



Providence Health Care
Infection Prevention & Control

IPAC Annual Report 2022/23



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Executive Message

During the past year, the Infection Prevention and Control team has continued routine surveillance of antibiotic resistant organisms, tuberculosis, certain respiratory viruses, central line associated blood stream infections (CLABSI) and surgical site infections in renal transplant and cardiac surgery.

We improved surveillance efficiency by launching a web-based application to streamline data flow and reporting for CLABSI surveillance. We also successfully launched a new semi-automated surveillance system for hospital acquired *Staphylococcus* bacteremia. This work supplements a knowledge translation project planned for the next few years to improve how we care for patients with peripheral intravenous catheters to reduce complications such as bacteremia.

Our learnings from the past few years of the pandemic also influence our practice of improving the environmental infrastructure to better manage airborne pathogen transmission in health care facilities. In our long-term care facilities, we received grants for the SPH Foundation to purchase and install portable HEPA units in higher risk areas.

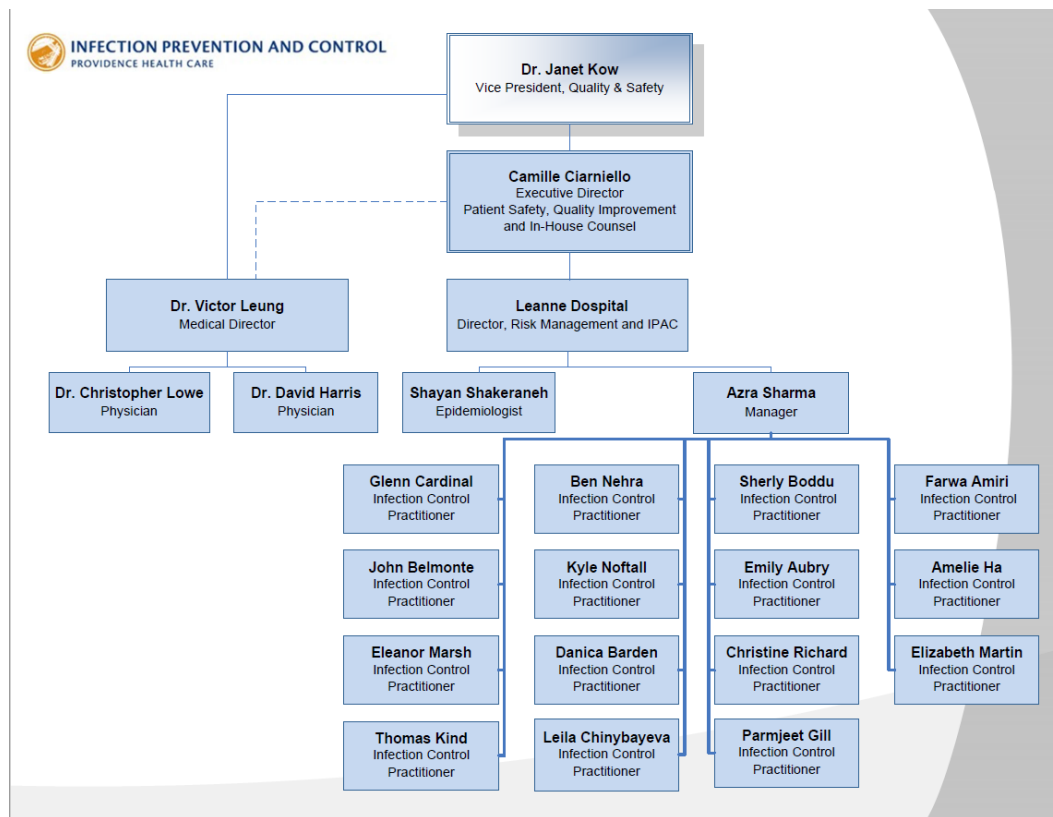
We would like to thank our clinical and operations team and all the front-line staff members at Providence Health Care for doing their part in reducing health care associated infections.

Dr. Victor Leung, Medical Director of Infection Prevention and Control.

Leanne Dospital, Director of Infection Prevention and Control



Who We Are



IPAC is a team of 21 people primarily located at 1190 Hornby Street in Vancouver and serving all 17 PHC sites.

13.6 FTEs – Infection Control Practitioners (ICP)

1 FTE – Epidemiologist

1.2 FTEs – Physicians

1 FTE – Manager

0.5 FTE – Director

Vision, Mission, and Values

IPAC is in alignment with the Mission, Vision, and Values of Providence Health Care (PHC).

The vision of IPAC is to help stop preventable infections.



What We Do

Preventing infections is a shared goal of all who work in health care. Working collaboratively, IPAC is responsible for developing and implementing strategies to reduce or prevent the spread of healthcare-associated infections (HAIs) in patients, residents, visitors, and staff.

We help improve health outcomes in collaboration with our partners.

Our vision is carried out using the initiatives below.

- Surveillance
- Hand hygiene audits
- Education and training
- Outbreak management
- Construction, renovation, maintenance and design (CRMD) consulting
- Policy and procedure development
- Case management
- Environmental hygiene and engineering
- Disinfection and sterilization

The Infection Prevention and Control Standards Committee and its members are advocates and role models for the IPAC program at PHC. The Committee is responsible for:

- endorsing standards and guidelines
- reviewing IPAC surveillance data and developing improvement action plans
- reviewing and addressing the results of outbreak management, audits, and investigations
- endorsing annual goals and objectives of IPAC
- enabling compliance or progress to achieve Accreditation Canada standards

Surveillance

Surveillance is the systematic and consistent collection, analysis, and interpretation of data with timely dissemination of results to those who require it in order to take action.

Surveillance identifies potential risks of infection and reinforces the need for good practices. Regular reporting of data is important for awareness and action by the front line staff and by organizational leaders.

The main objectives of surveillance of hospital-associated infections and/or antibiotic resistant organism colonization are:

- Early detection of clusters and outbreaks
- Identification of risks for infections, implementation of infection prevention measures and evaluation of risk-reducing interventions
- Monitoring of infection rates over time and evaluation of trends

PHC's current surveillance systems are:

- Antibiotic-resistant organisms (ARO) including Methicillin Resistant *Staphylococcus aureus* (MRSA), Vancomycin Resistant Enterococci (VRE), and Carbapenemase Producing Organisms (CPO)
- *Clostridioides difficile* infection (CDI)
- *Mycobacterium tuberculosis* (TB)
- Surgical Site Infections in Cardiac and Renal Transplant
- Central line-associated bloodstream infections (CLABSI)
- Healthcare associated *Staphylococcus aureus* bloodstream infections (HA-SAB).



Strategic Direction:

Quality Forward: Exceptional Quality, Safety & Value

Hospital Acquired Infections and Hand Hygiene Data is reported to the PHC Senior Leadership Team and Board

Methicillin Resistant Staphylococcus aureus (MRSA)

Background

- MRSA is transmissible in hospital, long-term care and community settings. MRSA has the potential to cause serious infection for which treatment options are limited.
- MRSA infections are associated with increased length of stay, higher mortality and increased costs. Early identification of patients colonized¹ with MRSA through admission screening and prompt implementation of infection control measures can prevent transmission. Admission screening at St. Paul's Hospital (SPH) and Mount Saint Joseph Hospital (MSJ) is based on risk-factor assessment. In the ICU, patients are screened on admission for MRSA and subsequently at weekly intervals.

Outcome

There were 517 new cases of MRSA identified at PHC in 2022/23.

- In 2022/23, 69 (13%) were classified as PHC-associated cases. Of these, 55 (80%) were from acute care facilities (Figure 1).
- The PHC-associated incidence rate in 2022/23 was 3.6 cases /10,000 patient days (95% CI: 2.7-4.7). This rate was similar to the last fiscal year (4.1 cases/10,000 patient days (95% CI: 3.1-5.3, p=0.51).
- The MRSA incidence rate at SPH in 2022/23 was 3.9 cases/10,000 patient days (95% CI: 2.9-5.2). This rate was similar to the last fiscal year (4.4 cases/10,000 patient days, 95% CI: 3.3-5.7, p=0.58).
- The MRSA incidence rate at MSJ in 2022/23 was 2.0 cases/10,000 patient days (95% CI: 0.64-4.6). This rate was similar to the last fiscal year (2.5 cases/10,000 patient days, 95% CI: 0.92-5.5, p=0.71).
- In 2022/23 64% of PHC-associated cases were identified through hospital admission screening programs, while remaining cases were identified from clinical specimens.

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.

¹ Colonization is the presence of bacteria on a body surface (like on the skin, mouth, intestines, or airway) without causing diseases in the person.

