK TOWARDS THESE BEST PRACTICES IN AN EFFORT TO IMPROVE QUALITY OF CARE.

British Columbia Ministry of Health
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Forward

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PIDAC is a multidisciplinary scientific advisory body that provides evidence-based advice to the Chief Medical Officer of Health regarding multiple aspects of infectious disease identification, prevention and control. 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 healthcare providers.

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Abbreviations

ABHR	Alcohol-Based Hand Rub
DIN	Drug Identification Number
HAI	Healthcare-Associated Infection
HCP	Healthcare provider
ICU	Intensive Care Unit
MoH	Ministry of Health (British Columbia)
MRSA	Methicillin-Resistant *Staphylococcus aureus*
NICU	Neonatal Intensive Care Unit
OHS	Occupational Health and Safety/Workplace Health
PHAC	Public Health Agency of Canada
PICNet	Provincial Infection Control Network
PIDAC	Provincial Infectious Diseases Advisory Committee
PPE	Personal Protective Equipment
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).

Assisted Living: Assisted living residences provide housing, hospitality and personalized assistance services for adults who can live independently but require regular assistance with daily activities, usually because of age, illness or disabilities. Support services promote clients' independence, while involving family and friends in their care. Assisted living residences combine building features and services that enable people to remain in their community as long as they are able to make decisions on their own behalf. They maximize independence, while promoting choice, self-direction and dignity.

British Columbia Provincial Hand Hygiene Working Group (PHHWG): The Provincial Hand Hygiene Working Group was formed to create a comprehensive provincial program to improve and sustain hand hygiene compliance rates. The goal of this group is to decrease healthcare associated infections and to support the implementation of the Ministry's Clinical Care Management initiative.

British Columbia Provincial Infection Control Network (PICNet): PICNet is a provincial program of the Provincial Health Services Authority with a specific interest in the prevention and control of healthcare associated infections. PICNet works together with partners on province-wide surveillance,

development and promotion of evidence-based best practices, and the creation of educational and operational tools. More information is available at: www.picnet.ca

Champions: Healthcare providers who publicly share their commitment to improving hand hygiene practice in the healthcare setting.

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

Continuum of Care: Across all healthcare sectors, including settings where emergency (including pre-hospital) care is provided, hospitals , rehabilitation facilities, residential care and assisted living facilities, outpatient clinics and centres, community health centres, clinics and programs, and physician, dental and allied health services provided on contract through health authorities.

Direct Care: Provision of hands-on care (e.g., bathing, washing, turning patient, changing clothes, continence care, dressing changes, care of open wounds/lesions, toileting).

Environment of the Patient [i, ii]: The immediate space around a patient that may be touched by the patient and may also be touched by the healthcare provider when providing care. For example:

- In a single room, the patient environment is the room.
- In a multi-bed room, the patient environment is the area inside the individual's curtain and including the curtain.
- In an ambulatory setting, the patient environment is the area that may come into contact with the patient within their cubicle.
- In a nursery/neonatal setting, the patient environment includes the inside of the bassinette or incubator unit, as well as the equipment outside the bassinette or incubator unit used for that infant (e.g., ventilator, monitor). Refer to Appendix F, '*Environment of the Patient',* for a graphical depiction of the environment around a patient*.* See also, *Healthcare Environment*.

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

Hand Care Program: A hand care program for staff is a key component of hand hygiene and includes hand care assessment, staff education and an occupational health assessment. If skin integrity is an issue, hand moisturizing products and alcohol-based hand rub containing an emollient should be provided.

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 for patient care may be accomplished using an alcohol-based hand rub or soap and running water. Hand hygiene includes surgical hand preparation.

Hand Hygiene Indication[iii]: The reason why hand hygiene is necessary at a given moment.

Hand Hygiene Moment[iv]: The point(s) in an activity at which hand hygiene is performed. There may be several hand hygiene moments in a single care sequence or activity. For more information refer to Appendix E, '*Hand Hygiene Before & After*'.

Hand Hygiene Opportunity[v]: Terminology used when performing an audit of hand hygiene. A hand hygiene opportunity is an observed indication for hand hygiene. Each opportunity should 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 Authorities: Health authorities are responsible for the delivery of health service delivery in their respective regions. The 5 regional health authorities include: Northern Health, Interior Health, Vancouver Island Health, Vancouver Coastal Health and Fraser Health. Provincial Health Services Authority and Providence Health Care provide health services for the entire province.

Healthcare-Associated Infection (HAI): A term relating to an infection that is associated with the delivery of healthcare.

Healthcare 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 patient. See also, *Environment of the Patient*.

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

Healthcare Provider (HCP): Any person working in the healthcare system. 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, environmental and food service workers, facility maintenance workers, contracted providers and home healthcare providers. In some settings, volunteers might provide care and would be included as a healthcare provider.

Healthcare Setting: Any location where healthcare 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, offices of health professionals and home healthcare.

Hospital: Hospital is defined by the *Hospital Act* (RSBC 1996) as a non-profit institution that has been designated as a hospital by the minister and is operated primarily for the reception and treatment of persons (a) suffering from the acute phase of illness or disability, (b) convalescing from or being rehabilitated after acute illness or injury, or (c) requiring extended care at a higher level than that generally provided in a private hospital.

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 healthcare settings, can prevent or reduce the risk of transmission of microorganisms to healthcare providers, other patients 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 Occupational 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.

Moistened Towelette: Single-use, disposable towelette that is pre-moistened with either a skin anti-septic or detergent, that is used to physically remove visible soil from hands in situations where running water is not available (e.g., pre-hospital care). The use of moistened towelette does not constitute hand hygiene.

Moment: See *Hand Hygiene Moment*.

Nail Enhancement: Nail enhancements refer to artificial nails, resin wraps, tips, acrylics, gems, stickers, piercings or gels.

Occupational Health and Safety (OHS)/Workplace Health: Preventive and therapeutic health services in the workplace provided by trained occupational health professionals, e.g., nurses, hygienists, and physicians.

Ontario Provincial Infectious Diseases Advisory Committee (PIDAC): An Ontario based 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

Patient: The term 'patient' in this document refers to any patient, client and resident receiving care within a healthcare setting.

Personal Protective Equipment (PPE): Clothing or equipment worn for protection as per routine practices and additional precautions (e.g., gloves, masks, protective eyewear, gowns). General work clothes (e.g., uniforms, pants, shirts or blouses) not intended to function as protection against a hazard are not considered to be personal protective equipment.

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

Point-of-Care[vi]: The place where three elements occur together: the patient, the healthcare provider and care or treatment involving patient contact. Point-of-care products should be accessible to the healthcare provider, within arm's reach, without the provider leaving the zone of care.

Pre-Hospital Care: Pre-hospital care or emergency health service means the provision of first aid or medical services by a licensed health care professional in emergency situations as well as the provision of ongoing care during transfer to definitive care. Pre-hospital care may also include inter-facility transfer.

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

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

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

Residential Care: Residential care facilities provide 24-hour professional nursing care and supervision in a protective, supportive environment for people who have complex care needs and can no longer be cared for in their own homes.

Routine Practices & Additional Precautions: The system of infection prevention and control practices to be used by all healthcare providers with all clients/patients/residents during all care activities to prevent and control transmission of microorganisms in all healthcare settings. For a full description of Routine Practices, refer to the Public Health Agency of 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]),[vii] available at: http://www.collectionscanada.gc.ca/webarchives/20071116015234/http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/99vol25/25s4/index.html

Surgical hand preparation[viii]: The preparation of hands for surgery, using either antimicrobial soap and water or an alcohol-based hand rub, preferably one with sustained antimicrobial activity.

Surgical Hand Rub[ix]: Surgical hand preparation with an alcohol-based hand rub that has sustained antimicrobial activity.

Surgical Hand Scrub[1x]: Surgical hand preparation with antimicrobial soap that has sustained antimicrobial activity, and water.

Transient Flora: Microorganisms that contaminate the upper layers of the skin and are acquired during direct contact with clients/patients/residents, healthcare providers, contaminated equipment or the environment. Transient flora may be removed or killed by hand hygiene.

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.

PREAMBLE

1. About this Document

This document deals with the performance of hand hygiene across all healthcare sectors. This includes, but is not limited to, settings where emergency (including pre-hospital) care is provided, hospitals, rehabilitation facilities, residential care and assisted living facilities, outpatient clinics and centres, community health centres, clinics and programs, and physician, dental and allied health services provided on contract through health authorities.

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.

2. 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 the grading system used for these recommendations.

3. How to Use this Document

FOR RECOMMENDATIONS IN THIS DOCUMENT:

- "**shall**" indicates mandatory requirements based on legislated requirements or national standards (e.g., Canadian Standards Association – CSA); and
- "**should**" indicates what is considered best practice.
- "**strongly recommended"** indicates a preferred practice where conclusive evidence remains in development. This level of recommendation is only used once throughout this document (in reference to 'bare below the elbows') and was included based on feedback provided by the Provincial Clinical Care Management Steering Committee.

4. Assumptions for Best Practices in Infection Prevention & Control

The best practices in this document are based on the assumption that health authorities in BC already have basic infection prevention and control systems and programs in place. This document provides a number of recommendations to health authorities regarding ways to implement best practices in the area of hand hygiene. The objective of these guidelines is to protect patient safety by ensuring that all health authorities are in full compliance with established standards for hand hygiene. This document can be obtained at:

- BC Ministry of Health. *Best Practices for Hand Hygiene in All Healthcare Settings*, July 2012, available at:

http://www.health.gov.bc.ca/library/publications/year/2012/best-practice-handhygiene.pdf

- The BC Ministry of Health's Policy Communiqué (2012-04) on hand hygiene is available at:

http://www.health.gov.bc.ca/library/publications/year/2012/handhygiene-policy-communique.pdf

Healthcare settings that do not have dedicated Infection Control Professionals should work with their affiliated health authority to develop evidence-based programs. PICNet is also available as a provincial resource.

In addition to the general assumption above, 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 all healthcare settings, including:
    a) Public Health Agency of 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]),[xi] available at:
    http://www.collectionscanada.gc.ca/webarchives/20071116015234/http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/99vol25/25s4/index.html

2. Adequate resources are devoted to infection prevention and control in health authorities.

3. Health authorities have implemented programs that promote good hand hygiene practices and ensure adherence to standards for hand hygiene. See:
    a) BC Centre for Disease Control's Hand Hygiene Fact Sheet,[xii] available at: http://www.bccdc.ca/prevention/HandHygiene/default.html
    b) The Public Health Agency of Canada's, *Handwashing, Cleaning, Disinfection and Sterilization in Health Care'* [xiii] available at:
    http://www.collectionscanada.gc.ca/webarchives/20071115105916/http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/98pdf/cdr24s8e.pdf
    c) Provincial Infection Control Network's Hand Hygiene Resource page [xiv] available at:
    http://www.picnetbc.ca/education-training/64/hand-hygiene-resources

4. Adequate resources are devoted to Environmental Services/Housekeeping in all healthcare settings that include written procedures for cleaning and disinfection of patient rooms and equipment; education of new cleaning staff and continuing education of all cleaning staff; and ongoing review of procedures. Each health authority publishes the results of an external auditor's (i.e. Westech) annual independent housekeeping audit on their website. Contact information for each health authority is available at:
    http://www.health.gov.bc.ca/socsec/index.html

5. Regular education (including orientation and continuing education) and support to help staff consistently implement appropriate infection prevention and control practices is provided across the continuum of care.

