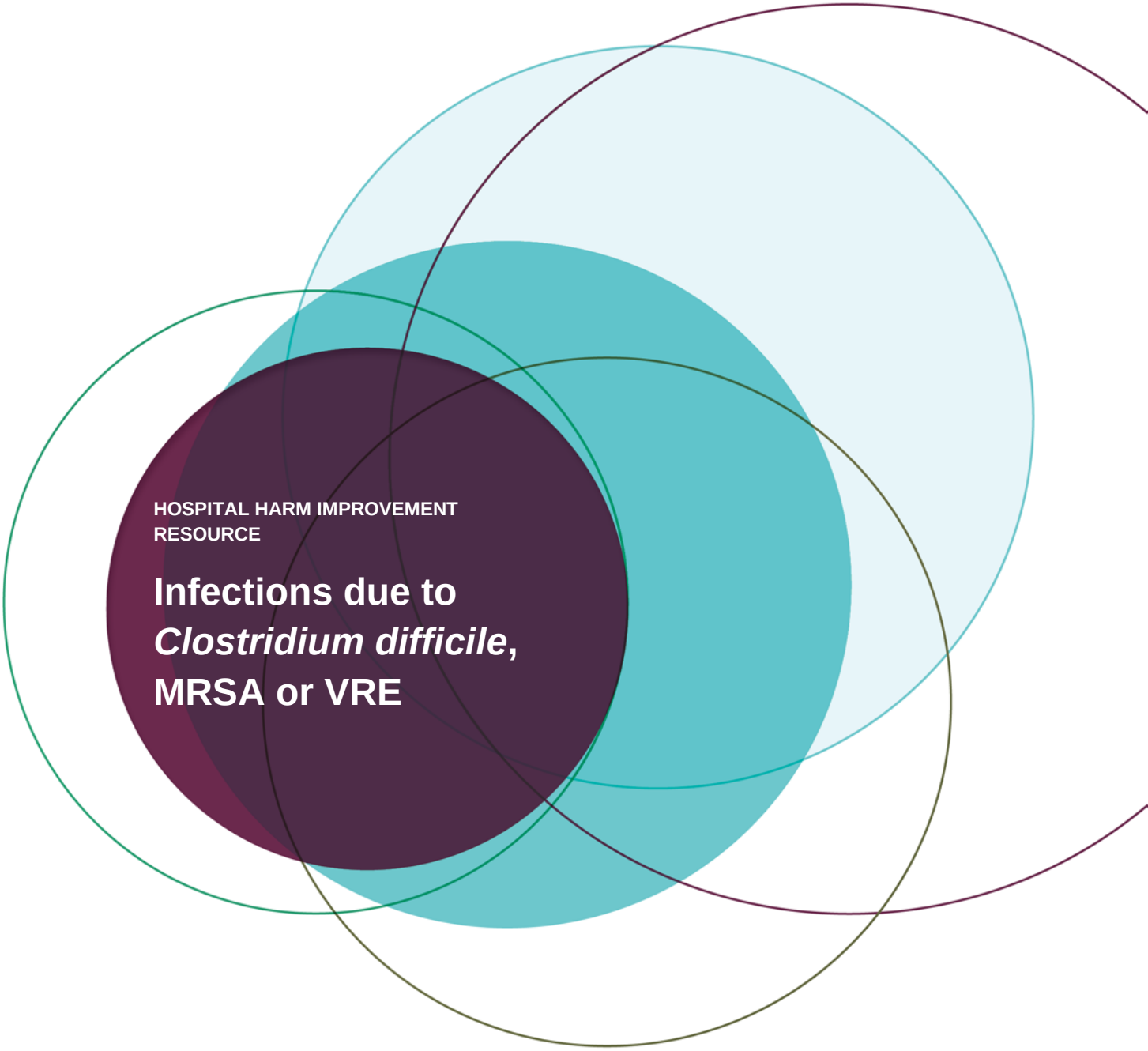

HOSPITAL HARM IMPROVEMENT RESOURCE

Infections due to *Clostridium difficile*, MRSA or VRE

cpsi icsp
Canadian Patient Safety Institute
Institut canadien pour la sécurité des patients

ACKNOWLEDGEMENTS

The Canadian Institute for Health Information and the Canadian Patient Safety Institute have collaborated on a body of work to address gaps in measuring harm and to support patient safety improvement efforts in Canadian hospitals.

The Hospital Harm Improvement Resource was developed by the Canadian Patient Safety Institute to complement the Hospital Harm measure prepared by the Canadian Institute for Health Information. It links measurement and improvement by providing resources that will support patient safety improvement efforts.

DISCHARGE ABSTRACT DATABASE (DAD) CODES INCLUDED IN THIS CLINICAL CATEGORY:

B18: Infections due to Clostridium difficile, MRSA or VRE

Concept	Bacterial infections identified during a hospital stay due to *Clostridium difficile* (*C. difficile*), methicillin-resistant *Staphylococcus aureus* (MRSA) or vancomycin-resistant enterococci (VRE).
C. difficile	
Selection criteria	
A04.7	Identified as diagnosis type (2)
Exclusions	1. Abstracts with age on admission less than 1 year 2. Abstracts with a length of stay less than 3 days
MRSA	
Selection criteria	
A04.10	Identified as diagnosis type (2) **AND** U82.1 as diagnosis type (1) or (2) **in the same diagnosis cluster** **OR** Identified as diagnosis type (3) **AND** U82.1 as diagnosis type (1) or (2) **AND** T80.2, T81.4, T82.6, T82.7–, T83.5, T83.6, T84.5–, T84.6–, T84.7, T85.7 or T88.0 as diagnosis type (2) **AND** Y60–Y84 **in the same diagnosis cluster** **OR** Identified as diagnosis type (3) **AND** U82.1 as diagnosis type (1) or (2) **AND** O03.0, O03.5, O04.0, O04.5, O05.0, O05.5, O07.3 or O08.0– as diagnosis type (2) **in the same diagnosis cluster** **OR** Identified as diagnosis type (3) **AND** U82.1 as diagnosis type (1) or (2) **AND** O98.502 or O98.802 as diagnosis type (M), (1), (2), (W), (X) or (Y) **in the same diagnosis cluster**
A49.0 J15.2 G00.3 L00 M00.0–	Identified as diagnosis type (2) **AND** U82.1 as diagnosis type (1) or (2) **in the same diagnosis cluster**
B95.6	Identified as diagnosis type (3) **AND** U82.1 as diagnosis type (1) or (2) **AND** a site of infection code* as diagnosis type (2) **in the same diagnosis cluster**
Exclusions	Abstracts with a length of stay less than 2 days

VRE	
Selection Criteria	
A41.80* **A40.21**	Identified as diagnosis type (2) **AND** U83.0 as diagnosis type (1) or (2) **in the same diagnosis cluster** **OR** Identified as diagnosis type (3) **AND** U83.0 as diagnosis type (1) or (2) **AND** T80.2, T81.4, T82.6, T82.7–, T83.5, T83.6, T84.5–, T84.6–, T84.7, T85.7 or T88.0 as diagnosis type (2) **AND** Y60–Y84 **in the same diagnosis cluster** **OR** Identified as diagnosis type (3) **AND** U83.0 as diagnosis type (1) or (2) **AND** O03.0, O03.5, O04.0, O04.5, O05.0, O05.5, O07.3 or O08.0– as diagnosis type (2) **in the same diagnosis cluster** **OR** Identified as diagnosis type (3) **AND** U83.0 as diagnosis type (1) or (2) **AND** O98.502 or O98.802 as diagnosis type (M), (1), (2), (W), (X) or (Y) **in the same diagnosis cluster**
B96.81* B95.21‡	Identified as diagnosis type (3) **AND** U83.0 as diagnosis type (1) or (2) **AND** a site of infection code* as diagnosis type (2) **in the same diagnosis cluster**
	* Before 2018-2019 data ‡ Starting with 2018-2019 data
Exclusions	Abstracts with a length of stay less than 2 days
Codes	**Code descriptions**
A04.7	Enterocolitis due to *Clostridium difficile*
A41.0	Sepsis due to *Staphylococcus aureus*
A41.80 A40.21	Sepsis due to *Enterococcus*
B95.6	*Staphylococcus aureus* as the cause of diseases classified to other chapters
B96.81 B95.21	*Enterococcus* as the cause of diseases classified to other chapters
A49.0	Staphylococcal infection, unspecified site
J15.2	Pneumonia due to Staphylococcus
G00.3	Staphylococcal meningitis
L00	Staphylococcal scalded skin syndrome
O03.0	Spontaneous abortion, incomplete, complicated by genital tract and pelvic infection
O03.5	Spontaneous abortion, complete or unspecified, complicated by genital tract and pelvic infection
O04.0	Medical abortion, incomplete, complicated by genital tract and pelvic infection
O05.0	Other abortion, incomplete, complicated by genital tract and pelvic infection
O05.5	Other abortion, complete or unspecified, complicated by genital tract and pelvic infection

O07.3	Failed attempted abortion, complicated
O08.0–	Complication following abortion and ectopic and molar pregnancy; genital tract and pelvic infection
O98.502	Other viral diseases complicating pregnancy, childbirth and the puerperium; delivered with mention of postpartum complication
O98.802	Other maternal infectious and parasitic diseases complicating pregnancy, childbirth and the puerperium; delivered with mention of postpartum complication
T80.2	Infections following infusion, transfusion and therapeutic injection
T81.4	Infection following a procedure, not elsewhere classified
T82.6	Infection and inflammatory reaction due to cardiac valve prosthesis
T82.7–	Infection and inflammatory reaction due to other cardiac and vascular devices, implants and grafts
T83.5	Infection and inflammatory reaction due to prosthetic device, implant and graft in urinary system
T83.6	Infection and inflammatory reaction due to prosthetic device, implant and graft in genital tract
T84.5–	Infection and inflammatory reaction due to internal joint prosthesis
T84.6–	Infection and inflammatory reaction due to internal fixation device (any site)
T84.7	Infection and inflammatory reaction due to other internal orthopedic prosthetic devices, implants and grafts
T85.7	Infection and inflammatory reaction due to other internal prosthetic devices, implants and grafts
T88.0	Infection following immunization
U82.1	Resistance to methicillin
U83.0	Resistance to vancomycin
Y60–Y84	Complications of medical or surgical care (refer to Appendix A of the Hospital Harm Indicator General Methodology Notes)

*For the descriptions of site of infection codes, please see Appendix B of the Hospital Harm Indicator General Methodology Notes.

OVERVIEW AND IMPLICATIONS

Infections due to *Clostridium difficile,* MRSA or VRE

Healthcare-associated infections result in a substantial burden of disease in Canadians, and are an important public health problem. They are also a burden on Canada's healthcare system and a barrier to timely access to care for all Canadians (Public Health Agency of Canada 2017, "Routine").

