INFECTION PREVENTION AND CONTROL

PROVIDENCE HEALTH CARE

ANNUAL REPORT

2019-2020

SURVEILLANCE - SSI

SURVEILLANCE - BACTERIA

DEVICE-ASSOCIATED INFECTIONS

PROJECTS & COLLABORATIONS

St. Paul's Hospital

Mount Saint Joseph Hospital

St. Vincent's: Brock Fahrn

St. Vincent's: Langara

Holy Family Hospital

Youville Residence

Background

In collaboration with the Division of Cardiac Surgery, IPAC has conducted SSI surveillance for coronary artery bypass graft (CABG) surgery and cardiac valve replacement surgery for the past seven years. Cases are identified by weekly review of the consults seen by the Infectious Diseases service and through cardiac nurse practitioners notifying IPAC of any suspected SSI, via a dedicated phone line.

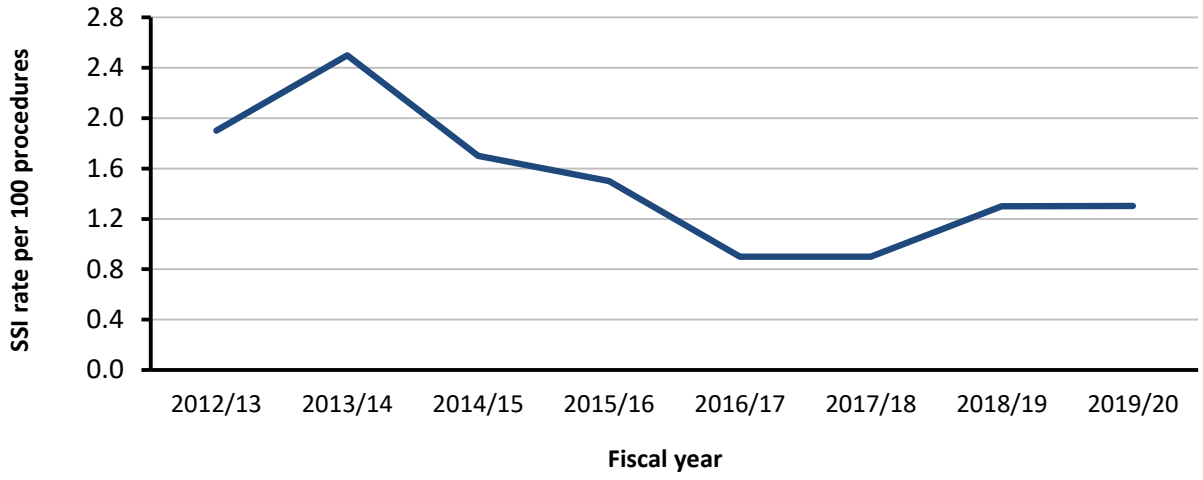
Outcome

- 691 CABG and cardiac valve replacement surgeries were performed at PHC during 2019/20.
- There were 9 cardiac SSI cases (1.3 per 100 procedures).
- Among the 9 cardiac SSI cases, infections were classified as:

  22% superficial (2 cases)
  44% deep-incisional (4 case)
  33% organ space (3 cases)

9 (100%) infections were identified in patients' sternum. Appropriate pre-operative antibiotics were used in 100 % of the SSI cases.

Figure 1: SSI rate per 100 procedures following CABG and valve surgery, 2012/13 to 2019/20



What we are working on

We are exploring ways to better ensure we have adequate case ascertainment. We will work with nurse practitioners and the cardiac surgeons to identify ways for more efficient and comprehensive case follow-up.

Background

Since 2009/2010, IPAC has been working with the Department of Obstetrics and Gynecology at Providence Health Care to conduct SSI surveillance after a Caesarean section. Since length of stay in hospital is short for this procedure, post-discharge surveillance is critical.

Cases are found through daily rounds, review of readmissions and visits to the Emergency Department (ED), and post-discharge surveillance.

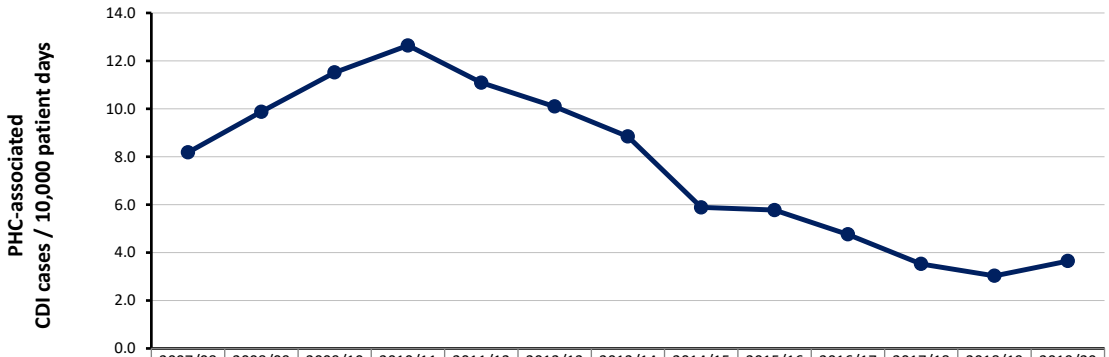
In 2015/16, we initiated a web-based platform (Q-Care) to automatically email and text patients for post-discharge surveillance. This became our standard approach in 2017/18.