6. Effective education programs emphasize:
    a) The risks associated with infectious diseases, including acute respiratory illness and gastroenteritis;
    b) Hand hygiene, including the use of alcohol-based hand rubs and hand washing;
    c) Principles and components of Routine Practices as well as additional transmission-based precautions;
    d) Assessment of the risk of infection transmission and the appropriate use of personal protective equipment (PPE), including safe application, removal and disposal;
    e) Appropriate cleaning and/or disinfection of healthcare equipment, supplies and surfaces or items in the healthcare environment
    f) Individual staff responsibility for keeping patients, themselves and co-workers safe; and
    g) Collaboration between professionals involved in Infection Prevention and Control and Occupational Health and Safety (OHS).

    NOTE: *Education programs should be flexible enough to meet the diverse needs of the range of healthcare providers and other staff who work in the healthcare setting. The local public health unit may be a resource and can provide assistance in developing and providing education programs for community settings.*

7. Collaboration between professionals involved in OHS and Infection Prevention and Control is promoted in all healthcare settings to implement and maintain appropriate infection prevention and control standards that protect workers.

8. There are effective working relationships between the healthcare setting and local Public Health. Clear lines of communication are maintained and Public Health is contacted for information and advice as required and the obligations (under the *Public Health Act*, SBC. 2008, section 73)[xv] to report reportable and communicable diseases are fulfilled. Public Health provides regular aggregate reports of outbreaks of any infectious diseases in facilities and/or in the community to healthcare settings.

9. Infection prevention and control guidance is required for staff support in the decision making process.

10. There are established procedures for receiving and responding appropriately to all international, national, regional and local health advisories in all healthcare settings. Health advisories are communicated promptly to all staff responsible for infection control and regular updates are provided.

11. Where applicable, there is a process for evaluating PPE in the healthcare setting, to ensure it meets quality standards.

12. There is regular assessment of the effectiveness of the hand hygiene program and its impact on practices in the healthcare setting. The information is used to further refine the program.[xvi]

13. The BC Ministry of Health's Home and Community Care requirements shall be met. Specific legislative requirements for long-term care providers shall be found in:

- The *Community Care and Assisted Living Act,*[xvii] available at: http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/00_02075_01
- The *Residential Care Regulation*,[xviii] RSBC 2009, Regulation, available at: http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/96_2009
- The *Continuing Care Act*, [xix] RSBC 1996, available at: http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/00_96070_01
- The *Hospital Act Regulation*, [xx] 2008, available at: http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/10_121_97
- The *Hospital Insurance Act*, [xxi] RSBC 1996, available at: http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/00_96204_01

Note: The *Public Health Act* and *Mental Health Act* apply as referenced in the He*alth Authorities Act*.

All residential care facilities are either licensed under the *Community Care and Assisted Living Act*,[xxii] or licensed or designated under the *Hospital Act*, and are subject to regular inspection and monitoring under these Acts. Many facilities are also voluntarily accredited through the Canadian Council on Health Services Accreditation.

The Assisted Living Registrar under the *Community Care and Assisted Living Act* [xxiii] has a mandate to protect the health and safety of assisted living residents. The Registrar administers the assisted living provisions of the Act, which require assisted living operators to register their residences and meet provincial health and safety standards. Information on the Assisted Living Registrar is available at: http://www.health.gov.bc.ca/assisted/mandate.html

In addition, all health authorities have operating agreements with their affiliate residential care operators and have established performance management frameworks within the agreements that include performance indicators against which to measure facility performance.

All long-term care providers shall also comply with all requirements outlined in the Ministry's Home and Community Care Policy Manual.[xxiv] The Home and Community Care Policy Manual[xxv] outlines the Ministry's requirements for the provision of long-term care services, programs and supplies for health authorities. There is also a range of legislation and regulation which address facility operator requirements such as environment services (waste management; pest control; housekeeping services; laundry services and; maintenance services) and risk management (infection control; health and safety; internal and external disaster planning and; monitoring, evaluating and improving quality). This legislative framework includes the Public Health Act[xxvi] and Residential Care Regulations. [xxvii]

In regard to the legislative requirements for staff education in long-term care facilities, health authorities establish their own policies for orientation of staff, and mandatory education programs are established by professional licensing bodies. Health authorities should also require their staff to participate in regular education (orientation and continuing education) programs.

As such, there is a range of legislative and regulatory requirements that an operator of a facility should comply with and Licensing Officers, who are delegated by the BC Medical Health Officer are responsible for ensuring that facilities meet the requirements of the Community Care and Assisted Living Act[xxviii] as well as all applicable regulations.

- The Home and Community Care Policy Manual is available at: http://www.health.gov.bc.ca/hcc/policy-manual.html

For more information, please contact your respective health authority. Contact information for each health authority is available at: http://www.health.gov.bc.ca/socsec/index.html.

14. Occupational Health and Safety requirements shall be met:

    Healthcare facilities are required to comply with applicable provisions of the *Workers Compensation Act, RSBC 1996,* and Occupational Health and Safety Regulations.[xxix] Employers, supervisors and workers have rights, duties and obligations under the *Workers Compensation Act*. Specific requirements under the *Workers Compensation Act* are available at:
    http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/96492_00.

    The *Workers Compensation Act* places duties on many different categories of individuals associated with workplaces, such as employers, contractors, supervisors, owners, suppliers, licensees, officers of a corporation and workers. Additional information regarding the requirements and regulations under the *Workers Compensation Act* are available at:
    http://www2.worksafebc.com/Publications/OHSRegulation/WorkersCompensationAct.asp.

    Specific health and safety requirements for residential facilities shall be found in the *Residential Care Regulation*, RSBC 2009, Regulation, available at:
    http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/96_2009

In addition, the Workers Compensation Act[xxx] section 115 the 'general duty clause', requires an employer to take every precaution reasonable in the circumstances for the protection of a worker. 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 shall include, but are not limited to, the following:

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

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

- A worker who is required by his or her employer or by the *Community Care and Assisted Living Act* (CCALA) 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. Training should also be provided at regular intervals following initial orientation. 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 *Workers Compensation Act*, a worker should work in compliance with the Act and its regulations, and use or wear any equipment, protective devices or clothing required by the employer.

For more information, please contact your local WorkSafeBC office. A list of local regional WorkSafeBC offices is available at http://www.worksafebc.com/contact_us

BEST PRACTICES FOR HAND HYGIENE IN ALL HEALTHCARE SETTINGS

TERMS USED IN THIS DOCUMENT:

Healthcare Provider: Any person working in the healthcare system. 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, environmental and food service workers, facility maintenance workers, contracted providers and home healthcare providers. In some settings, volunteers might provide care and would be included as a healthcare provider.

Patient: Any patient, client or resident receiving care within a healthcare setting.

1. Background

Hand hygiene is one of the five key initiatives set out by the World Alliance for Patient Safety's Global Patient Safety Challenge. The World Health Organization (WHO) states: "*The goal of Clean Care is Safer Care is to ensure that infection control is acknowledged universally as a solid and essential basis towards patient safety and supports the reduction of healthcare-associated infections and their consequences"*.

- For more information about *Clean Care is Safer Care*, visit: http://www.who.int/gpsc/en/

In BC, hand hygiene is one of the priority areas for the Ministry's clinical care management initiative. Accreditation Canada also includes hand hygiene as a Required Organizational Practice (ROP). These best practice guidelines for hand hygiene have been developed in accordance with recommendations made by the Office of the Auditor General of BC in 2010[1]. Used in conjunction with the provincial hand hygiene policy and compliance auditing, these guidelines support ongoing quality improvement and patient safety in BC.

The hands of healthcare providers are the most common vehicle for the transmission of microorganisms from patient to patient, from patient to equipment and the environment, and from equipment and the environment to the patient. During the delivery of healthcare, the healthcare provider's hands continuously touch surfaces and substances including inanimate objects, patient's intact or non-intact skin, mucous membranes, food, waste, body fluids and the healthcare provider's own body. The total number of hand exposures in a healthcare 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 healthcare environment within a few hours.[xxxi]

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

[1] Office of the Auditor General of British Columbia. Hand Hygiene Self Assessments. December 2010. Available from: http://www.bcauditor.com/pubs/2010/report9/summary-report-results-completed-projects

2. Evidence for Hand Hygiene

"Adherence to hand hygiene recommendations is the single most important practice for preventing the transmission of microorganisms in healthcare and directly contributes to patient safety."

[Public Health Agency of Canada]

Healthcare-associated infections (HAIs) occur worldwide and affect 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.[xxxii] In residential care and assisted living, both endemic and epidemic infections are common occurrences. [xxxiii,xxxiv]

HAIs remain a patient safety issue and represent significant adverse outcomes in the healthcare system. [xxxv, xxxvi] In Canada, it has been estimated that 220,000 incidents of HAI occur each year, resulting in more than 8,000 deaths.[xxxvii]

Hand hygiene is the responsibility of <u>all</u> individuals involved in healthcare.

Hand hygiene is considered the most important and effective infection prevention and control measure to prevent the spread of HAIs. Despite this, compliance with hand hygiene protocols by healthcare providers has been, and continues to be, unacceptably low at 20% to 50%.[xxxviii, xxxix , xl] It has been shown that a facility-wide, multifaceted hand hygiene program, which includes administrative leadership, sanction, support and incentives, can be effective in reducing the incidence of HAIs (Table 1).[xli, xlii, xliii]

Table 1: Association between Improved Adherence with Hand Hygiene Practice and HAI Rates

Year	Authors	Hospital Setting	Significant Results	Duration of follow-up	Reference
2009	Herud et al.	Hospital-wide	Demonstrated an inverse association between use of hand hygiene products and rates of infection	8 years	33
2008	Grayson et al.	Hospital-wide	Significant reduction in MRSA bacteraemia following implementation of a multimodal hand hygiene program	2 years	32
2007	Pessoa-Silva et al.	NICU	Reduction in HAI rates, particularly in very low birth weight neonates, associated with promotion of hand hygiene	27 months	31
2005	Johnson et al.	Hospital-wide	Significant reduction in MRSA bacteraemia following implementation of a multifaceted hand hygiene program	3 years	30
2005	Zerr et al.	Hospital-wide	Significant reduction in hospital-acquired rotavirus infections associated with institution of a hand hygiene program that included monitoring and observation	4 years	29

2005	Rosenthal et al.	Adult ICU	Reduction in HAI rates following implementation of a hand hygiene program that included focused education and performance feedback	21 months	28
2004	MacDonald et al.	Hospital-wide	Significant reduction in hospital-acquired MRSA cases following introduction of hand hygiene observation of healthcare providers with feedback of results	1 year	25
2004	Swoboda et al.	Adult intermediate care unit	Improvement in HAI rates associated with improved hand hygiene compliance	2.5 months	26
2004	Won et al.	NICU	Improved hand washing compliance associated with significant reduction in HAI rates in the NICU	2 years	27
Year	**Authors**	**Hospital Setting**	**Significant Results**	**Duration of follow-up**	**Reference**
2003	Hilburn et al.	Orthopaedic Surgical Unit	Decrease in urinary tract infection rates when ABHR introduced	10 months	19
2000	Pittet et al.	Hospital-wide	Significant reduction in the annual overall prevalence of HAIs and MRSA rates. Active surveillance cultures and contact precautions were implemented during the same time period	8 years	18
2000	Larson et al.	NICU	Significant relative reduction of VRE rate in the intervention hospital	8 months	24

HAI = healthcare-associated infection
ICU = intensive care unit
NICU = neonatal ICU
MRSA = methicillin-resistant *Staphylococcus aureus*
VRE = vancomycin-resistant enterococci

Adapted from the World Health Organization: '*WHO Guidelines on Hand Hygiene in Healthcare, May 2009'* [Table 1.22.1][xliv]

A multifaceted, multidisciplinary hand hygiene program that incorporates the following elements should be implemented in all healthcare settings[xlv, xlvi, xlvii]:

A multifaceted, multidisciplinary hand hygiene program should be implemented in all healthcare settings.

a) assessment of staff readiness and cultural influences in order to effectively implement a hand hygiene program;
b) a written policy regarding hand hygiene;
c) easy access to hand hygiene agents at point-of-care;
d) 70 to 90% alcohol-based hand rub (ABHR) is preferred and should be provided in the healthcare setting; for more information about alcohol concentration, see Section 5, "*Alcohol-based Hand Rub*";
e) education that includes indications for hand hygiene, hand hygiene techniques, indications for hand hygiene agents and hand care;
f) education in the appropriate selection, limitations and use of gloves;
g) access to free-standing hand washing sinks dedicated to hand hygiene and used for no other purpose;
h) a hand care program; and

i) a program to monitor, evaluate and improve hand hygiene compliance, with feedback to individual employees, managers, health authority senior leaders and the Medical Advisory Committee.