While it is important to prevent, and control the spread of all infections, there are certain, antimicrobial resistant organisms that are more prevalent and pose a great risk in healthcare settings.

Antimicrobial Resistance (AMR) occurs when microbes (e.g. bacteria, viruses, fungi and parasites) evolve in ways that reduces or eliminates the effectiveness of antimicrobial medicines (e.g. antibiotics, antivirals, antifungals and antiparasitics) to treat infections. When microbes are exposed to antimicrobials, they adapt and become more resistant (Public Health Agency of Canada 2017, "Tackling"). (These organisms include (but are not limited to) methicillin-resistant *Staphylococcus aureus* (MRSA), vancomycin-resistant Enterococci (VRE) and *Clostridium difficile (C. difficile).*

The Public Health Agency of Canada (PHAC) estimates that approximately two per cent of patients admitted to large, academic Canadian hospitals will have acquired an infection with an Antibiotic Resistant Organism (ARO) during the course of their hospital stay (Mitchell et al. 2019) and that at any given time, three to 10 per cent of patients who are hospitalized in Canada will either be infected or be a carrier of an ARO (Martin et al. 2019). According to Dr. Tedros Adhanom Ghebreyesus, Director General, World Health Organisation *"AMR is one of the most urgent health risks of our time and threatens to undo a century of medical progress*" (World Health Organization 2019*).* Globally, today, 700,000 people die of resistant infections every year; and, if no action is taken, it's estimated that by 2050, 10 million lives are at risk worldwide due to the rise of drug resistant infections (*Review on Antimicrobial Resistance,* 2016).

The Government of Canada is com mitted to taking action to prevent, limit, and control the emergence and spread of AMR. The *Federal Action Plan on Antimicrobial Resistance and Use in Canada* (Public Health Agency of Canada, 2015) outlines 3 pillars of action:

1. **Surveillance:** Detecting and monitoring trends and threats in order to inform strategies to reduce the risks and impacts of antimicrobial resistance.
2. **Stewardship:** Conserving the effectiveness of existing treatments through infection prevention and control guidelines, education and awareness, regulations, and oversight.
3. **Innovation:** Creating new solutions to counteract loss in antimicrobial effectiveness through research and development (Public Health Agency of Canada, 2015).

In addition to the *Federal Action Plan*, a *Pan-Canadian Framework for Action* (Public Health Agency of Canada 2017, "Tackling") outlines a One Health approach from both the human and

agriculture perspectives. The framework encompasses the three pillars listed above, as well as a **fourth pillar** for Infection Prevention and Control (IPC).

Clostridium difficile Infection (CDI)

Clostridium difficile (*C. difficile*) is a bacterium that causes mild to severe diarrhea and intestinal conditions like pseudomembranous colitis (inflammation of the colon).

C. difficile bacteria and their spores are found in feces. People can get infected if they touch surfaces contaminated with feces, and then touch their mouth. This may occur as a result of contamination of the patient environment, of shared equipment, or via the hands of healthcare workers. The elderly, those with other co-morbid illnesses, those who are hospitalized, or who are taking antibiotics, are at a greater risk of infection. Certain antibiotics used over a prolonged period of time increase the chance of developing a *C. difficile* infection (CDI). Nearly all antibiotics have been implicated in CDI, but broad-spectrum antibiotics and certain antibiotic classes, such as cephalosporins, clindamycin, and fluoroquinolones, seem to have a higher risk for placing patients at risk of CDI.

C. difficile spores can exist for five (5) months on hospital surfaces. *C. difficile* is the most frequent cause of infectious diarrhea in hospitals and long-term care facilities in Canada, as well as in other industrialized countries and it is associated with increased hospital costs, including increased length of stay (Association for Professionals in Infection Control and Epidemiology 2013; Public Health Agency of Canada 2014; McDonald et al. 2018; NICE 2015; Centers for Disease Control and Prevention 2016, "*Clostridium difficile"*).

Methicillin-resistant *Staphylococcus aureus* (MRSA)

Staphylococcus aureus (Staph) is a type of bacteria that is commonly found on the skin and in the noses of healthy people. Some Staph bacteria are easily treatable while others are not. Staph bacteria that are resistant to the antibiotic methicillin are known as Methicillin-resistant *Staphylococcus aureus* or MRSA. If left untreated, MRSA infections may develop into serious, life-threatening complications such as infections of the bloodstream, bones and/or lungs (e.g., sepsis, pneumonia, etc.).

Methicillin-resistant *Staphylococcus aureus* (MRSA) is commonly found in Canadian hospitals and in the community. On one end of the spectrum, individuals can be colonized (carriers) and asymptomatic. On the other end of the spectrum, MRSA can lead to life-threating infection including septic shock and death. MRSA is spread by skin to skin contact or through contact with items contaminated by the bacteria. Those with weakened immune systems, chronic illnesses, hospitalized or having medical procedures are more at risk of acquiring infection. MRSA has been shown to spread easily in healthcare settings. MRSA can cause infections in a number of places, such as skin and soft tissue, blood, bones, joints, heart valves, lungs, and surgical wounds. (Public Health Agency of Canada 2008; Calfee 2012, Centers for Disease Control and Prevention 2016, "MRSA").

Vancomycin-resistant Enterococci (VRE)

Enterococci are bacteria that live in the human intestine and are often found in the environment. Generally, these bacteria do not cause illness; however, when illness does occur, it can usually be treated with antibiotics. Vancomycin-resistant Enterococci (VRE) are strains of enterococci bacteria that are resistant to the antibiotic vancomycin. A person who is colonized with VRE does **NOT** have symptoms. A person is considered to be infected with VRE when symptoms **ARE** present.

