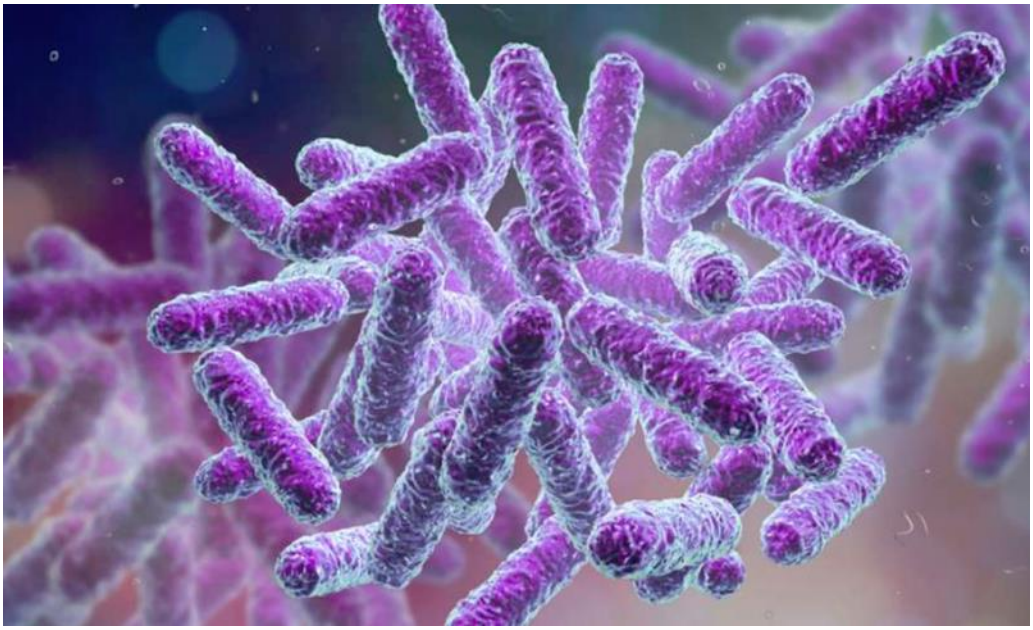
Annual Report
2018–2019



Infection Prevention and Control
July 2019

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Executive Summary

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 Operations, the IPC program at Fraser Health is pleased to present the IPC Annual Report for 2018/19; the seventh consecutive year that an IPC Annual Report has been published. The IPC program continues to grow and strengthen operationally and as a regional program, supporting Fraser Health in the achievement of excellence in healthcare through the implementation of IPC evidence-based practices and reduction in health-care associated infections.

During 2018/19, the program focused on one of the six Fraser Health Patient Safety Priorities (PSPs) that is under the leadership of IPC: (a) reducing methicillin-resistant *Staphylococcus aureus* (MRSA). The program also continues to monitor and support the previous two PSPs: CDI reduction and ensuring hand hygiene compliance meets and exceeds the provincial target of 80% compliance. The IPC program also concentrated on developing and implementing a third Service Plan (2019–2021) (IPC Program, 2019). The plan established priorities for the IPC program (and the organization) by providing goals and initiatives based on the organization's gaps and strengths and on emerging pathogens and public health threats. All the components of the service plan are intended to meet or exceed industry standards and best practices, to improve patient safety by preventing healthcare-associated infections (HAI), to reduce the number of serious complications and deaths of hospitalized patients and residents, and to improve the use of valuable healthcare resources.

This Annual Report highlights the outcomes and accomplishments of the program and outlines major goals and continued priorities for the 2019/20 fiscal year.

Infection Prevention and Control Health Care Report Card and Indicators for 2018–2019

Fraser Health IPC Health Care Report Card Priorities					
Indicator	Status	Target	2017/18	2018/19	Page #
Clostridioides difficile Infection	●	≤4.5*	3.4	3.0*	8
Methicillin-Resistant *Staphylococcus aureus*	●	≤7.0*	6.7	5.3*	10
Hand Hygiene Compliance	●	≥80%	87%^	80%^	13

* cases per 10,000 patient days

^ please see the Hand Hygiene section for a further discussion regarding the 2018/19 hand hygiene compliance rates

● meeting target

▲ within 10% of target

◆ outside of target range by more than 10%

Additional IPC Indicators					
Indicator	Status	Target	2017/18	2018/19	Page #
Carbapenemase-Producing Organisms	■	Reduction in nosocomial transmissions	13†	7†	11
Outbreak Management	■	Reduction in # of CDI outbreaks	3	4	15

† 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

Infection Prevention and Control Priorities for 2019–2020

The IPC priorities for 2019/20 are aligned with the initiatives of the 2019–2021 IPC Service Plan:

1. **HAI Quality Improvement:** Consultation, communication, and quality improvement support of healthcare-associated infection (HAI) reduction initiatives as a component of the Fraser Health Patient Safety Priorities, particularly methicillin-resistant Staphylococcus aureus (MRSA) and carbapenemase-producing organisms (CPO).

2. **Hand Hygiene Audit Program and Best Practices:** Continue with improvements to the Fraser Health hand hygiene audit program, including an update of the Fraser Health clinical practice guidelines, audit training and ongoing support for site-based auditors to conduct informal hand hygiene audits, and implementation of a sustainable patient hand hygiene program.

3. **IPC as a Regional Program:** Continue to develop the IPC program team in the LEADS Framework (LEADS Canada, 2017) and competencies, focusing on leadership, patient-centred care and quality improvement methodology.

4. **IPC Surveillance Systems and Reports:** Development and implementation of the Lumed IPC/ASP system and reporting tools for acute care.

5. **Research, Innovation and Publication:** Explore and implement new IPC-related technologies, supporting projects, research and quality improvement initiatives with submission of abstracts to IPC and quality improvement conferences and peer-reviewed journals in partnership with internal and external stakeholders.

6. **IPC Construction:** Ensure IPC consultation and support for all phases of Fraser Health construction and renovation projects to incorporate IPC best practices in both acute care and community facilities.

7. **IPC Best Practices:** Continue to engage the organization with incorporating IPC best practices in daily workflow routines, including the assessment and improvement of environmental cleaning practices, appropriate liquid waste disposal to reduce transimission of microorganisms in the healthcare setting and improved practices for the management and storage of linens and linen carts in acute care facilites.

In a healthcare environment where accountability and transparency are at the centre of garnering public trust, the IPC program at Fraser Health welcomes your feedback on this report.

Please send comments to Petra Welsh, Director, IPC Strategy and Performance (petra.welsh@fraserhealth.ca)

Awards, Achievements and Presentations

Table 1. Presentations at Conferences by the IPC Program for 2018/19

Presentation Title	Authors	Conference	Date
Clinical and Economic Impact of Ultra-Violet Light Germicidal Irradiation at Fraser Health (oral presentation)	Infection Prevention and Control	BC Patient Safety and Quality Committee Quality Forum	February 2019
Comparison of Data Quality from a Manual and an Automated MRSA Surveillance Database (poster presentation)	Infection Prevention and Control	BC Patient Safety and Quality Committee Quality Forum	February 2019
Clinical and Economic Impact of UVGI on Hospital Acquired Infections in a Canadian Health Region (poster presentation)	Infection Prevention and Control	Canadian Agency for Drugs and Technologies in Health	April 2019
Use of Whole Genome Sequencing to Detect and Investigate a Community-Based Outbreak of Carbapenemase-Producing *Escherichia coli* (poster presentation)	Infection Prevention and Control and BCCDC Public Health Laboratory	Association of Medical Microbiology and Infectious Disease Canada	April 2019
A Hospital's Experience with Preventing Nosocomial Transmission of Carbapenemase-Producing Enterobacteriaceae During a Community Outbreak (oral presentation)	Infection Prevention and Control, Peace Arch Hospital and Medical Microbiology	Society of Healthcare Epidemiology of America (SHEA)	April 2019
Fraser Health's Extraordinary CDI Journey: 2011/2012 Through 2018/2019 (oral presentation)	Infection Prevention and Control, Peace Arch Hospital and Medical Microbiology	Infection Prevention and Control Canada / International Federation of Infection Control (IPAC/IFIC)	May 2019
The Common, Weird and Wacky Findings of the Canine Scent Detection Program in Vancouver Coastal Health and Fraser Health Authorities (poster presentation)	Infection Prevention and Control	IPAC/IFIC	May 2019
Report Automation for the Identification and Escalation of Guideline Discordant *Clostridium difficile* Infection Therapy (poster presentation)	Fraser Health Infection Prevention and Control and Vancouver Coastal Health Infection Prevention and Control	IPAC/IFIC	May 2019
It's Not "Just a Colonization": Five Years of Acute Care MRSA Surveillance Data in a Multi-Site Health Region (poster presentation)	Infection Prevention and Control, Pharmacy and Antimicrobial Stewardship	IPAC/IFIC	May 2019