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.[xlviii, xlix] An effective hand hygiene program supports sustained improvement in compliance with hand hygiene among healthcare providers and can significantly reduce HAI rates[l, li] and associated rates of patient morbidity and mortality.[lii, liii,liv, lv, lvi]

3. What is Hand Hygiene?

Hand hygiene is a general term referring to any action of hand cleaning.[lvii] Hand hygiene relates to the removal of visible soil and removal or killing of transient microorganisms from the hands while maintaining the good skin integrity resulting from a hand care program. Hand hygiene includes surgical hand preparation.

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

Effective hand hygiene kills or removes transient microorganisms on the skin and maintains good hand health. 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 healthcare settings takes less time than traditional hand washing[lviii] 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 [lix, lx, lxi, lxii, lxiii, lxiv, lxv]; and

b) **hand washing with soap and running water must be performed when hands are visibly soiled**.[lxvi, lxvii, lxviii] 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 microorganisms 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 ABHR.

Alcohol-Based Hand Rub vs. Soap and Water

Alcohol-based hand rub (ABHR):

- preferred when hands are not visibly soiled
- should contain 70 – 90% alcohol
- takes less time than hand washing
- more effective than hand washing with soap and water when hands are not visibly soiled
- mechanical rubbing action is important to kill transient microorganisms
- less drying to hands than soap and water

Hand washing with soap and running water:

- preferred when hands are visibly soiled because alcohol is inhibited by organic matter
- mechanical action of washing, rinsing and drying removes most transient microorganisms

BEST PRACTICES FOR HAND HYGIENE

1. The Hand Hygiene Program

There have been many approaches to improving hand hygiene compliance in healthcare settings, but the introduction of a multifaceted, multidisciplinary strategy is the most effective.[lxix] See Figure 1 for the components of a multifaceted hand hygiene program. Key elements include[lxx]:

a) staff education and motivation programs;
b) adoption of ABHR at point of care;
c) use of performance indicators; and
d) strong commitment by all stakeholders including frontline staff, managers and healthcare leaders, to add hand hygiene as an essential component of patient and staff safety.[lxxi]

It is imperative that the enablers and barriers to an effective hand hygiene program are assessed and addressed in order to support the healthcare provider and promote compliance. These include the selection of user-friendly hand hygiene products, providing ABHR 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. [lxxii]

An integral part of an effective hand hygiene program is the promotion of hand hygiene by champions and role models[lxxiii, lxxiv] within the healthcare setting. By being role models for best practices, these champions will promote hand hygiene as a shared responsibility.

A multidisciplinary group within the healthcare setting may facilitate adherence to best practices and provide leadership and decision-making. [lxxv] 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;
- facility services/maintenance representative;
- hand hygiene program champions;
- product purchasing representative;
- quality improvement/change management representative;
- public relations/communications representative; and a
- patient representative.

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



FIGURE 1: Components of a Multifaceted Hand Hygiene Program

Recommendation:

1. ***A multidisciplinary, multifaceted hand hygiene program should be developed and implemented in all healthcare settings, [BI] including hand hygiene agents that are available at point-of-care in all healthcare settings. [AI] In healthcare facilities the hand hygiene program should 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 healthcare providers about when and how to clean their hands;***
    - ***d) ongoing monitoring and observation of hand hygiene practices, with feedback to healthcare providers;***
    - ***e) patient engagement; and***
    - ***f) opinion leaders and champions modelling the right behaviour.***

2. Hand Hygiene Policies and Procedures

For each healthcare setting, a written hand hygiene policy and procedure should be developed that includes the following:

a) indications for hand hygiene;
b) how to perform hand hygiene;
c) selection of products used for hand hygiene;
d) appropriate placement of hand hygiene products;
e) management of product dispensing containers;
f) hand care program;
g) use of ABHR as the preferred method of hand hygiene; and
h) hand hygiene compliance and feedback.

- For more information please refer to the Ministry's Hand Hygiene Policy Communiqué (2012-04) available at:

  http://www.health.gov.bc.ca/library/publications/year/2012/handhygiene-policy-communique.pdf

- Additional resources and tools for hand hygiene are available online at:

  http://www.bcpsqc.ca/quality/handhygiene-resources.html

  http://www.picnet.ca/education-training/64/hand-hygiene-resources

Recommendation:

2. Each healthcare setting should have written hand hygiene policies and procedures.[BIII]

3. Indications for Hand Hygiene during Healthcare Activities

A **hand hygiene indication** points to the reason 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 are:

a) before initial contact with a patient or items in their environment; this should be done on entry to the room or bed space, even if the patient has not been touched;
b) before putting on gloves;
c) before preparing, handling or serving food or medications to a patient;
d) after care involving contact with blood, body fluids, secretions and excretions of a patient, even if gloves are worn;
e) immediately after removing gloves and before moving to another activity;
f) when moving from a contaminated body site to a clean body site during healthcare;
g) after contact with a patient or items in their immediate surroundings when leaving, even if the patient has not been touched; and
h) whenever in doubt.[lxxvi , lxxvii, lxxviii]

The essential indications for hand hygiene can be simplified into **before and after** for training purposes.[lxxix] 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 healthcare activities.

- For more information about hand hygiene moments refer to Appendix E, "Hand Hygiene Before and After".

When to Perform Hand Hygiene in Healthcare

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

Patient Hand Hygiene

Personal hand hygiene for patients is also important and is often overlooked. ABHR should be readily available to patients and visitors to reduce the risks of environmental contamination with respiratory viruses[lxxx], gastrointestinal viruses and antibiotic-resistant organisms (AROs). Patients should be encouraged or assisted to perform hand hygiene after toileting, before leaving their room and prior to eating.[lxxxi]

Recommendations:

3. ***Hand hygiene should be performed:***
   a) ***BEFORE initial contact with each patient or items in their environment; [BI]***
   b) ***BEFORE performing an invasive/aseptic procedure; [BI]***
   c) ***AFTER care involving risk of exposure to, or contact with, body fluids; [AI] and***
   d) ***AFTER contact with a patient or their environment.***
4. ***Provide hand hygiene facilities for patients and visitors in all healthcare settings. Encourage and assist patients to perform hand hygiene upon arrival, before eating and before leaving their room or clinic area. [BIII]***

4. Hand Care and Hand/Wrist Adornments

The condition of the hands and the presence of hand/wrist adornments can influence the effectiveness of hand hygiene.

A. Condition of the Hands

Intact skin is the body's first line of defence against infection; 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.

It is estimated that approximately 30% of healthcare providers report symptoms or signs of dermatitis involving their hands,[lxxxii] and as many as 85% give a history of having skin problems.[lxxxiii] 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 healthcare provider and patients.

Occupational hand dermatitis is mostly caused by hand washing and work where skin is occluded by wearing gloves.[lxxxiv] ABHRs have been shown to be less irritating to skin than soap and water,[lxxxv, lxxxvi, lxxxvii, lxxxviii] 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.[lxxxix] Allergic contact dermatitis associated with ABHRs is uncommon. Staff education relating to the benefits of ABHR will help to alleviate anxiety and promote their use.[xc]

Barrier Creams

The use of barrier creams is not recommended. Inappropriate barrier cream application may exacerbate irritation rather than provide benefit.[xci] 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.[xcii] 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.[xciii]

Hand Care Programs

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

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

a) staff education on the benefits of using ABHRs and appropriate hand hygiene technique;
b) referring individuals to Occupational Health for assessment if skin integrity is an issue;
c) 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[xciv, xcv];
d) providing an ABHR product that contains an emollient, which can significantly decrease irritant contact dermatitis under frequent-use conditions[xcvi]; and
e) staff input for product selection.

B. Nails

Long nails are difficult to clean, can pierce gloves[xcvii] and harbour more microorganisms than short nails.[xcviii] Keep natural nails clean and short.[xcix] The nail should not show past the end of the finger.[c]

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.[ci, cii, ciii,civ,cv,cvi] Nail polish should not be worn by those having direct contact with a patient

D. Artificial Nails or Nail Enhancements

Artificial nails and nail enhancements should not be worn by those having direct contact with a patient.

Acrylic nails harbour more microorganisms and are more difficult to clean than natural nails.[cvii]

Artificial nails and nail enhancements have been implicated in the transfer of microorganisms such as *Pseudomonas* species,[cviii,cix] *Klebsiella pneumoniae*[cx] and yeast[cxi]; and in outbreaks, particularly in neonatal nurseries[cxii, cxiii] and other critical care areas.[cxiv, cxv, cxvi, cxvii, cxviii, cxix, cxx, cxxi, cxxii] Surgical site infections[cxxiii, cxxiv] and hemodialysis-related bacteremias[cxxv] have been linked to artificial nails. Artificial nails and nail enhancements are also associated with poor hand hygiene practices and result in more tears to gloves.[cxxvi]

E. Rings, Hand Jewellery, Bracelets and Wrist Watches

Rings, hand jewellery, bracelets and wrist watches should not be worn when performing hand hygiene.

Impediments to effective hand hygiene include:

a) jewellery, which hides bacteria and viruses from the action of the hand hygiene agent[cxxvii, cxxviii, cxxix, cxxx, cxxxi, cxxxii];
b) rings, which increase the number of microorganisms present on hands[cxxxiii, cxxxiv, cxxxv, cxxxvi, cxxxvii,cxxxviii] and that may increase the risk of tears in gloves[cxxxix]; and
c) eczema, which often starts under a ring as irritants may be trapped under the ring causing irritation.[cxl]

F. Other Impediments to Effective Hand Hygiene

There is no evidence that hand contamination is reduced with a 'bare below the elbows' policy[cxli, cxlii]. However, long sleeves or jewellery can interfere with or become wet when performing hand hygiene. As such, bare below the elbows is *strongly recommended*[2] to ensure optimal hand hygiene. Bare below the elbows means that shirt sleeves should be short or rolled up, no wrist watches or hand jewellery worn, and short clean nails (no polish, or acrylic nails).

[2] This recommendation reflects input from BC's Clinical Care Management Steering Committee and is unique to the evidence-based approach adopted throughout this best practice document.

