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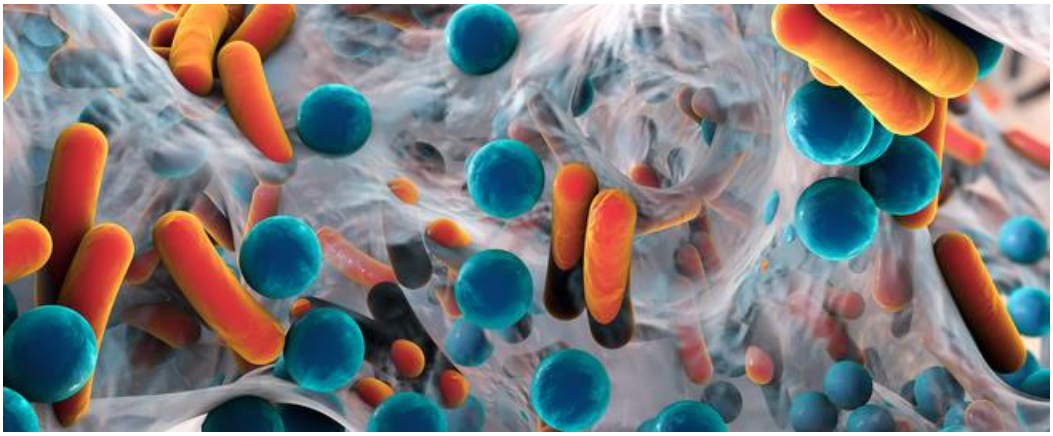
Annual Report
2015–2016



Infection Prevention and Control
July 2016

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Executive Summary

FH IPC Health Care Report Card Priorities					
Indicator	Status	Target	2015/16 Actual	Preferred Direction	Page #
CDI	●	≤6.0*	5.0*	↓	23
MRSA	▲	≤7.0*	7.0*	↓	29
Hand Hygiene Compliance	●	80%	87%	↑	44

* cases per 10,000 patient days
● meeting target
▲ within 10% of target
◆ outside of target range by more than 10%

Additional IPC Indicators					
Indicator	Status	Target	2014/15 Actual	2015/16 Actual	Page #
CPO	■	Reduction in transmissions	24**	13**	30
Hand Hygiene Observations	■	Increase in observations	167,732	135,258	44
Reprocessing Compliance	■	Increase in compliance (high-risk areas)	94%	93%	50
	■	Increase in compliance (low-risk areas)	99%	95%	
Outbreak Management	■	Reduction in # of CDI Outbreaks	9	8	55

** number of cases
■ = minimal concerns: actual is meeting the target of year-over-year improvement and data points are moving in the preferred direction
■ = concern area: actual is not meeting target of year-over-year improvement, or data points are not moving in the preferred direction, or indicator is a special consideration (e.g. CPO)
■ = problem area: actual is not meeting target of year-over-year reduction and data points are not moving in the preferred direction

Under the leadership of Linda Dempster, VP Patient Experience, Dr. Elizabeth Brodkin, Infection Prevention and Control (IPC) Executive Medical Director, and Loraine Jenkins, Executive Director, Maternal, Child, Infant & Youth Clinical Program and IPC, the IPC program at Fraser Health (FH) is very pleased to present the 2015/16 annual report. IPC is a regional program that supports FH in the achievement of excellence in healthcare through implementation of infection prevention and control evidence-based best practices.

In meeting the Fraser Health patient safety's priorities of reducing hospital-acquired infection (HAI) rates, the IPC team focused on a number of very important initiatives and major projects for 2015/16 as highlighted in the 2014–2016 IPC Service Plan. This annual report identifies the initiatives of the service plan, the outcomes and accomplishments of the program, and outlines major goals and continued priorities for the 2016/17 fiscal year. The following initiatives highlight the achievements of the IPC program for the 2015/16 fiscal year in alignment with in the 2014–2016 IPC Service Plan.

IPC Service Plan Initiative 1: Strengthen IPC as a regional program

The first initiative outlined in the 2014–2016 IPC Service Plan was to strengthen IPC as a regional program across the health authority. Accomplishments for 2015/16 included completion of the final year of the 2014–2016 service plan. Main objectives for Initiative 1 were to complete the human resources plan for recruitment and training of IPC Practitioners, implementation of the IPC Professional practice council, support the IPC team with new program leadership (Operations Director, Operations Manager, and Managing Consultant for the IPC Consultants) and broaden support for community programs—including home health and primary care. A significant change for the IPC program occurred late in 2015/16 as the IPC Practitioners were moved to a centralized model under IPC Operations, directly reporting to an operations manager with a professional responsibility to IPC Director leads at the acute care sites.

IPC Service Plan Initiative 2: Ensure evidence-based guidelines are put into practice

The highest priority objective for this initiative was to finalize and publish the IPC acute care manual; a document that guides evidence-based best practices for all FH acute care staff and physicians. The IPC program finalized and published seven new clinical practice guidelines with associated standard operating procedures, clinical decision support tools, and a comprehensive (A-Z) table that identifies infection prevention and control requirements and best practices for managing infectious organisms and their associated conditions. The new clinical practice guidelines outline overarching basic infection control practices for routine practices and additional precautions, as well as detailing requirements for the additional precautions used at FH (Airborne, Droplet, Contact, Contact Plus and Enhanced precautions). Implementation occurred between May 2015 and January 2016.

The FH IPC program went through a successful supplemental Accreditation Canada survey in Aril 2015. Infection prevention and control practices at BH, SMH, RCH, FCH and ARH were evaluated where it was noted that there is a definite culture of teamwork across the sites to reduce infections. All the Required Organizational Practices were met, however, two unmet criteria were that the organization did not provide patients, families and visitors with information about routine practices and additional precautions as appropriate, and ensuring that staff, service providers and volunteers have access to handwashing sinks.

Other accomplishments for this initiative include the hiring of a Medical Director for the Antimicrobial Stewardship program (Dr. Kevin Afra, an Infectious Disease physician) to provide leadership and support for antimicrobial stewardship actions at FH, initial preparation for the Accreditation Canada survey visit in October 2016 of the Infection Prevention and Control standards, as well as support for construction, and restructuring of the Ministry of Health (MoH) reprocessing audits under the Medical Device Reprocessing program within acute care site.

IPC Service Plan Initiative 3: Support hand hygiene audit program and best practices

Initiative 3 outlines the hand hygiene program objectives for the organization that fall under the responsibility of the IPC program. As part of an engagement strategy to facilitate awareness and hand hygiene compliance improvement, hand hygiene audits are conducted across all facilities throughout FH including all acute care units and FH-operated residential facilities. Hand hygiene compliance increased by 3% from 84% in 2014/15 to 87% in 2015/16, with the majority of FH acute care sites meeting the provincial target of 80% compliance.

The continued success in hand hygiene compliance may be attributable to a number of factors, including ongoing education and improvement work conducted by the IPC Practitioners and university co-operative program students, site dedication to frequent audits, ongoing communication strategies, and improvement work performed by front-line staff and healthcare providers across the organization. Site leadership and physician commitment to increased engagement at the sites and the community facilities to ensure audits are completed for each unit, each fiscal period, also impacted the ability for FH to meet targets.

The importance of hand hygiene in minimizing transmission of HAIs continues to be a highlight, where units with an increased prevalence of *Clostridium difficile* infection (CDI), Methicillin-Resistant *Staphylococcus aureus* (MRSA), or carbapenemase-producing organism (CPO) cases are required to increase hand hygiene activities through audits and improvement work.

IPC Service Plan Initiative 4: Reduce health-care associated infections

The ongoing focus to reduce HAIs as a quality and safety priority action for the organization included quick identification and strict management of CDI and CPO cases to minimize the risk of transmission to other patients, as well as reduction in the number of nosocomial cases MRSA.

CPO

A major objective for the IPC program was the reduction in transmission of multi-drug resistant organisms (MDRO), primarily CPO. 2015/16 successful initiatives included the establishment of CPO cohort units at SMH and ARH, with a Rehabilitation program cohort at PAH. Another initiative included the in-depth exploration of modes of transmission of indeterminate CPO cases (new cases where the source of transmission cannot be determined). FH identified 67 CPO cases in 2015/16. The overall goal across FH for this fiscal year was to reduce CPO transmission by examining the epidemiology and origin of the cases and addressing any risk factors for transmission. While, the organization identified 67 CPO cases in 2015/16, the overall number of nosocomial cases was significantly reduced. The majority of the high-risk units (such as the HAU and ICU) sustained zero transmissions for greater than 12 months.

CDI

The CDI incidence rate for 2015/16 was 5.0 cases per 10,000 patient days, which was above 2014/15 (4.3 cases per 10,000 patient days). Reduction strategies from the past two fiscal years (2013/14 and 2014/15) continue to be emphasized and incorporated into front-line practice, including individual gastrointestinal case, alert-level and outbreak-level cleaning, widespread use of the Bristol Stool Chart, de-cluttering activities, and improved hand hygiene. Additional improvement strategies for 2015/16 included a priority and focus on units that are vulnerable to ongoing nosocomial CDI cases. Comprehensive action plans were developed, actioned, and updated each fiscal period for those vulnerable units in an effort to minimize the number of nosocomial cases.

Work also started to better understand behaviour change and implementation science with site leadership and front-line staff in an effort to facilitate changes in clinician behaviors, habits and care processes in support of a stronger patient safety culture.

MRSA

MRSA improvement initiatives were also a major component of overall FH HAI reduction strategies. FH experienced an increase in the rate of MRSA to 7.1 cases per 10,000 patient days in 2015/16 from 6.8 cases per 10,000 patient days in 2014/15. The improvement strategies undertaken for management of CDI and CPO, along with hand hygiene improvements, helped minimize the increase in MRSA nosocomial cases. This rise in nosocomial cases is postulated to be a result of ongoing improved screening protocols that involve admission screening for both MDRO and MRSA. As with CDI and CPO, units and programs with ongoing higher rates of MRSA nosocomial cases are targeted for focused improvement work, including hand hygiene initiatives, enhanced room cleaning, and assurance that medical devices and patient care equipment are dedicated to one patient or disposable and appropriately cleaned between each patient use.

CLABSI

A Central Line Associated Bloodstream Infections (CLABSI) surveillance protocol was developed and piloted in the Intensive Care units at SMH and RCH in 2014/15. CLABSI surveillance was subsequently expanded to include ARH and BH in 2015/16. The protocol was based on existing protocols from the CDC's National Healthcare Safety Network (NHSN) of America and the Canadian Nosocomial Infection Surveillance Program (CNISP). It is a unique protocol specific to Intensive Care Unit (ICU)-related CLABSI surveillance. A preliminary 6-month CLABSI report was provided to the Critical Care program in May 2016, which indicated minimal cases for the reporting sites.

VRE

In November 2012, FH changed its protocol for screening patients and identifying carriers of Vancomycin-resistant Enterococci (VRE) (patients colonized in the bowel), recognizing that few infections occurred as a result of VRE colonization. FH staff no longer perform routine tests for VRE colonization and no longer apply special infection control measures to patients with VRE colonization unless the patient has a VRE-related infection; however, the IPC program continues to monitor clinical outcomes of patients

with VRE infection to evaluate this change in protocol and ensure patients are not at increased risk as a result of the change. Surveillance reports continue to be provided to Health Authority Medical Advisory Committee (HAMAC) annually for accountability and evaluation.

IPC Service Plan Initiative 5: Enhance IPC surveillance systems and reporting tools

This initiative focused on automating and improving the electronic surveillance and reporting systems for the IPC program across FH. Robust surveillance systems improve the reliability and validity of HAI data that in turn, allow for optimal use of valuable IPC program resources to promote IPC improvement and education initiatives, ultimately leading to better outcomes for patients. In ongoing collaboration with the Health and Business Analytics team at FH, the IPC program continued to update and develop automated surveillance systems. 2015/16 work included enhancements to the CDI and MDRO surveillance and reporting systems, as well as major development of an automated surveillance system for MRSA and VRE. Work also progressed on streamlining the externally sourced hand hygiene and reprocessing audit and reporting systems. Significant time and resources were spent to ensure reliability, accuracy and validity of all IPC surveillance and audit metrics: CPO, CDI, VRE, MRSA, and CLABSI through comprehensive case reviews and analysis of epidemiological information. In addition, data validation protocols were conducted to ensure standardization of case definitions and accuracy of manual case determination by IPC team as well as the automated surveillance systems. Other objectives under this initiative included automation of the IPC metric reports for FH leadership and front-line staff as well as export to external stakeholders, including the Provincial Infection Control Network of BC (PICNet) and the MoH.

IPC Service Plan Initiative 6: Explore and implement new IPC technologies, best practices and research

This last initiative represented some of the leading-edge technologies and forward thinking for the IPC program as well as research objectives. These objectives, when implemented, will eventually become the new IPC best practices for the organization and, in turn, support ongoing reduction of HAIs.

FMT

Fecal Microbiota Transplantation (FMT) therapy was implemented at RMH by Dr. Ed Auersperg for patients with chronic relapses of CDI, following a provincially adopted protocol. This service will continue to be offered at RMH, and will be expanded to accommodate all patients across the HA once the protocol has been well established at RMH.

GeneXpert

In-patient molecular testing for tuberculosis (TB) and CPO using the GeneXpert instrument was implemented at SMH laboratory; confirmatory testing is performed by the BC Centre for Disease Control Public Health Laboratory (BCCDC PHL). The in-house testing for TB and CPO using this technology will support a much quicker turn-around time for receiving test results that, in turn, will significantly improve patient safety plus reduce congestion and competition for negative pressure rooms.

Research

One major objective of the IPC research initiative was to increase research capacity of the IPC program with submission of abstracts for conferences and articles for peer-reviewed journals. The FH epidemiologist provided an oral presentation on the development of an automated, electronic MDRO surveillance system at the Infection Prevention and Control (IPAC) Canada national conference in June 2015 and presented on the topic of *Clostridium difficile* infection surveillance: Applying the case definition at the annual PICNet conference (March 2016). Two Simon Fraser University co-operative program students presented posters on their hand hygiene initiatives at FH at the BC Patient Safety and Quality forum. The poster on physician hand hygiene improvements won one of the top awards at the conference. The IPC program also collaborated on a number of presentations regarding CPO and CDI at the provincial level and is supporting a national research initiative on this topic. Research is an important priority for the team, and there is a strong commitment from the IPC program leadership to fully support this objective for 2016/17.

Ultra-violet Germicidal Irradiation

The FH IPC program, in collaboration with SMH, BISS (Business Initiatives and Shared Services) and P3 partners, trialed an ultra-violet germicidal irradiation (UVGI) device at SMH. UVGI systems are being used at some provincial health authorities and in North

America as an adjunct to traditional manual chemical cleaning to reduce bacterial contamination in the healthcare environment. The UVGI system that was evaluated at FH emits short pulses of UV light between 200 and 320 nm of the spectrum (UV-C). In vitro evaluations indicate wavelengths in this part of the spectrum are germicidal and effective in deactivating a multitude of pathogens including CPO, *C. difficile*, MRSA and VRE. The device showed some efficacy in reducing the level of microbial contamination in hospital settings beyond what standard manual cleaning can achieve. An evaluation report on the feasibility and use of the device were submitted to the FH Executive for consideration for purchase.

FH Biocontainment Unit

In September 2014, FH began preparations for the possibility that an Ebola Viral Disease (EVD) patient would require management at one of the acute care facilities. The IPC program was one of many stakeholders that responded to this emerging threat and collaborated with internal FH programs and externally with other HAs, Public Health, and the MoH to develop protocols, processes, guidelines, policies, algorithms, checklists, communication tools, and training material to ensure that patients, clients, residents, and all healthcare providers would be well protected and have appropriate care in the event that an EVD case arrived in BC. Based on the 2014/15 EVD preparations, the SMH HAU was designated as the provincial Biocontainment unit that will support and provide care for patients when physical containment and medical treatment is required due to suspicion or confirmation of highly pathogenic organisms or agents (bacteria, viruses, and toxins). IPC supports the continuous training of staff on this unit to properly don and doff protective equipment as well as support general infection prevention and control best practices.

IPC Service Plan Key Priorities for 2016/2017

Based on the new 2016–2018 IPC Service Plan, key priorities for 2016/17 will be to:

- Prepare for and provide assistance to FH sites and programs to ensure a successful 2016 Accreditation Canada survey visit (the measure is to meet all IPC Required Organizational Practices);
- Implement and communicate quarterly status updates regarding the IPC 2016–2018 service plan program initiatives;

- Consult on and support site-led improvement initiatives for the FH patient safety priorities of CDI and hand hygiene with an increased focus on behaviour change strategies;
- Continue to develop and strengthen the support for residential care, MHSU and community programs including the restructure of the Residential Care IPC Committee;
- Implement automated IPC surveillance systems for MRSA and VRE;
- Educate and train IPC Practitioners and Consultants in CSA standards to ensure all phases of FH construction and renovation projects are well supported by IPC best practices;
- Foster a cohesive, solid, integrated IPC regional program;
- Promote IPC program research and publications; and
- Participate in and advocate for antimicrobial stewardship activities.

In a healthcare environment where continued accountability and transparency is at the centre of garnering public trust, IPC at FH welcomes your feedback on this report. Please send comments to the IPC program assistant Julie Reynolds (julie.reynolds@fraserhealth.ca)

Introduction

The FH IPC program's mandate is to ensure patient, resident, client, staff, physician, and visitor safety through control and prevention of infectious agents across the continuum of care.

In fiscal year 2015/16, the IPC program continued to grow and develop by filling IPC Practitioner vacancies at FH acute sites, hiring IPC Consultants for the community sites and programs, providing a structured training and orientation program for the new hires, recruiting an operations manager and a managing consultant for the IPC Practitioners and the Consultants respectively, along with continued advancement and clarity of the IPC operations and clinical streams' roles and responsibilities.

IPC has a regional structure that provides consultation across FH residential care facilities and community programs, as well as providing local operational support at each of the FH acute care sites. A major shift for the IPC program in 2015/16 was having the IPC Practitioners report centrally to an IPC Operations Manager and Clinical Director of Operations, with a professional responsibility to their acute care sites. Previously, the IPC Practitioners reported directly to Directors at the acute care sites with a matrix reporting to the IPC program. This change in reporting supported a requirement to standardize IPC practices as well as provide flexibility for the program to respond in a timely way to urgent and emerging situations. A regional Infection Prevention and Control Operations Council was formed with membership consisting of IPC leadership and the site-based IPC Director leads to provide a discussion venue for IPC operations and clinical practice issues at the acute sites.

The IPC team provides expertise in infection prevention and control principles, best practices, and standards that promote patient safety efforts across FH, from front-line to organizational levels. The IPC program also participates in expert committees and collaborates with other BC HAs as well as local, provincial, and national quality and patient safety organizations and related initiatives. A selection of organizations that IPC works in partnership with includes PICNet, Infection Control Epidemiologists of BC (ICE BC), IPAC Canada and the BC IPAC chapter, the BC Patient Safety and Quality Council, Accreditation Canada, the Provincial Hand Hygiene Working Group, as well as the provincial Reprocessing Working Group. The program collaborates with PICNet and the BC MoH in developing and updating BC best practice guidelines (e.g., hand hygiene, reprocessing, and environmental services).