Healthcare-Associated Infection Indicators

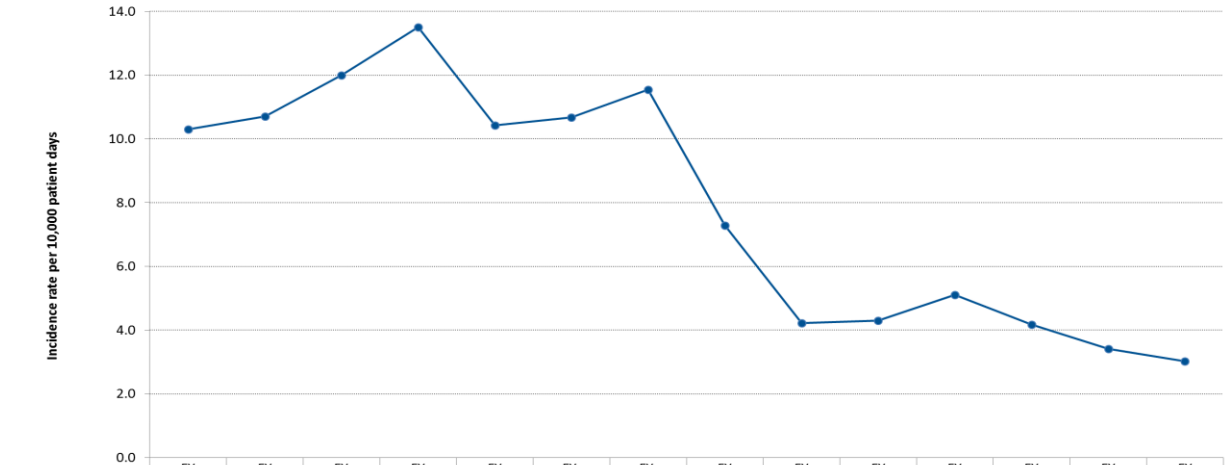
Clostridioides difficile Infection

Status	Target	2017/18	2018/19
●	≤4.5*	3.4*	3.0*

*cases per 10,000 patient days

Clostridioides difficile infection (CDI) is one of the most commonly acquired healthcare-associated infections (HAIs) 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.

As Fraser Health consistently met the CDI target of ≤ 6.0 cases per 10,000 patient days from 2013/14 to 2016/17, and national benchmarks decreased during this period, the target was reduced to ≤ 4.5 cases per 10,000 patient days beginning with the 2017/18 fiscal year. The Fraser Health rate of new CDI for 2018/19 decreased from the previous fiscal year from 3.4 (95% CI: 3.1–3.8) to 3.0 (95% CI: 2.7–3.4) cases per 10,000 patient days (Figure 1). Although the decrease was not statistically significant, this represents a 12% decrease in the number of facility-associated CDI incident cases and 40 CDI cases prevented during the 2018/19 year.



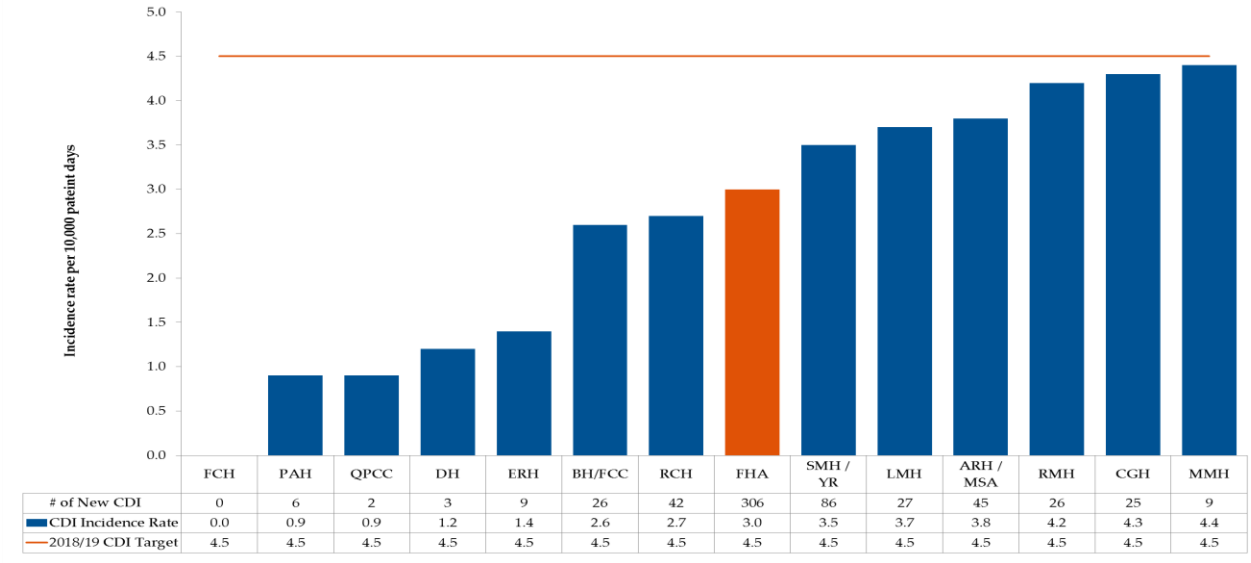
	FY 2005/06	FY 2006/07	FY 2007/08	FY 2008/09	FY 2009/10	FY 2010/11	FY 2011/12	FY 2012/13	FY 2013/14	FY 2014/15	FY 2015/16	FY 2016/17	FY 2017/18	FY 2018/19
# of New CDI	725	843	945	1150	909	1007	1141	738	437	447	550	426	346	306
CDI Incidence Rate	10.3	10.7	12.0	13.5	10.4	10.7	11.5	7.3	4.2	4.3	5.1	4.2	3.4	3.0

Source: Fraser Health CDI Surveillance Database, extract May 16th, 2019

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

In 2018/19, all of Fraser Health acute care sites met the annual target of ≤ 4.5 new CDI cases per 10,000 patient days (Figure 2).

Caution must be taken when interpreting rates because one case can result in 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 can account for a higher incidence of CDI include, but are not limited to, congestion, and over-capacity, and higher level of care sites that serve patients of higher acuity with an increased risk of complications.



	FCH	PAH	QPCC	DH	ERH	BH/FCC	RCH	FHA	SMH / YR	LMH	ARH / MSA	RMH	CGH	MMH
# of New CDI	0	6	2	3	9	26	42	306	86	27	45	26	25	9
CDI Incidence Rate	0.0	0.9	0.9	1.2	1.4	2.6	2.7	3.0	3.5	3.7	3.8	4.2	4.3	4.4
2018/19 CDI Target	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5

Source: Fraser Health CDI Surveillance Database, extract May 16th, 2019

Figure 2: Number of new facility-associated CDI and incidence rate by Fraser Health site for 2018/19

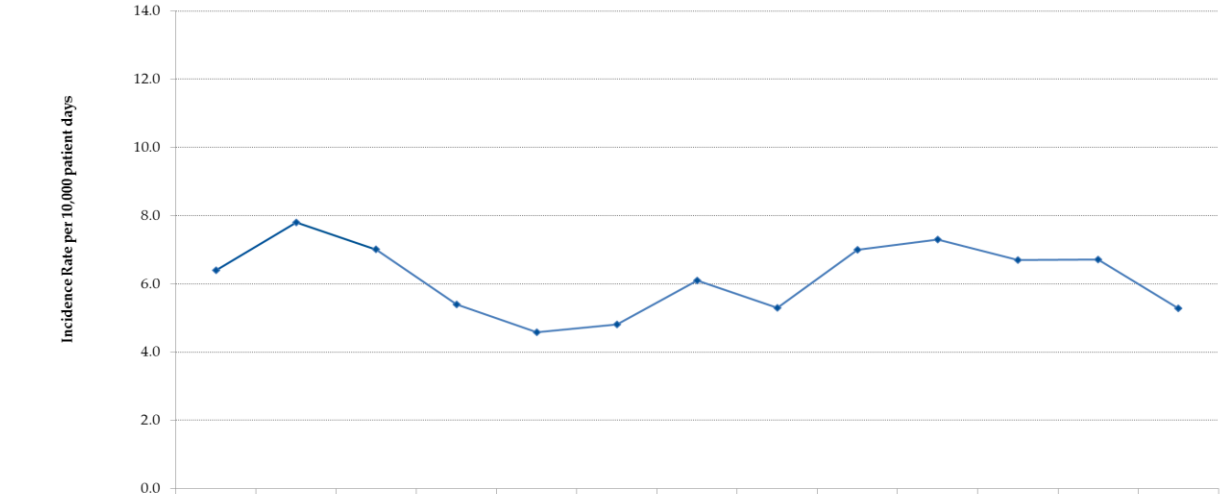
Methicillin-Resistant *Staphylococcus aureus*

Status	Target	2017/18	2018/19
●	≤7.0*	6.7*	5.3*

*cases per 10,000 patient days

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 difficult to treat and causes increased length of hospital stay and increased morbidity and mortality.