Upper extremity support devices such as casts and splints, or complex bandages, etc. on hands and forearms of HCWs may impede effective hand hygiene. HCW's who wear such devices should be assessed by occupational health in collaboration with infection prevention and control to investigate whether they:

a) are able to perform adequate hand hygiene;
b) can continue to provide direct patient care; or
c) require an alternate work placement.

Recommendations:

4. ***Healthcare providers should strive to maintain hand skin integrity to enable effective hand hygiene. [BI]***
5. ***In all healthcare settings, a hand care program should be implemented that includes staff education, staff input into product selection, and skin assessment for skin integrity issues. [BI]***
6. ***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. [AI]***
7. ***Refer individuals to Occupational Health if skin integrity is an issue. [BIII]***
8. ***To enable effective hand hygiene bare below the elbows is strongly recommended:***
   a) ***nails should be kept clean and short; [BII]***
   b) ***artificial nails or nail enhancements should not be worn; [AI]***
   c) ***nail polish should not be worn; [CI] and***
   d) ***rings and wrist jewellery, including watches should not be worn when performing hand hygiene [BII]***

5. Hand Hygiene Products

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

a) efficacy of the product;
b) staff input into product choice regarding feel and skin tolerance;
c) low irritancy potential, particularly when these products are used multiple times per shift;
d) ABHR that contains emollients;
e) information from manufacturers regarding interactions between hand products (lotions, creams, soap, ABHR) and between hand hygiene products and gloves.;
f) making manufacturer product information available to staff;
g) evaluating the dispenser system of product manufacturers to ensure that dispensers function adequately and deliver an appropriate volume of product; and
h) selecting paper towels that are non-irritating and dispensers where the paper towel can be accessed without touching the dispenser with the hands.[cxliii,cxliv]

A. Alcohol-Based Hand Rub (ABHR)

ABHRs are the first choice for hand hygiene when hands are not visibly soiled. [cxlv,cxlvi] ABHRs are less time-consuming to use than washing with soap and water. [cxlvii, cxlviii, cxlix, cl]

ABHR is the preferred method for decontaminating hands, when hands are not visibly soiled.

Using ABHR is more effective than washing hands (even with an antimicrobial soap) when hands are not visibly soiled.

When visible soil is present and running water is not immediately available, use moistened towelettes followed by ABHR.

There is insufficient evidence to suggest that the use of towelettes containing alcohol may be used as a substitute for ABHR for hand antisepsis in healthcare settings.

For maximum compliance, ABHRs should be available at point-of-care.

For maximum compliance and use, healthcare providers should perform hand hygiene at the appropriate moment of care.[cli] ABHRs should be located at point-of-care,[clii, cliii, cliv, clv] i.e., the place where three elements occur together: the patient, the healthcare provider and care or treatment involving patient contact. Point-of-care products should be accessible without leaving the patient.

1. Efficacy of ABHR

The efficacy of the ABHR depends on the quality of the product, the amount of product used, the time spent rubbing and the hand surface rubbed.[clvi] ABHR should not be used with water, as water will dilute the alcohol and reduce its effectiveness. ABHR should not be used immediately after hand washing with soap and water as it may result in more irritation of the hands.[clvii, clviii]

Alcohols provide for a rapid kill of most transient microorganisms due to their ability to denature proteins.[clix, clx, clxi] The most common types of alcohols used for hand hygiene include ethanol, isopropanol or combinations of these. The antimicrobial action of ethanol and isopropanol are similar, however ethanol has greater activity against viruses than isopropanol.[clxii] Ethanol is the primary agent used in North America; isopropanol is the primary agent used in Europe.

ABHRs available for healthcare 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. Norovirus and other non-enveloped viruses (e.g., rotavirus, enterovirus) are a frequent cause of gastroenteritis outbreaks in healthcare facilities. Studies[clxiii, clxiv] suggest that norovirus is inactivated by alcohol concentrations ranging from 70% to 90%. Since norovirus is a concern in all healthcare settings, this should be taken into consideration when choosing an ABHR product. **A minimum concentration of 70% alcohol should be chosen.**

2. ABHR Formulations and Product Selection

ABHR products being considered for purchase shall have a Drug Identification Number (DIN) 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://www.hc-sc.gc.ca/dhp-mps/prodpharma/databasdon/index-eng.php.

The choice of the ABHR will depend on a number of factors (e.g., efficacy, safety, environmental concerns). Before selecting a product[clxv]:

a) form a point-of-care assessment team. This team should include representation from the hand hygiene committee, front-line healthcare providers and content experts;
b) review efficacy according to the published literature;
c) verify local fire regulations regarding choice of ABHR (see Section 8.C);
d) conduct a local risk assessment related to placement of ABHR dispensers; (see Section 8.C); and
e) identify locations which will provide the best access to ABHR at point-of-care as well as workflow patterns (see Section 8.C).

ABHR's with antimicrobial agents (i.e. surgical hand rub) are not recommended for use at point of care). See Section 5.C for more information regarding surgical hand preparation.

B. Hand Washing Soaps

The physical actions of washing with soap and water and rinsing are important for effective removal of material from the hands. It has been shown that at least 15 seconds of lathering with soap is required to remove transient flora.

1. Efficacy of Soaps

Plain soaps act on hands by emulsifying dirt and organic substances (e.g., blood, mucous), which are then flushed away with rinsing. Antimicrobial agents in plain soaps are only present as a preservative.

Antimicrobial soaps have residual antimicrobial activity and are not deactivated by the presence of organic material. Studies have shown that antimicrobial soap is more effective than plain soap and water[clxvi, clxvii, clxviii, clxix, clxx] in critical care settings such as intensive care units and burn units. Antimicrobial soap may be considered for use in critical care areas but is not required and not recommended in other care areas.

2. Soap Formulations and Product Selection

Liquid products should be dispensed in a disposable pump/cartridge that are discarded when empty. Dispenser should never be "topped-up" or refilled.[clxxi]

Bar soaps for hand hygiene should not be used in healthcare facilities except for personal use by a single patient. In this case, the soap should be supplied in small pieces that are single-patient use, and the bar should be stored in a soap rack to allow drainage and drying. It should be discarded on patient discharge.[clxxii]

C. Surgical Hand Preparation

For more information regarding surgical hand preparation please consult the Operating Room Nurses Association of Canada, '*Standards, Guidelines and Position Statements for Perioperative Registered Nursing Practice*', 9th Edition.[clxxiii]

D. Non-alcohol-based Waterless Antiseptic Agents

In all healthcare settings, non-alcohol based waterless anti-septic agents should not be used for hand hygiene. At the present time, there is insufficient evidence for the efficacy of non-alcohol based, waterless antiseptic agents in the healthcare environment. Most non-alcohol based products have a quaternary ammonium compound (QAC) as the active ingredient, which has not been shown to be as effective against most microorganisms as ABHR or soap and water.[clxxiv] QACs are prone to contamination by Gram-negative organisms.[clxxv, clxxvi] QACs are also associated with an increase in skin irritancy.[clxxvii, clxxviii]

Recommendations:

10. ***Use 70 to 90% alcohol-based hand rub for hand hygiene in all healthcare settings. [BI]***
11. ***Wash hands with soap and water if there is visible soiling with dirt, blood, body fluids or other body substances. [AI]***
12. ***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. [AII]***
13. ***In all healthcare settings, provide hand hygiene products at point-of-care for use by staff and patients. [BI]***
14. ***All hand hygiene and hand care products should be dispensed in a dispenser that delivers an appropriate volume of the product. [AII]***
15. ***Single-use product dispensers are preferred and should be discarded when empty; containers should not be "topped-up". [AI]***
16. ***Bar soap for hand hygiene is not acceptable in healthcare settings except for individual patient use. [DII]***
17. ***Non-alcoholic, waterless antiseptic agents should NOT be used as hand hygiene agents in any healthcare setting. [DII]***
18. ***User acceptability should be a factor in hand hygiene product selection. [BI]***
19. ***Hand hygiene and hand care products with low irritant potential should be chosen. [BI]***
20. ***Hand hygiene products should not interfere with glove integrity or with the action of other hand hygiene or hand care products. [AII]***

6. Techniques for Performing Hand Hygiene

A. Technique for Using an ABHR

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 wrist jewellery; long sleeves or jewellery should not interfere with, or become wet when performing, hand hygiene.
c) apply one to two full pumps of product onto one palm; the volume should be such that 15 seconds of rubbing is required for drying;
d) spread product over all surfaces of hands[clxxix]; frequently missed areas are finger tips, between fingers, backs of hands and base of the thumbs; and
e) continue rubbing hands until product is dry[clxxx, clxxxi]; this will take a minimum of 15 seconds if sufficient product is used.

Hands should be fully dry before touching the patient or the care environment/equipment for the ABHR to be effective.[clxxxii]

B. 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 wrist jewellery; long sleeves or jewellery should not interfere with, or become wet when performing, hand hygiene;[clxxxiii]
b) wet hands with warm (not hot or cold) running water;
c) apply liquid or foam soap;
d) lather soap covering all surfaces of hands for a minimum of 15 seconds;[clxxxiv] frequently missed areas are finger tips, between fingers, backs of hands and base of the thumbs;
e) thoroughly rinse soap from hands using running water;
f) dry hands thoroughly with a paper towel; and
g) turn off taps with paper towel, to avoid recontamination of the hands.[clxxxv, clxxxvi]

Recommendations:

21. ***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). [BI]***
22. ***When using soap and water, a minimum of 15 seconds of lathering is required before rinsing. [BI]***
23. ***Dry hands using a method that does not re-contaminate the hands. [BI]***
24. ***Do not use alcohol-based hand rub immediately after washing hands with soap and water. [AII]***
25. ***Perform surgical hand preparation using either a surgical hand rub or surgical hand scrub that ensures sustained antimicrobial activity, before donning sterile gloves. [BI]***

26. When performing surgical hand preparation using a surgical hand scrub, 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. [BI]

7. Considerations with Gloves

The use of gloves does not replace the need for hand hygiene. Several studies provide evidence that wearing gloves can help reduce transmission of pathogens in healthcare settings.[clxxxvii,clxxxviii] However, gloves do not provide complete protection against hand contamination.[clxxxix, cxc]

The barrier integrity of gloves varies on the basis of type and quality of glove material, intensity of use, length of time used and, manufacturer. Gloves may be adversely affected by petroleum-based hand lotions or creams.[cxci]

It is preferable to provide more than one type of glove to healthcare providers, because it allows the individual to select the type that best suits their care activities.[cxcii, cxciii]

Gloves are not completely free of leaks and tears/punctures can occur. Hands should be cleaned before donning gloves and after glove removal. Gloves should be removed immediately and discarded after the activity for which they were used and before exiting the environment of a patient. Disposable gloves should not be washed or re-used. Gloves should never be re-worn between patients.