Outcome

596 C-sections were performed at St. Paul's Hospital in 2019/20. Response rate for the 30 day follow-up was 65% which is consistent with the 2018/19 (70%) rate.

We were not able to streamline resources for our post-discharge follow-up and the process became unsustainable due to limited resources within the IPAC team. We have decided to stop the Caesarean section surgical site surveillance.

Figure 3: PHC-associated CDI incidence rate in acute care facilities, 2007/08 to 2019/20



	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
Rate	8.2	9.9	11.5	12.6	11.1	10.1	8.8	5.9	5.8	4.8	3.5	3.0	3.6
Cases	157	189	213	233	203	187	167	111	108	90	66	56	54

CDI cases and rates exclude colonization
2019/20 cases and denominator exclude Mental Health units

Background

Clostridium difficile (C. difficile) is the most common cause of health care-associated infectious diarrhea. IPAC is actively involved in preventing transmission of *C. difficile* at Providence Health Care sites by engaging in the following activities

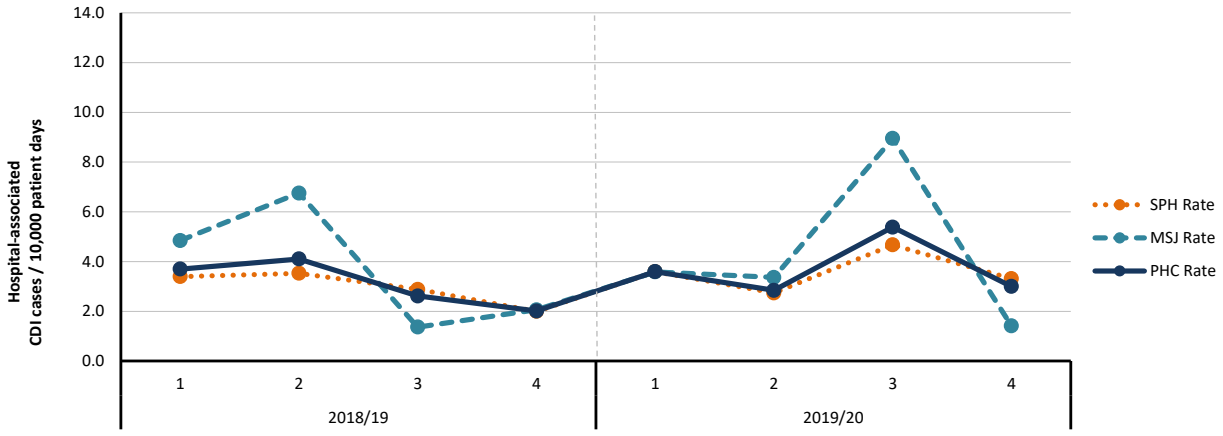
- providing education for staff and patients on all positive cases and providing regular education on units with respect to appropriate isolation precautions, cleaning and disinfection practices, and hand hygiene;
- increasing the frequency of communication with environmental cleaning staff to inform them of patient rooms that require enhanced bleach disinfection;
- creating a process for environmental cleaning staff to inform unit staff upon completion of bleach disinfection; and
- notifying the Antimicrobial Stewardship Program (ASP) of inpatient and outpatient cases to ensure our patients and residents receive timely, effective and optimal antimicrobial therapy and management

Outcome

There were 104 new cases of *C. difficile* infection (CDI) identified at PHC in 2019/20.

- 54 (52%) of these were classified as PHC-associated cases and of these, 52 (96%) were from acute care facilities.
- The incidence rate of PHC-associated CDI in acute care facilities was 3.6 cases/10,000 patient days (95% CI: 2.7-4.8). This is consistent with the previous fiscal year (3.0 cases/10,000 patient days, 95% CI: 2.3-3.9, p=0.33)
- The CDI incidence rate at St. Paul's Hospital was 3.6 cases/10,000 patient days (95% CI: 2.6-4.8). This rate was similar to the last fiscal year (2.9 cases/10,000 patient days, 95% CI: 2.1-3.9, p=0.33).
- The CDI incidence rate at Mount Saint Joseph Hospital was 4.1 cases/10,000 patient days (95% CI: 1.9-7.6). This rate was similar to the last fiscal year (3.7 cases/10,000 patient days, 95% CI: 1.9-6.4, p=0.78).
- The unadjusted incidence, which includes patients colonized with *C. difficile*, was 6.1 per 10,000 patient days (95% CI: 4.9-7.5). This rate was similar to the unadjusted incidence from last fiscal year (5.2 cases/10,000 patient days, 95% CI: 4.2-6.4, p=0.25).

Figure 4: PHC-associated CDI incidence rate by acute care facility site and fiscal quarter, 2018/19 to 2019/20



CDI cases and rates exclude colonization
2019/20 cases and denominator exclude Mental Health units

Issue

Patients can be colonized with *C. difficile* prior to entering our hospitals and remain asymptomatic without clinical disease, only to develop CDI after receiving antibiotics in hospital. As a result, some CDI cases that are acquired in the community are misclassified as health care-associated CDI.