VRE infections occur primarily in healthcare settings among patients with weakened immune systems, chronic illnesses and medical procedures/instrumentation. Those who have been previously treated with vancomycin or other antibiotics for long periods of time; those who have undergone surgical procedures and those with medical devices such as urinary catheters are at a higher risk of becoming infected with VRE. VRE tends to focus on places like the gastrointestinal tract, urinary tract, heart valves, blood, and any prosthetic devices, such as artificial joints, prosthetic heart valves, and intravenous catheters.

Vancomycin-resistant Enterococci (VRE) is considered a healthcare-associated drug-resistant organism. It can spread from patient to patient when bacteria are carried on the hands of healthcare workers and occasionally through contact with contaminated equipment or other surfaces (e.g. toilet seats, bedrails, door handles, soiled linens, stethoscopes, etc.) (Public Health Agency of Canada 2010; Calfee 2012; Centers for Disease Control and Prevention 2011).

GOAL

Reduce the incidence of infections due to *C. difficile,* MRSA or VRE.

IMPORTANCE FOR PATIENTS AND FAMILIES

When patients get an infection while in hospital, it delays healing, extends the patient's length of stay and increases their risk for harm and readmission. By implementing infection prevention and control practices, patients are safer. Organisms can be spread from person to person in the hospital in different ways. Bacteria can be spread between patients on pieces of equipment and on unwashed hands. Since germs can live on many surfaces, staff, family and visitors can spread infections without knowing. Healthcare workers, patients, family, friends and visitors all have a role to play in preventing healthcare-associated infections. Hand hygiene is one of the most important ways to stop the spread of infections (Canadian Patient Safety Institute 2012).

Patient Stories

Marie's Story
Video: Infection with *Clostridium difficile*

Ginny's Story
Video: Infection with MRSA

SURVEILLANCE, OUTBREAK MANAGEMENT

HAI surveillance should be performed to guide infection prevention and control interventions and detect outbreaks, with timely feedback of results to healthcare workers and stakeholders and through national networks (World Health Organization 2016).

Outbreak Management Outbreaks of both infectious and noninfectious adverse events can occur in any healthcare setting and pose a threat to patient safety. Regardless of scope, investigation of a potential outbreak involves certain epidemiological components. Cooperation between healthcare epidemiologists, infection preventionists, and public health experts is important in effectively managing outbreak responses in healthcare settings. The ultimate goal of any outbreak investigation is to identify probable contributing factors and to stop or reduce the risk for future occurrences (Campbell, 2014).

CLINICAL AND SYSTEM REVIEWS, INCIDENT ANALYSES

In addition to surveillance and outbreak investigation a system review maybe indicated to identify potential causes of outbreaks and determine appropriate recommendations.

Occurrences of harm are often complex with many contributing factors. Organizations need to:

1. Measure and monitor the types and frequency of these occurrences.
2. Use appropriate analytical methods to understand the contributing factors.
3. Identify and implement solutions or interventions that are designed to prevent recurrence and reduce the risk of harm.
4. Have mechanisms in place to mitigate consequences of harm when it occurs.

To develop a more in-depth understanding of the care delivered to patients, chart audits, incident analyses and prospective analyses can be helpful in identifying quality improvement opportunities. Links to key resources for conducting chart audits and analysis methods are included in Hospital Harm Improvement Resources Introduction.

If your surveillance, outbreak investigation or system review reveals that your cases of *C. difficile*, MRSA or VRE are linked to breaks in infection prevention and control practices, these resources maybe helpful:

Organizations

Canadian

- Infection Prevention and Control Canada: Resources and Publications https://ipac-canada.org/resources.php
- Provincial Infection Control Network of British Columbia (PICNet): Guidelines and Toolkits https://www.picnet.ca/guidelines/
- Public Health Agency of Canada, Infection Control Guideline Series https://www.canada.ca/en/public-health/services/infectious-diseases/nosocomial-occupational-infections.html
- Public Health Ontario: Infection Prevention and Control https://www.publichealthontario.ca/en/health-topics/infection-prevention-control

International

- World Health Organization: Infection Prevention and Control https://www.who.int/infection-prevention/en/
- Association for Professionals in Infection Control and Epidemiology: Practice guidance for infection prevention https://apic.org/Professional-Practice/overview/
- Centers for Disease Control and Prevention (CDC) : Infection Control https://www.cdc.gov/infectioncontrol/index.html

Infection Prevention and Control Programs

Canadian

- Government of Manitoba. R*outine practices and additional precautions: Preventing the transmission of infection in health care.* Winnipeg, MB: Government of Manitoba; 2012. Available at: https://www.gov.mb.ca/health/publichealth/cdc/docs/ipc/rpap.pdf
- Health Quality Ontario. *Improvement map: Infection prevention and control.* Available at: http://www.hqontario.ca/portals/0/Modals/qi/en/imap/infection.html
- Provincial Infectious Diseases Advisory Committee (PIDAC). *Best practices for infection prevention and control programs in Ontario.* Toronto, ON: Public Health Ontario; 2012. Available at: https://www.publichealthontario.ca/en/eRepository/BP_IPAC_Ontario_HCSettings_2012.pdf