To reduce hand irritation related to gloves:

a) wear gloves for as short a time as possible[cxciv];
b) clean and dry hands before donning gloves[cxcv] and after glove removal; and
c) wear gloves that are 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.tpsgc-pwgsc.gc.ca/ongc-cgsb/programme-program/certification/prog/medical-eng.html

- Detailed information about the indications and appropriate use of gloves are included in PHAC'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]),[cxcvi] available at: http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/99vol25/25s4/index.html

Recommendations:

27. Gloves should not be used in place of proper hand hygiene. [BI]

28. Hand hygiene should be performed before donning gloves and after glove removal.

29. Dry hands completely before donning gloves.

30. The same pair of gloves should not be used for the care of more than one patient. [BI]

31. Gloves should be removed immediately and discarded after the activity for which they were used. [AII]

32. ***Gloves should be changed or removed when moving from a contaminated body site to a clean body site within the same patient. [AII]***
33. ***Gloves should be changed or removed after touching a contaminated environmental surface. [AII]***
34. ***Disposable gloves should not be washed or re-used. [BI]***

8. Hand Hygiene-related Requirements for Health Facility Planning, Design, and Construction

Hand hygiene facilities should be readily available in all clinical areas.[cxcvii] Hand washing facilities which are not immediately accessible are one of the main reasons that healthcare providers do not comply with hand hygiene protocols.[cxcviii] Studies offer convincing and important evidence that providing a conveniently located hand hygiene sink in each patient room reduces HAIs rates.[cxcix] See Table 2 for a summary of hand washing sink indications and placement criteria, to be used in renovations or new construction.

CSA Z8000, *Canadian Health Care Facilities – Planning, Design and Construction*[cc] provides requirements for the planning, design, and construction of Canadian health care facilities, and is intended for use by all facilities in Canada which provide health care services.

New healthcare facility construction and renovation projects in B.C.:

- will follow all “shall” statements in this document
- attempt to comply with all “should” statements in this document

All existing British Columbia health care facilities shall complete an Infrastructure Audit[3] every 2 years to identify specific physical spaces that are non-compliant with Section 8 guidelines and requirements. The audit will identify:

- the specific guideline/requirement
- reason for non-compliance
- a corrective action plan

A. Hand Washing Sinks

There should be sufficient sinks to encourage and assist staff to readily conform to hand hygiene protocols.[cci] A sink with warm running water shall be available for hand washing in all clinical areas, separate from and in addition to any sinks used in patient washrooms or in the preparation of clinical samples. Nearby surfaces should be nonporous to resist fungal growth[ccii] and should be protected from splashes with impermeable back/side splashguards. Hand washing sinks should be cleaned on a regular basis. Hand washing sinks should be regularly inspected to ensure they are maintained in good condition. Paper towels and liquid soap shall be provided at each hand washing sink. A current hand washing guide should be posted at each hand washing sink in order to promote correct washing methods.

All hand hygiene facilities shall be developed in consultation with infection prevention and control personnel, and shall be consistent with all relevant risk assessments. The healthcare facility design shall specify:

[3] From Office of the Auditor General of British Columbia audit criteria for the evaluation of Hand Hygiene Programs.

a) the placement of hand hygiene sinks or stations within the facility, including their location in relation to other fixtures, and;
b) the design of such sinks or stations[cciii]

Improper sink placement and design can add to the environmental reservoir of contaminants and can lead to outbreaks, particularly with gram-negative bacilli (e.g., *Pseudomonas spp*.).[cciv] Sinks need to be convenient and accessible and, where possible, follow established criteria regarding placement and design:

Placement Criteria

Accessible sinks:

a) Wheelchair-accessible hand hygiene sinks shall be provided in addition to the hand hygiene sinks used by staff.
b) Hand hygiene sinks should be in accordance with ASME A112.19.2/ CSA B45.1; wheelchair-accessible hand hygiene sinks should be wall-mounted, 510 mm long by 685 mm wide, and comprised of slab-type vitreous china with combination-set faucets and gooseneck spouts. Drains shall be open, free of strainers, and connected to 32 mm cast brass adjustable P-traps with tailpieces.[ccv]
c) Sinks should be located in such a way and at sufficient distance that they do not contaminate clients/patients/residents, clean supplies or adjacent counters through splashing.[ccvi]

Sink use:

a) Hand hygiene sinks shall not be dedicated to any other purpose.[ccvii]
b) Sinks used for cleaning equipment or disposing of any waste fluids of any sort shall not be used for hand hygiene.[ccviii]

Design Criteria

The design and installation of hand hygiene sinks shall be in compliance with the accepted standard, CSA Z8000* Canadian health care facilities – planning, design and construction. *These criteria are summarized as follows:

Construction and Installation:

a) Hand hygiene sinks shall be constructed of a non-porous material such as porcelain, enamel, vitreous china, or 18+ gauge stainless steel.
b) Granite and marble are not acceptable materials for hand hygiene sinks.
c) Traps shall be metal, and gaskets shall be plastic or neoprene only.
d) Traps shall be 40 mm diameter.
e) Overflows shall not be used, as the difficulty of sanitizing them presents an unacceptable contamination risk.
f) Flow rate shall be maintained at a level adequate to ensure the removal of soap residue.
g) Cup and bar sinks are not appropriate as hand hygiene sinks. Hand hygiene sinks shall be designed with rims of minimal width, and with surfaces angled down towards the inside, in order to prevent both water building and the placement of objects on sink rims.
h) The design of hand washing sinks (e.g., depth, position of drain) should prevent splash back that may contaminate hands or faucets. The minimum depth recommended by the CHICA-Canada Healthcare Facility Design Position Statement is 225 mm. The minimum inside dimensions should be 350 by 250 mm.[ccix]
i) Backsplashes must extend a minimum 0.6 metres/two feet above sink level and a minimum of 25 cm./10 inches below sink level.

j) 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.
k) Sinks and spouts shall be designed in order to minimize splashing and/or aerosolization. For example, spouts shall not direct water directly into drains, but to the basin surfaces in front of those drains. Collars shall be placed such that runoff is directed into sink basins.
l) Spouts shall be free of aerators\modulators\rose sprays and shall not swivel
m) Sinks shall not be capable of taking plugs.
n) Strainers and anti-splash-fittings present an unacceptable contamination risk and shall not be used.
o) Controls (faucets) should be operated by foot, elbow or knee. Electric eye operation is acceptable.
p) Temperature control shall not be automatic. A means to control the temperature of the sink manually shall be provided.
q) Any electric eye controls shall be designed with alternate modes of use in case of power interruptions.[ccx]

The location and design of hand hygiene facilities shall be developed in consultation with infection prevention and control personnel and shall be consistent with the infection control risk assessment.

The health care facility design shall specify:
a) the location of waterless hand hygiene stations;
b) hand hygiene sink design; and
c) the room location of hand hygiene sinks in the healthcare facility, and the placement of the sink(s) within each room location and in relation to counters and other related fixtures.
d) that sinks shall be wall-mounted, and separated by a splash barrier from any fixed work surface which exists within one meter of the sink. There shall be no storage underneath hygiene stations.[ccxi]
e) that functional design shall not cause any impediments, at any time, to sink access.

Table 2: Indications for, and Placement of, Hand Washing Sinks in Healthcare Facilities

Indication and Sink Placement – There shall be:	Reference
One hand washing sink inside every inpatient bedroom, adjacent to the exit. (Sinks in patient washrooms do not meet this requirement.)	CSA Z8000: 7.5.11.2.1
One sink inside every location that is meant to accommodate only one patient at any given time.	CSA Z8000: 7.5.11.2.1
A minimum of one sink per three patients inside every location that is meant to accommodate more than one patient at any given time, with a maximum distance of six meters between any patient station and the nearest sink.	CSA Z8000: 7.5.11.2.1
One sink in any space where treatment is provided, or where any procedure or physical examination is provided.	CSA Z8000: 7.5.11.2.1
One sink inside every utility or soiled-material holding room, adjacent to the exit. Sinks or hoppers intended for processing contaminated material do not meet this requirement.	CSA Z8000: 7.5.11.2.1
One sink inside, or within six meters of, each nursing station.	CSA Z8000: 7.5.11.2.1

Indication and Sink Placement – There shall be:	Reference
One sink inside each area where unbagged soiled linen is handled.	CSA Z8000: 7.5.11.2.1
One sink inside, or within six meters of, any staff lounges.	CSA Z8000: 7.5.11.2.1
One sink within each laboratory work room and within six meters of each laboratory workstation.	CSA Z8000: 7.5.11.2.1
One sink within each room where medication is prepared, including pharmacies.	CSA Z8000: 7.5.11.2.1
One sink within any room where food or patient-care item is prepared, including trays, infant formula, etc.	CSA Z8000: 7.5.11.2.1
One sink within any area where hands are likely to be contaminated, including but not limited to shipping-receiving areas, storage areas, or waste disposal areas, located adjacent to the exit.	CSA Z8000: 7.5.11.2.1
Three sinks within each airborne precaution facility: one within the ante-room, one within the isolation room, and one within the bathroom, all located adjacent to the exits.	CSA Z8000: 7.5.11.2.1
One sink either inside or adjacent to the entrance of each diagnostic MRI room. Note that a metal trap is still required for these sinks; it will need to be located outside the MRI room's radio frequency cage, connected to the sink by a plastic pipe which passes through the cage.	CSA Z8000: 7.5.11.2.1

B. Hand Drying (Paper Towel, Air Dryers & Waste Bins)

Effective hand drying is important for maintaining hand health.[ccxii]
Paper towel:

a) disposable paper hand-towels provide the lowest risk of cross-contamination and should be used for drying hands in clinical practice areas[ccxiii, ccxiv]
b) Cloth drying towels should not be used[ccxv];
c) towel dispensers should be mounted such that access to them is unobstructed and splashing or dripping onto adjacent wall and floor surfaces is minimized.[ccxvi, ccxvii]
d) To avoid recontamination of the hands, there should be single-use towels available to turn off faucets.[ccxviii]
e) Paper towels should be available to use on the exit door hardware and a trash container for used towels should be located near the exit door.[ccxix]

Air dryers:

f) hot-air dryers should not be used in any health care facility 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.[ccxx]

Waste bins:

a) Lidded, lined, foot pedal-operated waste bins, with waste bags, should be provided in close proximity to each hand washing sink.[ccxxi, ccxxii]
b) Paper waste receptacles shall be a corrosion free material and wide mouth design.
c) Space shall be allowed for the placement of waste bins in close proximity to the hand hygiene sink, and in close proximity to any exits in order to accommodate the use of paper towels on door handles or door hardware.

C. Placement of ABHR Dispensers

Installing alcohol-based-based hand rub dispensers at the point-of-care improves adherence to hand hygiene.[ccxxiii,ccxxiv, ccxxv] Point-of-care is the place where three elements occur together: the patient, the healthcare provider and care or treatment involving patient 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 patient contact is taking place.[ccxxvi])

A user-needs assessment and a workflow analysis should be completed before making the decision about where to place products. A point-of-care risk assessment will also help to guide placement of ABHR for patients 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 patients 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.

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. Requirements of BC's Building Code, BC Plumbing Code and BC Fire Code (the "BC Codes")[4] as well as Municipality Fire Regulations must be met with respect to placement of ABHR. (see Section 5.A and Appendix G).

ABHR should be provided in each of the following locations:

a) at all entrances to and exits from the facility;
b) on the external wall immediately adjacent to the entrance to every inpatient room;
c) on walls immediately adjacent to the entrances to any patient care areas of any sort;
d) adjacent to all points-of-care in all situations, except where the presence of alcohol would compromise patient safety;
e) in any location where PPE is donned or removed;
f) at all entrances to Dirty and Clean Service Rooms
g) and in any additional location where its use is required to comply with routine hygiene practices.[ccxxvii]

Hand hygiene fixtures for ABHR shall be mounted at a height of approximately 1 m from the floor. Adjacent floor and wall surfaces should be protected from the hand hygiene fluid.[ccxxviii] 7.5.11.3.3

[4] 2012 version of "BC Codes" consultation period ends 31Mar12 – 2012. 2012 version of BC Codes will come into effect in the Fall of 2012.