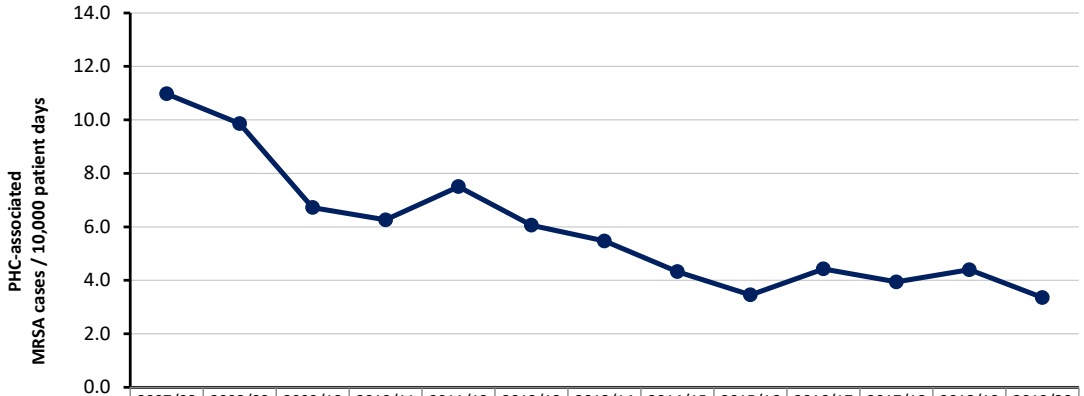
This year was the fourth year that IPAC, along with the ASP, clinically reviewed every case of CDI to determine whether the patient had a true infection, rather than colonization. This information is reflected in this year's rate.

What we are working on

IPAC continues to collaborate with the PHC ASP. This collaboration ensures that upon a patient's new positive or indeterminate *C. difficile* result, the ASP pharmacist and physician receive real-time alerts.

Infection control practitioners continue to round on every CDI case, providing education on contact precautions and hand hygiene for both patients and staff.

Figure 5: PHC-associated MRSA incidence rate in acute care facilities, 2007/08 to 2019/20



	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
Rate	11.0	9.9	6.7	6.3	7.5	6.1	5.5	4.3	3.5	4.4	3.9	4.4	3.4
Cases	211	189	126	117	138	113	104	82	65	84	74	83	50

2019/20 cases and denominator exclude Mental Health units

Background

MRSA are antibiotic-resistant bacteria that are transmissible in hospital, long-term care and community settings. MRSA has the potential to cause serious infection for which treatment options are limited.

In hospital, MRSA infections are associated with increased length of stay, higher mortality and increased costs. Early identification of patients colonized with MRSA through admission screening and prompt implementation of infection control measures can prevent transmission of MRSA. Admission screening at St. Paul's Hospital (SPH) and Mount Saint Joseph Hospital (MSJ) is risk-factor based, except for in General Medicine and the Intensive Care Unit (ICU) where all patients are screened. In the ICU, they are screened on admission and subsequently at weekly intervals.

Outcome

In 2019/20, there were 549 new cases of MRSA identified at PHC facilities.

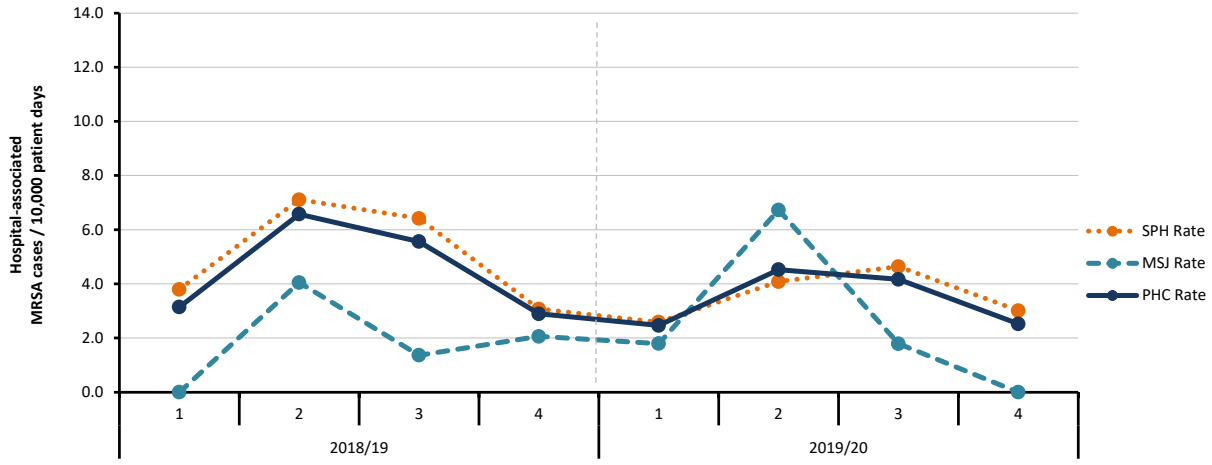
- 62 (11%) of these were classified as PHC-associated cases and of these, 50 (81%) were from acute care facilities.
- The PHC-associated incidence rate was 3.4 cases /10,000 patient days (95% CI: 3.5-5.5).
  The rate was similar to last fiscal year (4.4 case /10,000 patient days (95% CI: 3.5-5.5, p=0.13).