Infection prevention and control across the organization is accomplished by:

- Undertaking surveillance, trending, and reporting of site- and program-based HAI to increase awareness of and response to patient safety issues and help drive improvement initiatives
- Engaging stakeholders in the adoption, implementation, and standardization of IPC principles and best practices
- Educating and partnering with employees, physicians, third-party providers, patients, clients, residents, visitors, and volunteers

Strategic initiatives and improvement actions for fiscal year 2015/16 were comprised of the following categories:

- Completion of the 2014–2016 IPC Service Plan with planning and development of the new 2016–2018 Service Plan
- Support of the FH Patient Safety priorities for hand hygiene and CDI, particularly units that are vulnerable to CDI transmission
- Final implementation, education and publication of the IPC manual, standards, and best practices
- Management, reduction initiatives and surveillance for HAIs (CPO, CDI, and MRSA)
- Development of automated databases and improvement of reporting systems for HAIs
- Development and implementation of the IPC Practitioner hiring processes and orientation manual

The IPC Annual Report is organized in four sections:

- Executive Summary
- Introduction
- Healthcare-associated Infection (HAI) Indicators
- Infection Prevention and Control Best Practices

Details are available throughout the body of the annual report with the methodology and technical notes as an Appendix C.

IPC Leadership and Support Team

The FH IPC program reported to Linda Dempster, the Vice-President Patient Experience who provided executive leadership and strategic oversight for the Infection Prevention and Control program. The IPC program is led by Dr. Elizabeth Brodkin, Executive Medical Director, and Loraine Jenkins, Executive Director for Operations, in consultation with the Medical Microbiologists from the Department of Laboratory Medicine and Pathology and the site-based Directors, Clinical Operations IPC leads. The IPC program is also supported by Public Health, Workplace Health, and numerous other stakeholders and programs across the Health Authority (see Appendix A for IPC Program Chart).

Linda Dempster Vice-President, Patient Experience	Tara Leigh Donovan IPC Managing Consultant
Dr. Elizabeth Brodkin IPC Executive Medical Director	Daniel Chan Manager, IPC Operations
Loraine Jenkins Executive Director, MICY & IPC Operations	Louis Wong Epidemiologist
Petra Welsh Senior Leader, IPC Strategy and Performance	Loretta Bogert-O'Brien Health Data Analyst
Tamara van Tent Director, Clinical Operations, MICY & IPC	Julie Reynolds Program Assistant
Ruth Dueckman CNS, MICY & IPC	Ziquan (Steven) Zhou Business Analyst, IPC / Health and Business Analytics

Infection Prevention and Control Practitioners and Consultants – 2015/16 (alphabetical order by surname) *

IPC Practitioners

Abed, Vlada	Giesbrecht, Amanda	Nelson, Tanis
Au, Stephanie	Gill, Parmjeet	Nichols, Janie
Baddan, Sandeep	Imamovic-Buljubasic, Amira	Ratzlaff, Jackie
Bos, Stephanie	Jensen, Karen	Riarh, Kam
Butler-Lim, Susan	Khan, Maryam	Rodgers, Karen
Chan, Daniel	Khoddami, Masoud	Sidhu, Rani
Chilton, Kathy	Kim, Lauren	Sohi, Raj
Dhaliwal, Parveen	McLean, Rhonda	Tjosvold, Sandra
Dickson, Terry	Meeds Montero, Darlene	Rivas, Charina
Emley, Kirsten	Melanson, Lorraine	Wong, Winnie
Garcha, Shelly	Mendes, Adriana	
Gardezy, Simone	Michael, Maria	

IPC Consultants

Brierton-Joseph, Iona	Ibrahimov, Fuad	Ormond, Sarah
Chisholm, Paul	Jensen, Karen	Taha, Fatma
Esmail, Noorsallah	Meeds Montero, Darlene	
Hlagi, Jacqueline	Nichols, Janie	

* The IPC Practitioners report centrally to the IPC Operations Manager through to the Director, Clinical Operations MICY and IPC. This list depicts all staff that were part of the program during the 2015/16 reporting period. The IPC Consultants report through the IPC Managing Consultant to the Senior Leader, IPC Performance and Strategy.

Acknowledgements

The IPC program would like to acknowledge the important partnerships shared with the site and program clinical care teams and the significant contribution they provided in achieving positive results for the infection prevention and control initiatives across the organization. Included in this acknowledgement are the FH Executive Team, Medical Microbiologists, Medical Program Directors, Physicians, Executive Directors, site-based Directors, Clinical Operations, managers, and all FH program staff. We look forward to continued collaboration to address those areas where nosocomial infections continue to have a negative impact on patients and their families. It is a privilege to work with dedicated, compassionate, and knowledgeable staff throughout the organization. Special thanks go to:

- BC Centre for Disease Control Public Health Laboratory
- BC Patient Safety and Quality Council
- BISS and General Managers of P3 facilities and all Environmental Services staff
- Colleagues from other provincial health authority IPC programs
- Communications and Public Affairs
- Infection Prevention and Control (IPAC) – IPAC-BC
- Crede Technologies
- FH Health & Business Analytics team
- Facilities Maintenance & Operations
- BC Clinical and Support Services
- Corporate IMIT Services
- HR People Services
- Medical Health Officers
- Ministry of Health Services
- Pharmacy Services
- Provincial Infection Control Network (PICNet) of BC
- Quest University co-operative student (Katherine Hosford for contributions to alert and outbreak reporting for CDI/GI and RI, and FH hand hygiene initiatives)
- Simon Fraser Health Sciences co-operative students (Amani Kafeety and Barbara Stroud for contributions to FH hand hygiene initiatives)
- Workplace Health & Safety

Healthcare Associated Infection (HAI) Indicators

Clostridium difficile Infection (CDI)

CDI is one of the most commonly acquired HAI in industrial countries. CDI is often related to antimicrobial therapy, which alters the normal bacteria found in the gastrointestinal tract. CDI may be a mild infection or can present as massive diarrhea that may be difficult to control, with the potential for toxic megacolon, sepsis, and even death.

Status	Target	Actual (2015/16)	Preferred Direction
	≤ 6*	5.0*	

*cases per 10,000 patient days

General Overview for 2015/2016

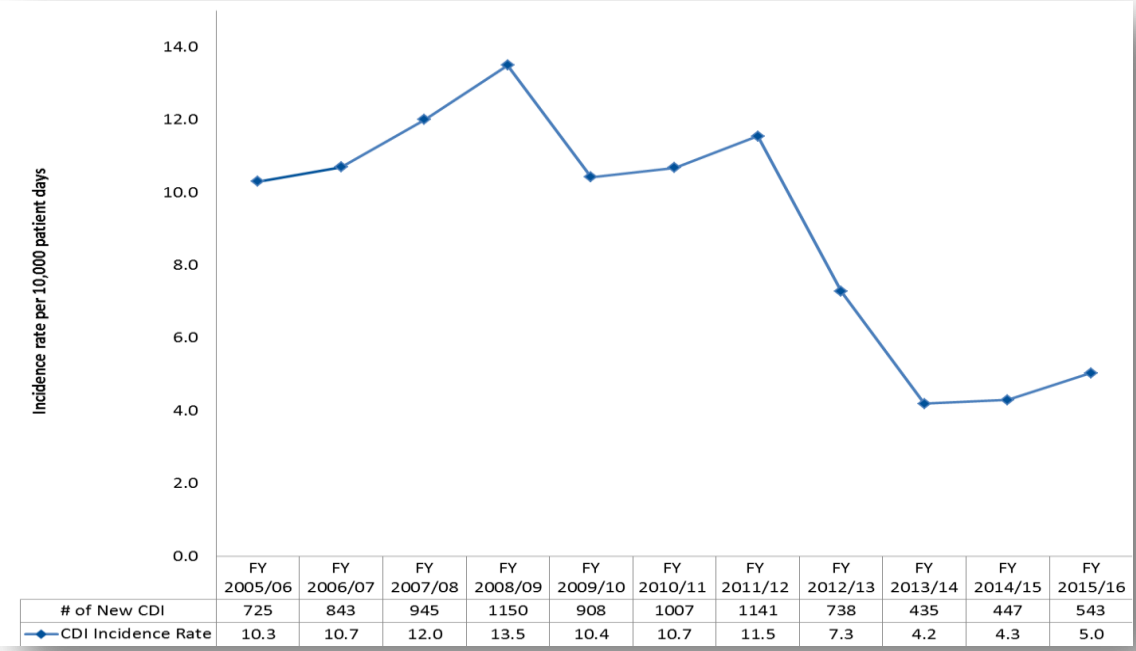
What is the annual target the organization seeks to reach?

A CDI incidence rate of ≤ 6.0 cases per 10,000 inpatient days was the established annual target for FH for 2015/16 fiscal year; consistent with the previous two fiscal years. The overarching goal is s a reduction in the CDI rate year over year. The FH rate of new CDI for 2015/16 increased from the previous fiscal year of 4.3 to 5.0 cases per 10,000 patient days. Although this increase was not statistically significant, it does not meet the goal of the organization to reduce CDI rates.

Trend: What do the data show?

Overall FH

The FH facility-associated CDI incidence rate was 5.0 cases per 10,000 patient days [95% CI: 4.6-5.5] in fiscal year 2015/16, which is slightly higher than the fiscal year rate in 2014/15 of 4.3 cases per 10,000 patient days [95% CI: 3.9-4.7]. This remains well below the peak incidence of 13.5 cases per 10,000 patient days seen in fiscal year 2008/09 (Figure 1). There is no statistically significant difference in the incidence of CDI in 2015/16 compared to the previous year. The proportion of new CDI that were community-associated in fiscal year 2015/16 was 33%, which is compared to 29% in the previous fiscal year, 2014/15.



	FY 2005/06	FY 2006/07	FY 2007/08	FY 2008/09	FY 2009/10	FY 2010/11	FY 2011/12	FY 2012/13	FY 2013/14	FY 2014/15	FY 2015/16
# of New CDI	725	843	945	1150	908	1007	1141	738	435	447	543
CDI Incidence Rate	10.3	10.7	12.0	13.5	10.4	10.7	11.5	7.3	4.2	4.3	5.0

Source: Fraser Health CDI Surveillance Database, extract July 2016

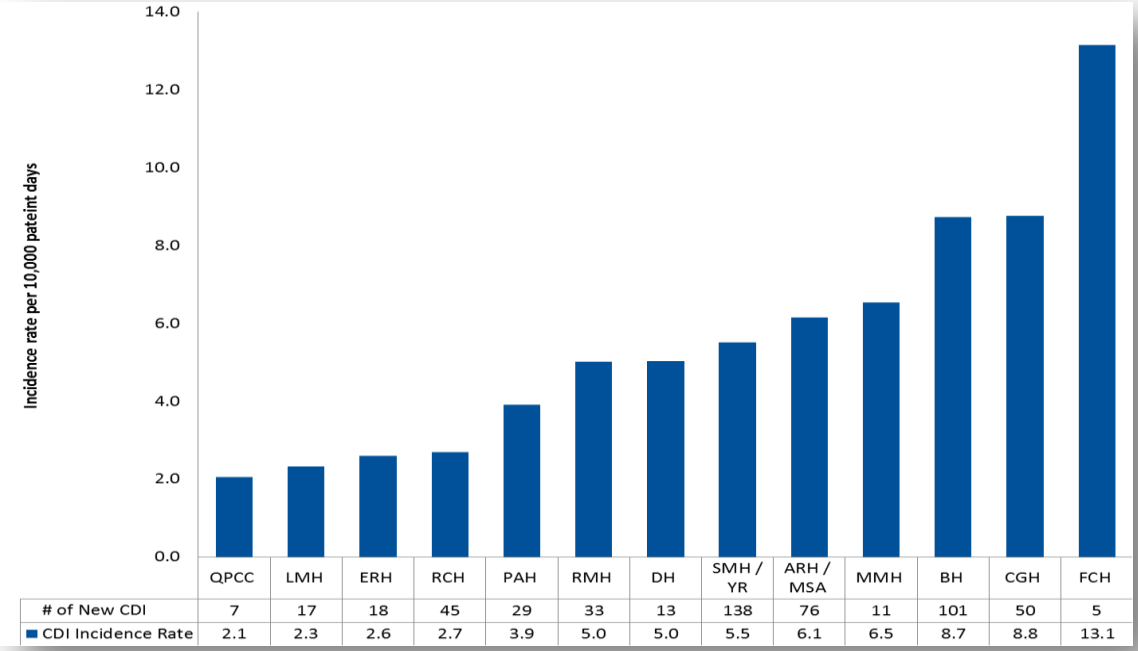
Figure 1: Number of new CDI and facility-associated CDI incidence rate per 10,000 patient days, by fiscal year for FH

FH Acute Care Sites

In 2015/16, the CDI incidence rate was highest among FCH, CGH, and BH respectively (Figure 2). The CDI incidence rates among FH sites ranged from 2.1 cases at QPCC (7 CDI) to 13.1 cases at FCH (5 CDI) per 10,000 patient days (Figure 2). BH had a CDI rate of 8.7 cases per 10,000 patient days (101 CDI), and the CGH rate was 8.8 cases per 10,000 patient days (50 CDI). It should be noted, that CGH and BH both experienced CDI or GI outbreaks during fiscal year 2015/16, which could account for the increased incidence as these sites. Lastly, SMH/YR (138 CDI) and BH had the greatest number of CDI in fiscal year 2015/16.

Caution must be taken when interpreting rates because one case can result in a display of an inflated rate for facilities and programs with a small number of beds and patient days (e.g., FCH). An increase of one or two cases can lead to a high facility rate. Moreover, additional factors that could account for the higher incidence of CDI include, but not limited to, congestion and over-capacity some sites serve patients with higher acuity who likely experience comorbidities, health complications, and critical illnesses

and require antibiotic therapy, which can pose an increased risk of CDI. Older infrastructure challenges such as limited number of single patient rooms at these sites can also present a challenge for implementing infection prevention and control best practices.



	QPCC	LMH	ERH	RCH	PAH	RMH	DH	SMH / YR	ARH / MSA	MMH	BH	CGH	FCH
# of New CDI	7	17	18	45	29	33	13	138	76	11	101	50	5
CDI Incidence Rate	2.1	2.3	2.6	2.7	3.9	5.0	5.0	5.5	6.1	6.5	8.7	8.8	13.1

Source: Fraser Health CDI Surveillance Database, extract July 2016

Figure 2: Number of new CDI and facility-associated CDI incidence rate, by FH site, 2015/16

Benchmark Comparison: How does the rate compare to other areas?

The provincial rate of new cases of CDI associated with the reporting facility is used as a benchmark for FH due to a similar methodology and reporting structure. The provincial annual CDI rate was 4.2 cases per 10,000 inpatient days [95% CI: 3.9-4.4] in fiscal year 2014/15, which is the most recently published provincial annual rate. The 2015/16 annual rate of CDI for FH of 5.0 cases per 10,000 inpatient days [95%CI: 4.6-5.5] was significantly above the provincial 2014/15 benchmark. [*Annual surveillance report of healthcare-associated infections in BC acute care facilities*. Provincial Infection Control Network of BC (December 2015). Retrieved from https://www.picnet.ca/wp-content/uploads/PICNet-Annual-Surveillance-Report-2014-15.pdf].

CDI Reduction Strategies

The key to management and reduction of CDI across the organization continues to be education to healthcare providers and physicians regarding early identification and isolation of potential CDI cases. This is primarily accomplished through use of a documented Bristol Stool chart and immediate implementation of the IPC-recommended protocols and practices for all patients with gastrointestinal symptoms. This includes judicious use of antimicrobials as directed by the CDI pre-printed orders, wearing the correct personal protective equipment, as well as applying appropriate precautions, monitoring the number of cases on the unit to determine if transmission is occurring, and conducting enhanced cleaning with a sporicidal agent.

Continued focus on the following CDI risk-reduction strategies each fiscal period has been effective in focusing the organization leadership on units with chronic CDI issues (CDI vulnerable units). A focused attention on these units generates additional support, such as soiled utility room re-design, hand hygiene improvements, and special task groups, in an effort to reduce CDI rates on units and within programs.

CDI Vulnerable Unit List: Due to the enhancements of the FH CDI surveillance system, FH provides the organization with a list of approximately 7-10 units across FH that have the highest CDI incidence rates each fiscal period. The list is produced and disseminated to FH stakeholders every fiscal period, in an effort to focus attention and improvement work on units in FH with the greatest burden of CDI cases and to support units with chronic CDI issues that are vulnerable to nosocomial *C. difficile* transmission. This CDI Vulnerable Unit List contains CDI nosocomial case counts for the current and previous five fiscal periods as well as the cumulative number to date for each particular unit. Units that are on the Vulnerable Unit List are required to develop, implement and submit action plans to IPC and site operations leadership to demonstrate active work in adopting IPC best practices and reducing the number of nosocomial cases on their units.

Communication strategies: Site IPC Practitioners are responsible to monitor CDI cases on units within the sites and to distribute standardized communication to unit and site leadership, if units have an increased level of GI or CDI cases, and to identify units that are in an outbreak status. These alerts trigger a series of specific, targeted HAI-reduction strategies to minimize transmission to other patients.

Nosocomial CDI Risk Assessment and Case Management review of each health-care associated CDI case: In July 2013, as part of an effort to improve patient safety through

a better understanding of the particular factors that caused an individual patient to develop CDI, Nosocomial CDI Risk Assessment and Case Management tools were developed and implemented for healthcare-associated CDI that are deemed likely attributed to a site and unit. These forms enable the unit to evaluate patient care factors and to identify gaps in infection prevention and control best practices, in an effort to implement improvement actions. Ongoing review of these forms indicate that pharmacology (i.e., antibiotic exposure prior to acquiring CDI or the treatment regimen after CDI diagnosis) was the most problematic factor for nosocomial CDI, followed by underlying medical conditions of patients, enhanced cleaning of equipment, and hand hygiene practices on units where patients are located both before and after CDI diagnosis. The findings from these forms will continue to support on-going education for physicians and healthcare providers.

CDI adverse events and PSLS: Since October 2014, as part of efforts to prevent additional healthcare-associated *C. Difficile* cases, severe (Level 4) and death (Level 5) CDI events are entered by IPC Practitioners into the Patient Safety & Learning System (PSLS). Level 4 (Severe Harm) includes healthcare-associated CDI with toxic megacolon/colectomy, and Level 5 includes death related to healthcare-associated CDI. Entering these events into PSLS follows the FH policy to ensure that patients who experience significant harm events while receiving care in FH facilities are reviewed and actioned in an appropriate, timely manner. Recommendations from these reviews continue to support education and improvement initiatives across the organization.

Objectives for 2016/17

Focus for CDI reduction continues to be management of CDI on units vulnerable to transmission through increased unit engagement and behaviour changes on the following initiatives: antimicrobial stewardship; decluttering hallways and patient rooms; escalating levels of enhanced cleaning with a sporicidal agent; continued education and awareness of infection prevention and control principles and best practices; hand hygiene compliance for staff, physicians, patients, and visitors; bed accommodation (including closure of hallway beds); and cleaning of medical devices. A UVGI technology will also be introduced across FH sites as an adjunct for environmental cleaning in an effort to support HAI reduction.

Comments

Many other factors that contribute to the transmission of CDI include workload of staff, availability of single patient or isolation rooms in a facility, hand hygiene practices

and/or compliance, previous prolonged or unnecessary antibiotic treatment, environmental cleaning practices, timely application of additional precautions, availability of hand washing sinks in patient rooms, availability and practices with respect to closed human waste disposal systems, and soiled utility room infrastructure. FH strives for infection prevention and controls best practices to promote patient safety and is working to reduce the factors that contribute to patient acquisition of CDI.