International

- National Institute for Health and Care Excellence (NICE). *Healthcare-associated infections.* 2016. Available at: https://www.nice.org.uk/guidance/qs113
- NICE. *Infection prevention and control*. 2014. Available at: https://www.nice.org.uk/guidance/qs61

- World Health Organization (WHO). Guidelines on core components of infection prevention and control programmes at the national and acute health care facility level. 2016. Available at https://www.who.int/infection-prevention/publications/ipc-components-guidelines/en/

Routine Practices and Additional Precautions

Canadian

- Public Health Agency of Canada (PHAC). *Routine practices and additional precautions for preventing the transmission of infection in healthcare settings.* 2017. Available at: https://www.canada.ca/en/public-health/services/publications/diseases-conditions/routine-practices-precautions-healthcare-associated-infections.html
- Provincial Infectious Diseases Advisory Committee (PIDAC*). Routine practices and additional precautions in all health care settings*. Public Health Ontario; 2012. Available at: https://www.publichealthontario.ca/en/eRepository/RPAP_All_HealthCare_Settings_Eng2012.pdf

Hand Hygiene

Canadian

- Health Quality Ontario. *Improvement map: Hand hygiene.* Available at: http://www.hqontario.ca/portals/0/Modals/qi/en/imap/hand.html
- Provincial Infectious Diseases Advisory Committee (PIDAC). *Best practices for hand hygiene in all health care settings.* 4th Ed. Toronto, ON: Public Health Ontario; 2014. Available at: https://www.publichealthontario.ca/en/eRepository/2010-12%20BP%20Hand%20Hygiene.pdf

International

- Centers for Disease Control and Prevention (CDC). *Hand hygiene guideline.* CDC; 2002. Available at: https://www.cdc.gov/handhygiene/providers/guideline.html
- World Health Organization (WHO). *WHO guidelines on hand hygiene in health care.* Geneva; WHO: 2009. Available at: http://www.who.int/gpsc/5may/tools/9789241597906/en/

Best Practices in Environmental Cleaning

Canadian

- Provincial Infectious Diseases Advisory Committee (PIDAC). *Best practices for environmental cleaning for prevention and control of infections in all health care settings.* 3rd Ed. Toronto, ON: Public Health Ontario; 2018. Available at: https://www.publichealthontario.ca/en/eRepository/Best_Practices_Environmental_Cleaning.pdf
- Provincial Infection Control Network of British Columbia (PICNet). B*ritish Columbia best practices for environmental cleaning for prevention and control of infections in all healthcare settings and programs.* Vancouver, BC: PICNet; 2016. Available at:

https://www.picnet.ca/wp-content/uploads/British-Columbia-Best-Practices-for-Environmental-Cleaning-for-Prevention-and-Control-of-Infections-in-All-Healthcare-Settings-and-Programs.pdf

International

- Centers for Disease Control and Prevention (CDC). *Environmental cleaning and disinfecting for MRSA.* CDC; 2016. Available at: https://www.cdc.gov/mrsa/community/environment/index.html

Best Practices in Hospital Surveillance and Screening for Patients at High Risk for Presence of MRAS and/or VRE

Canadian

- Canadian Agency for Drugs and Technologies in Health (CADTH). *Methicillin-resistant Staphylococcus aureus (MRSA) screening and discontinuation of precautions in hospitals: Clinical effectiveness and guidelines.* CADTH; 2011. Available at: https://www.cadth.ca/methicillin-resistant-staphylococcus-aureus-mrsa-screening-and-discontinuation-precautions-hospitals
- Provincial Infectious Diseases Advisory Committee (PIDAC). *Best practices for surveillance of health care-associated infections.* Toronto, ON: Public Health Ontario; 2014. Available at: https://www.publichealthontario.ca/en/eRepository/Surveillance_3-3_ENGLISH_2011-10-28%20FINAL.pdf
- Provincial Infectious Diseases Advisory Committee (PIDAC). *Annex A: Screening, testing and surveillance for antibiotic-resistant organisms (AROs).* Toronto, ON: Public Health Ontario; 2013. Available at: https://www.publichealthontario.ca/en/eRepository/PIDAC-IPC_Annex_A_Screening_Testing_Surveillance_AROs_2013.pdf

International

- Lee TB, Montgomery OG, Marx J, Olmsted RN, Scheckler WE. Recommended practices for surveillance: Association for Professionals in Infection Control and Epidemiology (APIC). *AJIC.* 2007; 35: 427-440. doi:10.1016/j.ajic.2007.07.002. Available at: http://www.apic.org/Resource_/TinyMceFileManager/Practice_Guidance/AJIC-Surveillance-2007.pdf

Best Practices for Outbreak Management

Canadian

- Population and Public Health Division, Ministry of Health and Long-Term Care. *Institutional/facility outbreak management protocol, 2018.* Government of Ontario; 2018. Available at: http://www.health.gov.on.ca/en/pro/programs/publichealth/oph_standards/docs/protocols_guidelines/Inst_Fac_Outbreak_Protocol_2018_en.pdf
- Provincial Infectious Diseases Advisory Committee (PIDAC). *Annex C: Testing, surveillance and management of Clostridium difficile in all health care settings.* Toronto, ON: Public Health Ontario; 2013. Available at:

https://www.publichealthontario.ca/en/eRepository/PIDAC-IPC_Annex_C_Testing_SurveillanceManage_C_difficile_2013.pdf