- The MRSA incidence rate at St. Paul's Hospital was 3.5 cases/10,000 patient days (95% CI: 2.6-4.7). This rate was similar to the last fiscal year (4.9 cases/10,000 patient days, 95% CI: 3.9-6.2, p=0.07).

- The MRSA incidence rate at Mount Saint Joseph Hospital was 2.5 cases/10,000 patient days (95% CI: 0.9-5.4). This rate was similar to the last fiscal year (1.8 cases/10,000 patient days, 95% CI: 0.7-3.9, p=0.61).

- 47% of PHC-associated cases were identified through hospital admission screening programs, while remaining cases were identified from clinical specimens.

Figure 6: PHC-associated MRSA incidence rate by acute care facility site and fiscal quarter, 2017/18 to 2019/20

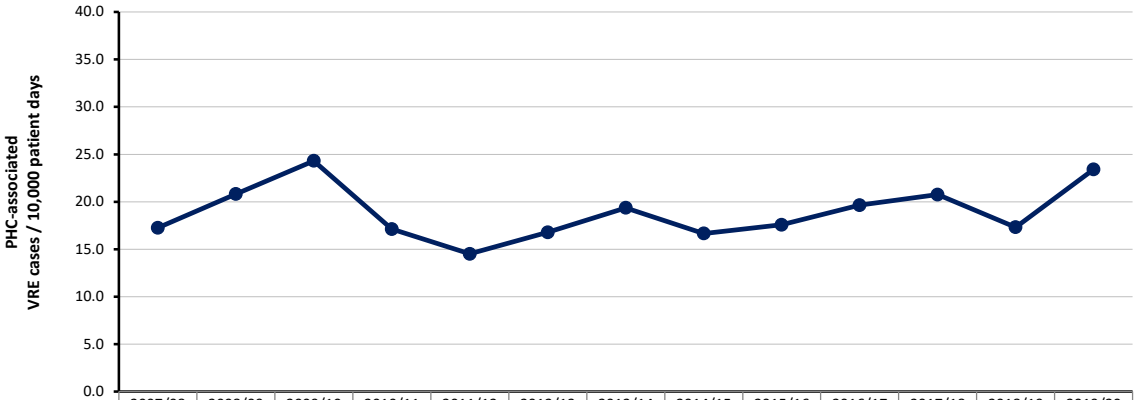


2019/20 cases and denominator exclude Mental Health units

What we are working on

IPAC continues to work closely with leaders and frontline staff of the Emergency and Medicine Departments to ensure timely ordering and collection of the admission screens

Figure 7: PHC-associated VRE incidence rate in acute care facilities, 2007/08 to 2019/20



	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
Rate	17.3	20.8	24.3	17.1	14.5	16.8	19.4	16.7	17.6	19.7	20.8	17.3	23.4
Cases	332	399	456	320	267	313	368	316	331	373	390	327	349

2019/20 cases and denominator exclude Mental Health units

Background

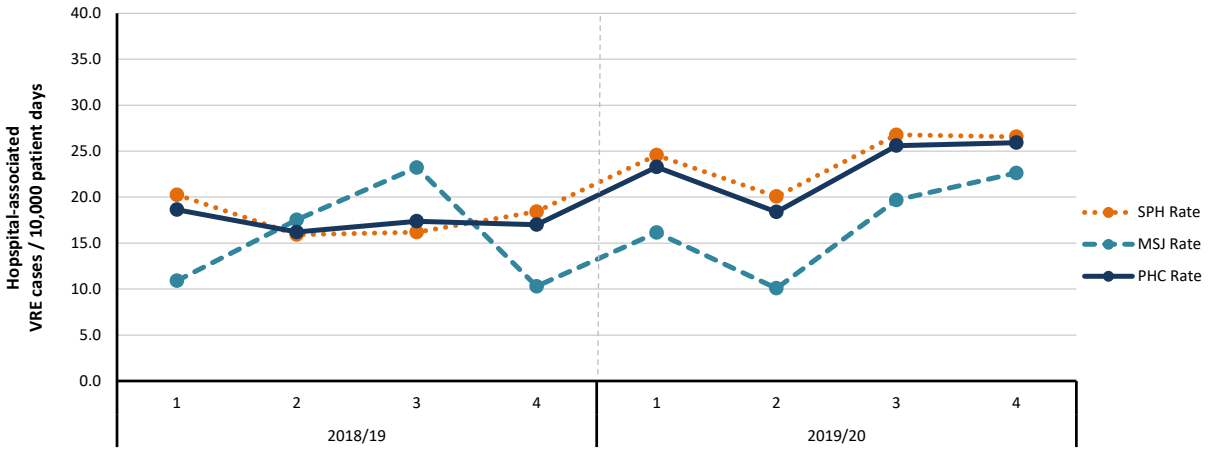
VRE are antibiotic-resistant bacteria that can be transmitted to patients in health care facilities. Colonization with VRE is more common than infection, and since colonization is the first step towards infection, prevention is crucial.

Outcome

There were 543 new cases of VRE identified at Providence Health Care facilities.