Methicillin-Resistant Staphylococcus aureus (MRSA)

Methicillin-resistant *Staphylococcus aureus* (MRSA) are strains of *staphylococci* that have become resistant to antimicrobial agents traditionally used to treat common skin and soft tissue infections (e.g., penicillins and cephalosporins). MRSA may be found in wound, skin, soft tissue, and bone infections as well as sites where foreign bodies have been inserted. Antimicrobial resistance makes these infections more difficult to treat and causes excessive illness, leading to increased length of hospital stay and increased morbidity and mortality.

Status	Target	Actual (2015/16)	Preferred Direction
▲	≤7.0*	7.1*	⬇

*cases per 10,000 patient days

General Overview for 2015/2016

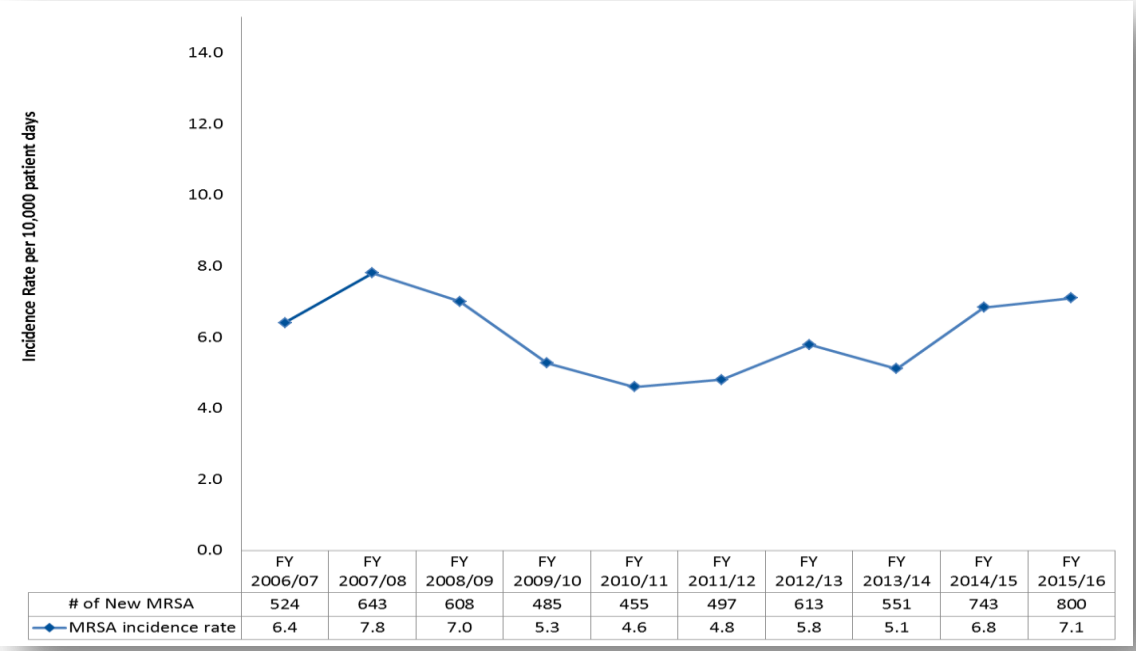
What is the annual target the organization seeks to reach?

An MRSA incidence rate of ≤ 7.0 cases per 10,000 inpatient days was the established annual target for FH for 2015/16 fiscal year; consistent with the previous two fiscal years. The overarching goal is s a reduction in the MRSA rate year over year. The FH rate of new MRSA for 2015/16 increased from the previous fiscal year of 6.8 to 7.1 cases per 10,000 patient days. Although this increase was not statistically significant, it does not meet the goal of the organization to reduce MRSA rates.

Trend: What do the data show?

Overall FH

In fiscal year 2015/16, the FH facility-associated incidence rate was 7.1 cases per 10,000 patient days [95%CI: 6.6-7.6], which is higher than the MRSA incidence rate of 6.8 cases per 10,000 patient days in fiscal year 2014/15 [95%: 6.4-7.3] (Figure 3). The MRSA incidence rate increased by 4% from 2014/15 to 2015/16. The increased rates observed in 2015/16 may be due to improved compliance with the MRSA and MDRO screening process for patients admitted to FH acute care sites implemented in 2014.



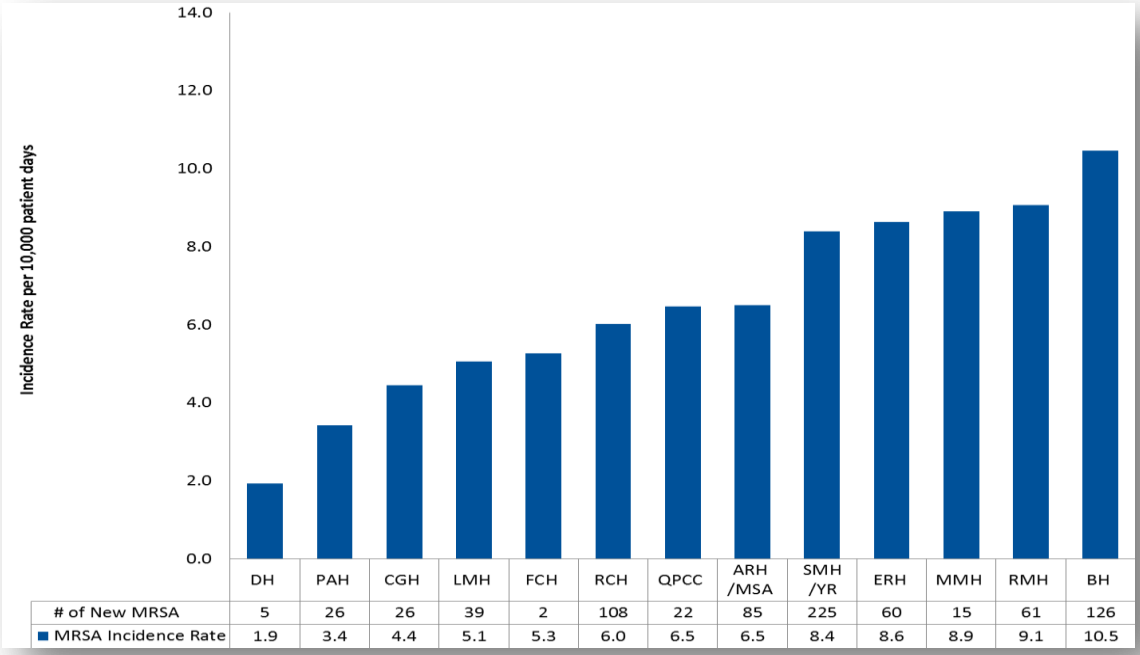
	FY 2006/07	FY 2007/08	FY 2008/09	FY 2009/10	FY 2010/11	FY 2011/12	FY 2012/13	FY 2013/14	FY 2014/15	FY 2015/16
# of New MRSA	524	643	608	485	455	497	613	551	743	800
MRSA incidence rate	6.4	7.8	7.0	5.3	4.6	4.8	5.8	5.1	6.8	7.1

Source: Fraser Health BUGS Surveillance Database, extract July 2016

Figure 3: Number of new MRSA and facility-associated MRSA incidence rate per 10,000 patient days by fiscal year for FH

FH Acute Care Sites

In 2015/16, the MRSA incidence rate was highest among MMH, RMH, and BH respectively (Figure 4). The MRSA incidence rates among FH sites ranged from 1.9 cases at DH (5 MRSA) to 10.5 cases at BH (126 MRSA) per 10,000 patient days (Figure 4). MMH had a MRSA rate of 8.9 cases per 10,000 patient days (15 MRSA), and RMH had a rate of 9.1 cases per 10,000 patient days (61 MRSA). Following SMH/YR (225 MRSA), which had the highest number of cases, RCH and BH had 108 and 126 new MRSA cases respectively (Figure 4). The higher number of cases at these sites could be the result of frequent congestion and over-capacity issues as well as infrastructure challenges at these sites, which can impact the ability to consistently adhere to infection prevention and control best practices.



	DH	PAH	CGH	LMH	FCH	RCH	QPCC	ARH /MSA	SMH /YR	ERH	MMH	RMH	BH
# of New MRSA	5	26	26	39	2	108	22	85	225	60	15	61	126
MRSA Incidence Rate	1.9	3.4	4.4	5.1	5.3	6.0	6.5	6.5	8.4	8.6	8.9	9.1	10.5

Source: Fraser Health BUGS Surveillance Database, extract July 2016

Figure 4: Number of new MRSA and facility-associated MRSA incidence rate by FH site, 2015/16

What is the annual target the organization seeks to reach?

The established MRSA goal was a reduction in MRSA rate. The FH rate of new MRSA for 2015/16 increased from the previous year to 7.1 cases per 10,000 patient days. Although this increase was not statistically significant, it does not meet the goal of the organization to reduce MRSA rates.

Benchmark Comparison: How does the rate compare to other areas?

The provincial rate of new cases of MRSA associated with the reporting facility is used as a benchmark for FH because of similar methodology and reporting between FH and the province. The provincial fiscal annual MRSA rate was 4.9 per 10,000 patient days [95%CI: 4.7-5.1] in 2014/15, which is the most recently published provincial annual rate. The 2015/16 annual rate of MRSA for FH was 7.1 cases per 10,000 patient days [95% CI: 6.6-7.6], which was significantly higher than the provincial 2014/15 benchmark. [*Annual surveillance report of healthcare-associated infections in BC acute care facilities*. Provincial Infection Control Network of BC (December 2015). Retrieved from

https://www.picnet.ca/wp-content/uploads/PICNet-Annual-Surveillance-Report-2014-15.pdf].

MRSA Reduction Strategies

The improvements undertaken for HAI reduction and management related to CDI, CPOs, and outbreaks, along with hand hygiene compliance improvements, are best practices that were emphasized to manage MRSA rates in 2015/16. Similar to CDI and CPO, quality improvement plans were developed and actioned on units and programs that were experiencing ongoing nosocomial cases and higher MRSA rates. The details of these improvement actions can be found under the related sections within this report.

Objectives for 2016/2017

Areas of focus for 2016/17 are similar to the improvements for CDI and CPO with respect to continued education and awareness of IPC principles and best practices; along with excellence in hand hygiene compliance and improvements for staff, physicians, patients, and visitors. Additional MRSA reduction initiatives will be evaluated this fiscal year including a trial of electronic hand hygiene compliance monitoring, use of wipes for patient bathing (with and without chlorhexidine), and patient, family and visitor hand hygiene compliance. UVGI technology will be deployed across FH sites to provide additional support for environmental cleaning in an effort to support HAI reduction.

Comments

Known factors that contribute to the transmission of MRSA include hand hygiene practices, duration from MRSA identification to initiation of additional precautions, adherence to following appropriate precautions and other IPC best practices, and quality of environmental cleaning practices. FH aims for excellence in infection prevention and controls best practices to achieve patient safety outcomes and to reduce the factors that contribute to patient acquisition of MRSA.

Carbapenemase-Producing Organisms (CPO)

Carbapenems are a family of antibiotics used to treat serious infections caused by gram-negative bacteria that are resistant to other antibiotics. Recently, some bacteria have become resistant to antibiotics through the production of enzymes encoded for resistance genes that destroy carbapenems, which are known as carbapenemase-producing organisms (CPO). CPOs are typically Enterobacteriaceae organisms: for example, *Klebsiella*, and Enterobacter species. Some less common organisms that have become carbapenem-resistant include *Acinetobacter baumanii*, *Pseudomonas aeruginosa*, and *Serratia marsacens*. CPO can arise through the transfer of carbapenemase genes from other bacteria by means of plasmids. Some common examples of these genes are the New-Delhi Metallo-β-lactamase (NDM) and *Klebsiella pneumonia* carbapenemase (KPC) genes.

There is potential for infection when any of these organisms move from the GI tract into other body spaces: for example, wounds, the bladder, respiratory tract, or bloodstream. When organisms that are resistant to carbapenem antibiotics cause infections, there are few treatment choices available. Carbapenem-resistant bacteria have become common in some parts of the world, and patients who travel to those areas may return home colonized with CPO, particularly if they were hospitalized while there. When colonized patients enter FH hospitals, there is a risk they will spread the bacteria to other patients. The environment can become contaminated with these organisms, providing another source of spread. In order to identify colonized patients and prevent transmission to others, FH has undertaken an active screening and surveillance program for early detection and management of cases.

Fraser Health implemented a screening process in 2014 for all patients admitted into FH acute care hospitals and for patients newly receiving renal dialysis treatment, for the purpose of identifying patients colonized with multi-drug resistant organisms (MDROs), and of particular interest Carbapenemase-producing Enterobacteriaceae (CPE). The screening process involves registration asking newly admitted patients: "Have you had any healthcare encounter outside of Canada in the last 12 months?"[1] Anyone who answers "Yes" to the screening question must be tested. One fecal

[1] In March 25, 2015 the MDRO site screening question changed from "Have you had any healthcare encounter outside of Canada in the last 6 months?" to 12 months.

-stained rectal swab is required for testing within 24 hours of admission to an acute care FH facility. Screening provides early identification of patients colonized with CPE on admission, ensuring prompt and appropriate management, preventing transmission to other patients and staff. Screening was implemented among select units in 2013 and a phased approach was taken to implement screening in all FH facilities by March 2014. FH performs screening and surveillance of this organism because CPE is an emerging pathogen and we wish to understand the epidemiology of this organism in our region and to ensure colonized patients are isolated appropriately to reduce transmission.

The overall goal for this fiscal year was to reduce CPO transmission by doing in-depth analyses of the epidemiology and molecular biology of all cases and using this information to reduce any risk factors for transmission. The organization identified 67 CPO cases in 2015/16; at present, 13 of these cases have been identified as nosocomial to FH. This is a significant reduction from the number of transmissions identified in 2014/15.

Status	Target	Actual (2014/15)	Actual 2015/16
	Reduction in transmissions	24**	13**

** number of cases

General Overview for 2015/2016

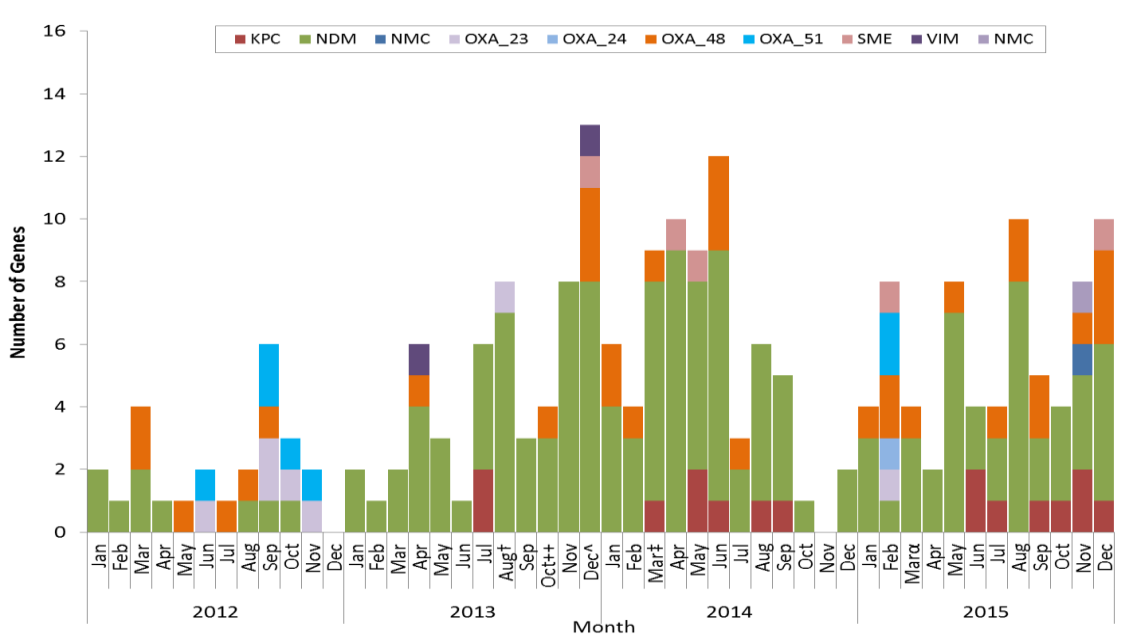
What is the annual target the organization seeks to reach?

In 2015/16, 67 new cases were identified; 13 (19%) of these were probable transmissions. Based on current information, there was a 46% reduction of CPO transmission in FH in 2015/16 compared to the previous fiscal year (24 probable transmissions). It should be noted that FH continues to explore advanced molecular testing (e.g., whole genome sequencing) with the BCCDC Public Health Laboratory to better understand and identify the source of transmissions. As a result of employing these techniques, FH is better positioned to reduce the risk of future transmissions.

Trend: What do the data show?

FH reported occasional clinical specimens since 2011, but the numbers began to rise in 2013 and 2014. This finding was expected because of the screening protocol that was put in place. Screening captures patients who are colonized with CPE, but who do not have symptoms and, therefore, can go undetected without active screening in place.

FH cases have demonstrated variety of CPO genes since 2012, but the most common is NDM (67%) (Figure 5); however, the number of organisms with the OXA-48 gene has been increasing.



Source: Fraser Health MDRO Surveillance Database, extract June 30, 2016
† SMH ICU screening started August 2013; ++ SMH HAU screening started October 2013
^ RCH ICU and HAU screening started December 2013
‡ FH-wide screening began March 2014 (foreign healthcare in previous 6 months)
α FH-wide screening question changed to foreign healthcare in previous 12 months

Figure 5. CPO genes for FH, Jan 2012 – Mar 2015

In fiscal year 2015/16, 67 patients with CPO were identified in FH. Based on current information 13 (19%) of these were likely transmissions while the majority of cases (55%) were associated with international travel with healthcare exposure (Table 1). The majority of CPO cases identified in 2015/16 were colonizations (59; 88%) versus eight infections (12%; Table 2).

Table 1. Patients with CPO in FH, by Fiscal Year

Fiscal Year	Healthcare-associated (FH)	Travel w/Healthcare	Undetermined^	Total
2013/14	41 (62%)	18 (27%)	7 (11%)	66 (100%)
2014/15#	24 (43%)	19 (34%)	13 (23%)	56 (100%)
2015/16	13 (19%)	37 (55%)	17 (25%)	67 (100%)
Total	78 (41%)	74 (39%)	37 (20%)	189 (100%)

Source: Fraser Health MDRO Surveillance Database, extract June 30, 2016.
excludes cases attributed to other Health Authority
^ includes cases that reported foreign travel only

Table 2. Patients with CPO Infections versus Colonization in FH by Fiscal Year

Fiscal Year	Infections	Colonizations	Total
2013/14	21 (32%)	45 (68%)	66
2014/15	11 (20%)	45 (80%)	56
2015/16	8 (12%)	59 (88%)	67
Total	40	149	189

Source: Fraser Health MDRO Surveillance Database, extract June 30, 2016
excludes cases attributed to other Health Authority; ^ includes cases that reported foreign travel only

Benchmark Comparison: How does the rate compare to other areas?

CPO is a newly emerging organism, and there is insufficient data to allow for benchmarking at a provincial or national level. Provincial level data collection began in July 2014. [*Annual surveillance report of healthcare-associated infections in BC acute care facilities*. Provincial Infection Control Network of BC (December 2015). Retrieved from https://www.picnet.ca/wp-content/uploads/PICNet-Annual-Surveillance-Report-2014-15.pdf].