Figure 1: PHC-associated MRSA incidence rate in acute care facilities, 2007/08 to 2022/23

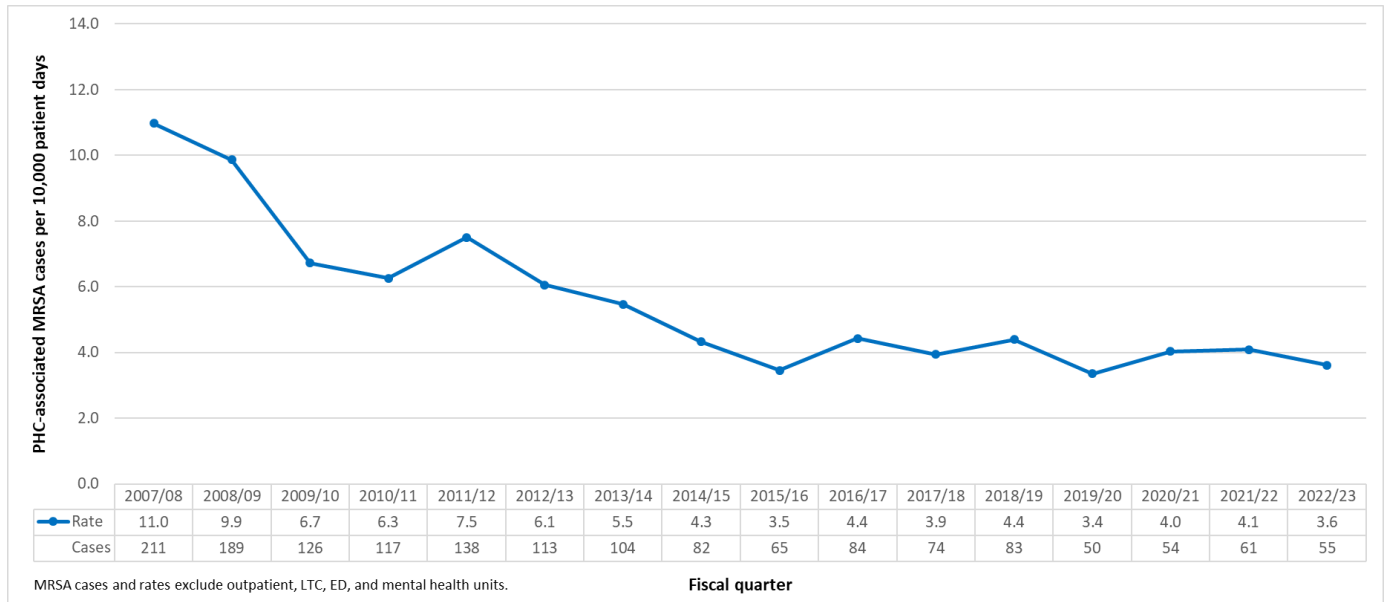
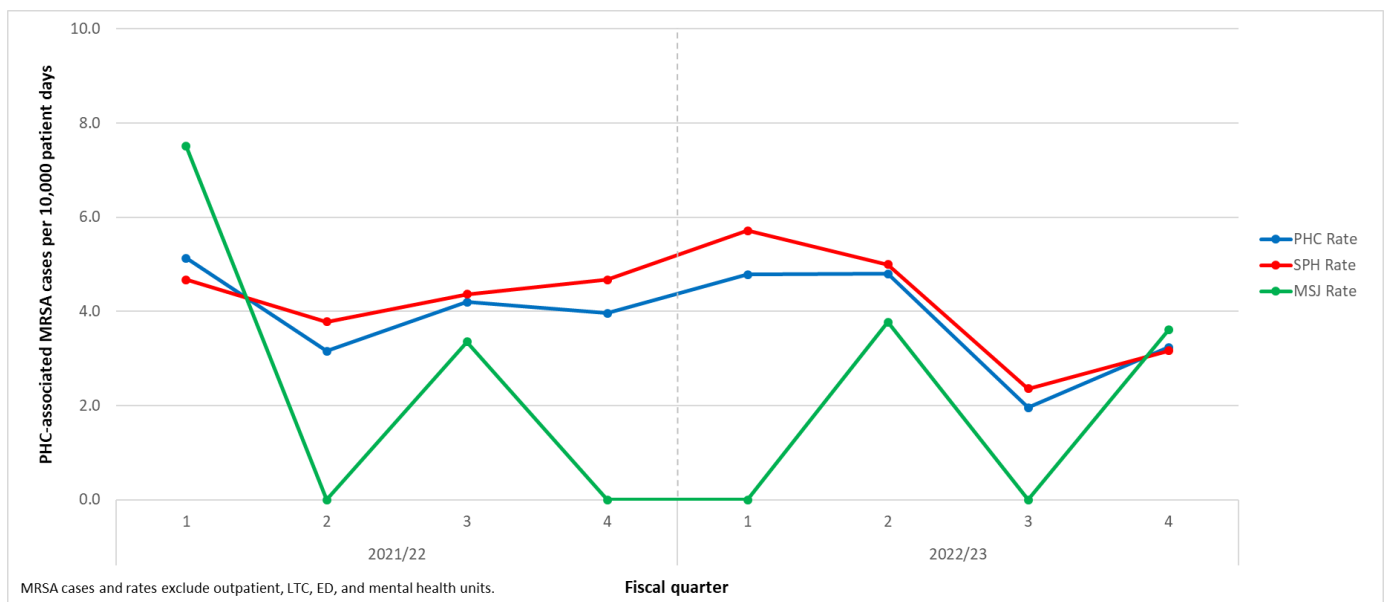


Figure 2: PHC-associated MRSA incidence rate by acute care facility site and fiscal quarter, 2021/22 to 2022/23



Vancomycin Resistant *Enterococcus* (VRE)

Background

VRE 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 566 new cases of VRE identified at PHC in 2022/23.

- In 2022/23, 310 (55%) were classified as PHC-associated cases. Of these, 297 (96%) were from acute care facilities (Figure 3).
- The PHC-associated incidence rate in 2022/23 was 19.5 cases/10,000 patient days (95% CI: 17.4-21.9). This rate was similar to the last fiscal year (20.0 cases/10,000 patient days (95% CI: 17.8-22.4, $p=0.79$).
- The VRE incidence rate at SPH in 2022/23 was 20.6 cases/10,000 patient days (95% CI: 18.2-23.2). This rate was lower than the last fiscal year (21.8 cases/10,000 patient days, 95% CI: 19.3-24.5, $p=0.51$).
- The VRE incidence rate at MSJ in 2022/23 was 14.3 cases/10,000 patient days (95% CI: 10.0-19.7). This rate was higher than the last fiscal year (10.4 cases/10,000 patient days, 95% CI: 6.8-15.4, $p=0.23$).
- In 2022/23, 76% of PHC-associated cases were identified through hospital admission screening, while remaining cases were identified through clinical or unclassified specimens.

Working on

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

Figure 3: PHC-associated VRE incidence rate in acute care facilities, 2007/08 to 2022/23

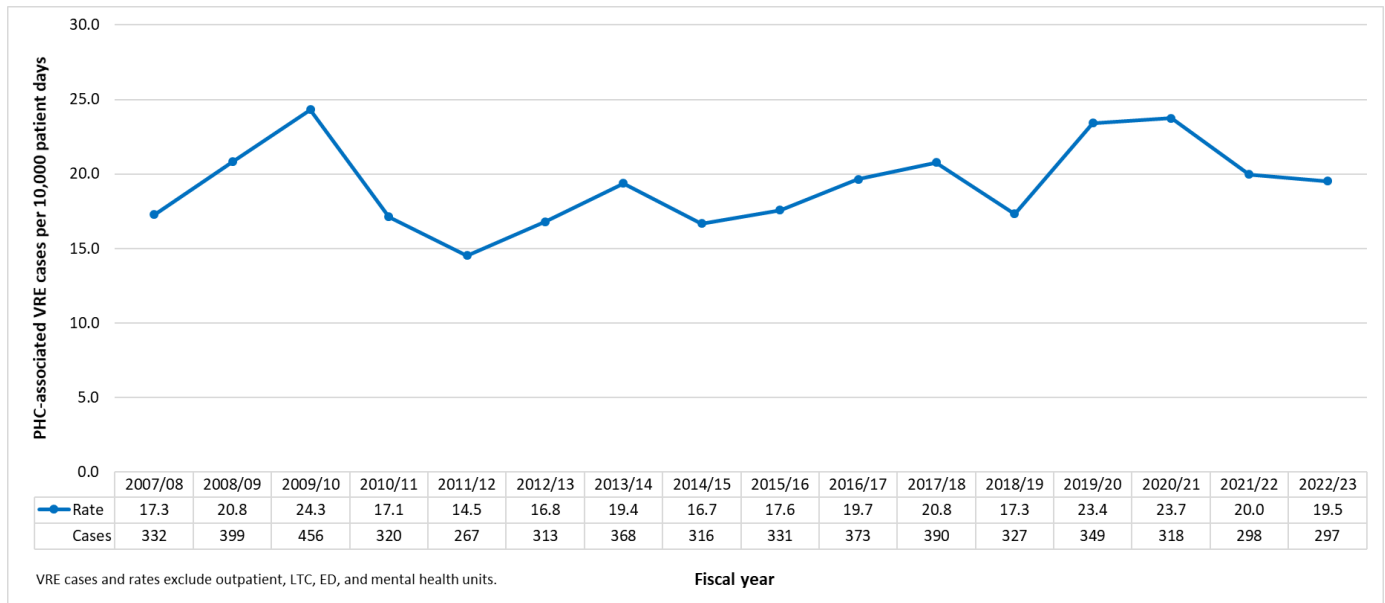
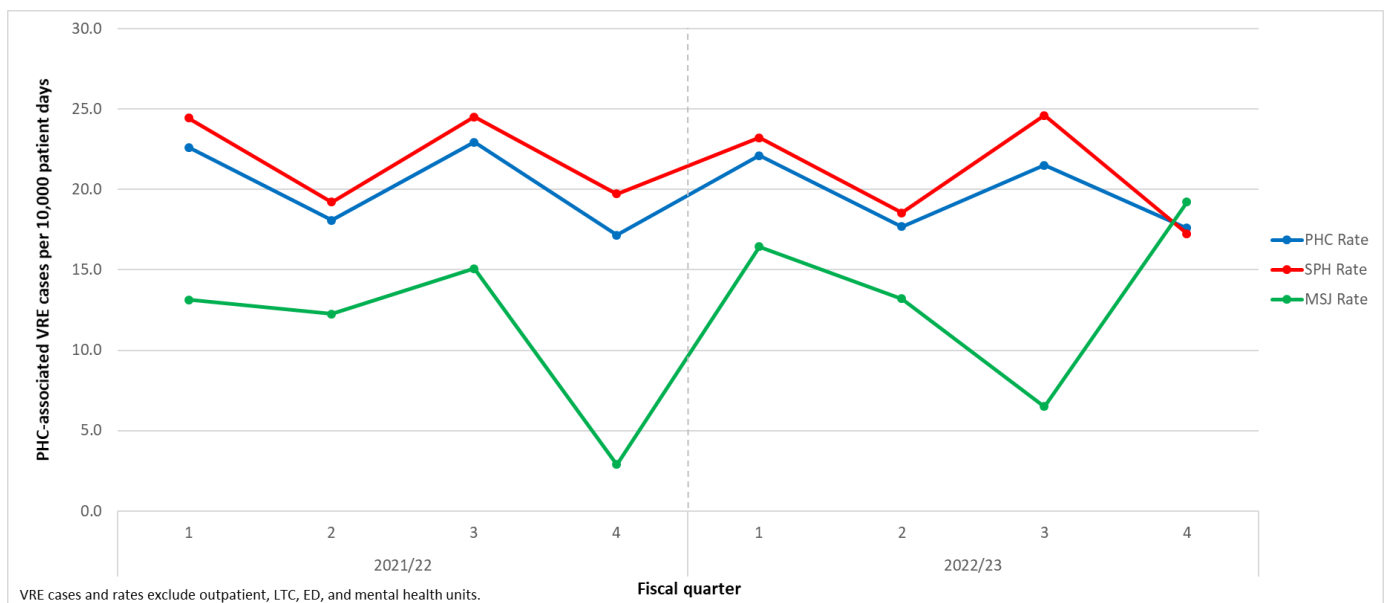