- 357(66%) of these were classified as PHC-associated cases and of these, 349 (98%) were from acute care facilities.
- The PHC-associated incidence rate was 23.4 cases/10,000 patient days (95% CI: 21.0 - 26.0).
- The PHC-associated VRE rate in 2019/20 was significantly higher than the last fiscal year ($p<0.0001$). This increase can be attributed to change in patient days from last fiscal year. Mental health units are no longer included in the denominator.
- 91% of PHC-associated cases were identified through hospital admission screening, while remaining cases were identified through clinical specimens.

Figure 8: PHC-associated VRE incidence rate by acute care facility site and fiscal quarter, 2017/18 to 2019/20



2019/20 cases and denominator exclude Mental Health units

Issue

Discussion continues over the utility of VRE prevention and control programs in Canadian hospitals. The Centers for Disease Control and Prevention (CDC) and Public Health Agency of Canada (PHAC) guidelines currently recommend Contact Precautions for patients with VRE.

Some hospitals have either discontinued or scaled back their VRE prevention and control efforts. Revising precautions for VRE may result in increased transmission of VRE in health care settings, with unexpected impact on neighbouring facilities.

What we are working on

IPAC continues to recommend a risk-informed VRE control program to prevent transmission and protect our most vulnerable patients.

Background

CPO are gram-negative bacteria that are resistant to carbapenems (considered antibiotics of last resort) and many other antibiotic classes. CPO infections are associated with high morbidity and mortality. Once established in a healthcare facility, CPO is difficult to control.

In Canada, cases (infection or colonization) have primarily been identified in patients previously hospitalized in endemic countries (e.g., China, India, USA and Greece). Healthcare-associated transmission of CPO within British Columbia facilities has also been documented. In December 2016, CPO was added to the list of reportable communicable diseases in BC.

At PHC, an Antibiotic Resistant Organism (ARO) Admission Risk Assessment Order was created and implemented in May 2014 in response to the BC CPO Working Group recommendations for identifying and screening high-risk patients on admission to acute care facilities. Further amendments to the Admission Risk Assessment Form were made in 2017 to create a more focused screening assessment.

Outcome

A total of 2038 screening swabs were collected for CPO at PHC facilities in 2019/20.

CPO screening was primarily conducted on inpatient units at St. Paul's Hospital and Mount Saint Joseph Hospital but also in the Emergency Department, Community Hemodialysis Units and Holy Family Rehab.

22 new CPO cases have been identified at PHC in 2019/20. Of these, two (9%) were secondary cases identified after contact tracing. This is a significant increase from screening swabs collected (n= 718) in the last fiscal year and consistent with the and newly identified cases (n=14) in 2018/19.

NDM (45%) was the most prevalent carbapenemase gene identified followed by KPC (36%). Other genes including IMP and OXA 48 accounted for 5% each (Table 1). Two patients (9%) had 2 different carbapenemase genes identified.

Ten patients (45%) reported a healthcare encounter outside of Canada in the 12 months prior to detection. A total of nine (41%) patients were considered to have an infection (rather than colonization), of which two (22%) died.

We investigated one large *Klebsiella pneumoniae* carbapenemase outbreak in 2019/20 fiscal year. The outbreak was identified in May 2019 on a Renal unit. In total, 9 post-transplant (recipient and donor) patients tested positive between August 2018 and August 2019 (Figure #).

IPAC worked with the unit and BC Transplant Society to improve adherence to infection control precautions, decluttered the shared spaces on the unit and revised procedures for cleaning/disinfecting of beds after hemodialysis. A total of 283 prevalence and exit screens were collected on 6B.