CPO Reduction Strategies

The improvement strategies undertaken for CPO transmission reduction and management are a very strong focus for the organization in an effort to ensure maximum patient safety. Similar to CDI and MRSA reduction initiatives, strict adherence to following IPC best practices is critical in minimizing nosocomial transmission of these organisms. The following strategies are in place across FH:

Strong communication and leadership on unit: All unit leadership and healthcare providers (e.g., physicians, environmental services, respiratory and laboratory staff, etc.) must be aware and keep each other informed of the CPO status of patients on the unit and when transferring patients. The unit leadership group is accountable to

provide appropriate resources to meet and ensure best practices are being followed on the unit and must implement additional quality improvement actions when transmission occurs.

Admission screening: All patients who are admitted to FH are asked about any healthcare encounters outside of Canada within the past 12 months. All patients who answer "Yes" to the screening question have a screening swab taken and are tested for an MDRO.

Bed allocation: Patients with CPO who are re-admitted to acute care are immediately placed into a private room. Patients with an admission screen for MDRO and those waiting for confirmatory testing are placed in multi-bed rooms due to limited availability and other priorities for single patient rooms. When patients are confirmed with a CPO, they are either moved to a CPO cohort or to a single patient room as quickly as possible. If a single patient room is not available, beds are blocked in the multi-bed room to provide single accommodation for the patient. Due to the unique molecular genetics of CPO and the ease with which genes can move from one organism to another, patients may only be cohorted together under direction of a medical microbiologist.

Contact screening: Contacts of patients who are CPO positive (e.g., roommates in multi-bed rooms) are subsequently screened for 21 days following exposure to the positive patient: at day 0, day 7, and day 21. If patients are discharged within the 21-day period, a flag is applied to the patient's chart to identify the screening requirement on the next admission.

Cohorting patients and staff: Where possible, patients who test positive for a CPO are grouped together in a unit with a separate cohort. Nursing staff are dedicated to patients with CPO and depending on the circumstances of the unit, other healthcare providers may be dedicated as well (e.g. respiratory therapists). Dedicating healthcare providers for CPO supports improved adherence to IPC best practices as there is increased awareness of the requirements and challenges posed by this specific patient population.

Emphasis on hand hygiene and enhanced contact precautions for staff: Strict adherence to hand hygiene and the requirements of the isolation sign are crucial for minimizing transmission of CPO. Units with CPO are required to conduct weekly hand hygiene audits and to monitor adherence to CPO precautions, including proper donning and doffing of PPE. Daily chlorhexidine baths for all colonized patients are

also a requirement for patients with CPO in an effort to minimize transmission of the organism from patient to patient.

Enhanced cleaning: Similar to cases of CDI, CPO transmission is through the fecal-oral route where pathogens in fecal material from one patient are introduced into the oral cavity of another patient. Rooms (and units if required) with patients on CPO precautions are cleaned twice daily with special cleaning solutions, in an effort to reduce the level of bio-burden in the room and on high-touch surfaces. When a patient with CPO is discharged from a room, whether a multi-bed or private room, an isolation clean is performed. Decluttering hallways and patient rooms is also a focus as this facilitates a thorough cleaning of all surfaces, along with separation of clean and dirty items and equipment.

Medical devices and patient-care equipment. Equipment for patients with CPO must be dedicated for individual use or disposable equipment should be used. If this is not possible, the equipment must be appropriately cleaned between patients as the organism can be easily transmitted from one patient to another via the shared items.

Point prevalence screening. Units that care for and house patients with CPO are required to regularly screen other patients on the unit to determine if transmission has occurred. This point prevalence screening is completed at the discretion of the medical microbiologist at the site and in collaboration with laboratory services.

Detailed surveillance and reporting. Similar to other HAIs, IPC Practitioners are responsible to conduct surveillance and do chart reviews to gather historical, geographical, and epidemiological information for patients with CPO. This information, in conjunction with an automated database for MDROs, provides the foundation for regular reports that are communicated internally and externally to FH. The internal reports are important communication tools that provide status updates for the organization, identifying infection prevention and control best practices that are working well and others that may require additional attention and support.

Objectives for 2016/17

The objectives for 2016/17 are to continue with the detailed HAI reduction initiatives that are already in place, primarily strict adherence to IPC best practices, as well as conducting in-depth analyses of the epidemiology and molecular biology of all cases. This information will be used to further reduce any risk factors for transmission. UVGI

technology will also be deployed across FH sites to provide additional support for environmental cleaning in an effort to support HAI reduction.

Comments

As with all other HAIs, known factors that contribute to the transmission of CPO include poor hand hygiene practices, longer duration of CPO identification to initiation of additional precautions, lack of adherence to following appropriate precautions and other IPC best practices and incomplete and/or infrequent cleaning practices of patient rooms and medical devices. FH strives for infection prevention and controls best practices and patient safety and aims to reduce the factors that contribute to patient acquisition of CPO.

Vancomycin Resistant Enterococci (VRE)

Enterococci are micro-organisms that are commonly found in the stomach and bowels of healthy people. Vancomycin is an antibiotic used to treat infections, and some strains of *Enterococci* are resistant to Vancomycin. These organisms rarely cause illness in healthy people. However, on rare occasions, the bacteria may move from the bowel to other body sites and cause serious infections of the blood or other body tissues.

Until November 2012, FH had a protocol in place to screen patients and identify carriers of VRE (patients colonized in the bowel). Recognizing that few infections occurred as a result of VRE colonization, this protocol has now changed and FH has chosen to focus efforts on other antibiotic resistant organisms that do cause serious infections. However, the IPC program continues to monitor clinical outcomes of patients with VRE infection and continues to evaluate this change in protocol to ensure that patients are not at increased risk as a result of the change.

General Overview for 2015/16

What is the annual target the organization seeks to reach?

There was no specified FH annual target for VRE in 2015/16.

Trend: What does the data show?

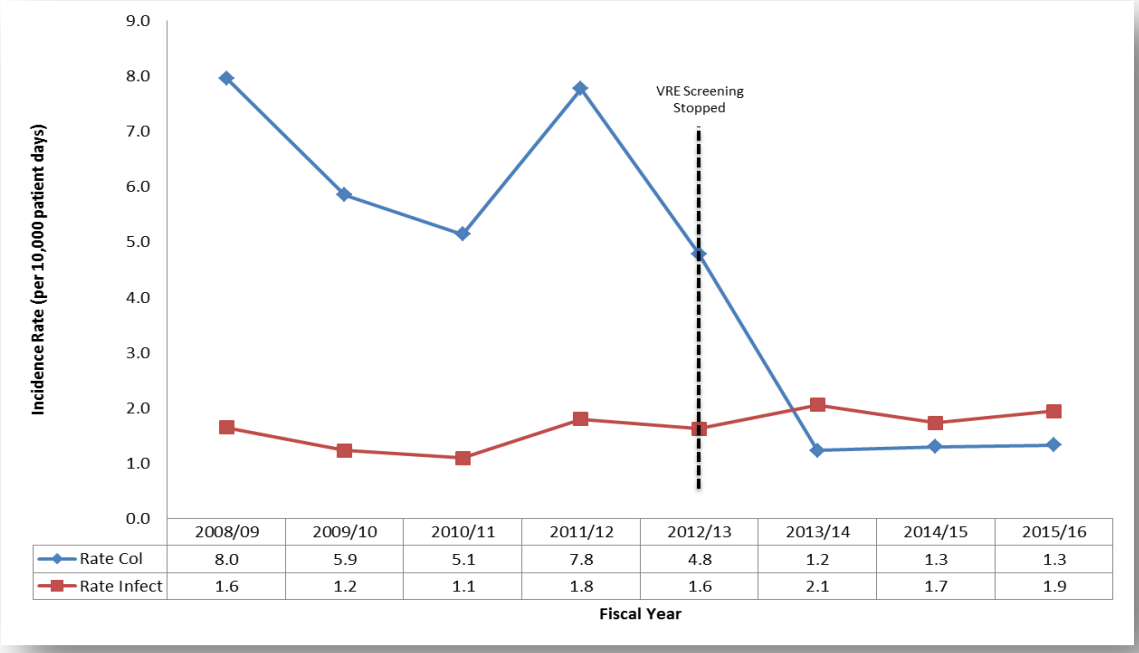
In fiscal year 2015/16, a total of 371 new VRE infections or colonizations were identified (Table 3), corresponding to a colonization rate of 1.3 cases per 10,000 patient days and an infection rate of 1.9 cases per 10,000 patient days (Figure 6). Since fiscal period 09, fiscal year 2012/13 (November 2012) there have been a total of 1176 confirmed healthcare-associated VRE; 40% of these are colonizations and 60% are infections.

Table 3. Number of new healthcare-associated VRE infectons and colonizatons by fiscal year

Fiscal Year	Colonization	Infection	Total
2012/13†	47 (39%)	73 (61%)	120 (100%)
2013/14	133 (38%)	221 (62%)	354 (100%)
2014/15	142 (43%)	189 (57%)	331 (100%)
2015/16	151 (41%)	220 (59%)	371 (100%)
Total	473 (40%)	703 (60%)	1176 (100%)

Source: Fraser Health BUGS Surveillance Database, extract May 17, 2016
† Reporting from November 9, 2012

Since fiscal year 2012/13, the VRE colonization rate has fluctuated with an overall decline (Figure 6). This result is expected as FH is no longer searching for colonized VRE patients by screening admitted inpatients upon entry to acute care sites. The incidence of VRE infections has remained steady since fiscal year 2008/09 to 2015/16 (Range: 1.1-2.1 per 10,000 patient days) peaking at 2.1 cases per 10,000 patient days in fiscal year 2013/14.



	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16
Rate Col	8.0	5.9	5.1	7.8	4.8	1.2	1.3	1.3
Rate Infect	1.6	1.2	1.1	1.8	1.6	2.1	1.7	1.9

Source: Fraser Health BUGS Surveillance Database, extract May 17, 2016

Figure 6: Incidence rate of healthcare-associated VRE (infections and colonizations) by fiscal year for FH

The majority of confirmed VRE specimens that were considered to be an infection from November 2012 to March 2016 were urine samples (67%) (Table 4). Eleven percent of all VRE infections were discovered in blood; conversely, 10% of infections were found in other body sites (e.g. abdominal fluid, bile, etc.) (Table 4). FH will continue to monitor bloodstream infections to ensure this proportion remains low.

Table 4. VRE infections specimen source, Nov 2012 – Mar 2015

	Count (%)				
Infection Source	2012/13[†]	2013/14	2014/15	2015/16	Total
Blood	16 (9%)	17(8%)	27 (14%)	28 (13%)	88 (11%)
Groin	2 (1%)	0 (0%)	0 (0%)	1 (0%)	3 (0%)
Rectal/perineum	4 (2%)	0 (0%)	0 (0%)	0 (0%)	4 (0%)
Skin & soft tissue wound	7 (4%)	13 (6%)	14 (7%)	18 (8%)	52 (6%)
Sputum/respiratory	8 (5%)	3 (1%)	1 (1%)	2 (1%)	9 (1%)
Stool	2 (1%)	0 (0%)	0 (0%)	1 (0%)	3 (0%)
Surgical site wound	2 (1%)	7 (3%)	5 (3%)	10 (5%)	24 (3%)
Urine	127 (74%)	160 (72%)	115 (61%)	136 (62%)	538 (67%)
Other [×]	9 (5%)	21 (10%)	27 (14%)	24 (11%)	81 (10%)
Total	172 (100%)	221 (100%)	189 (100%)	220 (100%)	802 (100%)

Source: Fraser Health BUGS Surveillance Database, extract May 17, 2016
[×] Other may include abdominal fluid, bile, etc.
+ Reporting from November 9, 2012

Historically, linezolid usage in FH tends to peak in fiscal quarter 1 (April-June) and 4 (December-March) with a decrease in quarter 2 (July-Sept) and 3 (September-November) (Table 5). In fiscal year 2015/16 linezolid, usage has increased with fiscal quarter. It is important to note that there is typically seasonality associated with the use of linezolid particularly from the summer to fall months which is indicative of a reduction in prescribing of the drug. Another factor is that these numbers haven't been normalized by patient-days. The increased usage could be related to hospitals being busier during the winter months. Lastly, quarter 4 data will have higher usage because it includes four fiscal periods whereas the other quarters only have three.

Table 5. Number of defined daily dose (DDD) of 1200mg of Linezolid in FH by fiscal quarter and fiscal year

Fiscal Year	Fiscal Quarter	# of Defined Daily Dose, 1200mg	Total
2012/13	Q3	239.5	1,177
	Q4	937.5	
2013/14	Q1	632.2	2,159.7
	Q2	485.0	
	Q3	432.0	
	Q4	610.5	
2014/15	Q1	427.6	1,697.6
	Q2	389.0	
	Q3	360.0	
	Q4	521.0	
2015/16	Q1	391.0	1,782
	Q2	411.0	
	Q3	457.0	
	Q4	523.0	

Source: Lower Mainland Pharmacy Services, extract June 27, 2016

Benchmark Comparison: How does the rate compare to other areas?

There is insufficient data to allow for benchmarking at a provincial or national level.

Comments

Surveillance of linezolid use in FH was an additional measure put in place after the VRE screening protocol was changed. This type of antibiotic is the primary treatment option for VRE infection, and therefore, the purpose of this measure is to understand if linezolid use has increased, presumably as a result of increasing numbers of VRE infections.

Best Practice

Hand Hygiene Compliance

Hand hygiene is a critical patient safety initiative and one of the most effective, well-evidenced measures to reduce the transmission of HAIs worldwide. Hand hygiene education and training is being provided across FH through new employee orientation sessions, along with on-the-job training and in-services provided by IPC Practitioners. FH continues to align with MoH Policy Communiqué 2012-04 and the provincial framework for hand hygiene by monitoring hand hygiene compliance using continuous observational audits, supporting on-going improvement activities, and public reporting. These initiatives also align with Accreditation Canada's Required Organizational Practices for hand hygiene.

Status	Target	Actual (2015/16)	Preferred direction
	80%	87% compliance	

Status	Target	Actual (2014/15)	Actual 2015/16
	Increase in observations	167,732	135,258

General Overview for 2015/2016

What is the annual target the organization seeks to reach?

The 2015/16 annual goal for hand hygiene compliance in FH was to increase compliance. FH achieved and surpassed the MoH and provincial target of 80%, with 87% overall compliance the majority of acute care sites (Range: 78%–96%) met or exceeded the FH hand hygiene compliance target. Moreover, FH saw an increase in compliance in fiscal year 2015/16 compared to the previous fiscal year.

Trend: What does the data show?

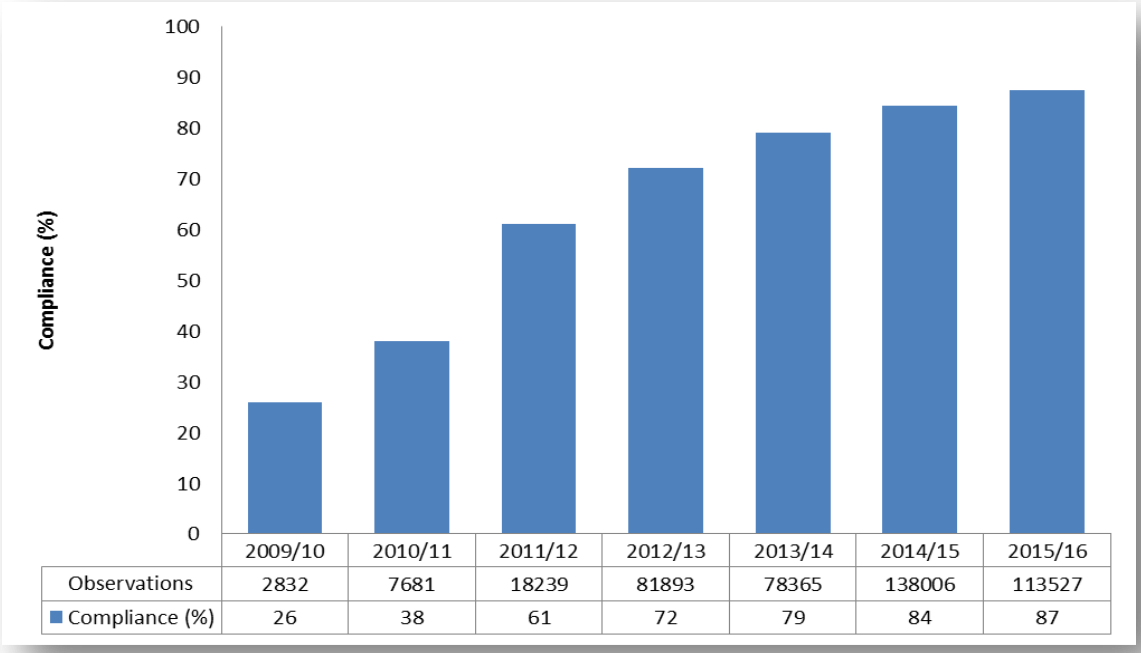
A total of 135,258 hand hygiene practice observations were completed in 2015/16 for FH, accounting for a total compliance of 87% (Table 6), compared to a total of 167,732 observations and 84% compliance in fiscal year 2014/15.

Table 6. Hand hygiene compliance by type of FH facility, fiscal year 2015/16

Fiscal Year 2014/15	FH Overall	Acute Care	Residential Operated	Mental Health & Substance Use (Operated)	Home Support/ Home Health	JPOCSC/ Public Health/ Primary Care	Residential Contracted
Compliance	87%	87%	85%	82%	89%	84%	70%
Observations	135,258	113,527	13,593	2,259	680	3,104	2,095

Source: Fraser Health FormAudit Hand Hygiene Module, extract June 30, 2016

The acute care audits completed during fiscal year 2015/16 (113,527 observations) provided a compliance of 87%, an increase from 84% in fiscal year 2014/15 (138,006 observations, Figure 7). While hand hygiene compliance has increased, the number of observations has decreased since fiscal year 2014/15.