The mounting of ABHR dispensers above carpets is not recommended due to the risk of damage and lifting/warping of carpets.

Placement and storage of ABHR products, fixtures, and supplies shall be in compliance with the healthcare facility's fire prevention guidelines and applicable requirements.[5]

Where the optimal placement of a ABHR hand hygiene station (i.e., for staff compliance) appears to conflict with applicable fire safety requirements, the fire marshal and the infection prevention and control team shall be consulted to resolve the issue.[6]

Hand hygiene stations shall be installed at the point of care to improve adherence to infection prevention and control principles. Stations should be installed outside inpatient rooms at the entrance. Stations should also be installed at the bedside. In healthcare area, the responsibility for refilling and replacing dispensers of ABHR (who and when) should be clearly delineated.

Risk of Fire Related to the Use of ABHRs

The risk of fire related to the use of ABHR is very small.[ccxxix, ccxxx] There is a modest risk of ignition in the presence of an oxygen-enriched environment[ccxxxi] or static electricity from carpeting[ccxxxii]; accordingly, users must ensure that their hands have been fully dried immediately after applying ABHR.

Alcohol is a flammable liquid, so the use and storage of these products is regulated under provincial fire safety regulations. Refer to your local fire inspector for information on the proper storage of alcohol hand sanitizer containers and pumps for your geographical area. Placement and storage of ABHR is regulated by provincial and municipal guidelines, key among which are:

- The BC Building Code, BC Plumbing Code and BC Fire Code (the "BC Codes")[7]; and
- Local Municipal fire regulations.[8]

In general, the product should not be dispensed, stored or handled near any source of ignition. Alcohol-based products may have hazardous reactions with strong oxidizers or inorganic acids so do not dispense, store or handle near such hazards. The storage of product not for immediate use should be located in an acceptable storage room or cabinet in accordance with provincial fire safety regulations or local bylaw. [ccxxxiii]

Client/resident rooms may have up to two litres of product per room. A hand rub station that is attached to the wall must not be installed directly over, or within 150 mm of, a source of ignition, such as an electrical outlet; and the wall space between the dispenser and the floor must be unobstructed. ABHR dispensers should not be installed over or directly adjacent to an ignition source such as an electrical outlet or switch, or over carpeted areas.[ccxxxiv]

ABHR dispensers placed on beds should be secured in an approved dispenser-holder. Dispenser spout faces should face away from beds in order to prevent dripping onto bed linens. If optimal placement or storage appears to conflict with local fire safety regulations or guidelines, consult both the fire marshal and the infection prevention and control team.

[5] Provincial/territorial and local fire codes and regulations can apply to the location of units that use alcohol-based hand hygiene products. See NFPA 101 for information on the installation of alcohol-based waterless hand hygiene systems. CSA 2011. *Canadian health care facilities – planning, design and construction*. Mississauga, ON: CSA. Section 7.5.11.3.4.
[6] Provincial/territorial and local fire codes can apply.
[7] 2012 version of "BC Codes" consultation period ends 31Mar12 – 2012. 2012 version of BC Codes will come into effect in the Fall of 2012.
[8] Additional reference sources to consider: The National Fire Protection Association (NFPA); International Fire Code (IFC); The Joint Commission (JAHCO); The American Society for Healthcare Engineering (ASHE); WHO; Alberta Health Services; Fire Code Regulations and Alcohol Based Hand Rubs.

Not more than one dispenser should be located at each entry into a room from any given corridor, and wall mount dispensers should be separated from each other by a minimum horizontal distance of 1220mm. ABHR storage rooms (defined as any room storing a quantity of 5 or more litres of ABHR), shall not have heat sources present, including battery stations, and a fire extinguisher should be located inside or immediately adjacent to these storage rooms.

D. Hand Hygiene Product Dispensers (soap, lotions, ABHR)

Liquid soap and lotion dispensers shall have hands free operation and mounted to permit unobstructed access and minimize splashing or dripping onto adjacent wall and floor surfaces. Liquid dispensers (soap or lotion) shall use non-refillable bottles and shall be placed to prevent splash-up contamination.[ccxxxv] Dispensers should be clearly labelled and easily distinguishable from each other.

Recommendations:

35. ***The location and design of hand hygiene facilities shall be developed in consultation with infection prevention and control personnel and shall be consistent with the infection control risk assessment. [BIII]***
36. ***Sinks shall be wall-mounted according to CSA z8000 standards. [AIII]***
37. ***The healthcare facility design shall specify:***
    - ***i. the room location of hand hygiene sinks in the healthcare facility;***
    - ***ii. the placement of the sink(s) within each room location and in relation to counters and other related fixtures;***
    - ***iii. hand hygiene sink design; and***
    - ***iv. the location of waterless hand hygiene stations. [BIII]***
38. ***Single-use paper towels shall be provided. Cloth drying towels shall not be used.[9] [BIII]***
39. **Towel dispenser design shall be such that towels are dispensed singly. They should either be hands-free or designed so that only the towel is touched during removal of towel for use.** ***[BIII]***
40. ***Where hot-air dryers are used in non-clinical areas, hands-free taps are required. [BIII]***
41. ***There should be a contingency plan to deal with power interruptions and temperature regulation when hot-air dryers or sink controls based on electric-eye technology are used. [BIII]***
42. ***Locate alcohol-based hand rub dispensers at point-of-care and at the entrance to other locations where activities occur, unless contraindicated by the risk assessment or BC fire and building codes. [BIII]***

9. Hand Hygiene Motivation and Behaviour

Improving hand hygiene compliance among healthcare providers is challenging. Staff compliance is significantly influenced by the behaviour of other healthcare providers.[ccxxxvi] As such, leadership, role-modeling and a hospital–wide commitment are essential to improving hand hygiene compliance rates.

[9] Paper hand-towels dry hands rapidly and dispensers can be used by several people at once. They are considered to be the lowest risk of cross-infection and are the preferred option in clinical practice areas. The World Health Organization recommends drying hands with single-use paper towels and does not recommend electric air dryers due to length of time to dry and risk of aerosolization.

It has been clearly demonstrated that sustainable success at improving hand hygiene compliance is achieved when several critical factors are in place. These include[ccxxxvii, ccxxxviii]:

a) demonstrable organizational commitment to improvement;
b) multidisciplinary leadership;
c) hand hygiene role models and champions;
d) drivers for improvement (e.g. accreditation, organization and provincial targets);
e) application of hand hygiene program to various healthcare settings;
f) involvement of front-line staff;
g) local ownership;
h) consistent measuring and sharing hand hygiene compliance data across the organization; and;
i) availability of financial resources.

Recommendations:

43. Focus promotional programs for healthcare providers on factors known to influence behaviour. [BI]

44. Incorporate peer role models and "champions" into the hand hygiene program. [BIII]

45. Review results of hand hygiene compliance as part of ongoing quality and patient safety improvement. This communication should include reports to Joint Health and Safety, Infection Prevention and Control and senior management.

10. Hand Hygiene Education

A. Education for Healthcare Providers

All healthcare providers should receive basic training and periodic retraining to reinforce their practice. An important and integral part of an effective hand hygiene program is education of all staff about the importance of hand hygiene in a healthcare 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).

It should be kept in mind, however, that educational programs alone are inadequate and other behaviour modifying strategies (i.e. positive deviance) should be included in a multifaceted approach to achieve change.[ccxxxix]

- An online provincial hand hygiene module was created as an education resource for health care providers working in BC. For the purpose of professional education and course tracking, the Provincial Hand Hygiene Education Module can be accessed through each health authority's Course Catalogue Registration System (CCRS).

- To module is also accessible for general knowledge and interest purposes, through the following public websites:

  http://www.bcpsqc.ca/quality/handhygiene-resources.html

  or

  http://www.picnet.ca/education-training/64/hand-hygiene-resources.

The Provincial Infection Control Network (PICNet) also has a number of hand hygiene resources available on their website at: http://www.picnet.ca/education-training/64/hand-hygiene-resources.

B. Education for Patients and Visitors

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

Recommendations:

45. ***Educate healthcare providers about [AII]:***
    - **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.***
46. ***Encourage partnerships between patients, their families and healthcare providers to promote hand hygiene in healthcare. [CIII]***

11. Hand Hygiene Monitoring and Feedback

Monitoring hand hygiene practices and the provision of immediate feedback are vital to improving motivation and compliance. The use of a standardized observation tool for trained auditors allows ongoing evaluation and performance monitoring. Components of a standardized observation audit include:

a) trained auditors;
b) standardized audit tool with clear instructions;
c) periodic inter-rater reliability testing; and
d) timely feedback of compliance data to the clinical area.

Recommendations:

47. ***Routinely monitor hand hygiene compliance with the provision of timely feedback by using a reliable, validated observer audit tool and training process. [AII]***
48. ***Monitoring should assess compliance to direct quality improvement activities. [BIII]***

12. Other Issues Relating to Hand Hygiene

A. Hand Hygiene and Clostridium difficile infection

Clostridium difficile infection often occurs in patients in healthcare settings. Symptomatic patients are often the source of transmission. C.*difficile* is a spore-forming bacterium and therefore the environment around symptomatic patients becomes highly contaminated with spores that are resistant to cleaning. When C. *difficile* infection is suspected or diagnosed, hand hygiene with either ABHR or soap and water becomes an important part of controlling the spread of this infection in healthcare settings. At the present time, there is a lack of evidence regarding the efficacy of ABHR versus hand washing with soap and water for removal of spores from hands.[ccxli, ccxlii,ccxliii] However, if hands are visibly soiled, soap and water is recommended as ABHR has limited efficacy in the presence of gross soilage.