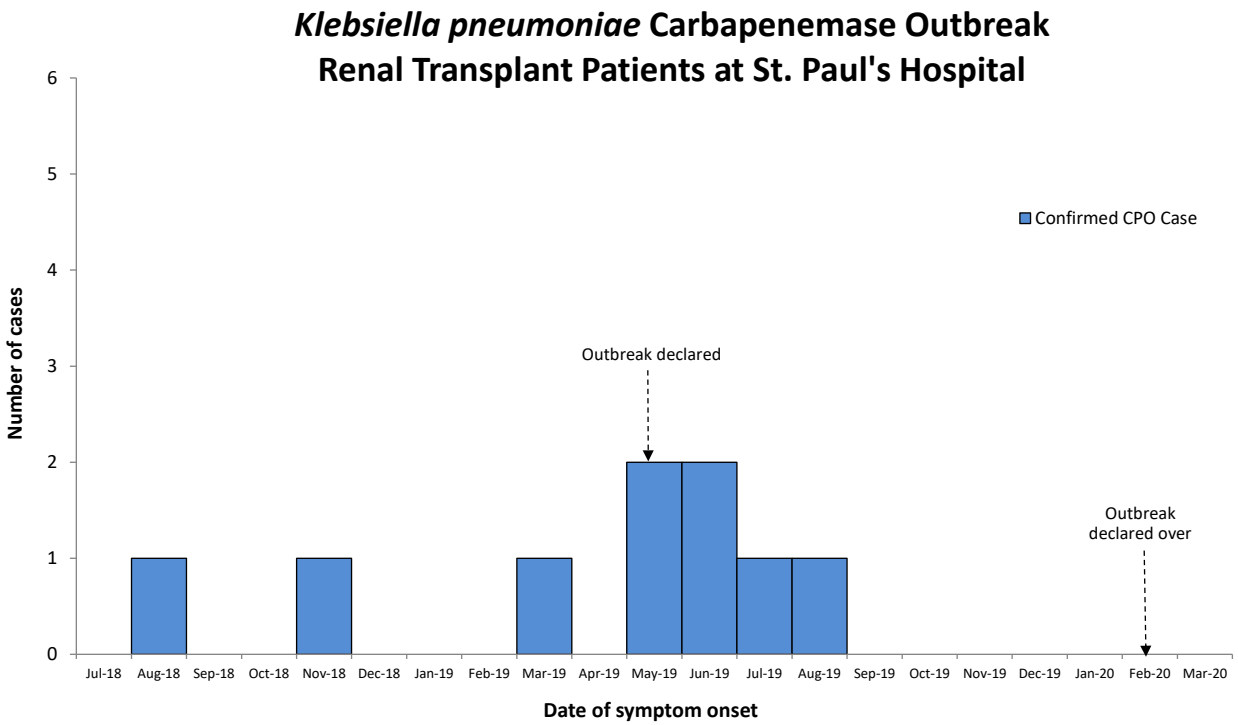


Table 1: Distribution of genes identified in CPO positive patients, 2019/20

Fiscal year	KPC	NDM	OXA -48	VIM	IMP	Patients with multiple genes
2019/20 (n=22)	8 (36%)	10 (45%)	1 (5%)	0	1 (1%)	2 (9%)
2018/19 (n=14)	6 (43%)	4 (29%)	2 (14%)	1 (7%)	0	1 (7%)
2017/18 (n=4)	0	2 (50%)	1 (25%)	0	0	1 (25%)
2016/17 (n=3)	0	2 (67%)	1 (33%)	0	0	0
2015/16 (n=2)	1 (50%)	0	0	0	0	1 (50%)
2014/15 (n=1)	0	1 (100%)	0	0	0	0
2013/14 (n=0)	0	0	0	0	0	0
2012/13 (n=3)	0	0	0	2 (67%)	1 (33%)	0

What we're working on

PHC continues to collaborate with other Health Authorities to maintain a provincial approach to preventing CPO transmission in healthcare facilities in British Columbia.

Background

St. Paul's Hospital (SPH) and Mount Saint Joseph Hospital (MSJ) frequently manage patients with active tuberculosis (TB) infection. As TB can be difficult to identify and diagnose, the most important contributor to health care-associated transmission is patients with unrecognized respiratory TB disease. Therefore, preventing in-hospital transmission of tuberculosis relies on a number of components including:

- Early identification of patients who are at high risk for active pulmonary disease.
- Prompt implementation of airborne precautions when active pulmonary disease is a consideration.
- Maintenance of appropriate precautions until either TB is ruled out and an alternate diagnosis is identified, or the patient is no longer considered infectious.

Outcome

- There were 19 cases of active pulmonary TB diagnosed at PHC acute care facilities. Of these, 15 (79%) were inpatients.

- Five (33%) inpatient cases required contact tracing which resulted in 29 patients being identified as contacts. This is consistent with 9 (70%) inpatient cases identified in 2018/19 of which 3 (33%) required patient screening and 24 exposed patients screened.

- On follow-up, VCH Public Health did not find evidence of TB transmission among any of these contacts.

Prevention of in-hospital TB transmission is focused on promoting the appropriate transmission-based precautions for suspect or confirmed TB cases. Physicians and other frontline staff should maintain a high index of suspicion for TB among high risk groups and consult with IPAC before discontinuing airborne precautions.

We continue to improve utilization of the Assessment, Communication and Education (ACE) tool to guide risk assessments and standardize Infection Control Practitioners' documentation and recommendations. We also work closely with VCH Public Health, Occupational Health & Safety and Workplace Health Call Centre to align our efforts in contact tracing.

Background

Central Line-Associated Bloodstream Infection (CLABSI) continues to be one of the most costly hospital-associated infections resulting in prolonged hospital stays and increased patient morbidity and mortality.