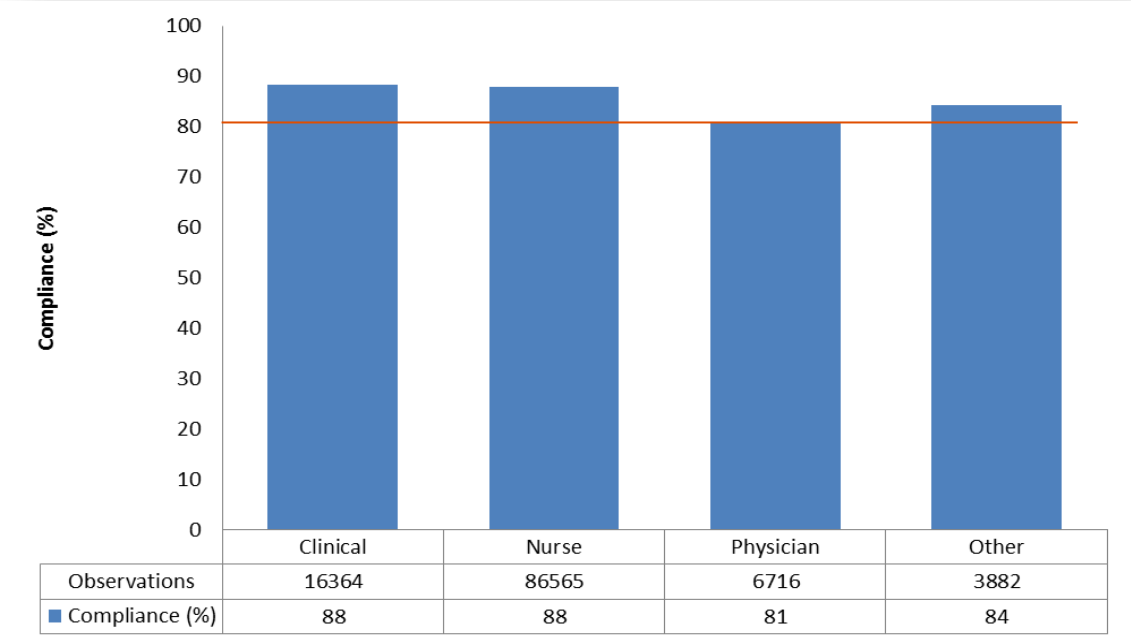


Source: Fraser Health FormAudit Hand Hygiene Module, extract July 4, 2016

Figure 7: Comparison of hand hygiene compliance by fiscal year in FH acute care sites

FH Healthcare Provider Type

The compliance by healthcare provider group in fiscal year 2015/16 was 88% for clinical staff (16,364 observations), 88% for nursing (86,565 observations), 81% for physicians (6716 observations), and 84% for other staff (3,882 observations; Figure 8). In fiscal year 2015/16, there was a 14% increase in hand hygiene compliance among physicians (71%, 10,662 observations in fiscal year 2014/15). Hand hygiene compliance among physicians, which include medical residents/students, continues to improve. In the last fiscal year, concerted efforts were made to increase hand hygiene compliance among physicians including the hiring of full-time co-op students to conduct physician audits and provide immediate feedback/education. While there is a noted increase in compliance, there has been a decrease in the number of observations among this health care provided group. The majority of observations collected were in the nursing category which aligns with the fact that this group makes up the largest proportion of healthcare employees.

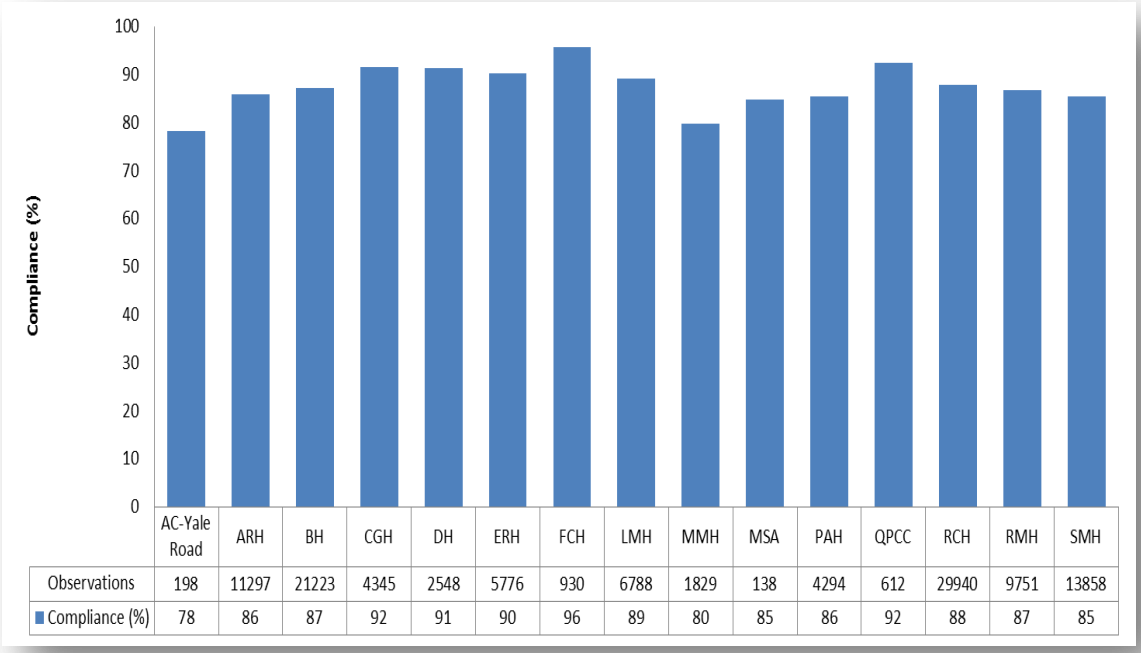


Source: Fraser Health FormAudit Hand Hygiene Module, extract June 30, 2016

Figure 8: Hand hygiene compliance by healthcare provider group for FH overall, 2015/16

FH Sites

All FH acute care sites achieved the FH target of 80% compliance for fiscal year 2015/16 with the exception of Yale Road (Figure 9). Yale Road was slightly below the target with 78% compliance. The high number of observations at RCH and BH reflects the site commitment to hand hygiene by way of conducting audits weekly rather than the FH policy requirement for once each fiscal period. High hand hygiene compliance for majority of the sites may reflect the leadership and site commitment to hand hygiene best practices, communication, and improvement work.



	AC-Yale Road	ARH	BH	CGH	DH	ERH	FCH	LMH	MMH	MSA	PAH	QPCC	RCH	RMH	SMH
Observations	198	11297	21223	4345	2548	5776	930	6788	1829	138	4294	612	29940	9751	13858
Compliance (%)	78	86	87	92	91	90	96	89	80	85	86	92	88	87	85

Source: Fraser Health FormAudit Hand Hygiene Module, extract July 4, 2016

Figure 9: Hand hygiene compliance among all staff by FH site, 2015/16

Benchmark Comparison: How does the rate compare to other areas?

The provincial hand hygiene compliance is used as a benchmark for FH to be consistent with provincial methodology and reporting. FH achieved 87% compliance which is better than the provincial fiscal annual compliance for 2014/15 which was 83%; the most recently published provincial annual rate. [*Annual surveillance report of healthcare-associated infections in BC acute care facilities*. Provincial Infection Control Network of BC

(December 2015). Retrieved from https://www.picnet.ca/wp-content/uploads/PICNet-Annual-Surveillance-Report-2014-15.pdf].

Hand Hygiene Improvement Strategies

Hand hygiene compliance at FH continues to increase, with gradual improvements in compliance by all healthcare professionals, by sites, and by programs. This is important, as hand hygiene is a fundamental principle for all FH HAI-reduction strategies. As part of an engagement strategy to facilitate awareness and to drive improvement work, hand hygiene audits continue to be conducted across all facilities throughout FH, including all acute care units, FH-operated residential facilities, and many community programs and outpatient clinics.

In addition to the extensive hours of education and improvement work provided at the sites by the IPC Practitioners, three university co-operative students also conducted audits and supported improvement work that significantly contributed to the increase in hand hygiene compliance across FH. The students were part of a larger team consisting of IPC Practitioners, IPC Consultants, and front-line staff that worked collaboratively to support front-line staff and physician hand hygiene improvement initiatives. They provided direct support and feedback for hand hygiene audits and compliance, generating dialogue at the time of the audit in an effort to gain greater understanding of the challenges with compliance. The co-op students were able to assist in daily audits and improvement work during outbreaks; as well, they provided standardization in auditing compliance application and interpretation. They would not have been able to provide the support they did without the numerous hours of education, conversation, and support they received from the IPC Practitioners and Consultants. The IPC Consultant team also provided support for hand hygiene improvements and initiatives by participating in the Provincial Hand Hygiene working group, revising the hand hygiene clinical practice guidelines, providing audit support for frontline staff and answering the multitude of questions that were sent to the IPC team. The community consultant that works with the MHSU program developed quarterly hand hygiene bulletins. These reports assisted sites with the ability to identify areas of success or concern, generating discussion and collaboration.

Overall, impressive numbers of hand hygiene audits were completed by many hand hygiene champions and enthusiasts across FH each fiscal period, demonstrating an increased engagement to hand hygiene best practices across FH sites, units, programs, and community facilities.

Objectives for 2016/2017

Continued improvements to the hand hygiene audit and reporting program. This will include expansion of the current program to include additional community and outpatient clinics. With the FH reorganization to a geographic, site-based leadership model, the hand hygiene program will develop geographic site-based reports as required. The functionality and feasibility of faxed-based audit submissions will be evaluated in order to improve the reliability and consistency of audit receipt by the electronic system.

Auditor standardization and engagement program. In an effort to better support auditor engagement, retention and recruitment, and information, knowledge and standardization of the audit process, a comprehensive auditor support program will be developed based on learnings and experiences of the co-operative student program from the 2015/16 fiscal year.

Increased focus on patient, family, and visitor hand hygiene. This objective pertains to ensuring, at a minimum, patients perform or are assisted with hand hygiene prior to meals and after toileting; that patients, families, and visitors have ready access to hand hygiene products; and, having clear, focused discussions and education with patients and their families on the importance and necessity for personal and healthcare provider hand hygiene during their care in hospital.

Electronic hand hygiene compliance. FH plans to trial an electronic hand hygiene compliance system in order to validate site/unit hand hygiene compliance using observational audit methodology. The IPC team is collaborating with vendors of these electronic systems to determine if hand hygiene compliance rates that are obtained using site-based auditors are consistent with electronic compliance monitoring systems.

Hand hygiene improvements. The IPC program and key stakeholders will continue to concentrate on providing support to front-line staff and site leadership on improving compliance based on behaviour change strategies in alignment with initiative and leadership of the Canadian Patient Safety Institute.

Comments

The substantial work being conducted across FH with respect to hand hygiene improvement initiatives, including auditing for compliance, is in alignment with the work of the Provincial Hand Hygiene Working Group of British Columbia available on the PICNet website.

Reprocessing of Medical Devices

Reprocessing involves the complete cycle of purchase/loan, transportation, pre-cleaning, cleaning, disinfection or sterilization, storage, and use of reusable and disposable medical devices and patient care equipment following best practices standards. FH continues to follow the British Columbia MoH's *Best Practice Guidelines for the Cleaning, Disinfection, and Sterilization of Medical Devices in Health Authorities* (November 2011) for a comprehensive overview of reprocessing activities for medical devices and patient-care equipment. The BC MoH mandates that health authorities increase patient safety by ensuring compliance with established standards for reprocessing of medical devices and patient-care equipment (e.g., Public Health Canada and the Canadian Standards Association).

FH completed audits and developed regional reprocessing clinical practice guidelines, Standard Operating Procedures (SOPs), education material and provided remediation recommendations. The organization continues to monitor reprocessing practices through audits of facilities, and reports gaps in compliance to stakeholders.

A standardized provincial audit tool that evaluates compliance with the BC MoH *Best Practice Guidelines for the Cleaning, Disinfection and Sterilization of Medical Devices in Health Authorities* for all critical and semi-critical medical devices and patient-care equipment is used. Residential facilities including Mental Health and Substance Use, and high-risk acute care units were audited according to the level of reprocessing for medical devices based on Spaulding's Classification. All FH units and sites are responsible for reprocessing including purchasing/loan, transportation, pre-cleaning, cleaning, disinfection or sterilization, storage, and use of medical devices. High-risk areas including MDRD (formerly Sterile Processing Department) and ORs (e.g., those that pre-clean, clean, high-level disinfection, or sterilization) are audited annually. Low-risk areas that do not perform high level disinfection or sterilization (i.e., those that only transport, store, and use items) are audited on a 3-year cycle.

Status	Target	Actual (2014/15)	Actual (2015/16)
■	Increase in compliance (high-risk areas)	94%	93%
■	Increase in compliance (low-risk areas)	99%	95%

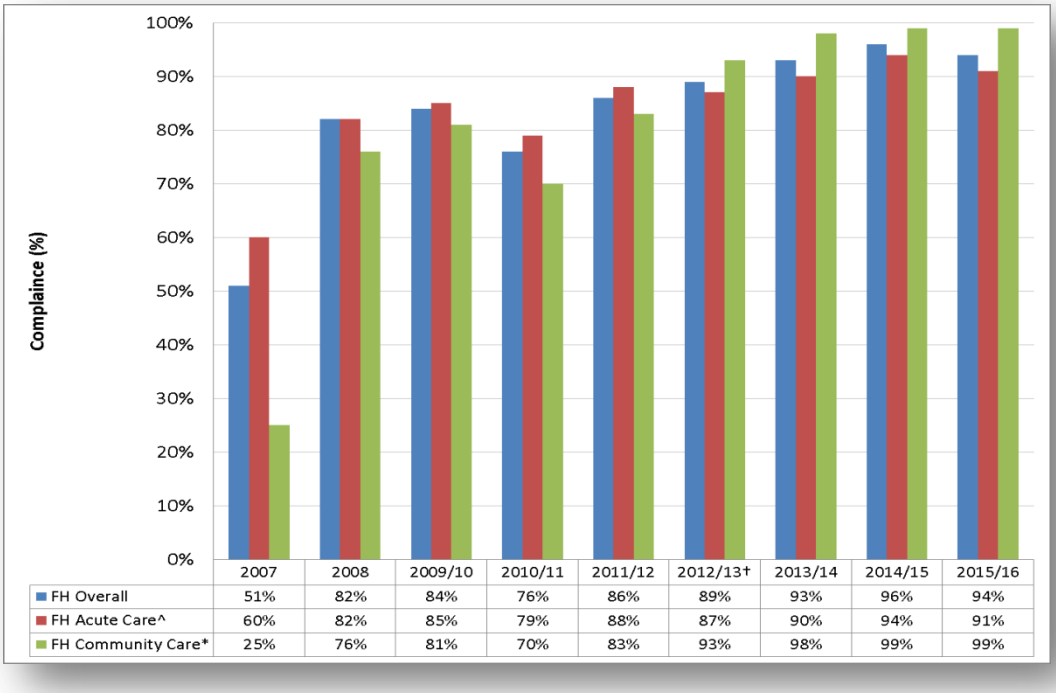
General Overview for 2015/2016

What is the annual target the organization seeks to reach?

The reprocessing goal for the organization is to increase compliance from year to year for both acute and community sites and programs. The reprocessing compliance in 2015/16 remained relatively unchanged from 2014/15.

Trend: What does the data show?

Reprocessing compliance has steadily increased over the past 8 fiscal years, with the highest levels achieved in fiscal year 2014/15 (Figure 10). Compliance in fiscal year 2015/16 was slightly less in acute, contributing to a decreased compliance overall. Overall compliance for FH reached 94%, with acute care at 91% and community at 99%.



	2007	2008	2009/10	2010/11	2011/12	2012/13†	2013/14	2014/15	2015/16
FH Overall	51%	82%	84%	76%	86%	89%	93%	96%	94%
FH Acute Care^	60%	82%	85%	79%	88%	87%	90%	94%	91%
FH Community Care*	25%	76%	81%	70%	83%	93%	98%	99%	99%

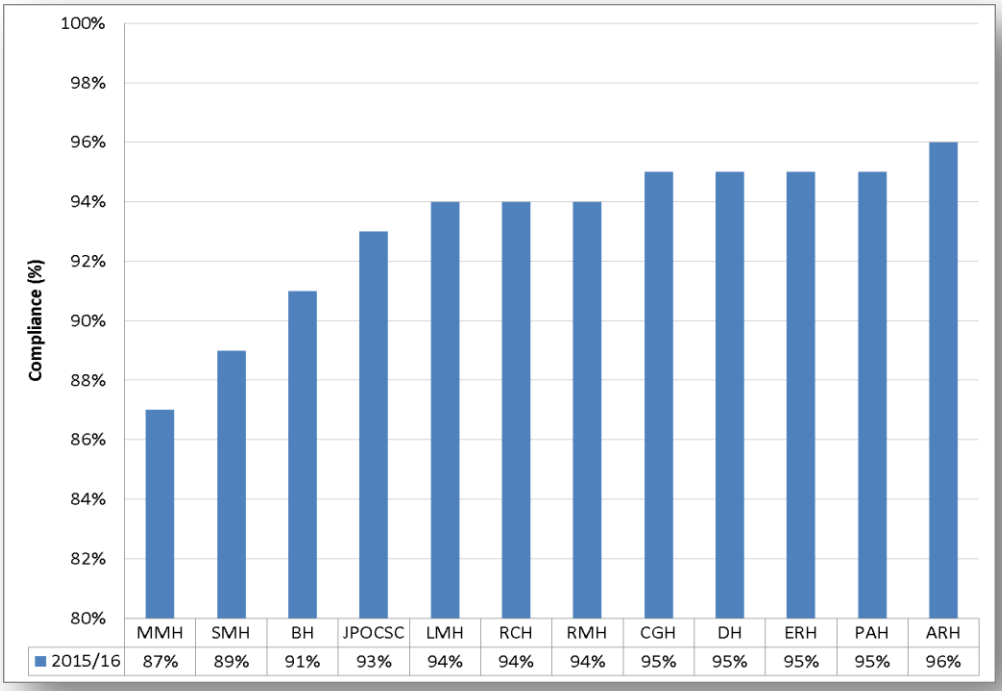
^ includes JPOCSC

* includes residential care sites except in 2010/11 Audit. †new audit tool implemented in 2012/13

Figure 10: Reprocessing compliance by sector and fiscal year for FH overall, 2012/13 to 2015/16

In fiscal year 2015/16, audits in acute care were expanded to not only include MDR and OR departments, but also ambulatory care, surgical day care, and JPOCSC -Respiratory

and SMH-family birthing unit (Figure 11). Five sites met the 95% target including CGH, DH, ERH, PAH and ARH. The remaining sites were below the target.



(see Appendix E for compliance in acute care)

Figure 11: Reprocessing compliance in high risk areas in FH acute care sites, 2015/16

All four community sectors including Residential Operated, Contracted, Mental Health and Substance Use and Public Health had between 98-100% compliance (Table 7). These results were similar to the compliance in previous years.

Table 7. Reprocessing compliance in community care areas, 2013/14 to 2015/16

Sector	2013/14	2014/15	2015/16
Residential – Operated	96%	100%	98%
Residential – Contracted	100%	99%	100%
MHSU	99%	98%	99%
Public Health	N/A	N/A	100%

(see Appendix F for compliance in community care)

Benchmark Comparison: How does the rate compare to other areas?

All health authorities within BC are required to conduct reprocessing audits using the provincial audit tool. The scope and approach for the audits varies by health authority, and no comparable rates are publicly available. FH audits different units and programs than other Health Authorities based on the services provided by FH, making it impossible to compare results and set comparable benchmarks.

Reprocessing Improvement Strategies

The organization made significant improvements in pre-cleaning cystoscopes. Additional improvements have been noted in procedures for storage of clean and sterile medical devices. These procedures include clearly defined responsibilities as well as environmental conditions of the storage area, temperature, relative humidity, ventilation; and cleanliness and cleaning of sterile storage area and shelves.

Objectives for 2016/2017

Transition Reprocessing initiatives under MRD and IPC areas of responsibility. Support the transition of the Reprocessing initiatives into two streams. One stream will be the acute care high-risk medical device reprocessing audits and remediation activities that are now under the responsibility of Medical Device Reprocessing. These areas will continue to conduct the MoH Reprocessing audits using the iPad reprocessing audits technology with annual compliance and remediation submission to the MoH. A second stream of low-risk non-critical medical device reprocessing activities will come under the purview of IPC best practices and guidelines, in both acute care and the community programs, including Residential Care, MHSU, primary care. Reprocessing actions that fall under this category will be evaluated through IPC best practices audits rather than the formal MoH audits program. The IPC and MDR programs will continue to collaborate on reprocessing initiatives through the MDR program quality committee.