International

- Campbell, EA. Chapter 12: Outbreak investigations. *APIC Text of Infection Control and Epidemiology.* Reston, VA: APIC; 2014. http://text.apic.org/toc/epidemiology-surveillance-performance-and-patient-safety-measures/outbreak-investigations
- Centers for Disease Control and Prevention (CDC). *Healthcare-associated infection (HAI) outbreak investigation toolkit.* CDC; 2013. Available at: https://www.cdc.gov/hai/outbreaks/outbreaktoolkit.html
- World Health Organization (WHO). *Infection prevention and control in health care for preparedness and response to outbreaks*. Geneva; WHO: 2014. Available at: http://www.who.int/csr/bioriskreduction/infection_control/publications/en/

Antimicrobial Stewardship

Canadian

- Do Bugs Need Drugs? www.dobugsneeddrugs.org
- Nakamachi Y, West S, Dresser L, Morris AM. Developing and expanding hospital antimicrobial stewardship: The Ontario experience. *CCDR Suppl.* 2015; 41S-4. https://doi.org/10.14745/ccdr.v41is4a04. Available at: https://www.canada.ca/en/public-health/services/reports-publications/canada-communicable-disease-report-ccdr/monthly-issue/2015-41/ccdr-volume-41-s-4-june-18-2015/ccdr-volume-41-s-4-june-18-2015-4.html
- Public Health Ontario. *Antimicrobial stewardship.* Available at: https://www.publichealthontario.ca/en/BrowseByTopic/InfectiousDiseases/AntimicrobialStewardshipProgram/Pages/Antimicrobial-Stewardship-Program.aspx

International

- Centers for Disease Control and Prevention (CDC). *Core elements of hospital antibiotic stewardship programs.* CDC; 2017. Available at: https://www.cdc.gov/antibiotic-use/healthcare/implementation/core-elements.html
- Interagency Coordination Group on Antimicrobial Resistance (IACG). *Future global governance for antimicrobial resistance: IACG discussion paper.* World Health Organization; 2018. http://www.who.int/antimicrobial-resistance/interagency-coordination-group/IACG_Future_global_governance_for_AMR_120718.pdf
- National Institute for Health and Care Excellence (NICE). *Antimicrobial stewardship. NICE Quality Standard*; 2016. Available at: https://www.nice.org.uk/guidance/qs121
- NICE. Antimicrobial stewardship: S*ystems and processes for effective antimicrobial medicine use.* NICE Guideline; 2015. Available at: https://www.nice.org.uk/guidance/ng15/

Best Practices for IPAC for *Clostridium difficile (C. difficile),* MRSA and VRE

Canadian

- Health PEI. *Prince Edward Island infection prevention and control methicillin-resistant staphylococcus aureus (MRSA) guideline.* Prince Edward Island Department of Health and Wellness; 2016. Available at: https://www.princeedwardisland.ca/sites/default/files/publications/pei_mrsa_guideline_sep_2016.pdf
- Prince Edward Island (PEI) Department of Health and Wellness. *Provincial vancomycin-resistant enterococci (VRE) guideline.* PEI Department of Health and Wellness; 2009. Available at: https://www.princeedwardisland.ca/en/publication/provincial-vancomycin-resistant-enterococci-vre-guideline
- Provincial Infection Control Network of British Columbia (PICNet). A*ntibiotic resistant organisms prevention and control guidelines for healthcare facilities.* Vancouver, BC: PICNet; 2013. Available at: https://www.picnet.ca/wp-content/uploads/PICNet_ARO_Guidelines_March2013.pdf
- Provincial Infectious Diseases Advisory Committee (PIDAC). *Review of literature for evidence-based best practices for VRE control*. Toronto, ON: Public Health Ontario; 2012. Available at: https://www.publichealthontario.ca/en/eRepository/PIDAC-IPC_VRE_Evidence-based_Review_2012_Eng.pdf
- Public Health Agency of Canada (PHAC). *Clostridium difficile infection: Infection prevention and control guidance for management in acute care settings*. Ottawa, ON: PHAC; 2013. Available at: https://www.canada.ca/en/public-health/services/infectious-diseases/nosocomial-occupational-infections/clostridium-difficile-infection-prevention-control-guidance-management-acute-care-settings.html

International

- Association for Professionals in Infection Control and Epidemiology (APIC). *Guide to the elimination of Methicillin-Resistant Staphylococcus aureus (MRSA) transmission in hospital settings, 2nd Ed*. Washington, DC: APIC; 2010. Available at: http://www.apic.org/Resource_/EliminationGuideForm/631fcd91-8773-4067-9f85-ab2a5b157eab/File/MRSA-elimination-guide-2010.pdf

Patient Education and Engagement

Canadian

- Patient Engagement Action Team. 2017. *Engaging Patients in Patient Safety – a Canadian Guide.* Canadian Patient Safety Institute. Last modified February 2018. Available at: www.patientsafetyinstitute.ca/engagingpatients
- Canadian Patient Safety Institute (CPSI). *Hand hygiene: Working with patients and families.* Edmonton, AB: CPSI; 2016. Available at: http://www.patientsafetyinstitute.ca/en/toolsResources/pages/patients-their-families.aspx

International

- Centers for Disease Control and Prevention (CDC). *Methicillin-resistant Staphylococcus aureus (MRSA): Information for patients.* CDC; 2016. Available at: https://www.cdc.gov/mrsa/healthcare/patient/index.html
- CDC. *Clostridium difficile infection information for patients.* CDC; 2015. Available at: https://www.cdc.gov/hai/organisms/cdiff/cdiff-patient.html

MEASURES

Vital to quality improvement is measurement, and this applies specifically to implementation of interventions. The chosen measures will help to determine whether an impact is being made (primary outcome), whether the intervention is actually being carried out (process measures), and whether any unintended consequences ensue (balancing measures).