Figure 4: PHC-associated VRE incidence rate by acute care facility site and fiscal quarter, 2021/22 to 2022/23



Clostridioides difficile Infection (CDI)

Background

CDI is the most common cause of health care-associated infectious diarrhea. IPAC is actively involved in preventing transmission by engaging in the following activities:

- Providing regular education for staff and patients on 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 requiring 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 cases to ensure our patients and residents receive timely, effective and optimal antimicrobial therapy and management.

Outcome

There were 118 new cases of CDI identified at PHC in 2022/23.

- In 2022/23, 54 (46%) were classified as PHC-associated cases. Of these, 47 (87%) were from acute care facilities.
- The incidence rate of PHC-associated CDI in acute care facilities in 2022/23 was 2.9 cases/10,000 patient days (95% CI: 2.1-3.9). This rate was statistically significantly lower than the last fiscal year (4.9 cases/10,000 patient days, 95% CI: 3.9-6.2, $p < 0.05$).
- The CDI incidence rate at SPH in 2022/23 was 2.8 cases/10,000 patient days (95% CI: 2.0-3.9). This rate was statistically significantly lower than last fiscal year (5.4 cases/10,000 patient days, 95% CI: 4.2-6.8, $p < 0.05$).
- The CDI incidence rate at MSJ in 2022/23 was 3.3 cases/10,000 patient days (95% CI: 1.5-6.3). This rate was higher than the last fiscal year (2.5 cases/10,000 patient days, 95% CI: 0.9-5.5, $p = 0.61$).
- The unadjusted incidence, which includes patients colonized with CDI in 2022/23, was 5.5 per 10,000 patient days (95% CI: 4.4-6.8). This rate was statistically significantly lower than the unadjusted incidence from last fiscal year (8.5 cases/10,000 patient days, 95% CI: 7.1-10.1, $p < 0.05$).

Outcome – CDI Rates by Test Results

- PHC transitioned to a 2-step test reporting algorithm with PCR testing followed by toxin antigen testing in quarter 4 of 2017/18.
- PHC-associated rates by testing results (positive, indeterminate, overall) are displayed in Figure 5.
- Over the last 5 years, although indeterminate results from the 2-step algorithm contributed to PHC-associated rates, positive test results continued to be the key driver.
- In 2022/23, both positive and indeterminate rates decreased compared to 2021/22; the indeterminate rate was the lowest in the last five years as displayed in Figure 5.

Issues

- Patients can be colonized with CDI prior to entering our hospitals and subsequently develop CDI when exposed to a risk factor such as antimicrobials. Thus, community acquired CDI can be misclassified as health care-associated CDI.
- 2022/23 was the sixth year that IPAC, along with the Antimicrobial Stewardship Program (ASP), clinically reviewed every case of CDI to determine whether the patient had a true infection, rather than colonization.

Working on

- IPAC continues to collaborate with the PHC ASP. This collaboration ensures that upon a patient's new positive or indeterminate CDI 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 CDI incidence rate by test results in acute care facilities, 2007/08 to 2022/23

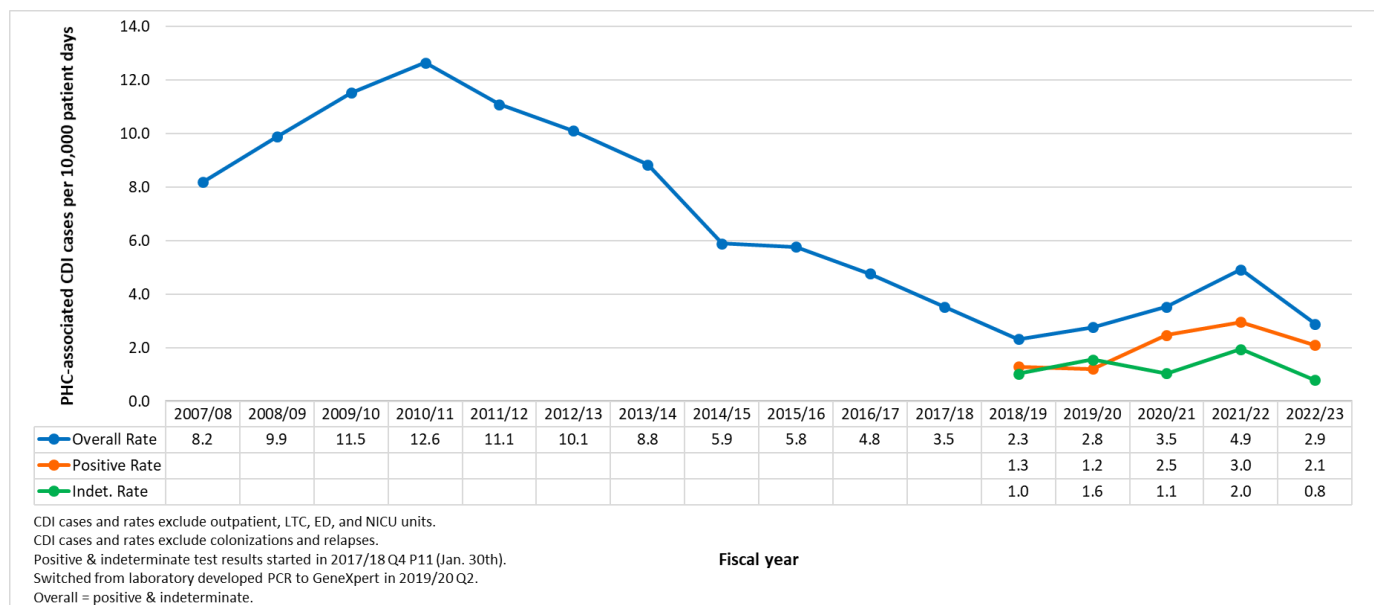
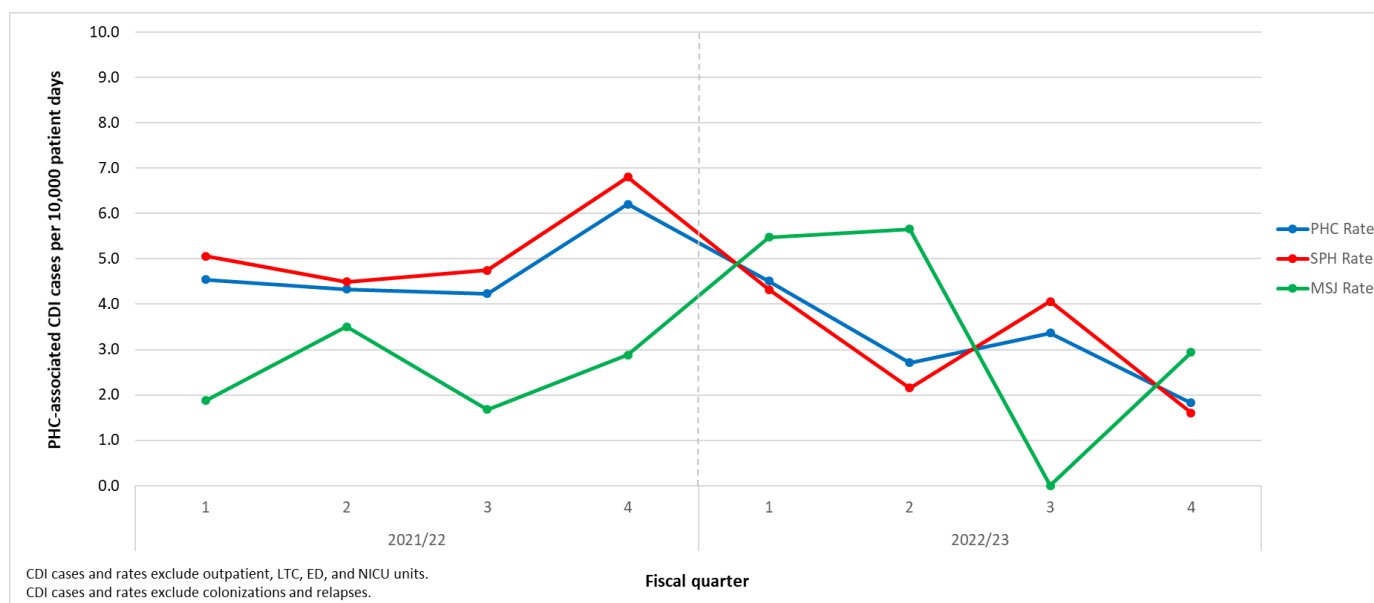