FH Reprocessing Clinical Practice Guidelines. Amalgamate the Reprocessing SOPs with the Clinical Practice Guidelines (CPG) to have one reprocessing CPG for the IPC program. This will provide clarity for the organization regarding scope of practice and responsibility for IPC. Education material that was previously developed with respect to the Reprocessing Standard Operating Procedures (SOPs) will be realigned to the new clinical practice guidelines. This education material will be provided to front line staff and submitted to the CCRS for on-going staff education and information.

Transition iPad Reprocessing system to MDR. Provide technical support and information to move the reprocessing iPad automated audit and reporting system to the MDR program. This technology will provide the MDR program and the audited units with a web-based electronic reprocessing audit tool platform. This platform will standardize the audit processes, provide the audited unit with an electronic framework for tracking and updating the remediation initiatives for the areas of non-compliance, and will also support regular status reporting to the FH site and unit leadership.

Comments

Given the recent organizational changes across FH, the IPC program will collaborate and engage with stakeholders that are part of the current audit program to review the overall reprocessing program and develop a functional Quality Assurance framework and auditing plan that will be submitted to the MoH.

Outbreak Management

FH monitors and tracks the total number of gastrointestinal illness (GI) and respiratory illness (RI) outbreaks and their impact on acute care sites across FH, including the pathogen responsible, total number of outbreaks declared, and the month and facility associated with outbreak declaration.

Alert notifications were implemented in 2013/14 as a way to reduce the number of outbreaks (GI, CDI, or RI) in FH acute care sites. Declaring an alert enables an IPC practitioner to implement enhanced cleaning and other initiatives aimed to reduce the bio-burden on the unit and avoid transmission of the organism which can lead to an increased number of cases and the likelihood of reaching a threshold, thus requiring the declaration of an outbreak.

The IPC program began declaring and reporting CDI outbreaks in acute care sites in 2012. In FH, a CDI outbreak is defined as three or more new healthcare-associated cases of CDI attributed to a unit (as defined by geographical area, nursing station, and unit mnemonic) in a seven-day period.

In 2014/15, the IPC program developed an RI policy with clinical practice guidelines for management of RI cases, alerts and outbreaks. These RI protocols mandate the escalation of IPC initiatives depending on the number and prevalence of cases on a unit. An RI outbreak is declared in consultation with IPC Executive Medical Director when there are 2 or more epidemiologically linked healthcare-associated RI cases on a unit (as defined by geographical area, nursing station, and unit mnemonic) within 7 days.

Status	Target	Actual (2014/15	Actual (2015/16)
■	Reduction in number of CDI outbreaks	9	8

General Overview for 2015/16

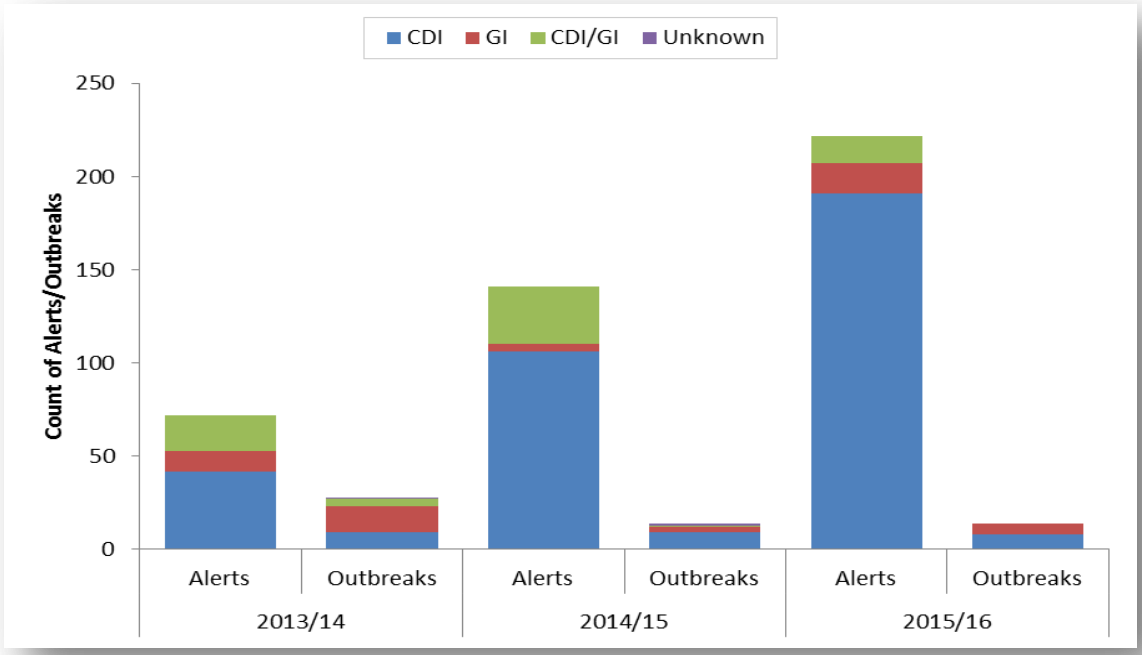
Gastrointestinal Illness and CDI Outbreaks and Alerts

What is the annual target the organization seeks to reach?

The outbreak management goal for the organization is to decrease the number of CDI outbreaks from year to year for the acute sites. The number of outbreaks in 2015/16 remained relatively unchanged, decreasing by one outbreak from 2014/15.

Trend: What do the data show?

The number of alerts has steadily increased since fiscal year 2013/14 (Figure 13). In fiscal year 2015/16, 222 alerts were issued with the majority (86%) of alerts issued for CDI. This increase could be attributed to an improvement in the recognition and communication of GI/CDI alerts in the 2015/16 fiscal year. GI alerts have fluctuated over the last couple of fiscal years with 16 GI alerts in 2015/16 compared to 4 GI alerts in 2014/15.



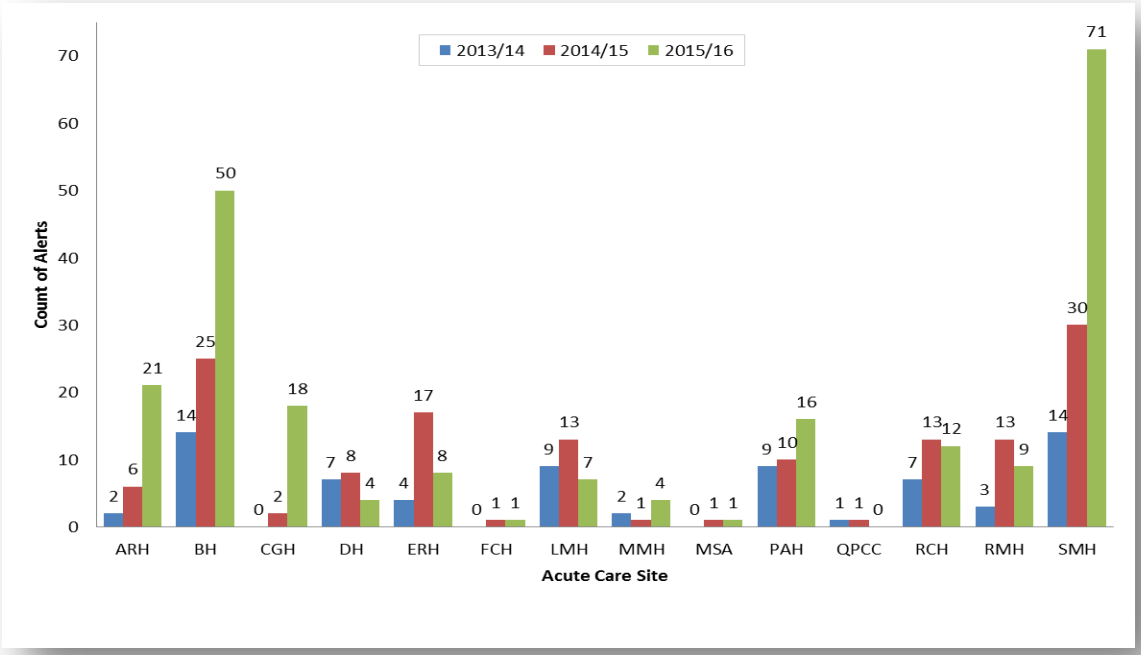
Source: Fraser Health Outbreak and Alert Database, extract May 2016

Figure 12: Number of GI/CDI alert and outbreak notifications issued for FH acute care sites by fiscal year and etiological agents

Alerts continue to be predominately issued by larger acute care sites (Figure 14). The site distribution of CDI/GI alerts in FH acute care facilities for the last three fiscal years (2013/14–2015/16) indicates higher activity at RCH, BH and SMH respectively (Figure 14). This effect may be the result of higher admissions and increased surge capacity issues at these acute care sites compared to smaller community hospitals in FH. At larger acute care sites there are more beds and thus more patients, potentially increasing the risk of transmission of CDI and GI. Further, the patient population may

be at greater risk of contracting CDI due to health complications and/or treatment needs including antibiotics, which are risk factors for acquiring CDI.

The average duration of alerts increased in fiscal year 2015/16 compared to previous fiscal years (Table 8). This may indicate that alerts were in place for a longer duration to reduce the number of cases and in turn decreased the number of outbreaks. In fiscal year 2015/16, alerts lasted an average 12.1 days, compared to 10.6 days in fiscal year 2014/15. There was a 92.8% increase in the number of alerts that occurred for longer than 2 weeks (>14 days) in fiscal year 2015/16 with 23 alerts being greater than or equal to 25 days.



Source: Fraser Health Outbreak and Alert Database, extract May 2016

Figure 13: Number of GI/CDI alerts issued by FH acute care sites and fiscal year

In fiscal year 2015/16, there were 14 GI/CDI outbreaks: 6 outbreaks were attributed to GI, and 8 outbreaks were attributed to CDI. Comparison to previous fiscal years is available in Table 8. The fourteen outbreaks were reported in seven FH acute care sites (Table 9). Twenty-eight percent of outbreaks in fiscal year 2015/16 were reported by CGH. There was an increase in the number of GI outbreaks from 3 in fiscal year 2014/15 to only 6 in fiscal year 2015/16.

The average duration of a CDI outbreak in fiscal year 2015/16 was 6.3 days and the average duration of a GI outbreak was 4.7 days. There has been a gradually decrease in the average duration (days) of GI/CDI outbreaks since fiscal year 2013/14 (Table 8).

Table 8. Number of GI/CDI alerts and outbreaks in FH acute care sites by fiscal year, average duration (days), and etiological agent

	Counts of Alerts/Outbreaks			Average Duration (days)		
Alerts	**2013/14**	**2014/15**	**2015/16**	**2013/14**	**2014/15**	**2015/16**
CDI	42	107	191	8.8	10.5	11.8
GI	11	4	16	7.9	3.8	6.5
CDI/GI	19	30	15	8.5	11.7	24.3
Unknown	0	1	0	0	0	0
Total	72	142	222	8.6	10.6	12.1
Outbreaks	**2013/14**	**2014/15**	**2015/16**	**2013/14**	**2014/15**	**2015/16**
CDI	9	9	8	8.0	8.4	6.3
GI	14	3	6	7.8	6.3	4.7
CDI/GI	4	1	0	7.5	8.0	0
Unknown	1	1	0	5.5	7.0	0
Total	28	14	14	7.6	7.9	5.6

Source: Fraser Health Outbreak and Alert Database, extract May 2016

Table 9. Number of GI/CDI outbreaks by FH acute care site and etiological agent, fiscal year 2015/16

	Site							
Etiologic Agent	**ARH**	**BH**	**CGH**	**FCH**	**MMH**	**PAH**	**SMH**	**Total**
CDI	1	0	3	1	2	0	1	8
GI	1	1	1	0	0	2	1	6
Total	2	1	4	1	2	2	2	14

Source: Fraser Health Outbreak and Alert Database, extract May 2016

Respiratory Illness Outbreaks and Alerts

Trend: What do the data show?

In fiscal year 2015/16, there were 6 RI outbreaks in FH acute care sites: 3 Influenza (Flu) A, 2 RSV, and 1 combined Influenza A/Influenza B. This is less than the previous year (Table 10). RI outbreaks in FH acute care sites for fiscal year 2015/16 started early (October 2015) and persisted longer, which is consistent with a longer influenza season for 2015/16. The majority of RI outbreaks during 2015/16 occurred during the typical influenza season (November to March) with 1 outbreak in November 2015, 2 outbreaks in January 2016, 1 outbreak in February 2016. The 6 RI outbreaks that occurred in 2015/16 were at BH, QPCC and SMH (Table 11).

Table 10. Number of GI/CDI alerts and outbreaks in FH acute care sites by fiscal year, average duration (days), and etiological agent

	Counts of Alerts/Outbreaks			Average Duration (days)		
Alerts	**2013/14**	**2014/15**	**2015/16**	**2013/14**	**2014/15**	**2015/16**
Flu A	0	3	10	0	2.0	14.2
Flu B	0	0	1	0	0	23.0
RSV	0	5	12	0	51.0	19.4
Flu A/RSV	0	20	1	0	7.0	2.0
Flu A/Flu B	0	0	3	0	0	5.7
Unknown	0	0	22	0	0	13.5
Total	0	28	49	0	7.1	15.2
Outbreaks	**2013/14**	**2014/15**	**2015/16**	**2013/14**	**2014/15**	**2015/16**
Flu A	1	3	3	30.0	7.3	6.0
RSV	1	3	2	7.0	9.0	6.0
Flu A/RSV	0	3	0	0	8.7	0
Flu A/Flu B	0	0	1	0	0	5.0
Unknown	1	0	0	4.0	0	0
Total	3	9	6	13.7	8.3	5.8

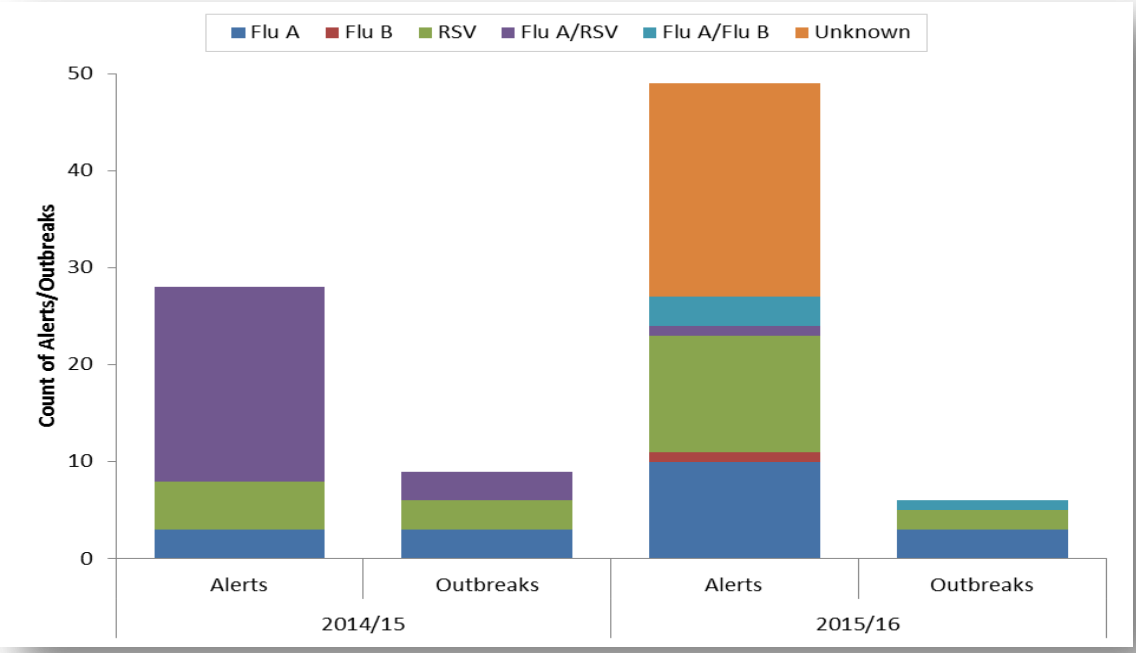
Source: Fraser Health Outbreak and Alert Database, extract May 2016

Table 11. Number of RI outbreaks by FH acute care site and etiological agent, fiscal year 2015/16

	Site			
Etiologic Agent	BH	QPCC	SMH	Total
Flu A	0	1	2	3
Flu A/Flu B	0	0	1	1
RSV	1	1	0	2
Total	1	2	3	6

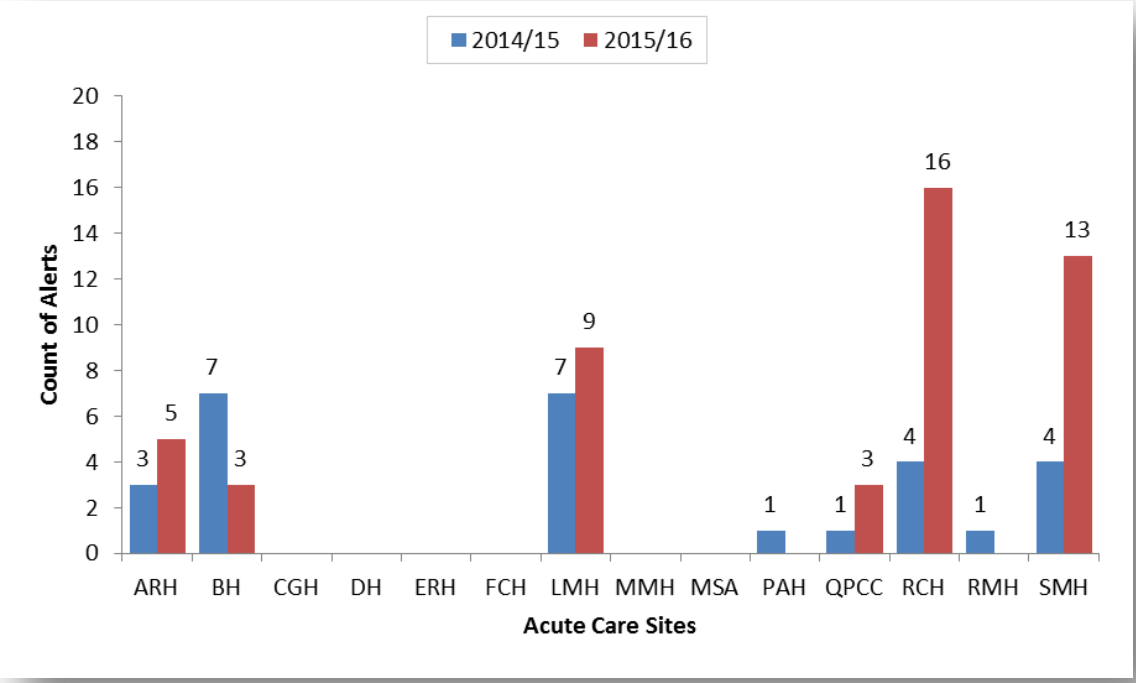
Source: Fraser Health Outbreak and Alert Database, extract May 2016

There was an increase in the number of RI alerts issued in 2015/16, which corresponded with an increase in duration of alerts (Figure 14, Table 10). This may indicate that alerts were in place for a longer duration to reduce the number of cases and in turn decreased the number of outbreaks. The number of RI alerts issued for 2014/15 and 2015/16 by acute care sites is presented in Figure 15.