A MRSA incidence rate of ≤ 7.0 cases per 10,000 patient days was the established annual target for Fraser Health for the 2018/19 fiscal year. The goal is a reduction in the MRSA rate year over year. The Fraser Health rate of new MRSA for 2018/19 decreased from the previous fiscal year from 6.7 (95% CI: 6.2–7.2) to 5.3 (95% CI: 4.9–5.7) cases per 10,000 patient days (Figure 3), a statistically significant decrease ($p < 0.05$). Moreover, this represents a more than 20% decrease in the number of facility-associated MRSA incident cases and over 150 MRSA cases prevented during the 2018/19 year.

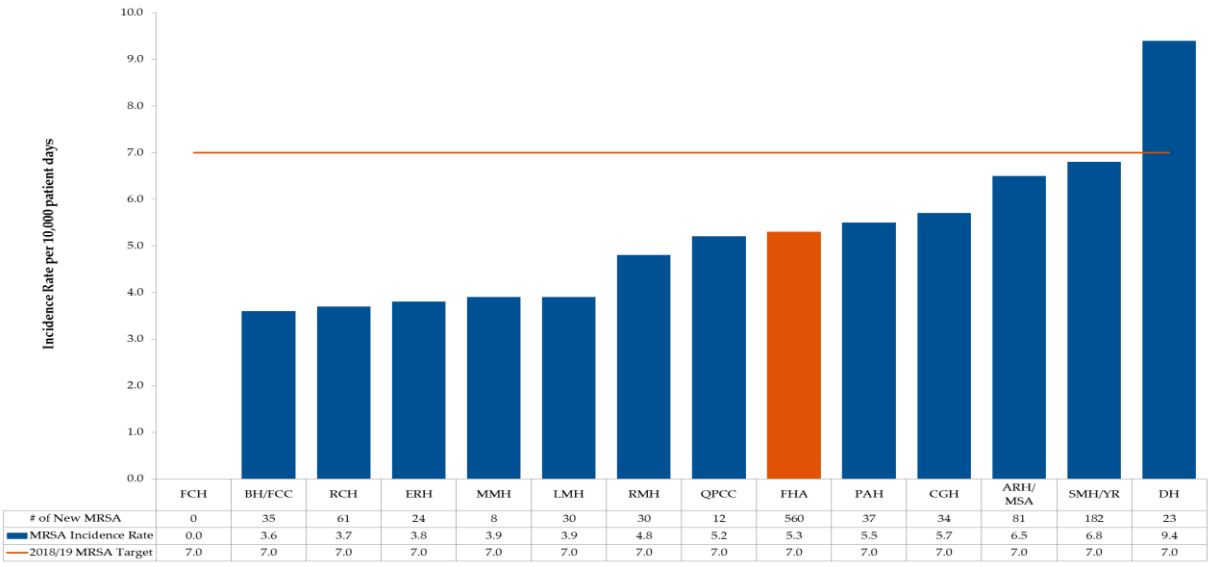


	FY 2006/07	FY 2007/08	FY 2008/09	FY 2009/10	FY 2010/11	FY 2011/12	FY 2012/13	FY 2013/14	FY 2014/15	FY 2015/16	FY 2016/17	FY 2017/18	FY 2018/19
# of New MRSA	524	643	608	492	453	498	647	568	760	822	721	714	560
MRSA incidence rate	6.4	7.8	7.0	5.4	4.6	4.8	6.1	5.3	7.0	7.3	6.7	6.7	5.3

Source: Fraser Health iTracker Surveillance Database, extract May 16th, 2019

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

The MRSA incidence rates among Fraser Health sites ranged from 0.0 per 10,000 patient days at Fraser Canyon Hospital (0 cases) to 9.4 per 10,000 patient days at Delta Hospital (23 cases) (Figure 4). One site did not meet the target of 7.0 cases per 10,000 patient days.



	FCH	BH/FCC	RCH	ERH	MMH	LMH	RMH	QPCC	FHA	PAH	CGH	ARH/ MSA	SMH/YR	DH
# of New MRSA	0	35	61	24	8	30	30	12	560	37	34	81	182	23
MRSA Incidence Rate	0.0	3.6	3.7	3.8	3.9	3.9	4.8	5.2	5.3	5.5	5.7	6.5	6.8	9.4
2018/19 MRSA Target	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0

Source: Fraser Health iTracker Surveillance Database, extract May 16th, 2019

Figure 4: Number of new facility-associated MRSA and incidence rate per 10,000 patient days by Fraser Health site for 2018/19

Carbapenemase-Producing Organisms

Status	Target	2017/18	2018/19
●	Reduction in nosocomial transmissions	13*	7*

*number of newly identified cases

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 carbapenems through the production of enzymes that break them down; these are known as carbapenemase-producing organisms (CPO). CPO can arise through the sharing of carbapenemase genes between bacteria by means of mobile genetic material called plasmids.

There is potential for infection when CPO moves from the gastrointestinal tract (where they are usually found) into other body spaces, including wounds, the bladder, the respiratory tract, or the bloodstream. When CPO 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 abroad. When colonized patients enter Fraser Health hospitals, other patients may be put at risk of acquiring the same organisms. The environment can also become contaminated with these organisms, providing another source of spread.

In fiscal year 2018/19, 130 patients with CPO were newly identified in Fraser Health. Over half of these cases (57%) were associated with healthcare outside of Canada, while seven (5%) were likely nosocomial (Table 2). The majority of newly identified cases reported in fiscal year 2018/19 were colonizations (88%) (Table 3).

Table 2. Patients with CPO in Fraser Health by Epidemiological Source and Fiscal Year

Fiscal Year	FH Healthcare Associated	Travel w/ Healthcare	Travel Only†	BC Community Associated	Undetermined	Total
2013/14	41 (61%)	19 (28%)	0 (0%)	0 (0%)	7 (10%)	67 (100%)
2014/15	26 (46%)	20 (36%)	2 (4%)	0 (0%)	8 (14%)	56 (100%)
2015/16	20 (30%)	37 (55%)	3 (4%)	0 (0%)	7 (10%)	67 (100%)
2016/17	10 (18%)	40 (70%)	2 (4%)	0 (0%)	5 (9%)	57 (100%)
2017/18	13 (14%)	48 (53%)	11 (12%)	10 (11%)	8 (9%)	90 (100%)
2018/19	7 (5%)	74 (57%)	14 (11%)	15 (12%)	20 (15%)	130 (100%)

Source: Fraser Health MDRO Surveillance Database, extract May 7th, 2019.
† = On 14 March 2017, Fraser Health implemented an additional screening question "Have you travelled to the Indian subcontinent countries of India, Pakistan, and Bangladesh within the last 12 months?"

Table 3. Patients with CPO Infections versus Colonizations in Fraser Health by Fiscal Year

Fiscal Year	Infections	Colonizations	Total
2013/14	21 (31%)	46 (69%)	67 (100%)
2014/15	11 (20%)	45 (80%)	56 (100%)
2015/16	6 (9%)	61 (91%)	67 (100%)
2016/17	10 (18%)	47 (82%)	57 (100%)
2017/18	7 (8%)	82 (92%)	90 (100%)
2018/19	16 (12%)	114 (88%)	130 (100%)

Source: Fraser Health MDRO Surveillance Database, extract May 7th, 2019

IPC Best Practice

Hand Hygiene Compliance

Status	Target	2017/18	2018/19
●	80% compliance	87% compliance	80% compliance*

* Due to the change to the hand hygiene audit model, only hand hygiene observations collected by the regional hand hygiene auditors in acute care inpatient units from fiscal period 4-13 are included.

Hand hygiene is a critical patient safety initiative and one of the most effective, well-evidenced measures to reduce the transmission of healthcare-associated infections worldwide. Hand hygiene education and training is provided across Fraser Health through new employee orientation sessions as well as on-the-job training and in-services provided by IPC Practitioners.