Figure 6: PHC-associated CDI incidence rate by acute care facility site and fiscal quarter, 2021/22 to 2022/23



Carbapenemase Producing Organisms (CPO)

Background

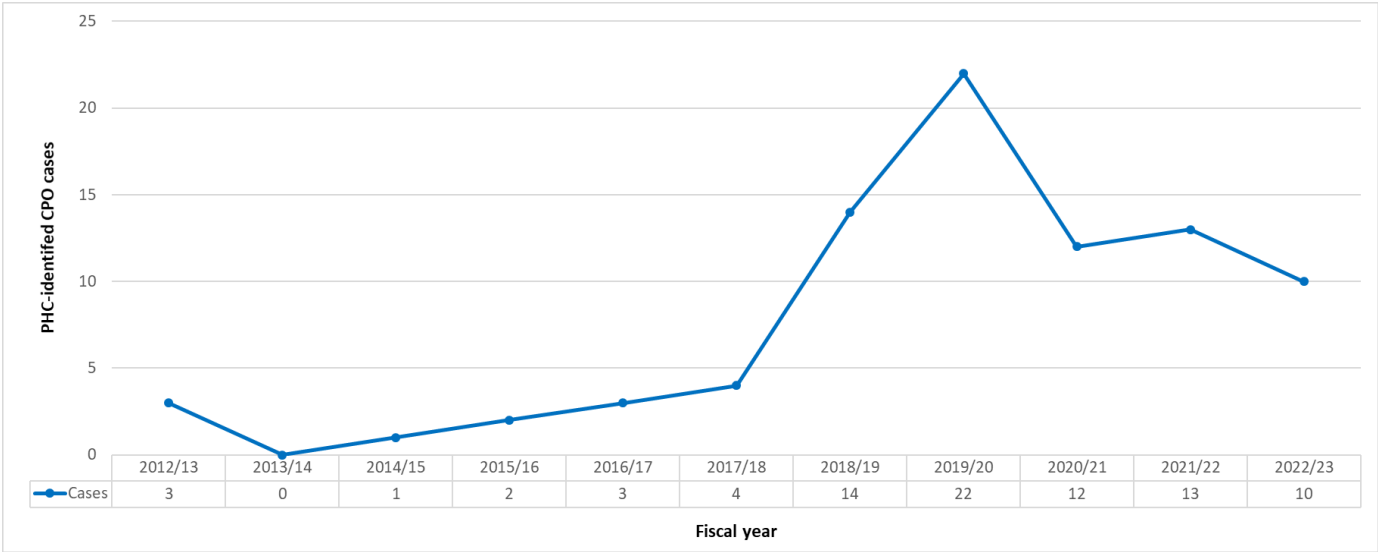
- CPO are gram-negative bacteria that are resistant to carbapenems (considered antibiotics of last resort) and many other antibiotic classes. CPO infections are associated with high morbidity and mortality.
- In Canada, cases (infection or colonization) have primarily been identified in patients previously hospitalized in endemic countries. Health care-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 403 screening swabs were collected for CPO at PHC in 2022/23 which was lower than in 2021/22 (853).

- Ten new CPO cases were identified at PHC in 2022/23 which was lower than in 2021/22 (13) (Figure 7). Of these, only 1 (10%) was PHC-associated.
- NDM (70%) was the most prevalent carbapenemase gene identified in 2022/23 and cumulatively over the last ten years (Table 5, Appendix).
- In 2022/23, 3 (30%) patients reported a healthcare encounter outside of Canada in the 12 months prior to detection; 6 (60%) patients were considered to have an infection, rather than colonization; and none of the patients died due to CPO infection at 30 days or at the time of discharge after the CPO infection was identified.

Figure 7: PHC-identified CPO cases by fiscal year: 10-year trend



Mycobacterium tuberculosis (TB)

Outcome

There were 27 cases in 2022/23 of active pulmonary TB diagnosed at PHC acute care facilities. Of these, 18 (67%) cases were inpatients. Three (17%) inpatient cases required contact tracing which identified 12 patient exposures.

- This is similar to **2021/22 where there were 27 new cases identified** with 17 (63%) inpatient cases identified of which 7 (41%) required patient screening resulting in 14 exposed patients.
- On follow-up, Vancouver Coastal Health Authority (VCH) Public Health did not find evidence of TB transmission among any of these contacts.
- Prevention of in-hospital TB transmission is focused on applying appropriate transmission-based precautions for suspected or confirmed infectious TB. Physicians and other frontline staff should maintain a high index of suspicion for TB when there is clinical and epidemiologic risk factors. IPAC should be consulted before discontinuing airborne precautions.
- We continue use 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 for contact tracing.

Surgical Site Infection (SSI) – Renal Transplant Surgery

Background

Due to the identification of CPO cases among renal transplant patients, we have started working with the renal transplant pharmacist, urology, nephrology and BC Transplant Society to prevent CPO transmission within this patient population. We implemented a renal transplant surgical site surveillance system in August of 2020.

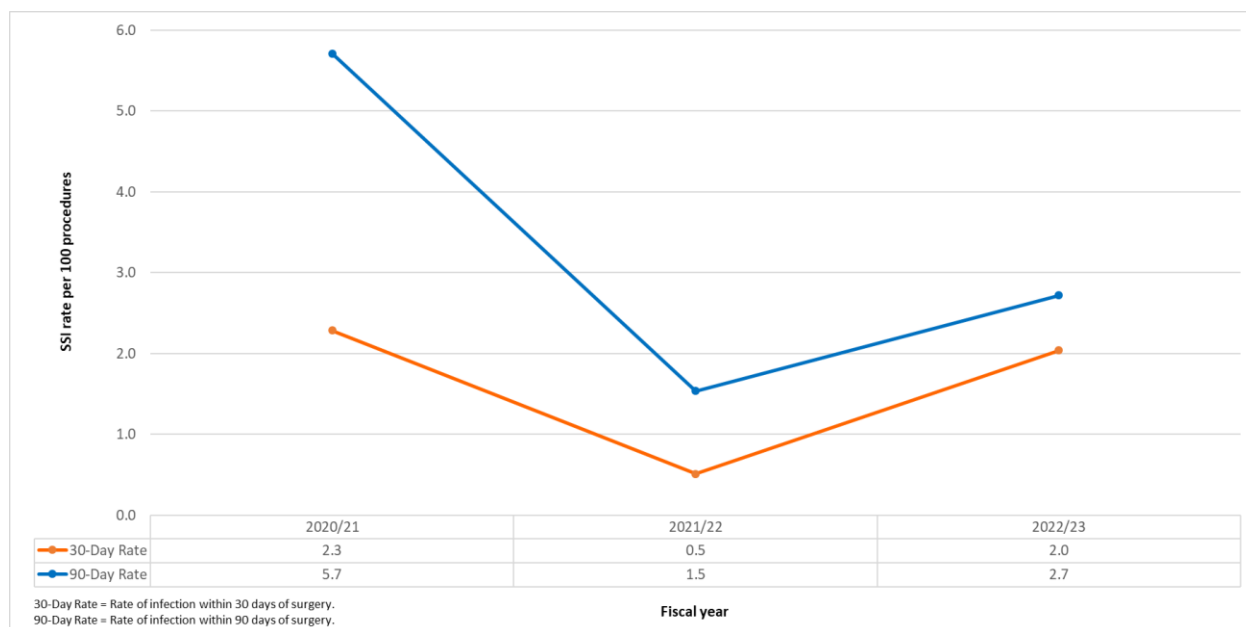
Outcome

Table 1: Summary of renal transplant surgical infections 2021/22 to 2022/23

	2021/22	2022/23
Renal transplant surgeries performed at PHC	195	147
Renal transplant SSI cases (Number and incidence)	3 (1.5 per 100 procedures)	4 (2.7 per 100 procedures)
Infection classification	3 (100%) organ space	4 (100%) organ space
Infection within 30 days of surgery	1 (33%)	3 (75%)
Infection beyond 30 days of surgery	2 (67%)	1 (25%)
Infection before ureteric stent removal	2 (67%)	2 (50%)
Infection after ureteric stent removal	1 (33%)	2 (50%)
Preoperative antibiotics used	3 (100%)	4 (100%)

The most prevalent sources of organisms in renal transplant SSIs cumulatively over the last 3 years were *E. coli* and *K. pneumoniae* (Figure 15, Appendix).