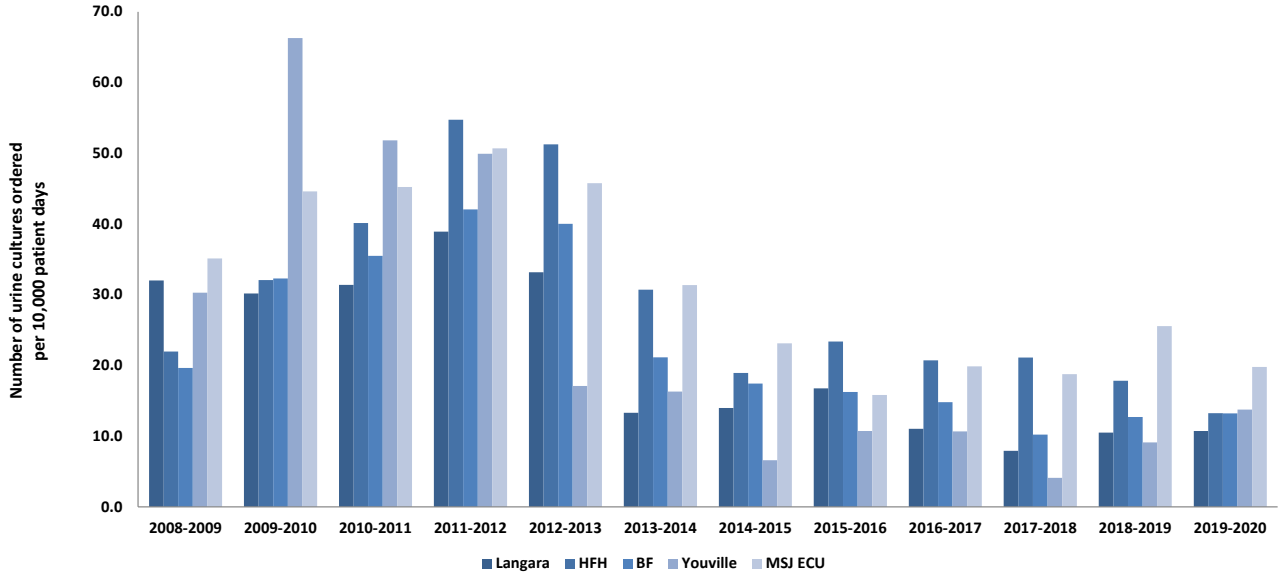
IPAC's CLABSI surveillance is focused on cases associated with the intensive care unit (ICU) at St. Paul's Hospital (SPH). Detection of CLABSI-related cases is based on ICP review of all ICU-associated positive blood cultures. We use standardized case definitions and methods from the Centers of Disease Control and Prevention's (CDC) National Healthcare Safety Network. Cases are confirmed by an IPAC physician.

Outcome

- Due to CERNER implementation data for CLABSI surveillance (numerator and denominator) is not available past November 16, 2019.
- There were 8 CLABSI cases up to November 16, 2019.
    - Seven (88%) of the cases were clustered in the second quarter between July and August. Of these, 4 (57%) cases had prolonged femoral lines. Six (86%) patients died.

What we are working on

IPAC continues to promote best practices in reducing the risk of infection for ICU patients. We are working with PHC Data Analytics teams to automate data collection and analysis process. This innovation would allow for more rapid data analysis and reporting of cases to ICU.



Note: Intervention of audit and feedback occurred at St. Vincent's Langara in 2013

Urine culture collection is a primary driver of increased antimicrobial use.

Our goal is to reduce the number of unnecessary urine cultures collected from residents at PHC residential care homes.

IPAC focused on auditing and providing feedback to nurses and physicians for all urine cultures collected at St. Vincent's residence from January to December 2013. This project was collaboration with the PHC Antimicrobial Stewardship Program.

The intense phase of review and feedback stopped at the end of 2013, but we continued to collect data on the total number of urine cultures ordered and collected at the residential care sites. We conducted annual follow-up to see if the initial intensive audit, feedback and education for the residential care facilities would be sustained without the need for intense phase interventions. We have continued to see a sustained significant decrease in urine cultures collected from all residential care sites.

All sites have had a significantly lower rate of urine cultures collected since 2012. Antimicrobial use also decreased for suspected UTIs.

Key elements and features of the physical environment play a significant role in the complex pathways leading to transmission of pathogens in the health care setting. IPAC continues to be involved with the planning of the New St. Paul's Hospital (NSP) providing advice to the NSP Redevelopment Team on infection prevention and control requirements for new construction.

Much of IPAC's recent work related to the NSP has been to provide input to help shape the clinical and technical specifications which will ultimately guide design choices to ensure the design, layout and physical aspects of the NSP will facilitate best infection control practices and include key elements within the built environment to help prevent the acquisition and transmission of infections.

Hand Hygiene

Background

Effective hand hygiene is the single most important strategy to prevent health care - associated infections.

In 2019/20 we continued using the electronic capturing of hand hygiene observations and automation of data analysis and reporting. In addition, we have expanded our observations from a 3 week period per quarter to auditing throughout the quarter in hopes of minimizing Hawthorne effect. Due to COVID-19 situation we did not complete audits in quarter 4.

Outcome

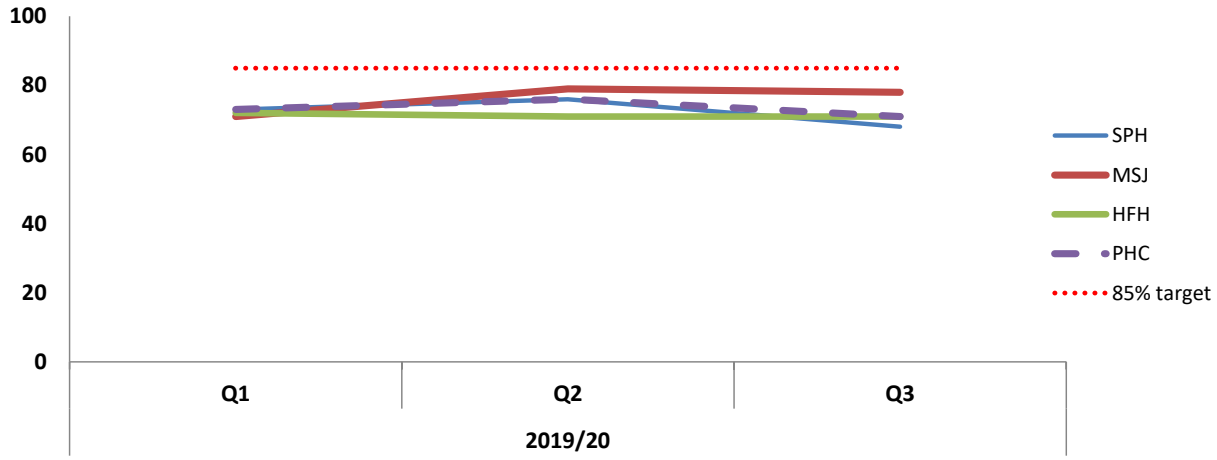


Figure 10: Hand Hygiene Compliance (%) by facility for 2019/20

In 2019/20, average PHC hand hygiene compliance across all health care workers in acute care facilities was 73%:

59% before patient contact

82% after patient contact

Average PHC hand hygiene compliance across all health care workers in residential care facilities was 51%:

38% before patient contact

60% after patient contact

Both, “before” and “after” patient contact compliance was lower in acute and residential care compared to 2018/19. We believe that the new methodology, as well as auditing throughout the quarter reduced the Hawthorne Effect, giving a more realistic assessment of hand hygiene compliance. This past year, we continued expansion of the patient hand hygiene initiatives and emphasis on hand hygiene "before" patient contact. Additionally, we have implemented “just in time” education for hand hygiene in both acute and residential care.

What we are working on

We will continue to emphasize just in time education, activities around improving compliance “before” patient contact and patient hand hygiene. Facility risk assessments will be completed to target staff engagement and hand hygiene infrastructure improvements.

Outcome

In 2019/20 there were a total of 3 influenza like illness (ILI) and gastrointestinal illness (GI) outbreaks in Providence Health Care facilities. Of these one (33%) was in acute care facilities (1 GI) and two (67%) in long term care facilities (1 GI and 1 ILI).

A total of 94 patients/residents were affected and affected areas were closed for a total of 115 days.

The majority of the outbreaks (67%) took place in the last fiscal period of 2019/20.

The number of outbreaks was significantly less than the past 3 fiscal years.

Debrief meetings after each outbreak with IPAC and the management team provides an opportunity to review outbreak processes, identify strengths and opportunities for improvement.

Opportunities for improvement include

- Early communication of suspected cases of influenza like illness;
- Communication of outbreak status to families and visitors; clarification of patient, resident, and health care worker movement on and off of a unit under outbreak precautions; and
- Timely staff and resident annual influenza vaccinations, as well as ensuring appropriate precautions implemented for unvaccinated staff.

What we are working on

IPAC continues to focus its outbreak education on improving frontline awareness of signs and symptoms, rapid containment of symptomatic patients/residents, and communication within the clinical team. The management and containment of outbreaks is contingent on a partnership with site and unit leadership, nursing, physicians, allied health, laboratory staff, pharmacy, and support services, such as housekeeping and food services. This collaboration enables ICPs to more fully support the identification, containment and implementation of outbreak measures.

The arrival of the COVID 19 pandemic at the beginning of 2020 introduced a new and very significant challenge to all acute and long term care services. The IPC team was actively involved in planning for patients with COVID 19 and helping staff with their management. This involved continuous updating and training of staff as new guidance was released as knowledge about the virus increased. Managing the pandemic and recovery from it will be an ongoing workload for the team in 2020/21.

PHC Facilities

St. Paul's Hospital

- Acute care, teaching and research hospital
- 433 beds
- SPH sees over 174,000 patients annually, accounting for 500,000+ patient visits

Mount Saint Joseph Hospital

- Acute care community hospital with 101 beds
- 100-bed extended care unit for residents
- Multicultural focus

Holy Family Hospital

- Extended care for 142 residents
- Specialized rehabilitation for older adults (65 acute rehab beds)

St. John Hospice

- 12-bed hospice, end-of-life care

Providence Crosstown Clinic

- Substance-use clinic

Granville Youth Health Clinic

- Primary care and outreach services for youth and young adults, ages 24 and under

St. Vincent's: Langara

- Complex care residential facility
- 197 residents
- Specialized unit for 20 adult mental health clients

St. Vincent's: Brock Fahrni

- Complex care residential facility
- 148 residents – many armed forces veterans

Youville Residence

- Complex care residential facility
- 42 residents
- Specialized unit for 32 older adult mental health clients

St. Vincent's: Honoria Conway

- Assisted living for 60 tenants
- Supportive housing for 8 young adults with disabilities

St. Michael's Centre

- Complex care residential facility located in Burnaby
- 128 residents
- 16 hospice patients

PHC Community Dialysis Units

- Vancouver Community Dialysis Unit
- East Vancouver Community Dialysis Unit
- North Shore Community Dialysis Unit
- Richmond Community Dialysis Unit
- Squamish Community Dialysis Unit
- Powell River Community Dialysis Unit
- Sechelt Community Dialysis Unit

IPAC's vision and mission are aligned with those of Providence Health Care (PHC).

The vision of the IPAC team is to stop preventable infections.

The purpose of the IPAC team is to protect everyone at PHC from preventable infections and improve health outcomes with our partners.

Our vision and mission are incorporated into the activities provided by IPAC for PHC:

- Surveillance
- Case management
- Outbreak management
- Education
- Research
- Policies and procedures

2019/20 PHC INFECTION PREVENTION AND CONTROL TEAM

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