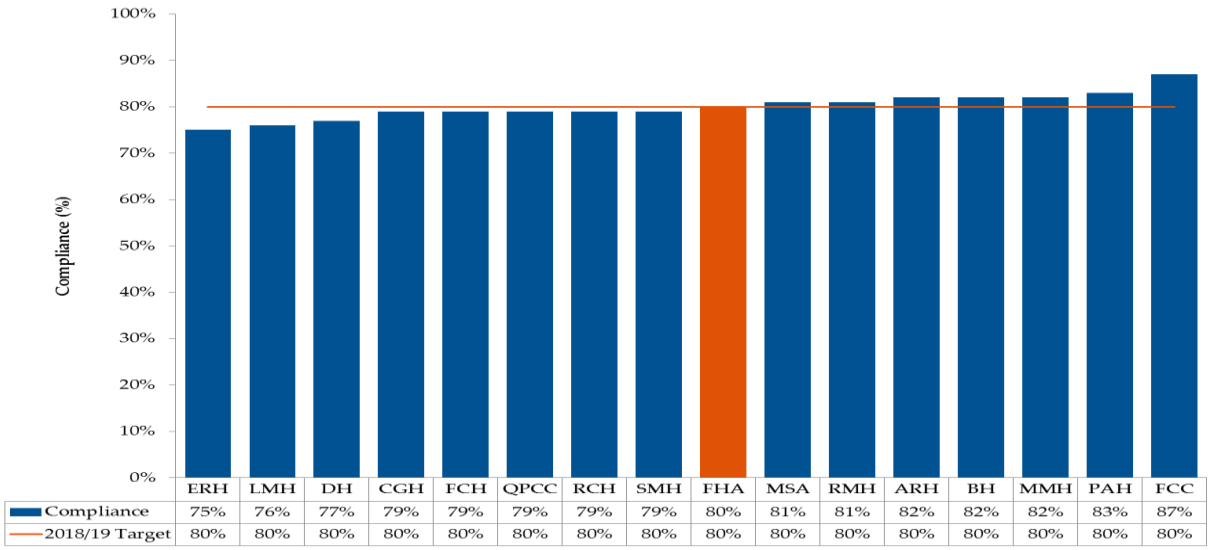
In the spring and summer of 2017, the Infection Prevention and Control (IPC) program conducted independent audits at all acute care sites in order to validate Fraser Health's publicly reported hand hygiene (HH) compliance rates. A series of recommendations were developed based on the results, and a new HH audit model has been implemented.

Undergraduate co-op students, known as the regional HH auditors, now perform all fiscal period audits on FH acute care inpatient units. This smaller team of dedicated auditors, trained in a consistent manner, ensure reported HH compliance rates reflect the quality of care on each unit. Facilities are retaining staff auditors to support periods requiring more frequent audits (e.g. during outbreaks). These staff auditors will eventually be trained on the new HH audit model, increasing regional capacity.

Due to the new HH audit model, as of fiscal period (FP) 1904 of 2018/19, only hand hygiene observation data collected by the regional hand hygiene auditors have been included in fiscal period/year compliance rates. Hand hygiene audit data collected by site auditors for fiscal periods, alerts/outbreaks, outpatient clinics and other quality improvement initiatives are not included in fiscal period reports.

The Fraser Health acute care hand hygiene compliance rate for fiscal year (FY) 2018/19, FP1904 to FP1913, was 80%, which meets the provincial target (80%). The compliance rate in 2018/19 decreased from 2017/18 due to the change in methodology of using regional hand hygiene auditors—providing a consistent, reliable representation of hand hygiene compliance across Fraser Health acute care sites. Hand hygiene compliance for FY 2018/19 by acute care site is presented in Figure 5. In FY 2018/19, FP1904 to FP1913, HH compliance rates at ARH/MSA, BH, FCC, MMH, PAH and RMH met or exceeded the provincial target. HH compliance is reported as a percentage based on observations

made by hand hygiene auditors. As such, the hand hygiene compliance rate is greatly impacted by the number of observations.

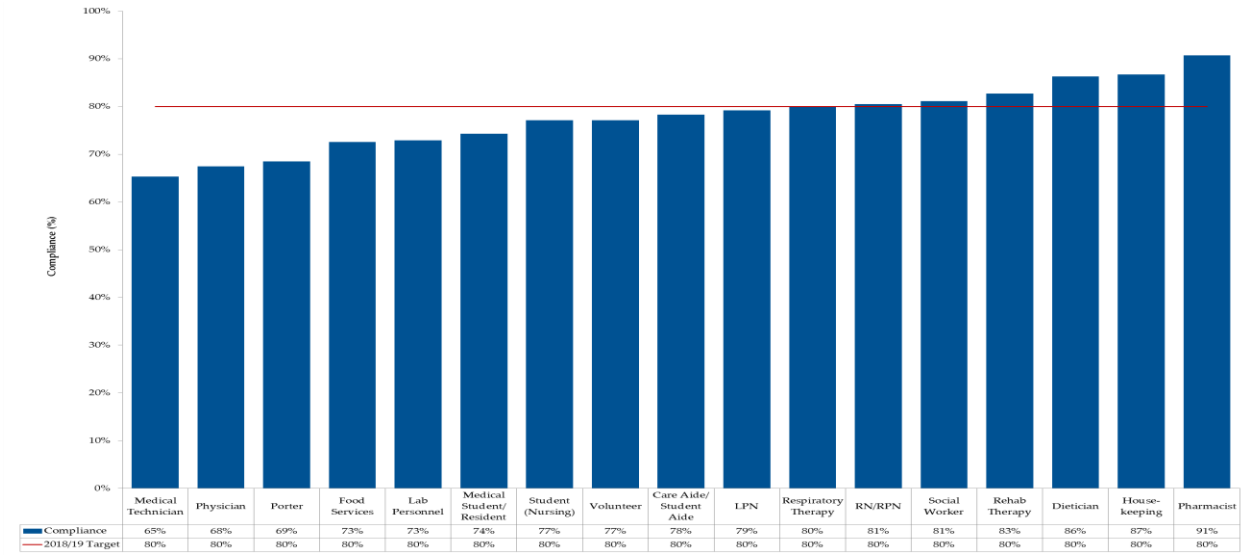


	ERH	LMH	DH	CGH	FCH	QPCC	RCH	SMH	FHA	MSA	RMH	ARH	BH	MMH	PAH	FCC
Compliance	75%	76%	77%	79%	79%	79%	79%	79%	80%	81%	81%	82%	82%	82%	83%	87%
2018/19 Target	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%

Source: Fraser Health FormAudit Hand Hygiene Module, June 3, 2019

Figure 5: Hand hygiene compliance among all staff by Fraser Health site for 2018/19

The HH compliance rate by health care provider type ranged from 65% for Medical Technicians to 91% for Pharmacists (Figure 6). In FY 2018/19, FP1904 to FP1913, HH compliance rates for Respiratory Therapy, RNs/RPNs, Social Workers, Rehabilitation Therapy, Dieticians, Housekeeping and Pharmacists met or exceeded the provincial target.



	Medical Technician	Physician	Porter	Food Services	Lab Personnel	Medical Student/ Resident	Student (Nursing)	Volunteer	Care Aide/ Student Aide	LPN	Respiratory Therapy	RN/RPN	Social Worker	Rehab Therapy	Dietician	House-keeping	Pharmacist
Compliance	65%	68%	69%	73%	73%	74%	77%	77%	78%	79%	80%	81%	81%	83%	86%	87%	91%
2018/19 Target	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%

Source: Fraser Health FormAudit Hand Hygiene Module, June 28, 2019

Figure 6: Hand hygiene compliance by health care provider in Fraser Health for 2018/19

Outbreak Management

Status	Target	2017/18	2018/19
■	Reduction in number of CDI outbreaks	3	4

Fraser Health monitors and tracks the total number of gastrointestinal illness (e.g., norovirus), CDI and respiratory illness (influenza and non-influenza respiratory viruses) outbreaks and alerts, along with their impact on acute sites. Outbreaks and alerts are declared in consultation with the IPC Executive Medical Director.

Alert notifications were introduced to reduce the number of outbreaks in acute care sites by enabling IPC Practitioners to implement enhanced cleaning and other initiatives aimed at improving IPC practices and reducing the bio-burden on the unit, thus reducing the risk of transmission.

In Fraser Health, a CDI outbreak is defined as three or more new healthcare-associated cases of CDI attributed to a single unit (as defined by geographical area, nursing station, and unit mnemonic) in a seven-day period. A gastrointestinal illness (GI) outbreak is defined as three or more probable or confirmed GI cases in one unit within a four-day period.

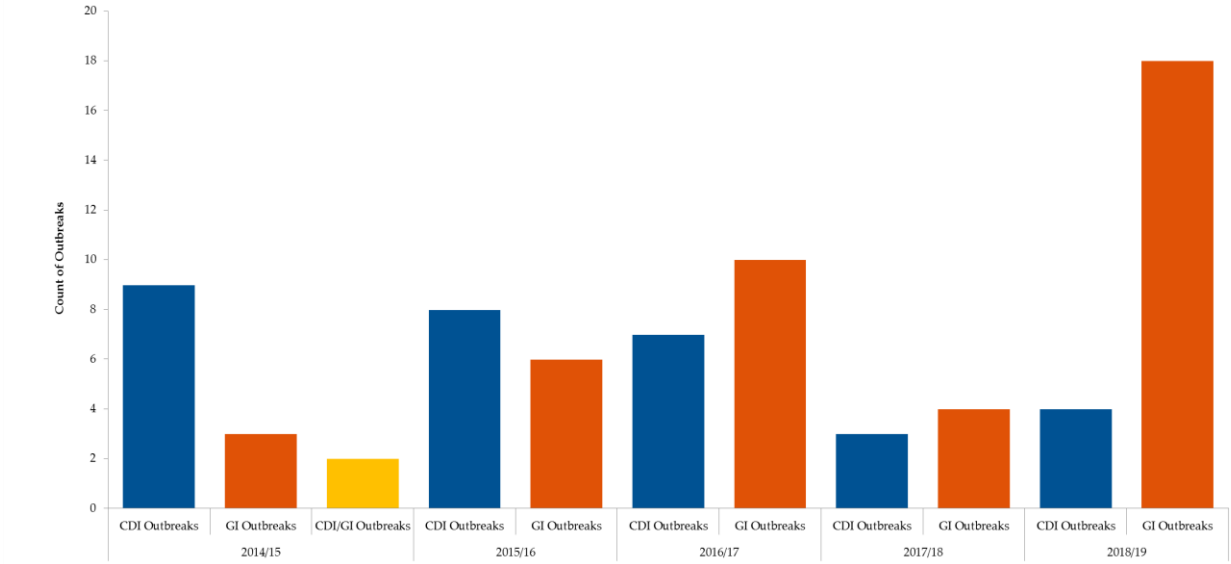
A respiratory illness (RI) outbreak is declared when there are two or more microbiologically and epidemiologically linked healthcare-associated RI cases on a unit.