Figure 8: SSI rate per 100 procedures following renal transplant surgery, 2020/21 to 2022/23



Corrections to Reported 2020/21 & 2021/22 SSI Cases in Previous Biennial Report

- In 2020/21, 8 SSI cases were reported with a rate of 4.6 per 100 procedures; in this report, they were adjusted to 10 cases with a rate of 5.7 per 100 procedures.
- In 2021/22, 2 SSI cases were reported with a rate of 1.0 per 100 procedures; in this report, they were adjusted to 3 cases with a rate of 1.5 per 100 procedures.
- In July 2023, we extended our inclusion criteria of infection post surgery from 30 days to 90 days; thus, the data was adjusted from previous years for accurate comparisons.

Surgical Site Infection (SSI) – Cardiac Surgery

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.

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.

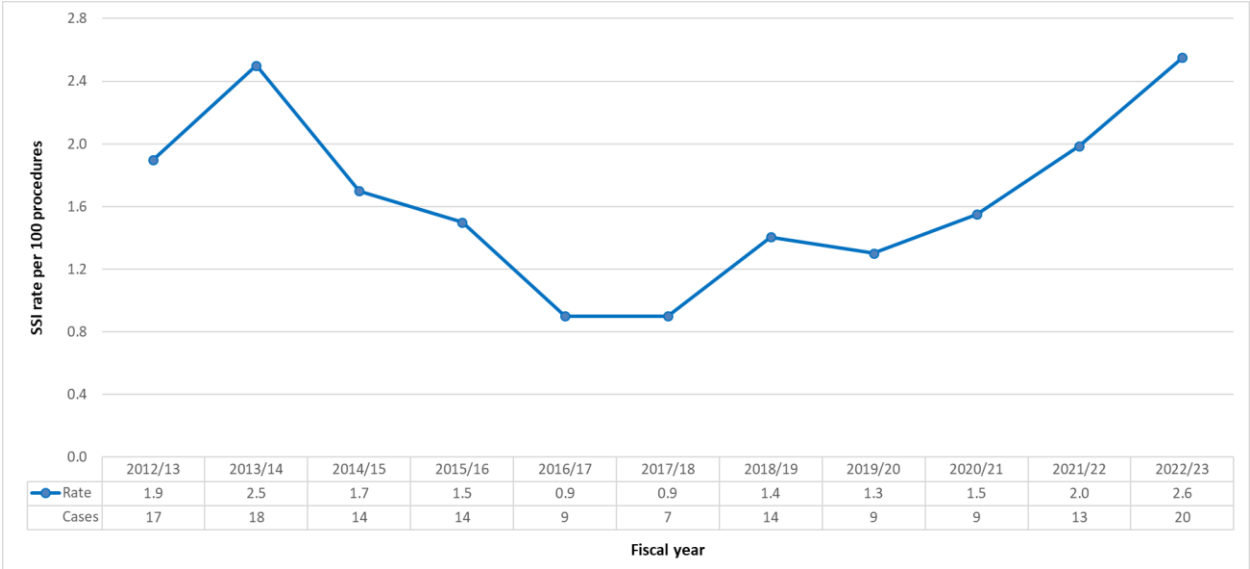
Outcome

Table 2: Summary of cardiac surgical infections 2021/22 to 2022/23

	2021/22	2022/23
Cardiac surgeries performed at PHC	654	784
Cardiac SSI cases	13 (2.0 per 100 procedures)	20 (2.6 per 100 procedures)
Infection classification	6 (46%) superficial 7 (54%) organ space	8 (40%) superficial 10 (50%) organ space 2 (10%) deep incisional
Location of infections	11 (85%) sternum 2 (15%) donor site (leg)	18 (90%) sternum 1 (5%) donor site (leg) 1 (5%) sternum + leg
Preoperative antibiotics used	13 (100%)	20 (100%)

The most prevalent sources of organisms in cardiac SSIs cumulatively over the last 5 years were coagulase-negative *Staphylococcus* (CoNS) and *S. aureus* (Figure 16, Appendix).

Figure 10: SSI rate per 100 procedures following CABG and valve surgery, 2012/13 to 2022/23



Central Line-Associated Bloodstream Infection (CLABSI)

Background

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

IPAC's CLABSI surveillance is focused on cases associated with the intensive care unit (ICU) at 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.

This year we started using an in house developed CLABSI application to improve surveillance efficiency.

Cases are confirmed by an IPAC physician.

Outcome

PHC-associated CLABSI incidence rate at SPH ICU was 1.9 cases per 1,000 catheter days which was the same as in 2018/19 (Figure 9).

Most cases were clustered in quarter 3 (44%) and quarter 4 (44%) (Figure 10).

The most prevalent sources of organisms in CLABSI cumulatively over the last 5 years were *C. albicans* and *S. epidermidis*/VRE (Figure 17, Appendix).

Working on

We are working with PHC Data Analytics teams to obtain the denominator, Central Line Days electronically. This process not only uses an existing resource, Cerner, but also allows for rapid data analysis and timely reporting of CLABSI rates. Moreover, if successful, CLABSI surveillance may be easily expanded to other acute inpatient units at PHC.

Figure 9: PHC-associated ICU CLABSI incidence rate by fiscal year, 2009/10 to 2022/23

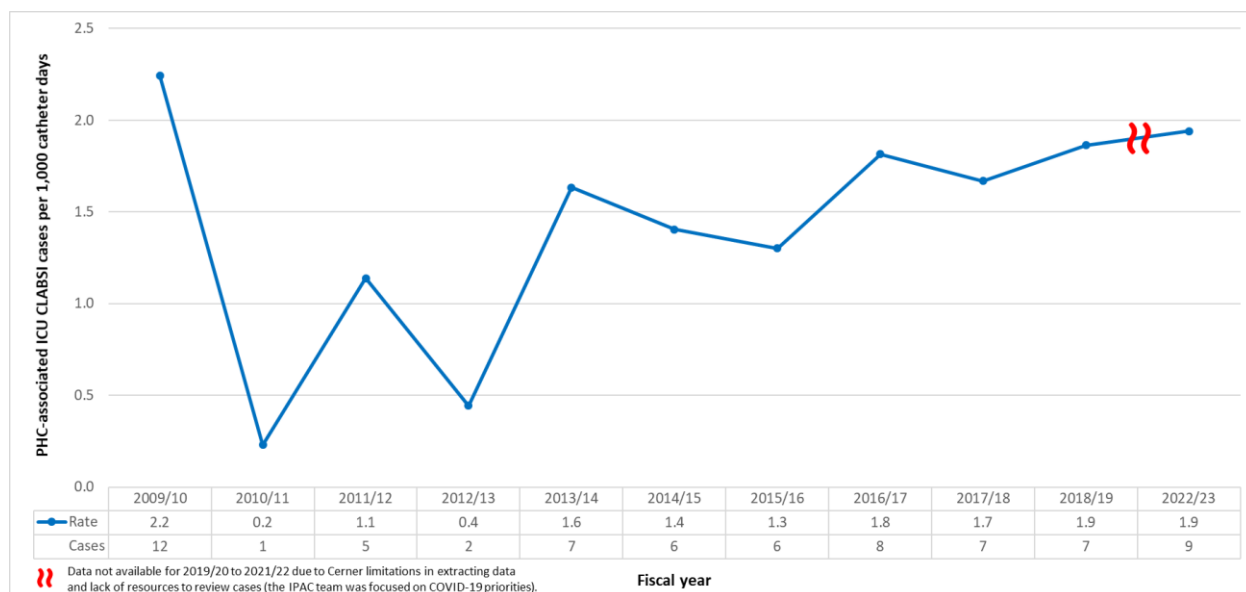
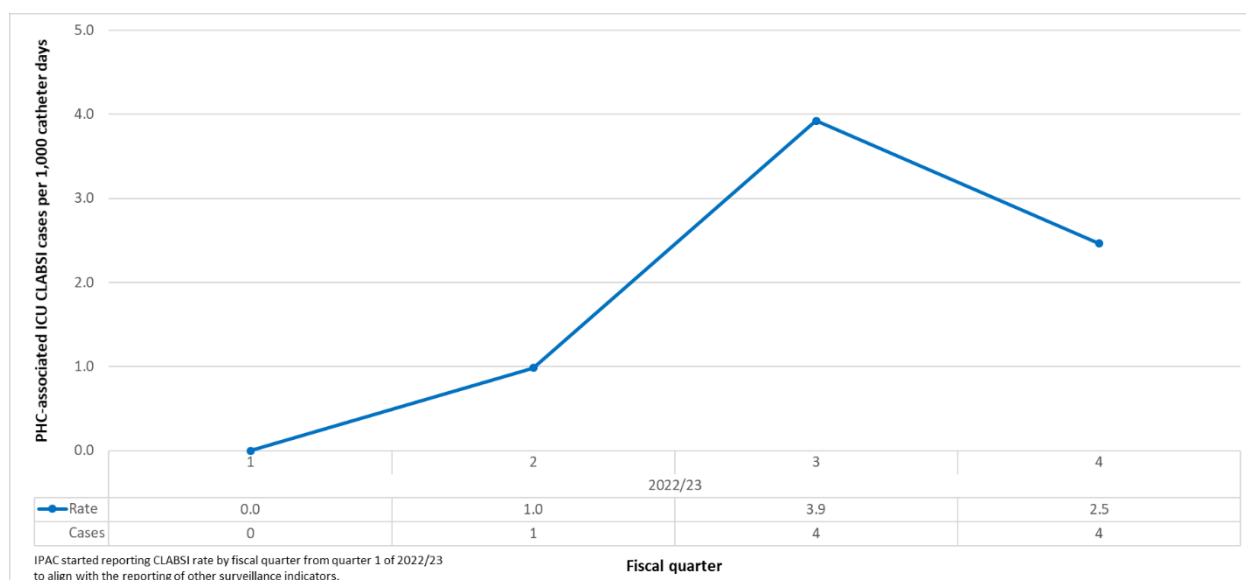


Figure 10: PHC-associated ICU CLABSI incidence rate by fiscal quarter, 2022/23 Q1 to Q4



Hospital-Associated *Staphylococcus aureus* Bloodstream Infections (HA-SAB)

Background

HA-SAB are associated with significant morbidity and mortality.