Source: Fraser Health Outbreak and Alert Database, extract May 2016

Figure 14: Number of RI alerts and outbreak notifications issued by FH acute care sites and fiscal year, and etiological agent



Source: Fraser Health Outbreak and Alert Database, extract May 2016

Figure 15: Number of RI alerts issued by FH acute care sites and fiscal year

Outbreak Management Improvements

As part of the FH initiative to decrease CDI incidence rates across the organization, a rigorous GI policy with clinical practice guidelines for management of GI cases and outbreaks was developed. These GI protocols mandate the escalation of IPC initiatives depending on the number and prevalence of cases on a unit and the deployment of a rapid response Outbreak Management Team (OMT) if an outbreak (either Norovirus or CDI) is declared.

The hands-on approach of the OMT is crucial to the timely cessation of the outbreak. The approach consists of daily teleconferences with leadership and key stakeholders from the facility and affected unit. The IPC practitioner keeps a detailed line list with new cases added as they occur for discussion and consultation with the IPC Executive Medical Director. IPC best practices are reviewed and assessed, including closure of patient kitchens, de-cluttering activities, emphasis on hand washing and increased frequency of audits, IPC education on principles and best practices, cleaning of shared patient equipment, dedicated toileting facilities, closure of hallway beds and review of

environmental cleaning practices. A rigorous outbreak resource toolkit was developed and implemented for the IPC Practitioners to provide them with a standardized framework to facilitate management with their site teams.

Daily communication emails and alerts are distributed to affected stakeholders including updated outbreak data and IPC best practice reminders. Outbreaks are also posted on the FH public website. This multipronged strategy minimizes the impact and duration of the outbreaks across FH.

To assist MHSU sites in the community, the designated consultant developed an outbreak toolkit and education for MHSU sites with less than 15 beds.

Outbreak Lessons Learned for GI/CDI Outbreaks in 2015/16

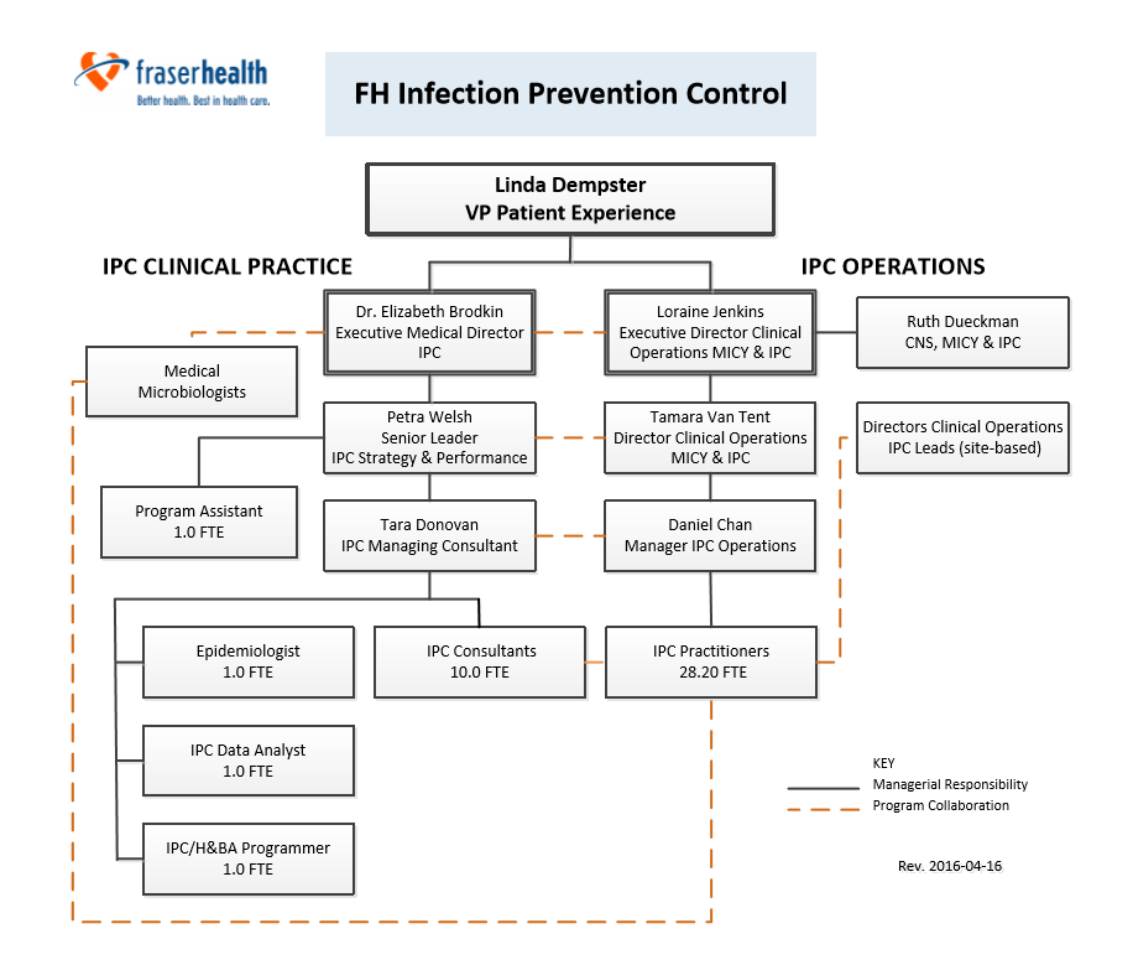
- Infection Prevention and Control should be involved by the unit as soon as a potential GI situation is identified. The affected unit needs to communicate the situation with ICP as soon as it becomes apparent.
- All suspect and confirmed CDI cases are appropriately accommodated in private rooms with dedicated toileting facilities or appropriately cohorted according to the Clinical Practice Guideline: Acute Care Infection Prevention and Control Best Practices for Patients Requiring Contact Precautions Plus
- Contact Precautions Plus (CPP) have been implemented on all symptomatic patients. Signage is posted at entrance to every room with symptomatic patients as well as over the beds of the affected patients in each room
- Ensure there is dedicated equipment and dedicated nursing for affected patients
- Personal Protective Equipment (PPE) must be available at the entrance of all rooms on isolation precautions and must be used appropriately. Facial protection is to be used when there is a risk of spraying or splashing of body fluids e.g. vomiting, explosive diarrhea
- Remediation of PPE placement and separation of clean and dirty outside the patient rooms
- Accelerated hydrogen peroxide (AHP) disinfectant wipes are available on the unit
- Minimize bed transfers of GI symptomatic patients to avoid further transmission. If symptomatic patient is moved from a multi-bed room, the emptied bed should be blocked for at least one incubation period

- Closure of hallway beds on a unit may create concerns for concerns regarding increased congestions, but the closure of these beds may significantly reduce the length of an outbreak
- De-clutter units to allow for effective environmental cleaning in addition to a review of de-clutter audits
- Discourage food sharing. No food should be eaten or kept at the nursing station and patient care areas.
- Daily-to-weekly hand hygiene audits and "in the moment" feedback. Additional hand hygiene auditors need to be trained to allow audits to be completed on weekends, as current auditors mostly work Monday-Friday.
- Ensure isolation cart (or alternative) available at store needed supplies at entrance to each isolation room
- Environmental Services providing extra staff for enhanced cleaning, and also in anticipation of unit re-opening facilitated the re-opening of the unit in a timely and efficient manner

Outbreak Lessons Learned for Respiratory Outbreaks in 2015/16

- Enhanced cleaning of the affected room must continue until patients with RI symptoms are resolved.
- Reviewing Droplet Precautions and PPE donning and doffing should be reviewed routinely before onset of respiratory season.
- Healthcare providers should be dedicated to symptomatic and non-symptomatic patients or should begin care of asymptomatic patients followed by symptomatic patients.
- Continue to conduct hand hygiene audits on the unit and provide "in the moment" feedback.
- Clear the clutter regularly, as it allows housekeeping staff to thoroughly clean surfaces.

Appendix A: Organizational Structure for the IPC Program



Appendix B: Terminology and Abbreviations

Adenovirus – a virus that is responsible for upper respiratory infections in children and adults. (http://encyclopedia.thefreedictionary.com/Adenovirus)
Annual target – a goal that is set on a fiscal year basis
ARH – Abbotsford Regional Hospital
ARO – antibiotic-resistant organism
BC – British Columbia
BCCDC – British Columbia Centre for Disease Control
BCCDC PHL – BC Centre for Disease Control Public Health Laboratory
Benchmark – a point of reference for judging value, quality, change, or the like; standard to which others can be compared
BH – Burnaby Hospital
Causative Organism – the organism causing the infection
CA-MRSA – Community-Associated Methicillin-resistant *Staphylococcus aureus* (MRSA)
CAUTI – catheter-associated urinary tract infection
CGH – Chilliwack General Hospital
CI – confidence interval
CLABSI – Central line associated bloodstream infection
***Clostridium difficile* Infection (CDI) –** CDI is a micro-organism that produces a toxin that can cause diarrhea and serious illness of the gastrointestinal tract. Generally, *Clostridium difficile* (*C. difficile*) rarely causes problems in healthy people; however, CDI can be serious and even fatal, in people with co-morbid illnesses, the elderly, or who have weakened immune systems.
CNISP – Canadian Nosocomial Infection Surveillance Program. A collaboration including the Canadian Hospital Epidemiology Committee (CHEC), a subcommittee of the Association of Medical Microbiology and Infectious Disease (AMMI) and the Centre for Infectious Disease Prevention and Control (CIDPC) of the Public Health Agency of Canada (PHAC). (http://www.phac-aspc.gc.ca/nois-sinp/survprog-eng.php)
CPE – Carbapenemase-producing Enterobacteriaceae. Enterobacteriaceae are Gram-negative bacilli that commonly colonize the human gastro-intestinal tract. Some gram negative bacilli are resistant to carbapenem antibiotics via production of enzymes encoded for by resistance genes that destroy carbapenems.

CPO – Carbapenemase-producing organisms refers to any gram-negative bacilli (e.g., Enterobacteriaceae, *Pseudomonas aeruginosa*, *Acinetobacter baumanii*, etc.) that are resistant to carbapenem antibiotics via production of enzymes encoded for by resistance genes that hydrolyze carbapenems.
CSA – Canadian Standards Association
DH – Delta Hospital
Enterovirus – a virus often found in respiratory secretions (e.g., saliva, sputum, or nasal mucus) and the stool of someone with an infection; affects millions of people each year worldwide. (http://encyclopedia.thefreedictionary.com/enterovirus)
ERH – Eagle Ridge Hospital
Facility-associated – a case that is acquired and identified at the same facility (i.e., nosocomial to the same facility)
Facility Type – a healthcare facility categorized by the range of services offered
FCH – Fraser Canyon Hospital
FH – Fraser Health
Hand Hygiene – preventing the spread of illness through washing hands with soap and water or cleaning hands with alcohol based hand-rubs.
Healthcare-associated Infections (HAI) *also Nosocomial Infections* **–** infections patients get while staying in any healthcare facility, which include micro-organisms from other patients, the environment, or staff—not to be confused with facility-associated infections, which are acquired and identified at the same facility (nosocomial to the same facility).
Healthcare-associated to Facility/Unit – the facility or unit where the case most likely contracted the causative organism. Based on if the patient spent 72 hours or longer where the infection was identified or the previous location where the patient spent 72 hrs or longer either during the current admission or the previous admission, prior to symptom onset.
HSP – Health Service Provider
Human Metapneumovirus (hMPV) – a virus common in the winter season, especially among children. (http://acronyms.thefreedictionary.com/hMPV)
IPC – Infection Prevention and Control
Influenza-Like Illness (ILI) – acute onset of respiratory illness symptoms which are similar to influenza, but are usually caused by other viruses or bacteria. (http://medical-dictionary.thefreedictionary.com/influenza-like+illness)

Indicator – a statistical measurement that shows how well something is working or operating
JP/JPOCSC – Jim Pattison Outpatient Care and Surgery Centre
KPI – key performance indicator
LMH – Langley Memorial Hospital
MDRD – Medical Device Reprocessing Department (formerly Sterile Processing Department (SPD)
Methicillin-resistant *Staphylococcus aureus* (MRSA) – *Staphylococcus aureus* is micro-organism that is normally found on the skin and in the nose of healthy people. Some strains have become resistant to the common antibiotics used to treat infections. MRSA is a type of *Staphylococcus aureus* that is resistant to antibiotics commonly used to treat skin and soft tissue infections, including penicillins and cephalosporins. *Staphylococcus aureus* can cause minor skin infections such as boils or infections in a surgical incision site.
Methodology – the methods, principles, and rules used to for the activity or result
MMH – Mission Memorial Hospital
MoH – Ministry of Health
MSA – Matsqui-Sumas Abbotsford Hospital
Norovirus – are a group of non-enveloped, single-stranded ribonucleic acid (RNA) viruses that cause acute gastroenteritis. Noroviruses belong to the family *Caliciviridae* that comprises sapoviruses, which also causes gastroenteritis. Norovirus affects people of all ages. It is transmitted through food and water contaminated with feces or by person-to-person contact. (http://www.cdc.gov/norovirus/hcp/clinical-overview.html)
PAH – Peace Arch Hospital
PICNet (Provincial Infection Control Network) **–** a collaborative group of healthcare professionals who aim to prevent and control healthcare associated infections. (http://www.picnetbc.ca)
QPC – Quality Performance Committee
QPCC – Queen's Park Care Centre
Resolution Date – the date after 72 hrs has passed since last diarrheal stool or stool returns to normal for the patient. (e.g., May 1 – last liquid stool, May 2 – 24hrs, May 3 – 42hr, May 4 – 72hrs. Date=May 4)
Rhinovirus – frequently referred to as "the common cold". Viruses that cause colds can spread from infected people to others through the air and personal contact. Another mode of infection is through contact with stool or respiratory secretions from an infected person. (http://www.cdc.gov/Features/Rhinoviruses/index.html)

RMH – Ridge Meadows Hospital
RCC – Residential Contracted (Health Service Provider)
RCH – Royal Columbia Hospital
RSV **–** respiratory syncytial virus causes infection of the lungs and breathing passages and is a major cause of respiratory illness in children. RSV is easily spread by droplets containing the virus when someone coughs or sneezes. (http://kidshealth.org/parent/infections/bacterial_viral/rsv.html)
Source – the person or thing that gave the information
SMH – Surrey Memorial Hospital
Trend – the general movement or direction of change
Vancomycin-Resistant *Enterococci* (VRE) – *Enterococci* are micro-organisms that are commonly found in the stomach and bowels of healthy people. Some bacteria have become resistant to antibiotics used to treat infections. Vancomycin is an antibiotic used to treat serious infections. VRE is a type of *Enterococci* that has become resistant to Vancomycin. These organisms rarely cause illness in healthy people. However, when VRE gets into open cuts and skin sores, they can cause infections. Occasionally, VRE can also cause more serious infections of the blood or other body tissues.

Appendix C: Methodology and Technical Notes

The following outlines methodological and technical considerations in the routine review of Fraser Health infection prevention and control data.

General Considerations

Under-reporting

Surveillance systems such as the CDI surveillance system, BUGS, and MDRO that primarily rely heavily on laboratory reports of illness can be characterized by under-reporting of the true burden of illness. Case counts only represent known cases reported to IPC practitioners and recorded in the respective surveillance systems. The resulting degree of under-reporting may vary among infection(s) due to a variety of factors such as awareness, medical care seeking behaviours, availability of health care, methods of laboratory testing, reporting behaviours, clinical practice, and severity of illness. However, the extent of under-reporting for individual diseases has not been fully assessed in Fraser Health.

Data Management and Descriptive Measures

Descriptive Measures

Case Counts

This measure refers to the number of confirmed cases of a disease reported in a calendar year or during a specified time frame.

Crude Incidence Rates

Crude incidence rates are calculated by dividing the total case count in a fiscal year by the total number of people at risk of acquiring the disease in that year (e.g. patient days). Please refer to the disease/infection specific key performance indicators as described below. Rates are presented per 10,000 patient days, unless otherwise specified.

Analysis Software

Data analysis and presentation of this report were completed using IBM SPSS Statistics 21 and Microsoft Excel 2010. Identified differences in rates and counts from one fiscal

year, from one month to another, and between Fraser Health acute care sites are absolute and do not imply statistical significance.

Clostridium difficile Infection (CDI)

CDI case identification and confirmation is completed by the IPC practitioners using a provincial standardized case definition and protocol to identify cases from medical microbiology reports, admission reports, and chart reviews. IPC practitioners enter relevant, clinical details into an internal FH database that contains automated, electronic lab confirmation of C. difficile test results, combined with healthcare-related admission information that pertains to the FH patient. Patients diagnosed with CDI during surgery or scope procedures are manually entered into the database. The IPC health data analyst extracts and analyzes the data, and the epidemiologist provides interpretation and explanation of the findings and oversees the surveillance program.

Infection with *C. difficile* causes severe colitis with severe diarrhea. A positive lab result alone does not indicate an active infection that requires treatment; it may indicate colonization.

Population Under Surveillance	
Inclusion Criteria	All newly confirmed (or re-infected) healthcare-associated cases of CDI among admitted acute care patients.
Exclusion Criteria	Outpatients, residential care patients/residents, children less than one year of age, and relapses.

Key Performance Indicator (Crude Incidence Rate)		
$\frac{\text{Number of new healthcare-associated CDI attributed to the Fraser Health acute care site where CDI was most likely acquired}}{\text{Total patient days}}$	X	10,000 patient days

Limitations: What might have affected the quality if this measure?

Caution must be taken when interpreting rates because one case can result in a display of an inflated rate for facilities and programs with a small number of beds and patient days (e.g., MMH). An increase of one or two cases can lead to a high facility rate. Sites with a smaller number of beds and/or cases have been combined. Additionally, *C. difficile* testing practices and case definition application have varied over the years or across sites and programs, and case management as well as targeted intervention strategies have been implemented, which will affect the rates.

Provincial standardization of the definition for "prior admission to a healthcare facility" implemented April 1, 2013, may result in an increase in the number of FH healthcare-associated cases. The duration of admission to a healthcare facility was set to a minimum 24 hours when determining if a patient had an encounter to a healthcare facility within the last 4 weeks before current hospitalization (constitutes part of the definition for healthcare-associated compared to community-associated cases). Previously, the timeframe ranged from overnight to 72 hours.

In addition, a resolution date became a requirement for CDI cases as part of a modified relapse definition in FH, introduced in July 2013. Resolution date is the date after 72 hrs has passed since last diarrheal stool or stool returns to normal for patient (e.g., May 1 is last liquid stool, May 2 is 24hrs, May 3 is 48hr, May 4 is 72hrs. Resolution date is May 4)[2]. A relapse is a confirmed case that meets case definition and experiences a recurrence of diarrhea within 8 weeks of the resolution date (or discharge date if resolution date is not available) of the last CDI-related diarrhea. A reinfection is a confirmed case that meets case definition and experiences a recurrence of diarrhea greater than 8 weeks from a resolution date (or discharge date if resolution date is not available). Previously, a relapse occurred when a patient with CDI had a recurrence of diarrhea within 2 to 8 weeks of a previous CDI commencing and a reinfection occurred greater than 8 weeks from a previous CDI commencing (as determined by the date of a previous lab test, chart note, or diagnosis by endoscopy or pathological specimen). The modification to these definitions may increase the number of relapses identified and, in turn, decrease the number of reinfections (i.e., new CDI cases) counted.