Clostridioides difficile Infection and Gastrointestinal Illness Alerts and Outbreaks

The outbreak management goal for the organization is to decrease the number of CDI outbreaks from year-to-year in acute sites. The number of CDI outbreaks in 2018/19 increased from three in 2017/18 to four in 2018/19, which represents an increase of 33% (Figure 6). Similarly, there was an increase in the number of GI outbreaks, from four in 2017/18 to 18 in 2018/19. It is important to note that the number of GI illness (i.e., norovirus) outbreaks in acute care sites is dependent on what is circulating in the community (see figure 7). IPC measures in the hospital are very important in controlling both CDI and GI illness outbreaks.

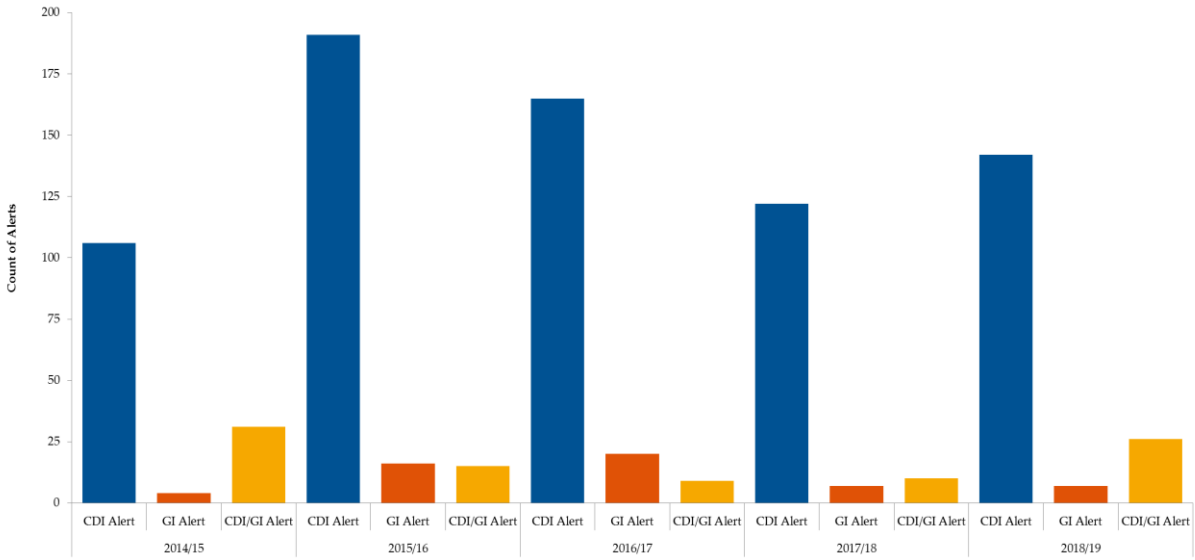
The number of CDI and GI alerts issued by Fraser Health acute care sites increased by 26% in 2018/19 (Figure 8). In fiscal year 2018/19, 175 alerts were issued. The majority (81%) of alerts were issued for CDI, which was consistent with the previous year. There

was a decrease in the duration of alerts. The average length of a CDI or GI alert for 2018/19 was 7 days.



Source: Fraser Health Outbreak and Alert Database, extract April 16th, 2019

Figure 7: Number of CDI and/or GI outbreak notifications issued for Fraser Health acute care sites by fiscal year and etiological agent



Source: Fraser Health Outbreak and Alert Database, extract April 16th, 2019

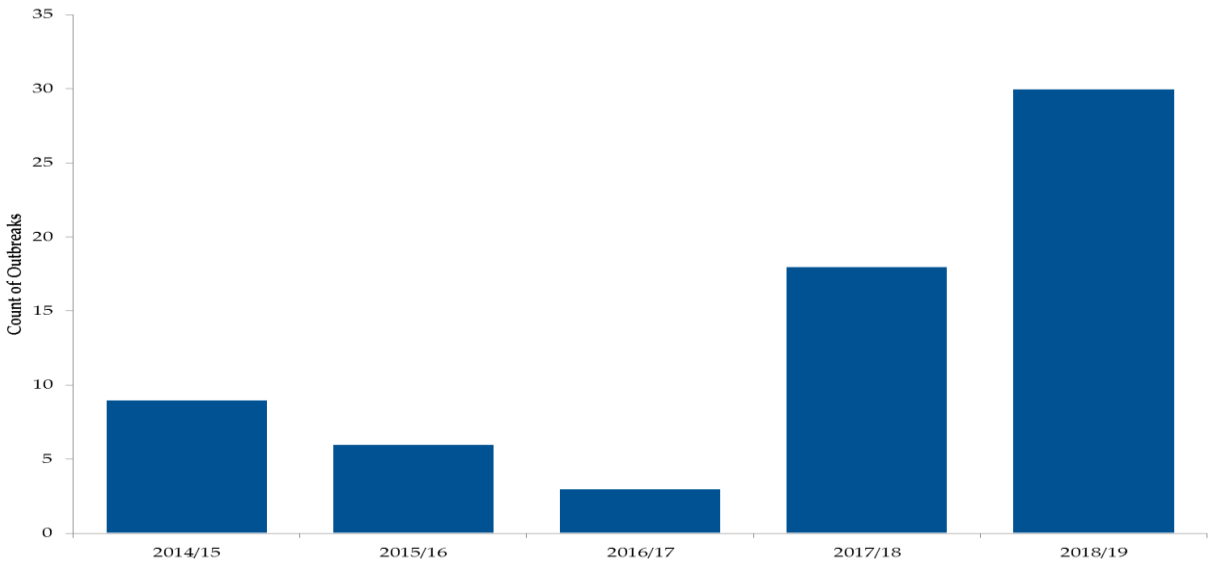
Figure 8: Number of CDI and/or GI alert notifications issued for Fraser Health acute care sites by fiscal year and etiological agent

Respiratory Illness Alerts and Outbreaks

In fiscal year 2018/19, there were 30 RI outbreaks declared in units across nine Fraser Health acute care sites. There was a substantial increase in the number of RI outbreaks from the previous fiscal years (Figure 9). This increase may have been due to the late-season second wave of influenza in British Columbia (BC) in 2018/19, with activity elevated above historical averages (British Columbia Centre for Disease Control [BCCDC], 2019). Other factors that may have increased the number of RI outbreaks include increased influenza testing and severe congestion in the facilities.

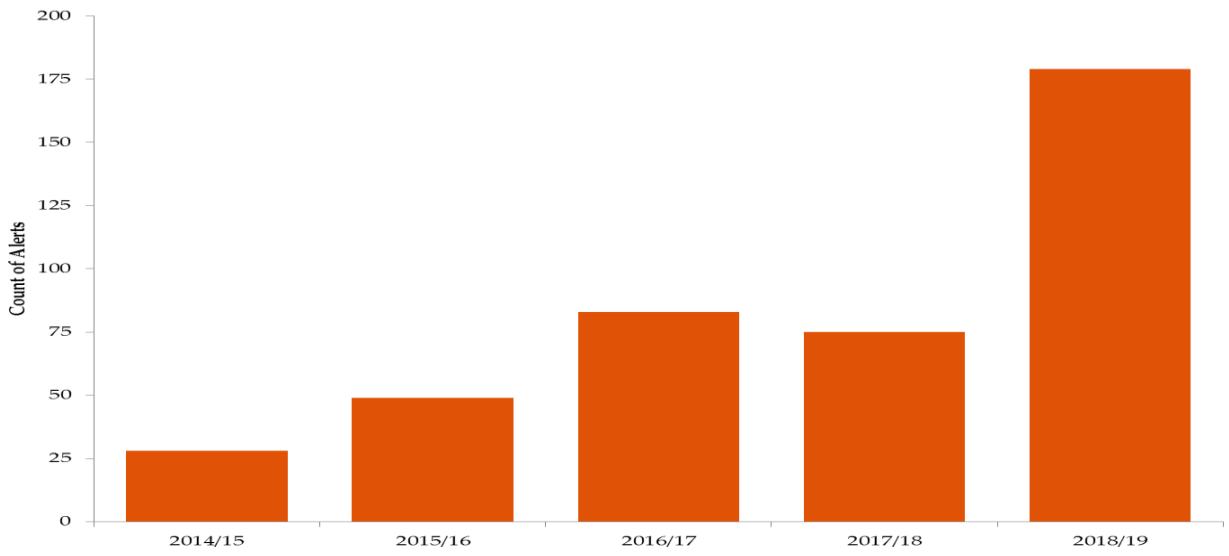
Influenza A was identified in all but four RI outbreaks, while respiratory syncytial virus (RSV) was identified in eight outbreaks. The majority of the RI outbreaks involved laboratory-confirmed influenza A, similar to previous years. Influenza B was only involved in one (3%) outbreak in 2018/19, compared to 44% of outbreaks in 2017/18.