Surveillance for HA-SAB is required to identify probable sources of healthcare transmission, and to target infection control interventions to prevent HA-SAB in our facilities.

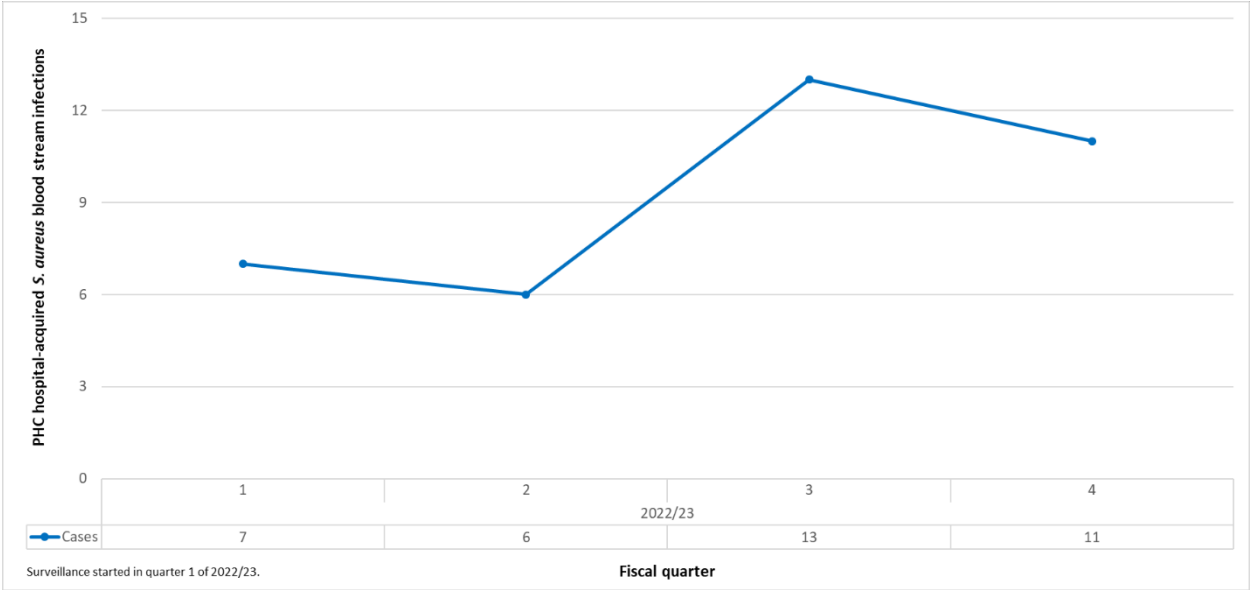
In the 2020/21 and 2021/22 fiscal year, we worked in collaboration with PHC Data Analytics to develop a semi-automated system to identify possible HA-SAB cases at PHC acute care facilities. Each case is reviewed by an ICP and IPAC physician. Confirmed cases of HA- SAB will reported to a [dashboard](#).

Outcome

2022/23 marked our first year of HA-SAB surveillance. We identified a total of 37 cases (Figure 11). The most common sources of HA-SAB were skin and soft tissue infection (SSTI) and peripheral intravenous catheter (PIVC) (Figure 18, Appendix).

We will be implementing a knowledge translation project to reduce the inappropriate use and maintenance of PIVC to prevent HA-SAB.

Figure 11: Number of hospital-associated *S. aureus* blood stream infections, 2022/23 Q1 to Q4



Outbreak Management

ASSESS → CONTAIN → COMMUNICATE

IPAC has been at the forefront of the assessment, investigation, containment, prevention, education, and communication of outbreaks of communicable diseases at PHC facilities.

In collaboration with Vancouver Coastal Health Authority's (VCH) Communicable Disease Control team, IPAC is responsible for investigating clusters of cases and determining whether there is an outbreak at a PHC facility.

Standardized control measures are promptly implemented when each outbreak is declared.

Outcome

In 2022/23, there were a total of 3 influenza like illness (ILI) and gastrointestinal illness (GI) outbreaks in Providence Health Care facilities. Of these, two (67%) were in acute care facilities (1 ILI and 1 GI) and one (33%) was in a long-term care facility (1 GI).

In acute care, there were 1 ILI outbreak (influenza A) at SPH 8A involving 3 patients and 0 staff, and lasting 4 days. There was one GI outbreak (norovirus) at SPH 9CD involving 9 patients and 3 staff, and lasting 7 days.

In long-term care, there was 1 GI outbreak (norovirus) at MSJ ECU involving 4 residents and 1 staff and lasting 9 days.

COVID-19

In 2022/23, there were 37 COVID-19 clusters* across acute and long-term care (Table 3). There were 580 patients/residents and 110 staff who tested positive for SARS-CoV-2. Most of the clusters and cases were from quarter 1 (10 clusters) and quarter 4 (15 clusters).

***COVID-19 cluster definition:** A cluster is suspected when 2 or more** epidemiologically-linked patients/residents and/or staff members present with COVID-19 symptoms and/or positive test result 3 or more days (or ≥72 hours) after admission within a 7-day period. **At least one of the cases identified as a patient/resident.

Genome sequencing analysis is performed on all large clusters and information is shared with units/program. Example: At SPH 5/B and CSICU in quarter 4 of 2022/23 a cluster affected 18 patients and 2 staff, and lasted 18 days. Genome sequencing was performed and determined that most cases were genetically related, highlighting the importance of early detection by doing proper symptom monitoring as well as early treatment to prevent complications.

Table 3: PHC-associated COVID-19 clusters, 2020/21 to 2022/23

Fiscal year	Site (Acute/LTC)	Number of clusters	Duration (days)	Number of patients/ residents cases	Number of staff cases
2020/21	Acute	14	238	47	64
	LTC	14	248	53	51
2021/22	Acute	6	122	34	8
	LTC	8	176	128	55
2022/23	Acute	17	207	140	21
	LTC	20	362	440	89

Projects and Collaborations

Urinary Tract Infections (UTIs) and Asymptomatic Bacteriuria in Long-Term Care

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 in long-term care homes.

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

Although the intense phase of review and feedback stopped at the end of 2013, we have continued to collect data on the total number of urine cultures ordered and collected at the

residential care sites. We conduct 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.

As of March 2023, we have continued to see a sustained significant decrease in urine cultures collected from all residential care sites since 2011/12 (Figure 12). Antimicrobial use has also decreased for suspected UTIs. All sites have had a significantly lower rate of urine cultures collected since 2011/12 (Figure 13). Antimicrobial use also decreased for suspected UTIs.

Figure 12: Number of urine cultures collected at PHC long-term care homes, 2008/09 to 2022/23