In selecting your measures, consider the following:

- Whenever possible, use measures you are already collecting for other programs.
- Evaluate your choice of measures in terms of the usefulness of the final results and the resources required to obtain them; try to maximize the former while minimizing the latter.
- Try to include both process and outcome measures in your measurement scheme.
- You may use different measures or modify the measures described below to make them more appropriate and/or useful to your particular setting. However, be aware that modifying measures may limit the comparability of your results to others.
- Posting your measure results within your hospital is a great way to keep your teams motivated and aware of progress. Try to include measures that your team will find meaningful and exciting (IHI, 2012).

GLOBAL PATIENT SAFETY ALERTS

Global Patient Safety Alerts (GPSA) provides access and the opportunity to learn from other organizations about specific patient safety incidents including alerts, advisories, recommendations and solutions for improving care and preventing incidents. Learning from the experience of other organizations can accelerate improvement.

Recommended search terms:

- Antibiotic resistant organisms
- Infection control
- Infection Prevention and Control
- Hand hygiene
- Methicillin resistant *Staphylococcus Aureus* (MRSA)
- *Clostridium difficile*

- Vancomycin-Resistant Enterococci (VRE)

SUCCESS STORIES

Volunteers and Patients as Hand Hygiene "Partners in Care"
Island Health, British Columbia

Patient engagement in hand hygiene (HH) is one of Island Health's strategies for improving the patient experience and decreasing healthcare associated infections that can result in excess length of stay, morbidity and mortality. It is well known that volunteers contribute greatly to personalizing, humanizing and demystifying the hospital experience, so it was only fitting that Island Health would engage volunteers educated in proper hand hygiene by its own infection control practitioners to supplement the existing independent auditors working to engage patients in their own education on hand hygiene.

During the volunteer's visit, the patient, their visitors and their family are taught how and why to do proper hand hygiene. The patient is then asked to participate in a perception survey and monitor their healthcare workers (HCW) HH practices before and after moments of care. The survey is not a tool to measure accuracy but to support existing HH results and includes the engagement of physicians and all staff on the unit.

The results of the six-month pilot indicated that the vast majority of patient commentary on the survey cards expressed satisfaction with survey participation and HCW hand hygiene practices. Patients learned proper HH practices and were given the opportunity to observe and ask their HCWs to clean their hands before and after care. While the project was not specifically designed as an intervention for improving HH rates among healthcare providers, interestingly we found HH Rates at the pilot units have increased dramatically.

The goal of this initiative is to foster HH culture at Island Health by providing HH education to patients as well as engaging patients and healthcare providers in improving HH practice. The ultimate goal is to improve patient safety (Health Standards Organization 2014).

Toronto East General Antimicrobial Stewardship Program (ASP)
Toronto East General Hospital (TEGH) / Michael Garron Hospital, Ontario

An estimated 30-80 per cent of antimicrobials used in hospitals are unnecessary. Antimicrobial overuse promotes the development of superbugs like *C. Difficile,* Methicillin Resistant *Staphylococcus Aureus* (MRSA), Vancomycin Resistant Enterococcus (VRE), and Extended Spectrum B-lactamase producing bacteria (ESBL). Prior attempts to reduce antimicrobial use with antimicrobial guidelines or formulary restrictions (i.e., limiting which antimicrobials can be used) have demonstrated little success in reducing unnecessary antimicrobial use. A model of prospective audit and feedback was utilized as the basis for the TEGH Antimicrobial Stewardship Program (ASP) quality improvement intervention. The selection of this model was based on available evidence and the feedback elicited from the healthcare team.

During the process of prospective audit and feedback an individual patient's antimicrobials are reviewed by the ASP with feedback and education provided directly to care providers. Since the implementation of the TEGH ASP there has been a 30 per cent reduction in antimicrobial costs and significant reductions in the use of broad spectrum antimicrobial agents. Patient outcome data has demonstrated stability in mortality rates and average length of stay, with some wards demonstrating a reduction in seven-day readmission rates. Institutional rates of hospital acquired *C. Difficile* have also significantly decreased from an average monthly rate of 0.67/1000 patient-days to 0.42/1000 patient days since ASP implementation (Health Standards Organization 2012).

REFERENCES

Association for Professionals in Infection Control and Epidemiology (APIC). *APIC Implementation Guide: Guide to preventing Clostridium difficile infections*. Washington DC: APIC; 2013. Available at: http://apic.org/Resource_/EliminationGuideForm/59397fc6-3f90-43d1-9325-e8be75d86888/File/2013CDiffFinal.pdf

Calfee DP. Methicillin-resistant Staphylococcus aureus and vancomycin-resistant enterococci, and other Gram-positives in healthcare. *Curr Opin Infect Dis.* 2012; 25(4): 385-394. doi: 10.1097/QCO.0b013e3283553441

Campbell EA. Outbreak investigations. In: APIC Text of Infection Control and Epidemiology Online (ATO). Arlington, VA: Association for Professionals in Infection Control and Epidemiology, INC. (APIC); 2014. https://text.apic.org/toc/epidemiology-surveillance-performance-and-patient-safety-measures/outbreak-investigations

Canadian Patient Safety Institute (CPSI). How to help prevent healthcare-associated infections: A patient and family guide. Edmonton, AB: CPSI; 2012. https://www.patientsafetyinstitute.ca/en/About/Programs/HH/Documents/Patients%20and%20Families/Patient%20Family%20Guide.pdf