There was an increase in the number of RI alerts issued in 2018/19 (Figure 10) and a decrease in the duration of alerts. The average length of an RI alert for 2018/19 was 5.6 days, compared to 9.9 days in 2017/18. The proportion of RI alerts with an unidentified etiological agent decreased to 13% in 2018/19 from 31% in 2017/18. Influenza A was the most identified etiological agent in alerts (65% of alerts had at least one laboratory-confirmed influenza A case), followed by RSV (40%) and influenza B (2%).



Source: Fraser Health Outbreak and Alert Database, extract April 16th, 2019

Figure 9: Number of RI outbreak notifications issued by Fraser Health acute care sites by fiscal year



Source: Fraser Health Outbreak and Alert Database, extract April 16th, 2019

Figure 10: Number of RI alert notifications issued by Fraser Health acute care sites by fiscal year

Outbreaks: Lessons Learned 2018/19

- **Outbreak Management Training (IPC Practitioners):** Table-top training exercise and template for IPC Practitioners in development and documentation of patient lines lists and communication tools for conducting an outbreak call investigation
- **Outbreak Management Training (Site Leadership):** Development and implementation of a table-top exercise for the site Directors for Clinical Operations (site IPC Leads) regarding roles and responsibilities in outbreak management situations
- **Outbreak Management calls**: One daily outbreak call with the ICP Executive Medical Director and the IPC Practitioners to discuss the current outbreaks, including site individual daily calls with their affected units. This provided learning opportunities and standardization of outbreak management initiatives across Fraser Health
- **Outbreak IPC Practitioner Support**: Develop a process to provide additional weekend support for IPC Practitioners during the outbreak season when there are multiple outbreaks
- **Hand Hygiene**: Training and support for site-based auditors to conduct alert and outbreak hand hygiene audits
- **Staff Education**: "Flu School" IPC education on infection control requirements for outbreak management focused on front-line staff responsibilities for patient

management and timely application of additional precautions for symptomatic patients

- **Development of IPC Guidelines**: Develop guidelines for the creation of a "clean" sub-unit on an outbreak unit
- **Update the Outbreak Management Clinical Practice Guidelines**: Update and provide clarification of various initiatives in the Outbreak Management clinical practice guidelines
- **Pharmacy Support**: Ensuring pharmacy is on the outbreak teleconferences. Ensure pharmacy support to provide appropriate antiviral therapy to confirmed influenza cases, along with antiviral prophylaxis to asymptomatic patients on the unit in an effort to support successful management of influenza outbreaks. In some cases, unimmunized staff may be asked to obtain a prescription for antivirals from their family physician
- **Visitor Signage and Policy**: Ensure visitors check-in at the unit nursing station prior to visitation to receive information regarding hand hygiene and respiratory etiquette and providing better outbreak signage to support this requirement.

Improvement Initiatives

Clostridioides difficile Infection

Patients with CDI are managed on specific precautions to prevent transmission of CDI to patients and staff. This includes adherence to best practices for hand hygiene, decluttering, donning and doffing personal protective equipment, dedicated medical devices and patient care equipment and an escalated series of environmental cleaning and disinfection requirements. In addition, improvement work continued on the following strategies from 2017/18:

- ***Clostridioides difficile* Vulnerable Unit List**: Targeted support, communication and site-led improvement initiatives on units that are at highest risk for CDI nosocomial transmission (i.e., vulnerable units)
- **Ultra-Violet Light Germicidal Irradiation (UVGI)**: Implementation of two ultra-violet light disinfection robots across Fraser Health acute care sites as an adjunct to the regular cleaning and disinfection of patient rooms using the Fraser Health developed deep clean methodology. In collaboration with the site Environmental Services teams, the IPC program provides oversight and technical support to each site, including ongoing evaluation of the program. An interrupted time series (ITS) analysis, comparing the changes in CDI HAI rates between pre- and post- trial periods while adjusting for changes in control sites was also completed and provided additional support for the use of the devices across FH
- **Canine Scent Detection Program**: Canine scent detection (CSD) is a unique program developed by Vancouver Coastal Health (VCH) whereby trained and certified detection dogs are able to identify the presence of environmental reservoirs of *Clostridioides difficile* (*C. difficile*) bacteria. Fraser Health contracted with VCH to provide a detection dog and handler two days per week at Fraser Health acute care sites. The CSD teams search high risk units/areas within acute care sites looking for environmental reservoirs. The teams record their findings and respond to contaminated areas (alerts) with immediate cleaning. Findings are presented back to the units, clinical staff and site leadership to support improvement initiatives in IPC best practices and cleaning/disinfection processes
- **Automated *Clostridioides difficile*/Antimicrobial Stewardship Program/Pharmacy Quality Improvement Project**: In 2017/18 the Antimicrobial Stewardship Program (ASP), Pharmacy, and IPC program collaborated on a quality improvement project to improve CDI patient outcomes where every CDI

case was reviewed by an IPC Practitioner and possible gaps in antibiotic management were escalated to a clinical pharmacist. Based on the success of the pilot and subsequent implementation, the IPC program developed an automated electronic system in collaboration with the Fraser Health Integrated Analytics team, replacing the manual assessment processes

- **Fraser Health Patient Safety Priorities**: Ongoing review, communication and support of CDI and hand hygiene improvement initiatives as part of the continuous monitoring of the previous 2016-2018 Fraser Health Patient Safety Priorities

Methicillin-Resistant *Staphylococcus aureus*

In addition to contact precautions for MRSA (including best practices for hand hygiene, correct donning and doffing of personal protective equipment and enhanced environmental cleaning), the following new strategies have been actioned to support MRSA reduction:

- **Fraser Health Patient Safety Priorities:** MRSA is one of the six 2019-2021 Fraser Health Patient Safety Priorities. Ongoing review, communication and support of site-led MRSA improvement initiatives and hand hygiene improvement initiatives
- **Methicillin-Resistant *Staphylococcus aureus* Vulnerable Unit List**: Targeted support, communication and improvement initiatives on units that are at highest risk for MRSA nosocomial transmission (i.e., vulnerable units)
- **Ultra-Violet Light Germicidal Irradiation (UVGI)**: Implementation of ultra-violet light disinfection robots across Fraser Health acute care sites as an adjunct to the regular cleaning and disinfection of patient rooms using the deep clean methodology. See description under CDI.

Carbapenemase-Producing Organisms

In addition to enhanced contact precautions for patients with CPO (i.e., best practices for hand hygiene, correct donning and doffing of personal protective equipment, dedicated nursing care, dedicated medical devices and patient care equipment, enhanced environmental cleaning and patient cohorting where possible), the following strategies have been actioned to contain and reduce transmissions of CPO:

- **Carbapenemase-Producing Organisms Screening Questions**: A continual review of Fraser Health CPO epidemiological information to assess the requirement of

adding additional screening questions for admitted patients who have travelled without healthcare to specific CPO-endemic countries

- **Cohort Units**: Continued work with Fraser Health acute care sites to support and manage the transfer of patients in CPO cohorts or in single patient rooms on units that optimally supports patients' specific care requirements. A communication tool was created and is distributed each day to identify the current location of all CPO patients to optimize the CPO cohort beds and healthcare resources
- **Whole Genome Sequencing**: The IPC program continues to collaborate with the BCCDC Public Health Laboratory to investigate clusters and identify risk factors for CPO acquisition using whole genome sequencing
- **Environmental Reservoirs**: In collaboration with Facilities Management, the search for contaminated environmental reservoirs continued through 2018/19, with a focus on monitoring and addressing the contamination of sink drains by remediating the sink infrastructure
- **Fraser Health / Public Health Agency of Canada CPO Community Prevalence Project:** Developed a project in partnership with the Public Health Agency of Canada (PHAC) and SMH to determine the prevalence of CPO and associated risk factors in SMH community where all a pateints admitted through the SMH Emergency Department (ED), Family Birthing Unit (FBU) and Pediatric ED unit over the course of three separate fiscal periods will be screened for CPO. The first data collection period was in March 2019, the second data collection period was in June 2019 with the third one planned for October 2019. Questionnaires are administered to all positives cases and controls. Community-laboratory positive cases from 2014 to 2020 are also being contacted to provide information regarding CPO epidemiological questions related to their positive test results.