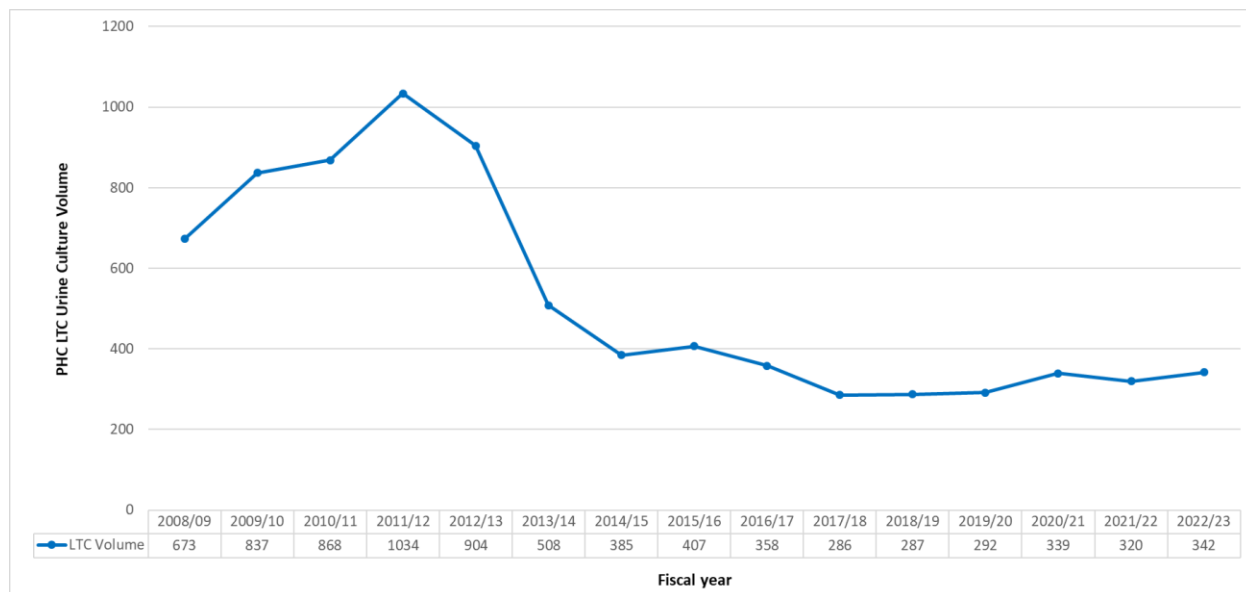
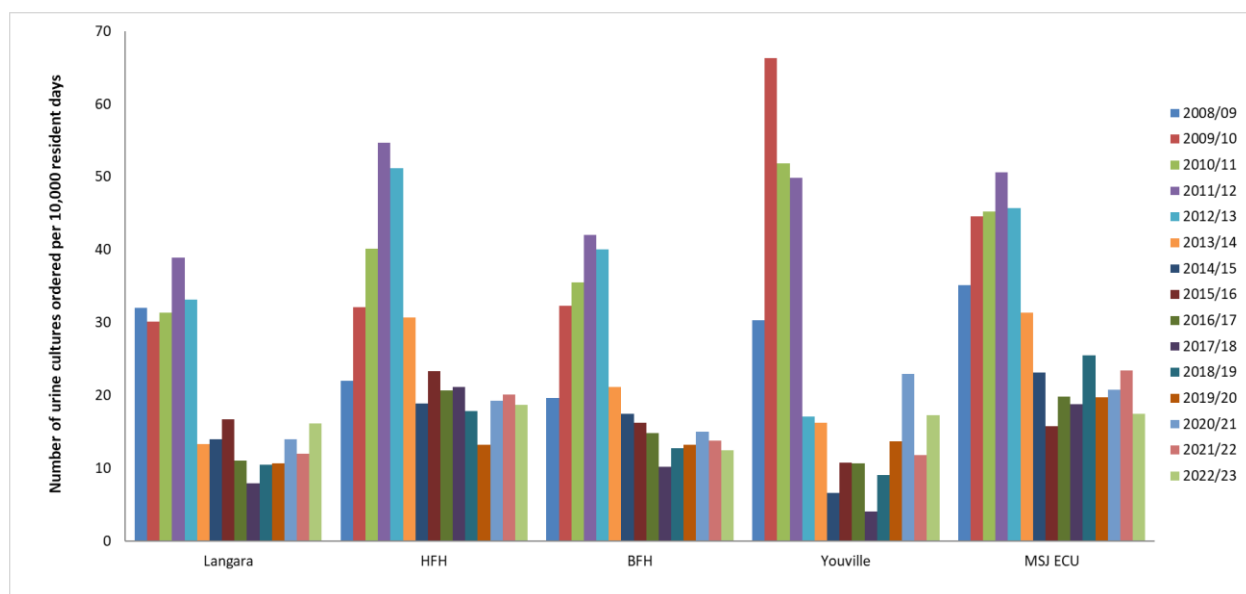


Figure 13: Urine culture rates by PHC long-term care homes, 2008/09 to 2022/23



High Threat Pathogens

High Threat Pathogens (HTP) are rare and emerging pathogens that are expanding geographically to new populations/locations.

In BC, Viral Hemorrhagic fever (VHFs) including Ebola, Lassa, Marburg and Crimean Congo Hemorrhagic fever have been the area of focus for healthcare facilities and infection control teams. While BC is considered to be low risk for VHFs, it is important to ensure our health care professionals are prepared to identify and respond safely, provide quality care to patients, and prevent harm of transmission to other patients and healthcare staff.

Facilities in BC are categorized into 3 levels - MSJ is a type 1 facility that would assess the risk and stabilise a patient before transferring to a type 2 or type 3 facility. SPH is a type 2 facility that will conduct testing and provide short term care while the potential HTP is assessed. The emergency department (ED), laboratory and IPAC team have collaborated on algorithms to quickly identify patients at risk and manage them safely in appropriate spaces within the ED at SPH and MSJ.

IPAC facilitated a series of education sessions to review PPE with SPH and MSJ ED staff giving them an opportunity to practice donning and doffing with specialized PPE utilized for VHFs and discuss how things would work if a suspected case presented to the department. IPAC received helpful feedback which was relayed to the provincial HTP working group as they update the BC HTP recommendations.



New St. Paul's Hospital (NSPH) Project

Construction is underway with the expectation for concrete to be poured up to level 7 by the end of December 2023. As the shell of the building rises, the interior design work continues and is expected to be complete by the end of 2023. IPAC will continue to ensure that the finished design will support, facilitate, and encourage infection control practices and behaviours by all users, occupants, patients, visitors, and staff. IPAC will take on the added dimension of ensuring the construction practices and materials handling will result in a sanitary facility safe for use as a health care facility. IPAC collaborates with the Project Construction team to develop a practical and effective Infection Control Plan for the project and conducts site visits and inspections to monitor progress and compliance.

In addition to the work related to the construction of the NSPH building, design work for the Clinical Support & Research Center will be starting soon. IPAC will support the (Clinical Services Redesign) effort to strategically plan how staff will work to deliver the best care in the new SPH.





Knowledge Translation (KT) Challenge

A collaborative group with members from IPAC as well as IV Therapy, Clinical Informatics, and Patient Partners was accepted into the Knowledge Translation (KT) Challenge, designed to support PHC staff in incorporating research evidence into practice. The project will span over two years in the PHC Medicine Programs and will focus on reducing bloodstream infections related to peripheral intravenous (PIV) catheters, an under-recognized yet serious hospital-acquired infection. To help prevent these infections, the team will implement a PIV bundle of care, which includes best practices for the care and maintenance of PIV catheters, and engage staff as well as patients/families in understanding, recognizing, and minimizing potential PIV-related infection risks. The learnings from the KT Challenge will be used to expand the bundle to more PHC programs once the project completes.



Support for Providence Living (PL)

Providence Living (PL) is a newly created non-profit Catholic-sponsored health care organization focused on long-term care, assisted living, housing, and other community services to support seniors and their family members. There are 3 sites, one in Comox (The Views at St. Joseph's), and two in Vancouver (Central City Lodge and Cooper's Place).

In August 2022, IPAC and PL signed a Memorandum of Understanding to formally begin IPAC support to PL sites. Support includes:

- On site visits
- Environmental and practice assessments
- Staff education and train-the-trainer program
- Risk assessments for construction, renovation, maintenance, and design based on the CSA Standards
- Recommendation on clinical and support services workflows
- Participation on the Home For Us Executive Steering Committee

Hand Hygiene

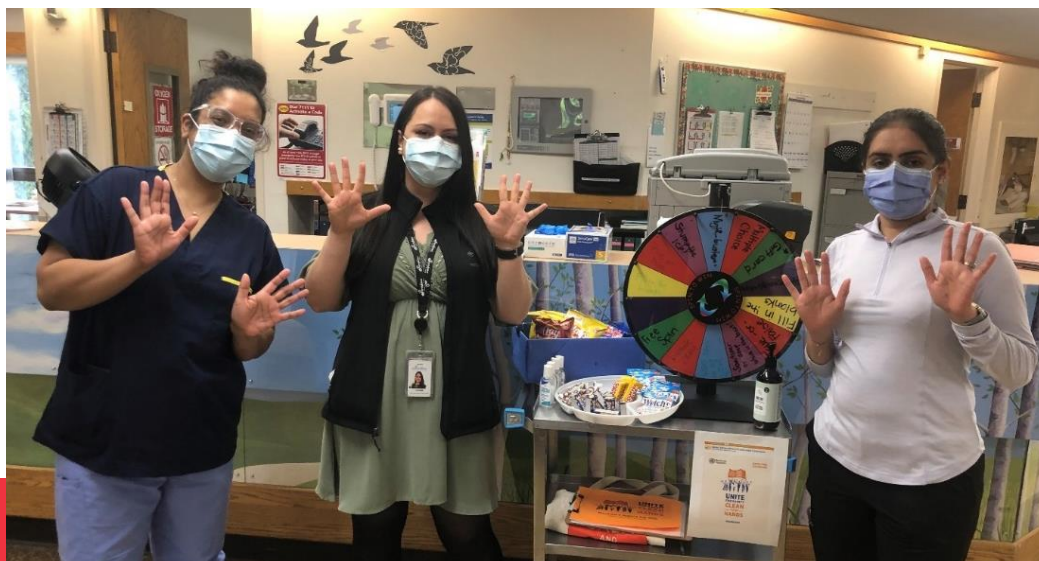
Background

Hand hygiene [hand-washing with soap and water or using an alcohol-based hand rub (ABHR)] is important for preventing many health care-associated infections. However, overall compliance with hand hygiene among health care professionals continues to be a challenge.

The IPAC team continues to support the organization’s improvement of hand hygiene compliance.

Goals/Successes/Innovations	Risks/Weaknesses/Threats & Mitigation Plans
1. Regular hand hygiene education: • In-the-moment • Unit huddles/meetings • All new staff orientations • Campaigns (e.g., annual <i>World Hand Hygiene Day</i> and <i>Bare Below the Elbows</i>) 2. Reporting via unit feedback boards, facility posters, and the dashboard 3. Innovation: SpeedyAudit app captures hand hygiene moments 4. Goal: electronically accessible data	1. Hawthorne Effect (behaviour change due to awareness of being observed) • Minimized by conducting audits throughout the quarter and rotating auditors 2. Comparison to other health authorities is difficult • Methodology is variable 3. Supporting medical staff by promoting physician peer champions

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.