Centers for Disease Control and Prevention (CDC). *Clostridium difficile infection*. CDC; 2016. https://www.cdc.gov/hai/organisms/cdiff/cdiff_infect.html

Centers for Disease Control and Prevention. https://www.cdc.gov/hai/organisms/mrsa-infection.html

Centers for Disease Control and Prevention. *VRE in healthcare settings*. CDC; 2011. https://www.cdc.gov/hai/organisms/vre/vre.html

Health Standards Organization (HS0). *Leading Practices Toronto East General Antimicrobial Stewardship Program (ASP)*. Health Standards Organization; 2012 https://healthstandards.org/leading-practice/toronto-east-general-antimicrobial-stewardship-program-asp/

Health Standards Organization (HS0). Leading Practices Volunteers and Patients as Hand Hygiene “Partners in Care”. Health Standards Organization; 2014 https://healthstandards.org/leading-practice/volunteers-and-patients-as-hand-hygiene-partners-in-care/

Institute for Healthcare Improvement (IHI). *How-to guide: Prevent catheter-associated urinary tract infections*. Cambridge, MA: IHI; 2011. Available at : http://www.ihi.org/resources/Pages/Tools/HowtoGuidePreventCatheterAssociatedUrinaryTractInfection.aspx

Martin, P., C. Abou, V. William, K. Bush, M. Dyck, Z. Hirji et al. 2019. Prevalence of Antibiotic-Resistant Organisms in Canadian Hospitals. Comparison of Point-Prevalence Survey Results from 2010, 2012, and 2016. Infection Control and Hospital Epidemiology 40(1): 53–59. doi:10.1017/ice.2018.279.

McDonald LC, Gerding DN, Johnson S, et al. Clinical practice guidelines for *Clostridium difficile* infection in adults and children: 2017 update by the Infectious Diseases Society of America (IDSA) and Society for Healthcare Epidemiology of America (SHEA). *Clin Infect Dis.* 2018; 66(7): 987-994. doi:10.1093/cid/cix1085. Available at: https://academic.oup.com/cid/article/66/7/e1/4855916

Mitchell R, G. Taylor, W. Rudnick, S. Alexandre, K. Bush, L. Forrester et al. 2019. Trends in Health Care-Associated Infections in Acute Care Hospitals in Canada: An Analysis of Repeated Point-Prevalence Surveys. *CMAJ;*191 (36): E981–88. doi:10.1503/cmaj.190361.

National Institute for Health and Care Excellence (NICE). *Clostridium difficile infection: Risk with broad-spectrum antibiotics.* NICE Evidence Summary; 2015. Available at: https://www.nice.org.uk/advice/esmpb1/chapter/Key-points-from-the-evidence

Public Health Agency of Canada (PHAC). *Routine practices and additional precautions for preventing the transmission of infection in healthcare settings*. Ottawa, ON: PHAC; 2017. Available at: https://www.canada.ca/en/public-health/services/publications/diseases-conditions/routine-practices-precautions-healthcare-associated-infections.html

Public Health Agency of Canada (PHAC). *Tackling antimicrobial resistance and antimicrobial use: A pan-Canadian framework for action.* Ottawa, ON: PHAC; 2017. Available at: https://www.canada.ca/en/health-canada/services/publications/drugs-health-products/tackling-antimicrobial-resistance-use-pan-canadian-framework-action.html

Public Health Agency of Canada (PHAC). *Federal action plan on antimicrobial resistance and use in Canada: Building on the Federal framework for action*. Ottawa, ON: PHAC; 2015. Available at: http://healthycanadians.gc.ca/alt/pdf/publications/drugs-products-medicaments-produits/antibiotic-resistance-antibiotique/action-plan-daction-eng.pdf

Public Health Agency of Canada (PHAC). *Fact sheet - Clostridium difficile (C. difficile)*. Ottawa, ON: PHAC; 2014. Available at: https://www.canada.ca/en/public-health/services/infectious-diseases/fact-sheet-clostridium-difficile-difficile.html

Public Health Agency of Canada (PHAC). *Fact Sheet - Vancomycin-resistant Enterococci (VRE)*. Ottawa, ON: PHAC; 2010. Available at: https://www.canada.ca/en/public-health/services/infectious-diseases/nosocomial-occupational-infections/vancomycin-resistant-enterococci.html

Public Health Agency of Canada (PHAC). *Fact Sheet - Methicillin-Resistant Staphylococcus aureus.* Ottawa, ON: PHAC; 2008. Available at: http://www.phac-aspc.gc.ca/id-mi/mrsa-eng.php

Review on Antimicrobial Resistance*. Tackling drug-resistant infections globally: Final report and recommendations*. UK; 2016. Available at: https://amr-review.org/sites/default/files/160525_Final%20paper_with%20cover.pdf

World Health Organization (WHO). News release. *In the face of slow progress, WHO offers a new tool and sets a target to accelerate action against antimicrobial resistance.* WHO. Geneva. 2019. Available at: https://www.who.int/news-room/detail/18-06-2019-in-the-face-of-slow-progress-who-offers-a-new-tool-and-sets-a-target-to-accelerate-action-against-antimicrobial-resistance

World Health Organization (WHO). *Guidelines on core components of infection prevention and control programmes at the national and acute health care facility level*. WHO; 2016. Available at: http://www.who.int/infection-prevention/publications/ipc-components-guidelines/en/