Hand Hygiene

In addition to the regular audits and hand hygiene improvement work that is conducted by the sites and community programs, the following new initiatives were put in place to support hand hygiene improvement work:

- **Validated Hand Hygiene Audits**: Development and implementation of a validated hand hygiene program using regional hand hygiene auditors (undergraduate cooperative program students) to conduct audits within Fraser Health acute care sites with just-in-time feedback to healthcare providers on

opportunities for hand hygiene improvements to meet the "Your 4 Moments of Hand Hygiene" standards and best practices

- **Hand Hygiene Reports**: Systematic reports with rates and common misses for hand hygiene compliance are reported back to the sites management teams. A "Hand Hygiene Summary (Vulnerable Unit List)" was developed, as well as a top ten and bottom ten hand hygiene unit report—both are distributed to the Fraser Health executive and to all acute care sites
- **Patient Hygiene**: An ongoing focus on patient hygiene, including hand hygiene, supporting patients with bathing and cleaning their hands, frequent linen changes, education on the importance of clean hands, and ensuring products available at the patient bedside
- **Audits in the Community**: Development and implementation of risk-based analysis tools, including a self-audit tool and supporting material to evaluate hand hygiene compliance in the community, primary care, outpatient areas and home health
- **Previous 2016-2018 Fraser Health Patient Safety Priorities**: Ongoing review, communication and support of hand hygiene compliance rates and improvement initiatives as part of the continuous monitoring of the previous 2016-2018 Fraser Health Patient Safety Priorities
- **Ministry of Health Hand Hygiene Guidelines**: Participation in a provincial hand hygiene working group to update the BC Ministry of Health Hand Hygiene Policy and Best Practices for Hand Hygiene in All Health Care Settings and Programs.

Other

- ***Candida auris (C. auris)***: The regional IPC program is finalizing guidelines for managing *C. auris* at all Fraser Health acute care sites and community residential care facilities and is planning the implementation of a protocol to screen CPO positive patients for *C. auris.* The program is also in the process of finalizing the necessary agreements in order to share enhanced surveillance data on C. auris cases with the Canadian Nosocomial Infection Surveillance Program on an ongoing basis
- **Central Line-Associated Blood Stream Infections (CLABSI):** CLABSI surveillance takes place in FH's four largest intensive care units (ICU): ARH, BH, RCH and SMH. IPC Practitioners review patients with a reported bloodstream infection (BSI) to determine if the infection may be associated with central line exposure in

the ICU, based on an established case definition. Central line days are collected by ICU informatics nursing staff and reported by Integrated Analytics. Rates presented in this report encompass data from FY 2017/18 up to Q2 of FY 2018/19. As line days are updated, CLABSI rates presented in this report may differ from previous reports. Moreover, surveillance data is routinely revised as new information becomes available

- **VRE Infection Reviews**: Each fiscal year, a consultant completes a chart audit of patients who were diagnosed with a healthcare-associated VRE deaths. These reviews are conducted annually as part of FH's commitment to monitoring the impact of VRE on patient safety. In 2018/19 a total of 39 reviews were completed. The median age of patients at the time of infection was 78 years old (range: 35-104 years); 49% were female and 51% were male. Consistent with previous years, 54% of VRE specimens were found in urine (Figure 9). The number of skin and soft tissue wound specimens remains consistent with the previous year.

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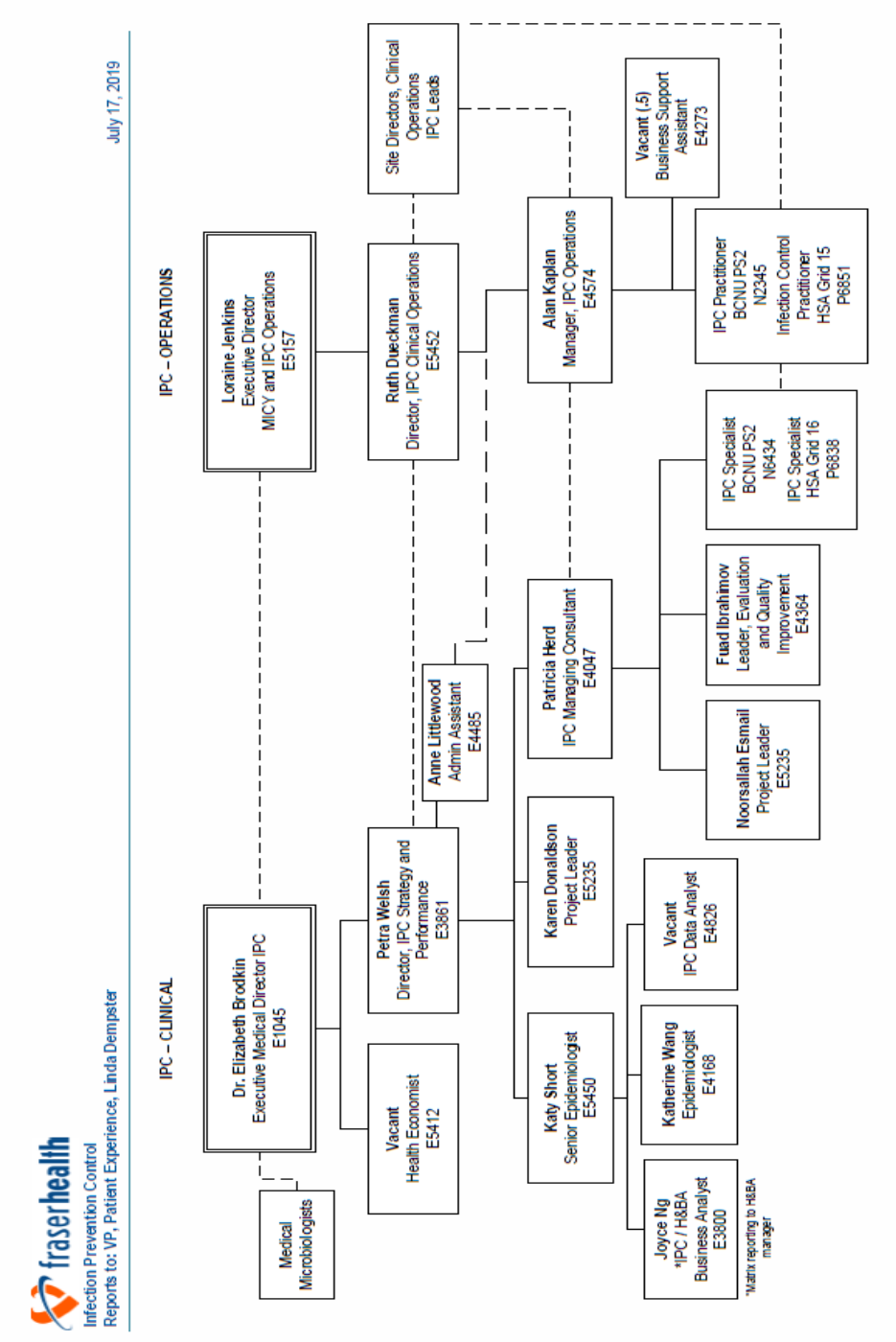
Appendices

Appendix A: Organizational Structure for the IPC Program



Appendix B: Terminology and Abbreviations

Acute care sites – sites where a patient receives active but short-term treatment for a severe injury or episode of illness, an urgent medical condition, or during recovery from surgery.
Alert – an alert is called when there is a high number or proportion of cases on a unit, but the number does not reach the pre-determined level for an outbreak to be declared.
Annual target – a goal that is set on a fiscal year basis
ARH – Abbotsford Regional Hospital
BC – British Columbia
BH – Burnaby Hospital
Bioburden – the number of microorganisms contaminating an object. (https://medical-dictionary.thefreedictionary.com/bioburden)
Causative Organism – the organism causing the infection
CGH – Chilliwack General Hospital
CI – confidence interval
***Clostridioides difficile* Infection (CDI) –** CDI is a micro-organism that produces a toxin that can cause diarrhea and serious illness of the gastrointestinal tract. Generally, *Clostridioides 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.
Cluster – a group of cases closely related in time and place
Colonization – the presence and multiplication of microorganisms without tissue invasion or damage. (https://medical-dictionary.thefreedictionary.com/colonization)
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.
DH – Delta Hospital
Etiological agent – a chemical, biological or physical entity that may cause disease in an organism (https://definedterm.com/etiological_agents)
ERH – Eagle Ridge Hospital
Facility-associated – a case that is acquired and identified at the same facility (i.e., nosocomial to the same facility)

FCH – Fraser Canyon Hospital
Gastrointestinal Illness (GI) – viral, bacterial or parasitic infections that cause diarrhea, vomiting and abdominal pain (http://www.biomerieux-diagnostics.com/gastrointestinal-infections).
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 (i.e., nosocomial to the same facility).
Healthcare-Associated to a Unit – the unit where the case most likely contracted the causative organism. Based on if the patient spent 72 hours or longer in the unit either during the current admission or the previous admission, prior to symptom onset.
IPC – Infection Prevention and Control
Incidence rate – the rate of new cases of the disease within a period of time
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
MDRO – multi-drug resistant organisms
Methicillin-resistant *Staphylococcus aureus* (MRSA) – *Staphylococcus aureus* is a 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 for the activity or result
MMH – Mission Memorial Hospital
MSA – Matsqui-Sumas Abbotsford Hospital
Nosocomial infections: *also Healthcare-Associated Infections (HAI)* **–** 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 (i.e., nosocomial to the same facility).