Finally, outpatients with C. difficile who meet case definition and are subsequently admitted to acute care directly from their outpatient visit are included in the population under surveillance. This change may slightly increase the total number of CDI cases in FH.

FH laboratories introduced Polymerase Chain Reaction (PCR) testing methods for CDI stool samples in fiscal year 2011/12. Compared to the previous cytotoxicity assay, the PCR test is more sensitive and has a reduced turn-around time; therefore, the numbers of reported positive cases likely increased and may be evident in the CDI statistics

[2] Discharge date is used in lieu of resolution date is unknown or unattainable.

reported. Fraser South sites (DH, LMH, PAH, and SMH) implemented PCR testing on October 27, 2011. The remaining sites in Fraser North and East implemented PCR testing on March 19, 2012.

The timeframe for evaluating the healthcare history of a patient with CDI changed from 8 weeks to 4 weeks in fiscal year 2010/11. Cases with symptom onset in the community or 3 days or less after admission to an acute care facility are deemed healthcare-associated to that facility if the patient had a healthcare encounter in the previous 4 weeks (as opposed to 8 weeks previously). This change may decrease the number of healthcare-associated CDI because the timeframe for the look-back period is shorter.

The IPC program continues to strive for standardization with accurate and effective application of infection prevention and control practices and definitions across FH. Data are updated and scrutinized on a regular basis, and as a result, numbers and rates may change slightly from previous reports based on case updates.

Methicillin-Resistant Staphylococcus aureus (MRSA)

MRSA (colonization or infection) case identification and confirmation is completed by the IPC Practitioners using a standardized case definition to identify cases from medical microbiology reports. IPC Practitioners enter all cases into an internal FH database. The IPC health data analyst extracts and analyzes the data, and the epidemiologist provides interpretation and oversees the surveillance program.

Population Under Surveillance	
Inclusion Criteria	Any newly confirmed healthcare associated cases of MRSA infections or colonizations among admitted acute care patients for the first time ever.
Exclusion Criteria	Outpatients, residential care patients/residents.

Key Performance Indicator (Crude Incidence Rate)

$$\frac{\text{Number of new healthcare-associated MRSA attributed to the Fraser Health acute care site where MRSA was most likely acquired}}{\text{Total patient days}} \times \text{10,000 patient days}$$

Limitations: What may have affected the quality of this measure?

Caution must be taken when interpreting rates because one case can lead to an inflated rate for facilities and programs with a small number of beds and patient days (i.e., denominator). An increase of one or two cases can result in an inflated MRSA rate. Sites with a smaller number of beds and/or cases have been combined. Additionally, case

definition application has varied over the years and/or across sites and programs, and case management as well as targeted intervention strategies have been implemented, which will affect the rates.

Beginning April 1, 2013 (i.e., start date of fiscal year 2013/14), the duration of admission to a healthcare facility was standardized provincially at a minimum 24 hours when considering if a patient had an encounter to a healthcare facility within the previous 12 months. Previously, no explicit timeframe was indicated and ranged from overnight to 72 hours. This change in admission duration could increase the number of FH healthcare-associated compared to community-associated cases. Historically and to-date, outpatients identified with MRSA were considered incidence cases of MRSA. Because the population under surveillance excludes outpatients with MRSA, this change could decrease the total number of new MRSA identified and reported in FH.

Classification of healthcare-associated MRSA cases, using a 12-month look-back period, is time consuming and requires chart review, which may not always be feasible, and records may not be complete or available.

Data collection only includes first incidence of MRSA, whether it be a colonization or infection. Colonizations that develop into infections are not captured; therefore, an accurate number of colonizations and infections and corresponding rates for FH are not possible.

Screening practices as well as isolation and contact precautions among cases may have varied over the years or across sites and programs, thus affecting the rates. The IPC program continues to encourage standardization and accurate and effective application of infection prevention and control practices and definitions across FH.

Data are updated and scrutinized on a regular basis and as a result, numbers may slightly change based on case updates.

Vancomycin Resistant Enterococci (VRE)

VRE (colonization or infection) case identification and confirmation is carried out by the IPC Practitioners using a standardized case definition to identify cases from medical microbiology reports. IPC Practitioners enter all cases into an internal FH database. The IPC health data analyst extracts and analyzes the data, and the epidemiologist provides interpretation and oversees the surveillance program.

Population Under Surveillance	
Inclusion Criteria	Any healthcare-associated, confirmed VRE colonization (first time only) or infection among admitted acute care patients since the change in the screening protocol (Nov 2012). Patients with both VRE colonization and infection are counted twice and patients with multiple infections from more than one source are included. All VRE bloodstream infections are counted.
Exclusion Criteria	Outpatients, residential care patients/residents.

Limitations: What may have affected the quality of this measure?

Reporting of VRE infections is impacted by the varied practices of physicians and the number of clinical isolates ordered.

In October 2013 the VRE protocol was changed and a request was made for IPC practitioners to enter all VRE specimens found in inpatients for the first time as well as when the status changed from colonization to infection or the source of culture for an infection changed (e.g. infection in wound to infection in blood). Multiple blood specimens for the same patient are entered if there is a new infection. This change may have caused an increase in the number of infections reported since October 2013.

Beginning April 1st 2013 (i.e. start date of fiscal year 2013/14), the duration of admission to a healthcare facility was standardized provincially to a minimum of 24 hours when considering if a patient had an encounter to a healthcare facility within the 3 months prior to the current hospitalization. Previously, no explicit timeframe was indicated and ranged from overnight to 72 hours. This change in admission duration could increase the number of cases deemed to be FH healthcare-associated.

Carbapenemase-Producing Organisms (CPO)

CPO (colonization or infection) reporting is carried out by the IPC Practitioners based on laboratory confirmation from medical microbiology reports. IPC Practitioners enter additional epidemiologic and clinical details into an internal FH database that contains an automated extraction of existing patient admission and laboratory information. The IPC epidemiologist mines and analyzes the data and provides interpretation and explanation of the findings and oversees the surveillance program.

Population Under Surveillance	
Inclusion Criteria	Patient admitted to a Fraser Health acute care facility or receiving dialysis at a Fraser Health renal unit/clinic identified to have CPO for the first time.
Exclusion Criteria	Patients who had the same gene identified previously, outpatients (e.g. ER visits, IV therapy clinic visits, etc.), and residential care patients/residents.

Limitations: What might have affected the quality if this measure?

As a result of the screening protocol that was implemented in 2014, there was an increased likelihood of identifying and in turn reporting cases.

Currently there is limited understanding of the community prevalence of CPO and the extent of transmission that is occurring in our communities. This will affect the number of CPO cases that may be identified in future.

Hand Hygiene Compliance

Hand hygiene audits are an ongoing performance measure across FH. The majority of hand hygiene observations in fiscal year 2014/15 were completed by audit-trained and certified healthcare providers on units, as well as trained co-op students. Observations were completed in various settings including acute care facilities, Residential Operated and Contracted facilities, Mental Health& Substance Use (MHSU) facilities, outpatient settings including JPOCSC, public health units, primary care facilities, and among home support and home health.

All auditors received standardized training based on the hand hygiene audit toolkit available to all staff via the FHPulse and were certified through a practice audit by IPC practitioners or Consultants. Auditors collected the hand hygiene observations on unit-specific audit forms that are faxed to a central provider and submitted into an electronic hand hygiene audit system (FormAudit) where it is stored on a secure server. Data are accessible to all FH staff on the FHPulse. Observations for hand hygiene compliance included before-and-after opportunities based on the four moments for hand hygiene. Use of both soap and water and alcohol-based hand rub (ABHR) were included for compliance. Missed opportunities occurred when hand hygiene compliance was not adhered to.

Each audit included a minimum of five healthcare providers who were observed up to 10 opportunities for hand hygiene; a valid audit required at least 25 total observations.

This requirement was to ensure the reliability of the results and provide consistency when comparing percentage of hand hygiene compliance over time.

Classification of staff/healthcare provider types is collated into four category codes:

Nurse	NP/RN/RPN, LPN, Care Aide/Student Aide, Student (Nursing)
Physician	Physician, Medical Student/Resident
Clinical	Medical Technician, Respiratory Therapy, Lab personnel, Porter, Social Worker, Rehab Therapy, Dietician, Pharmacist
Other	Housekeeping, Maintenance, Volunteer, Food Services, Other

Key Performance Indicator (% Hand Hygiene Compliance)		
$\frac{\text{Number of Compliant Hand Hygiene Moments}}{\text{Number of Opportunities}}$	X	100

Limitations: What may have affected the quality of this measure?

Data collection methods and auditors have varied over the years and should be considered when comparing rates. The variety of auditors could impact inter-observer variability (i.e., variation between auditors) or intra-observer variability (i.e., variation in an observer's classification over time), but use of the best practice hand hygiene toolkit should minimize this variability by standardizing the education provided to auditors and the methodology used when conducting hand hygiene audits.

The total number of acute care observations has significantly increased over the past three fiscal years compared to prior years; therefore, caution must be used when comparing fiscal year results. Some sites, programs, and types of staff have a smaller total number of observations and may not be as representative of the overall population.

Reprocessing of Medical Devices

Audits were conducted by subject-matter experts from the FH IPC program. Facilities and units are responsible for the reprocessing activities.

A database utilizing iPad technology is used. This system enables standardized data entry, with functionality to record both auditor and department/service managers' comments at the time of the audit, and allows users to submit their remediation directly into the system. All audit responses (i.e., Yes, No, or N/A) and comments are imported

into a database. The system allows for generation of compliance results, remediation reports and various other reports.

High-risk audits included MDR, OR, acute surgery units, ambulatory care as well as JPOCSC – respiratory and SMH-family birthing unit. Low-risk areas included areas in acute care such as ER, speech and language therapy, respiratory therapy, and community sites including MHSU and residential contracted and operated.

Limitations: What may have affected the quality of this measure?

A reformatted audit tool was implemented for the province in fiscal year 2012/13, so comparisons within FH can only be undertaken for the years since this time, as comparisons to previous years would be inaccurate since the audit questions are modified.

Data collection methods and auditors have varied over the years and should be considered when comparing rates. The variety of auditors could impact inter-observer variability (i.e., variation between auditors) or intra-observer variability (i.e., variation in an observer's classification over time), but a standardized audit tool and methodology used when conducting audits should minimize this variability.

Gastrointestinal Illness Outbreaks

Surveillance and oversight of acute care outbreaks is carried out by IPC Practitioners who are notified by front-line staff of symptoms consistent with gastroenteritis, which include otherwise unexplained vomiting and/or diarrhea. IPC Practitioners use standardized case definitions to determine if a GI outbreak should be declared. A GI/CDI Outbreak is declared in consultation with IPC Executive Medical Director when either of the following criteria is met:

a. ≥ 3 probable or confirmed GI cases in one unit within a 4-day period (GI Outbreak); OR
b. ≥ 3 laboratory confirmed cases of Clostridium difficile infection attributed to one unit (as defined by geographical area, nursing station, and unit mnemonic) within a 7-day period. (CDI Outbreak)

Acute care outbreaks are reported through standardized outbreak notification emails, which include posting all outbreaks that are in progress on the FH external website. IPC Practitioners monitor and record all acute care outbreaks in an FH internal database.

Limitations: What may have affected the quality of this measure?

Norovirus and CDI outbreaks often coincide, as increased norovirus activity means that fecal material colonized with *C.difficile* spores is more prevalent and more likely to contaminate the environment and cause transmission. Diarrheal symptoms due to norovirus may prompt testing for *C.difficile*, and mislabelling of patients who are only colonized with *C.difficile*.

Respiratory Illness Outbreaks

Surveillance and oversight of acute care outbreaks is carried out by IPC Practitioners who are notified by front-line staff of symptoms consistent with respiratory illness. An RI case is defined as:

a. laboratory confirmation of a known respiratory pathogen (e.g. Influenza, RSV, etc.), **OR**

b. new or worsening cough, **AND**

c. fever of > 38° C or a temperature that is above normal for the individual.

Additional symptoms may include myalgia/arthralgia, prostration, nasal discharge, sore throat, and/or headache. IPC Practitioners follow a standardized outbreak definition for declaration. An RI outbreak is declared in consultation with IPC Executive Medical Director when there are 2 or more epidemiologically linked healthcare-associated RI cases on a unit (as defined by geographical area, nursing station, and unit mnemonic) within 7 days. Acute care outbreaks are reported through standardized outbreak notification emails, which include FH-wide posting of all outbreaks that are in progress. IPC Practitioners monitor and record all acute care outbreaks in an FH internal database.

Appendix D: FH Acute Care Beds, FY2015/16

Facility	Facility Name	Total # of acute care patient beds
FCH	Fraser Canyon Hospital	10
MSA	Worthington Pavillion Subacute Unit (MSA)	25
MMH	Mission Memorial Hospital	45
DH	Delta Hospital	58
QPCC	Queen's Park Care Centre (acute care)	86
CGH	Chilliwack General Hospital	133
ERH	Eagle Ridge Hospital	165
RMH	Ridge Meadows Hospital	162
PAH	Peace Arch Hospital	181
LMH	Langley Memorial Hospital	192
ARH	Abbotsford Hospital	257
BH	Burnaby Hospital	287
RCH	Royal Columbian Hospital	446
SMH	Surrey Memorial Hospital	652
TOTAL		2699

Information provided by Finance based on staff budgeted acute care beds in operation at March 31, 2016 (incl. NICU bassinets)

Appendix E: Reprocessing Compliance Acute Care

Table 12. Percent compliance in FH acute care and JPOCSC, 2015/16

Facility	Department	Risk Level	Compliance
ARH	Ambulatory Care	High	88%
ARH	Medical Device Reprocessing	High	100%
ARH	Operating Room	High	98%
ARH	Emergency	Low	90%
ARH	Respiratory	Low	88%
ARH	Speech and Language Pathology	Low	89%
BH	Ambulatory Care	High	69%
BH	Medical Device Reprocessing	High	99%
BH	Operating Room	High	89%
BH	Emergency	Low	92%
BH	Respiratory	Low	88%
BH	Speech and Language Pathology	Low	90%
CGH	Ambulatory Care Cataract Clinic	High	81%
CGH	Ambulatory Care	High	88%
CGH	Medical Device Reprocessing	High	99%
CGH	Operating Room	High	94%
CGH	Emergency	Low	87%
CGH	Respiratory	Low	90%
DH	Ambulatory Care	High	93%
DH	Medical Device Reprocessing	High	95%
DH	Operating Room	High	99%
DH	Surgical Day Care	High	86%
DH	Emergency	Low	84%
DH	Respiratory	Low	78%
ERH	Ambulatory Care	High	91%
ERH	Medical Device Reprocessing	High	99%
ERH	Operating Room	High	89%
ERH	Emergency	Low	69%
ERH	Respiratory	Low	84%
ERH	Speech and Language Pathology	Low	89%
JPOSC	Respiratory	High	64%
JPOSC	Ambulatory Care	High	93%
JPOSC	Medical Device Reprocessing	High	99%
JPOSC	Operating Room	High	98%
JPOSC	Maternal, Infant, Child and Youth	Low	91%
LMH	Ambulatory Care	High	82%
LMH	Medical Device Reprocessing	High	97%

LMH	Operating Room	High	95%
LMH	Emergency	Low	70%
LMH	Respiratory	Low	94%
MMH	Ambulatory Care	High	66%
MMH	Medical Device Reprocessing	High	87%
MMH	Emergency	Low	84%
PAH	Medical Device Reprocessing	High	98%
PAH	Operating Room	High	93%
PAH	Ambulatory Care	High	85%
PAH	Emergency	Low	64%
PAH	Respiratory	Low	86%
PAH	Speech and Language Pathology	Low	86%
RCH	Ambulatory Care	High	82%
RCH	Medical Device Reprocessing	High	99%
RCH	Operating Room	High	93%
RCH	Surgical Day Care	High	76%
RCH	Emergency	Low	71%
RCH	Respiratory	Low	82%
RCH	Speech and Language Pathology	Low	90%
RMH	Ambulatory Care Cataract Clinic	High	94%
RMH	Ambulatory Care	High	88%
RMH	Medical Device Reprocessing	High	98%
RMH	Operating Room	High	90%
RMH	Emergency	Low	83%
RMH	Respiratory	Low	90%
SMH	Maternal, Infant, Child and Youth	High	80%
SMH	Ambulatory Care Cataract Clinic	High	80%
SMH	Ambulatory Care	High	83%
SMH	Medical Device Reprocessing	High	98%
SMH	Operating Room	High	88%
SMH	Emergency	Low	85%
SMH	Respiratory	Low	95%
SMH	Speech and Language Pathology	Low	87%

Appendix F: Reprocessing Compliance in Community Care

Table 13. Percent compliance in FH community care 2015/16

Facility	Sector	Compliance
Arbutus Lodge	MHSU (Residential care -operated)	100%
Argyll Lodge	MHSU	100%
Bradley Centre (CGH)	Residential care - operated	100%
Burquitlam Lions Care Centre	Residential Contracted	100%
Chrysallis Manor	MHSU	100%
Connolly	MHSU	100%
Cottage Pavilion (MSA)	Residential care - Operated	100%
Creekside Withdrawal	MHSU	100%
Crescent Gardens	Residential Contracted	100%
CRESST Surrey	MHSU	100%
Delta Lodge	MHSU	100%
Dufferin Care Centre	Residential Contracted	100%
Fellburne Care Centre	Residential care - Operated	94%
Finlay/Hogg (PAH)	Residential care - Operated	99%
Finnish Manor	Residential Contracted	100%
Fraser Hope Lodge	Residential care - Operated	100%
George Derby Centre	Residential Contracted	100%
Glenwood Care Centre	Residential Contracted	100%
Good Shepperd Lodge	MHSU	100%
Hilton Villa Care Centre	Residential Contracted	100%
Jackman Manor	Residential Contracted	100%
Kiwanis Care Centre	Residential Contracted	100%
La Rosa Rest Home	MHSU	100%
Langley Gardens	Residential Contracted	100%
LM-Cedar Hill/Maple Hill	Residential care - Operated	100%
LM-Convalescent Care (CVC)	Residential care - Operated	100%
LM-Rosewood/Marrwood	Residential care - Operated	100%
Maple Ridge Treatment Centre	MHSU	100%
Matsqui Sumas Abbotsford Manor	Residential Contracted	100%
Memorial Cottage (LMH)	MHSU	98%
Menno Home	Residential Contracted	100%
Murrayville Manor	MHSU	95%
NG Nair Place	MHSU	100%
Northcrest Care Centre	Residential Contracted	100%
Oceanside (PAH)	MHSU	90%
Pleasant View Society	MHSU	100%
Primary Care Clinic_Burnaby	MHSU	100%
Primary Care Clinic_Gateway-Surrey	MHSU	100%
Queens Park Care Centre	Residential care - Operated	100%
Queens Park Care Centre	Residential care - Operated	100%

William Rudd	Residential care - Operated	100%
Quibble Creek Treatment Centre	MHSU (Residential care -operated)	100%
St. Michael's Centre	Residential Contracted	100%
Surrey North Community Health Center	Public Health	100%
The Mayfair	Residential Contracted	100%
Topaz Place	MHSU	100%
Victoria Rest Home	MHSU	100%
Weatherby (PAH)	Residential care - Operated	99%
West Shore Laylum	Residential Contracted	100%
Worthington Pavilion (MSA)	Residential care - Operated	100%
Zion Park Manor	Residential Contracted	100%