- For more information relating to *C. difficile* and hand hygiene, refer to PIDAC's '*Annex C: Testing, Surveillance and Management of Clostridium difficile in All Healthcare Settings*',[ccxliv] available at: http://www.oahpp.ca/resources/pidac-knowledge/best-practice-manuals/testing-surveillance-and-management-of-clostridium-difficile.html

B. Systemic Alcohol Absorption

Recent studies have shown that the frequent use of ABHRs does not raise serum blood alcohol levels in adults[ccxlv, ccxlvi] or children.[ccxlvii]

SUMMARY OF RECOMMENDATIONS FOR BEST PRACTICES FOR HAND HYGIENE IN ALL HEALTHCARE SETTINGS

- **This summary table is intended to assist with self-assessment internal to the healthcare setting for quality improvement purposes.**
- **Each recommendation has a corresponding evidence rating based on the evidence ranking system outlined in Appendix A.**

Summary of Recommendations	
1.	***A multidisciplinary, multifaceted hand hygiene program should be developed and implemented in all healthcare settings, [BI] including hand hygiene agents that are available at point-of-care in all healthcare settings. [AI] In healthcare facilities the hand hygiene program should 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 healthcare providers about when and how to clean their hands;*** ***d) ongoing monitoring and observation of hand hygiene practices, with feedback to healthcare providers;*** ***e) patient engagement; and*** ***f) opinion leaders and champions modelling the right behaviour.***
2.	***Each healthcare setting should have written hand hygiene policies and procedures.[BIII]***
3.	***Hand hygiene should be performed:*** ***a) before initial contact with each patient or items in their environment; [BI]*** ***b) before performing an invasive/aseptic procedure; [BI]*** ***c) after care involving risk of exposure to, or contact with, body fluids; [AI] and*** ***d) after contact with a patient or their environment.***
4.	***Provide hand hygiene facilities for patients and visitors in all healthcare settings. Encourage and assist patients to perform hand hygiene upon arrival, before eating and before leaving their room or clinic area. [BIII]***
5.	***Healthcare providers should strive to maintain hand skin integrity to enable effective hand hygiene. [BI]***
6.	***In all healthcare settings, a hand care program should be implemented that includes staff education, staff input into product selection, and skin assessment for skin integrity issues. [BI]***
7.	***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. [AI]***

Summary of Recommendations	
8.	***Refer individuals to Occupational Health if skin integrity is an issue. [BIII]***
9.	***To enable effective hand hygiene bare below the elbows is strongly recommended:*** ***a) nails should be kept clean and short; [BII]*** ***b) artificial nails or nail enhancements should not be worn; [AI]*** ***c) nail polish should not be worn; and*** ***d) rings and wrist jewellery, including watches should not be worn when performing hand hygiene[BII]***
10.	***Use 70 to 90% alcohol-based hand rub for hand hygiene in all healthcare settings. [BI]***
11.	***Wash hands with soap and water if there is visible soiling with dirt, blood, body fluids or other body substances. [AI]***
12.	***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. [AII]***
13.	***In all healthcare settings, provide hand hygiene products at point-of-care for use by staff and patients. [BI]***
14.	***All hand hygiene and hand care products should be dispensed in a dispenser that delivers an appropriate volume of the product. [AII]***
15.	***Single-use product dispensers are preferred and should be discarded when empty; containers should not be "topped-up". [AI]***
16.	***Bar soap for hand hygiene is not acceptable in healthcare settings except for individual patient use. [DII]***
17.	***Non-alcoholic, waterless antiseptic agents should NOT be used as hand hygiene agents in any healthcare setting. [DII]***
18.	***User acceptability should be a factor in hand hygiene product selection. [BI]***
19.	***Hand hygiene and hand care products with low irritant potential should be chosen. [BI]***
20.	***Hand hygiene products should not interfere with glove integrity or with the action of other hand hygiene or hand care products. [AII]***
21.	***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). [BI]***
22.	***When using soap and water, a minimum of 15 seconds of lathering is required before rinsing. [BI]***
23.	***Dry hands using a method that does not re-contaminate the hands. [BI]***
24.	***Do not use alcohol-based hand rub immediately after washing hands with soap and water. [AII]***

Summary of Recommendations	
25.	***Perform surgical hand preparation using either a surgical hand rub or surgical hand scrub that ensures sustained antimicrobial activity, before donning sterile gloves. [BI]***
26.	***When performing surgical hand preparation using a surgical hand scrub, 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. [BI]***
27.	***Gloves should not be used in place of proper hand hygiene. [BI]***
28.	***Hand hygiene should be performed before donning gloves and after glove removal.***
29.	***Dry hand completely before donning gloves.***
30.	***The same pair of gloves should not be used for the care of more than one patient. [BI]***
31.	***Gloves should be removed immediately and discarded after the activity for which they were used. [AII]***
32.	***Gloves should be changed or removed when moving from a contaminated body site to a clean body site within the same patient. [AII]***
33.	***Gloves should be changed or removed after touching a contaminated environmental surface. [AII]***
34.	***The location and design of hand hygiene facilities shall be developed in consultation with infection prevention and control personnel and shall be consistent with the infection control risk assessment. [BIII]***
35.	***Sinks shall be wall-mounted according to CSA z8000 standards. [AIII]***
36.	***The healthcare facility design shall specify:*** ***i. the room location of hand hygiene sinks in the healthcare facility;*** ***ii. the placement of the sink(s) within each room location and in relation to counters and other related fixtures;*** ***iii. hand hygiene sink design; and*** ***iv. the location of waterless hand hygiene stations. [BIII]***
37.	***Single-use paper towels shall be provided. Cloth drying towels shall not be used.[10] [BIII]***
38.	***Towel dispenser design shall be such that towels are dispensed singly. They should either be hands-free or designed so that only the towel is touched during removal of towel for use. [BIII]***
39.	***Where hot-air dryers are used in non-clinical areas, hands-free taps are required. [BIII]***

[10] Paper hand-towels dry hands rapidly and dispensers can be used by several people at once. They are considered to be the lowest risk of cross-infection and are the preferred option in clinical practice areas. The World Health Organization recommends drying hands with single-use paper towels and does not recommend electric air dryers due to length of time to dry and risk of aerosolization.

Summary of Recommendations	
40.	***There should be a contingency plan to deal with power interruptions and temperature regulation when hot-air dryers or sink controls based on electric-eye technology are used. [BIII]***
41.	***Locate alcohol-based hand rub dispensers at point-of-care and at the entrance to other locations where activities occur, unless contraindicated by the risk assessment or BC fire and building codes. [BIII]***
42.	***Focus promotional programs for healthcare providers on factors known to influence behaviour. [BI]***
43.	***Incorporate peer role models and "champions" into the hand hygiene program. [BIII]***
44.	***Review results of hand hygiene compliance as part of ongoing quality and patient safety improvement. This communication should include reports to Joint Health and Safety, Infection Prevention and Control and senior management.***
45.	***Educate healthcare providers about [AII]:*** **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.***
46.	***Encourage partnerships between patients, their families and healthcare providers to promote hand hygiene in healthcare. [CIII]***
47.	***Routinely monitor hand hygiene compliance with the provision of timely feedback by using a reliable, validated observer audit tool and training process. [AII]***
48.	***Monitoring should assess compliance to direct quality improvement activities. [BIII]***

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.

NOTE: When a recommendation is based on a regulation, no grading will apply.

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.





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APPENDIX C: BC HAND HYGIENE FACT SHEET FOR HEALTHCARE SETTINGS

In healthcare 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 healthcare. Hand hygiene is a core element of patient safety for the prevention of infections and the spread of antimicrobial resistance. There are two methods of performing hand hygiene:

1. ALCOHOL-BASED HAND RUB (ABHR)

ABHR is the preferred method for decontaminating hands. ABHR is faster and more effective 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 healthcare 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 should 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 healthcare settings except for individual patient personal use.

WHEN TO PERFORM HAND HYGIENE

BEFORE initial patient or environment contact

- clean your hands when entering a room
- before touching patient or
- before touching any object or furniture in the patient's environment
- before donning gloves

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

BEFORE aseptic procedure

- clean your hands immediately before any aseptic procedure.

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

AFTER body fluid exposure risk

- clean your hands immediately after an exposure risk to body fluids (and after glove removal).

Why? To protect yourself and the healthcare environment from harmful patient germs.

AFTER patient or environment contact

- clean your hands when leaving a room
- after touching patient or
- after touching any object or furniture in the patient's environment

Why? To protect yourself and the healthcare environment from harmful 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 should be kept clean and short.
- **Nail polish** should not be worn by those giving care.
- **Artificial nails or nail enhancements** are not to be worn by those giving care.
- **Jewellery:** Hand and wrist/arm jewellery hinder hand hygiene. Rings increase the number of microorganisms present on hands and increase the risk of tears in gloves. Rings and wrist jewellery, including watches, should not be worn when performing hand hygiene.
- **Products:** Products should be dispensed in a disposable pump container that is not topped-up, to prevent contamination.

APPENDIX D: TOOLS FOR DEVELOPING A HAND HYGIENE PROGRAM

Provincial Hand Hygiene Program

There is increasing awareness of the importance of hand hygiene, not only to protect patients but to protect the health of healthcare providers. In response to an Office of the Auditor General review on hand hygiene programs in BC's health care system, the Provincial Hand Hygiene Working Group (PHHWG) was formed with the support of the Ministry of Health, health authorities and the BC Health Operations Committee.

The Working Group

The PHHWG is composed of representatives from each of the health authorities, the Ministry of Health, the Patient Safety and Quality Council, and the Provincial Infection Control Network (PICNet).

The group has been tasked with developing a mandatory province-wide hand hygiene program for the health authorities and assisting in its implementation for the individual health authorities.

Tools and Resources

The PHHWG has developed a number or useful tools and resources for health care providers including a standardized provincial auditing methodology, an online provincial hand hygiene education module, a survey of healthcare perceptions of hand hygiene, a process for publically reporting compliance rates and the development of a comprehensive two year communication plan for hand hygiene.

A number of these resources are available on the BC Patient Safety and Quality Council's website at:

http://www.bcpsqc.ca/quality/handhygiene-resources.html

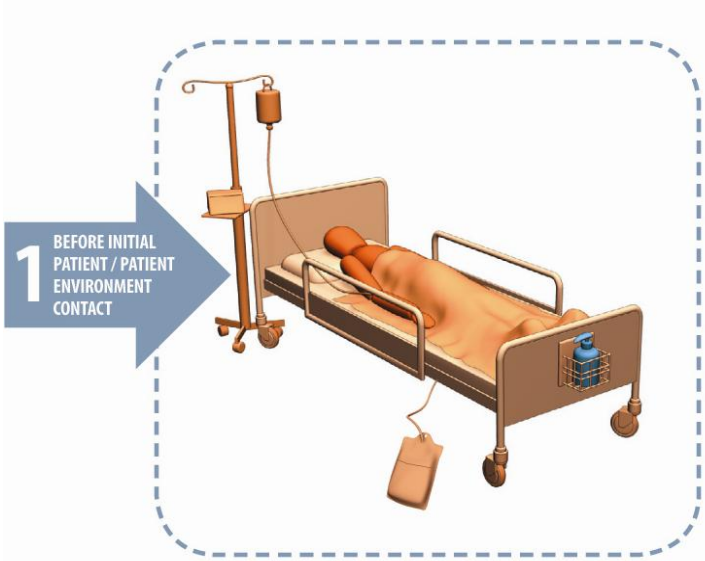
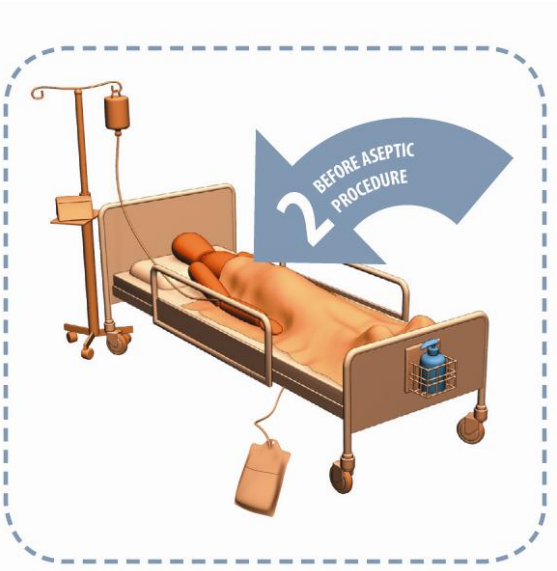
The Provincial Infection Control Network (PICNet) and the BC Centre for Disease Control (BCCDC) have produced a number of hand hygiene resources that are available to the public on their websites at:

http://www.picnetbc.ca/education-training/64/hand-hygiene-resources

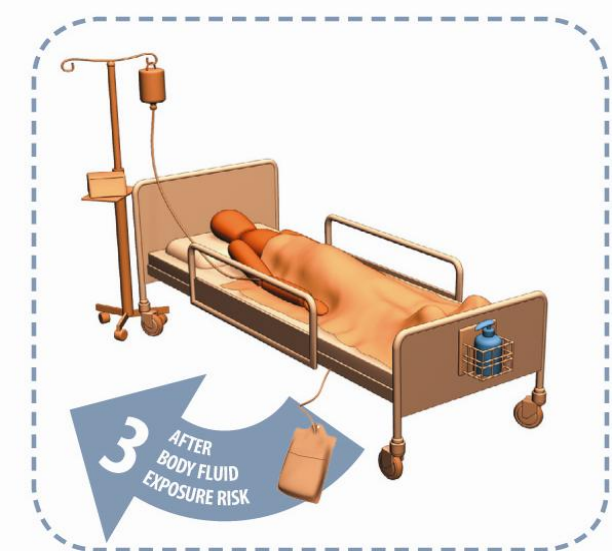
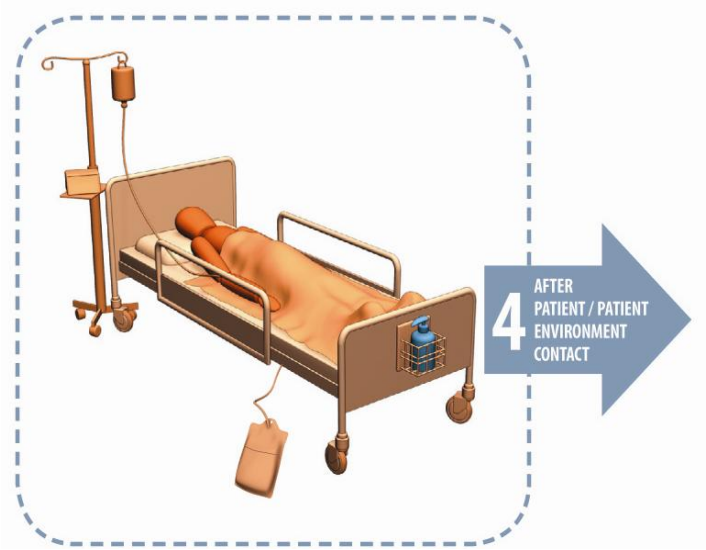
http://www.bccdc.ca/prevention/HandHygiene/default.html

APPENDIX E: HAND HYGIENE BEFORE & AFTER

BEFORE

BEFORE CONTACT WITH PATIENT OR PATIENT'S ENVIRONMENT	BEFORE DOING ASEPTIC PROCEDURES
	
• before shaking hands, stroking an arm • before helping a patient to move around, get washed, putting on clothing • before taking pulse, blood pressure, chest auscultation, abdominal palpation • before adjusting an IV rate • before contact with patient's environment (ie) bedrails	• before putting gloves on • before oral/dental care, giving eye drops, secretion aspiration • before skin lesion care, wound dressing, subcutaneous injection • before catheter insertion, opening a vascular access system or a drainage system • before preparation of medication, dressing sets

AFTER

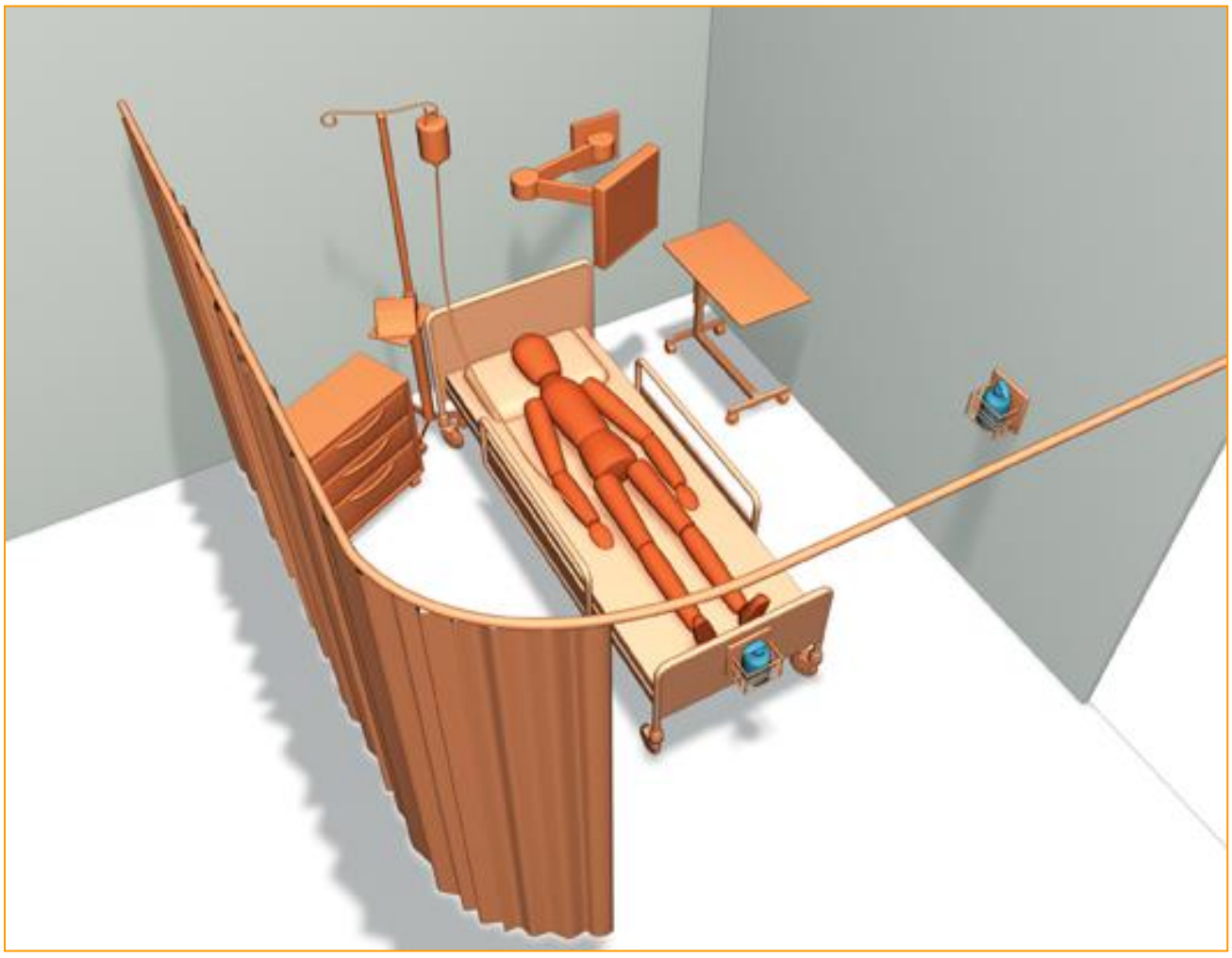
AFTER CONTACT WITH BODY FLUIDS	AFTER CONTACT WITH PATIENT OR PATIENT'S ENVIRONMENT
	
• after oral/dental care, giving eye drops, secretion aspiration • after skin lesion care, wound dressing, subcutaneous injection • after drawing and manipulating any fluid sample, opening a draining system, endotracheal tube insertion and removal • after cleaning up urine, faeces, vomit, handling waste (bandages, napkin, incontinence pads), cleaning of contaminated and visibly soiled material or areas (bathroom, medical instruments) • after removing gloves and other PPE	• after shaking hands, stroking an arm • after helping a patient to move around, get washed, get dressed • after taking pulse, blood pressure, chest auscultation, abdominal palpation • after changing bed linen • after perfusion speed adjustment • after monitoring alarm • after holding a bed rail • after clearing the bedside table

Reproduced with permission from *Just Clean Your Hands*, Ontario's evidence-based hand hygiene program.[ccxlviii] Available at: http://www.oahpp.ca/services/jcyh/moments.html.

APPENDIX F: ENVIRONMENT OF THE PATIENT

The environment of the patient is the space around a patient that may be touched by the patient and may also be touched by the healthcare provider when providing care.

- In a single room, the patient environment is the room.
- In a multi-bed room, the patient environment is the area inside the individual's curtain and including the curtain.
- In an ambulatory setting, the patient environment is the area that may come into contact with the patient within their cubicle.
- In a nursery/neonatal setting, the patient environment includes the inside of the bassinette or incubator unit, as well as the equipment outside the bassinette or incubator unit used for that infant (e.g., ventilator, monitor).



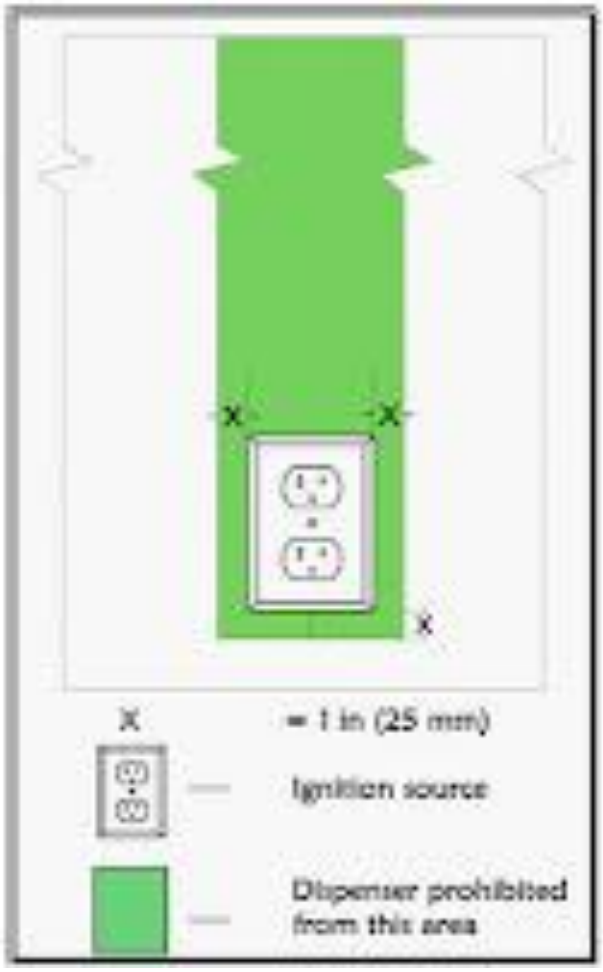
This image is reproduced with permission from *Just Clean Your Hands*, Ontario's evidence-based hand hygiene program.[ccxlix] Available at: http://www.oahpp.ca/services/jcyh/moments.html

APPENDIX G: PLACEMENT OF ABHR

Health care organizations should already be familiar with the current code-based requirements of NFPA 101®, Life Safety Code® and The Joint Commission (TJC) regarding the placement of Alcohol-Based Hand-Rub (ABHR) Dispensers. TJC is now allowing ABHR dispensers to be placed according to the requirements of the 2009 and 2012 editions of NFPA 101®,Life Safety Code®. The primary change from previous TJC requirements is the reduction of the minimum measurements from the ignition source to the dispenser. LSC Sections 18/19.3.2.6 (7) state: Dispensers shall not be installed in the following locations:

- Above an ignition source within 1 inch (25 mm) horizontal distance from each side of the ignition source.
- To the side of an ignition source within a 1 inch (25 mm) horizontal distance from the ignition source.
- Beneath an ignition source within a 1 inch (25 mm) vertical distance from the ignition source.

For ignition sources such as duplex receptacles and light switches the measurements are taken from the side edges of the ignition source coverplate as depicted in the diagram.[ccl]



ENDNOTES

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[xviii] The *Residential Care Regulation*, RSBC 2009, Regulation , available at:http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/96_2009
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