Outbreak – occurrence of cases in excess of what would normally be expected. An outbreak is declared when number or proportion of cases on a unit meets a pre-determined threshold.
PAH – Peace Arch Hospital
QPCC – Queen's Park Care Centre
Resolution Date – the date after 72 hours have 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)
Respiratory Illness (RI) – acute onset of respiratory illness symptoms usually caused by influenza and non-influenza respiratory viruses or bacteria.
RMH – Ridge Meadows Hospital
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
YR – Yale Road Centre

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 and iTracker, which 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 healthcare, 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

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- or 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, Microsoft Access 2010 and Microsoft Excel 2013. 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.

Clostridioides difficile Infection (CDI)

CDI case identification and confirmation are completed by the IPC Practitioners using a standardized case definition and protocol to identify cases from medical microbiology reports, admission reports and chart reviews. IPC Practitioners enter relevant clinical and epidemiological details into an internal Fraser Health database that contains automated, electronic lab confirmation of *C. difficile* test results, combined with healthcare-related admission information that pertains to the Fraser Health 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) 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)			
Number of new facility-associated CDI cases attributed to the same Fraser Health acute care site where CDI was most likely acquired and confirmed/diagnosed Total number of patient days		X	10,000

Limitations: What might have affected the quality of 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 Fraser Health 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 Fraser Health, introduced in July 2013. Resolution date is the date after 72 hours has passed since last diarrheal stool or stool returns to normal for patient (e.g., May 1 is last liquid stool, May 2 is 24 hours, May 3 is 48 hours, May 4 is 72 hours. Resolution date is May 4)[1]. 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 within 3 days (72 hours) of diagnosis are included in the population under surveillance. This change may slightly increase the total number of CDI cases in Fraser Health.

Fraser Health 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 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 eight weeks to four weeks in fiscal year 2010/11. Cases with symptom onset in the community or three days or less after admission to an acute care facility are deemed

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

healthcare-associated if the patient had a healthcare encounter in the previous four weeks (as opposed to eight 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 Fraser Health. 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 Fraser Health 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 cases of MRSA infections or colonizations among admitted acute care patients
Exclusion Criteria	Outpatients, residential care patients/residents.

Key Performance Indicator (Crude Incidence Rate)

$$\frac{\text{Number of new facility-associated MRSA cases attributed to the same Fraser Health acute care site where MRSA was most likely acquired and confirmed/diagnosed}}{\text{Total number of patient days}} \times 10{,}000$$

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 Fraser Health healthcare-associated cases compared to community-associated cases. Historically, 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 Fraser Health.

Classification of healthcare-associated MRSA cases, using a 12-month look-back period, is limited to healthcare encounters with Fraser Health. However, some sites choose to look into patients' history of healthcare encounters with other health authorities to minimize case misclassifications.

Surveillance records are entered only for the first isolate (whether it be a colonization or infection), the first infection, and all bloodstream infections for each patient. Therefore, accurate numbers of colonizations and infections and corresponding rates for Fraser Health 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 Fraser Health.

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

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 Fraser Health database. 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 of 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.

Each identified CPO case warrants a full epidemiological investigation. Information is gathered on any travel history, foreign healthcare, local healthcare, possible exposure to known or suspected environmental sources, possible contacts, and previous clinical and MDRO screening isolates. Cross-referencing Fraser Health epidemiological data with whole genome sequencing data from British Columbia Center for Disease Control (BCCDC) enables validation of suspected epidemiological links, as well as identification of possible sources of transmission. The collaboration with BCCDC in CPO case investigations has resulted in improved data quality.

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 Fraser Health. In the spring and summer of 2017, the Infection Prevention and Control (IPC) program conducted independent audits at all acute care sites in order to validate Fraser Health's publicly reported hand hygiene (HH) compliance rates. A series of recommendations were developed based on the results, and a new HH audit model has been implemented since fiscal period 04 in 2018/19.

Prior to fiscal period 04 in 2018/19, hand hygiene audits were conducted by trained and certified staff auditors from each site. These audits were completed in various settings, which included acute care facilities, Residential Operated and Contracted facilities, Mental Health & Substance Use (MHSU) facilities, outpatient settings including JPOCSC, public health units, primary care facilities; along with home support and home health. All auditors received standardized training based on the hand hygiene audit toolkit available to all staff via the FH*Pulse* and were certified through a practice audit organized by IPC Practitioners or Specialists. Auditors collected the hand hygiene observations on unit-specific audit forms which were then then faxed and submitted into an electronic hand hygiene audit system (FormAudit) stored on a secure server.

As of fiscal period 04 in 2018/19, regional HH auditors (undergraduate Co-op students), now perform all fiscal period audits for FH acute care inpatient units (other settings are

unaffected). This smaller team of dedicated auditors is able to help ensure reported HH compliance rates reflect the quality of care on each unit. In addition, regional HH auditors are tasked with providing direct in-the-moment feedback for healthcare providers immediately after an audit in order to help address gaps in hand hygiene knowledge. Facilities are retaining staff auditors to support periods requiring more frequent audits (e.g. during outbreaks).

The regional HH auditors all received standardized training provided by the regional HH specialist. HH audits are conducted using iPads, and the observations collected get transmitted automatically to the electronic HH audit system (FormAudit). Data collected by both the regional HH auditors and staff auditors are accessible to all Fraser Health staff on the FHPulse. The information collected during an audit include hand hygiene compliance based on the four moments for hand hygiene, the method of hand washing, factors affecting HH as well as general reasons for why misses occurred. Missed HH opportunities were recorded when hand hygiene compliance was not adhered to. Each audit will only include a maximum of five observations for each healthcare provider, with a valid audit requiring at least 25 total observations. This requirement was to ensure the reliability of the results and provide consistency when comparing hand hygiene compliance rates 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)

$$\frac{\text{Number of times healthcare providers correctly performed hand hygiene while providing direct patient care}}{\text{Total number of times that hand hygiene should have been performed by those same healthcare providers}} \times 100$$

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

With the changes associated to the new HH audit model, as of fiscal period 04 of 2018/19, only hand hygiene observation data collected by the regional HH auditors has been included in fiscal period/year compliance rates. HH audit data collected by staff auditors

for fiscal periods, alerts/outbreaks, outpatient clinics and other quality improvement initiatives are not being reported on. This change in HH audit model likely contributed to a drop of HH compliance rate in FY 2018/19 compared with previous years.

The total number of acute care observations varies from year to year; therefore, caution must be used when comparing fiscal year results. Some sites, programs, and types of healthcare provider have a smaller total number of observations and may not be as representative of the overall population. Moreover, the change in FY 2018/19 to only include HH observation data collected by the regional HH auditors for FP reporting resulted in a significant decrease in the total number of observations reported.

Clostridioides difficile Infection (CDI) and Gastrointestinal Illness (GI)

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. ≥ three probable or confirmed GI cases in one unit within a four-day period (GI outbreak); OR

b. ≥ three laboratory-confirmed cases of *C. difficile* infection attributed to one unit (as defined by geographical area, nursing station, and unit mnemonic) within a seven-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 Fraser Health external website. IPC Practitioners monitor and record all acute care outbreaks in a Fraser Health internal database. In December 2017, a new surveillance tool, the Alert & Outbreak Notification iTracker Module, was implemented across Fraser Health to streamline and standardize the GI/CDI alert/outbreak notification process and enhance surveillance reporting.

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 (RI) 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** 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 two or more epidemiologically linked healthcare-associated RI cases on a unit (as defined by geographical area, nursing station, and unit mnemonic) within seven days. Acute care outbreaks are reported through standardized outbreak notification emails, which include Fraser Health-wide posting of all outbreaks that are in progress. IPC Practitioners monitor and record all acute care outbreaks in a Fraser Health internal database. In December 2017, a new surveillance tool, the Alert & Outbreak Notification iTracker Module, was implemented across Fraser Health to streamline and standardize the RI alert/outbreak notification process and enhance surveillance reporting.