Average hand hygiene compliance across all health care workers in acute care facilities:

75% in 2022/23

65% before patient contact

83% after patient contact

72% in 2021/22

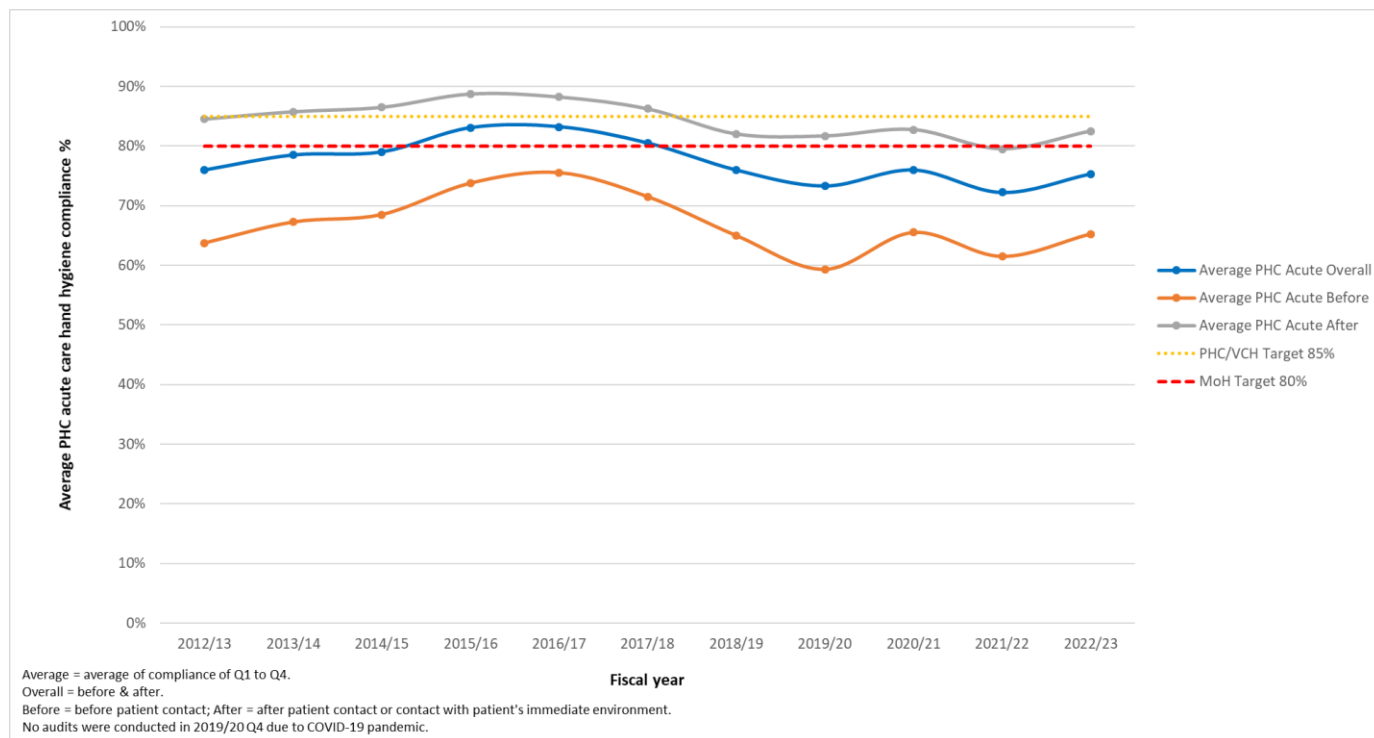
62% before patient contact

80% after patient contact

Both “before” and “after” patient contact compliance were higher in acute care compared to 2021/22.



Figure 14: Average PHC acute care hand hygiene compliance by fiscal year: 10-year trend

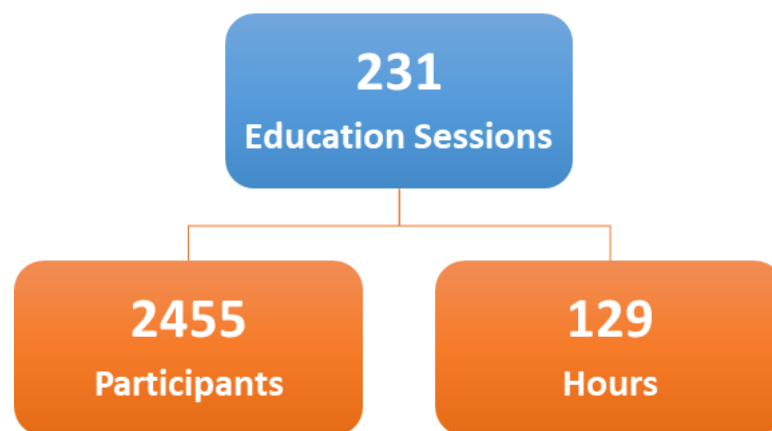


Education and Training

IPAC provides education to staff, physicians, patients and visitors in order to increase awareness of infection prevention and control measures. Education is provided during unit huddles, in presentations, while consulting, and on the IPAC website.

- Provide updates and discuss “hot topics” at monthly leadership meetings and at the Acute Nursing Practice Council
- Present at the general nursing orientation (GNO) for new hires
- Provide an orientation for incoming residents in critical care, cardiology, and medicine and other disciplines as needed
- Deliver the mandatory Learning Hub *Hand Hygiene Module* for all staff
- Deliver *Personal Protective Equipment (PPE) Skills Lab* – a hands-on session for donning and doffing PPE
- Train PPE spotters and coaches in acute and long term care.
- Celebrate IPAC Week and Hand Hygiene Day with a travelling roadshow

IPAC Education, 2022/23



Education and Training: Renal Hand Hygiene Champions

The idea of educating IPAC Champions, the front-line staff who would serve as role models and resources in best infection control practices for the units, is not entirely new to PHC. This educational concept was successfully implemented several years prior to the start of COVID-19 pandemic. Learnings from the COVID-19 pandemic have prompted us to refresh the Hand Hygiene (HH) Champions program.

The HH Champions will promote the best hand hygiene practices at bedside and support a culturally safe environment where everybody is comfortable to provide and receive a feedback. Supervised by ICPs, HH Champions will be instrumental in re-enforcing the best HH practices in the unit by providing in-the-moment feedback and escalating concerns to unit leadership and IPAC. They will also support peers with PPE donning and doffing and do quick environmental scans.

In April 2023, the first cohort of HH Champions from SPH's hemodialysis unit (6D) completed their course. They assessed staff work-flow, collaborated with unit leadership to address learning needs, and developed the education strategy. The HH Champion program addresses key principles for preventing HAIs through hand hygiene, such as maintaining healthy fingernails and skin, selecting the right HH products, appropriate glove use, and reducing environmental contamination associated with sinks and sink drains. Additionally, the program educates staff to provide timely and meaningful feedback on HH practices using the HH peer review tool and Glo-germ methodology. It also assists staff in understanding the foundations of hand hygiene audits.

Education and Training: PPE Skills Lab

PPE Skills Lab, Course 24041 on Learning Hub, was launched in February 2022 to provide hands-on personal protective equipment (PPE) training to PHC employees working with patients/residents. IPAC recognized the need for this form of instruction, given the increase in overuse and misuse of PPE since the COVID-19 pandemic. Furthermore, the course is tailored to the learner's needs, day-to-day tasks, facilitated by small group learning and accessible across all PHC sites. Other course highlights include routine practices, point-of-care risk assessment and PPE stewardship & sustainability. Thus far, 51 PHC employees have successfully completed this course.

Education and Training: IPAC Web Page

IPAC SHOP Documents and PHC Connect Web Page

In 2022/23, IPAC focussed on refreshing IPAC's guidelines and policies available on SHOP. Over 50 documents were reviewed and revised, and seven brand new guidelines were created.

The IPAC section on PHC Connect was also refreshed. Staff can find the latest IPAC updates, and links to SHOP documents, and other educational tools. In particular, we want to highlight the Organisms and Diseases page, which contains links to over 20 disease-specific guidelines as well as the PHC Diseases and Conditions Table - a 300 page catalogue of infectious conditions with essential information on preventing transmission.

CLINICAL SERVICES + SUPPORTS

Nursing

Allied Health

Programs

Medical Staff

Clinical Resources

Clinical Information, Systems, Technology + Privacy

IPAC

Routine Practices

Additional Precautions

Organisms and Diseases

Outbreaks

Surveillance

Cleaning + Disinfection

Construction

Antimicrobial Stewardship

Education Resources

Organisms and Diseases

PHC Diseases and Conditions Table

Find the critical information needed for managing the care of a patient/resident with an infectious disease or condition in the PHC Diseases and Conditions Table (link below).

Diseases/conditions are listed alphabetically by common disease name (e.g., Chickenpox) as well as by the causative agent (e.g., varicella-zoster virus), and each is summarized into a single page that can be quickly scanned to find relevant information like the clinical presentation, transmission routes, and appropriate precautions (site/unit specific) among other topics.

[Review the PHC Diseases and Conditions Table](#)

IPAC Disease Guidelines

For more detailed information on some of the most-commonly identified infectious diseases at PHC sites, a number of disease guidelines have been created and are available on [SHOP](#) or through the specific links below:

- [Candida auris](#)
- [Carbapenemase Producing Organisms \(CPO\)](#)
- [Clostridioides difficile \(C. difficile\)](#)
- [Conjunctivitis in Long Term Care](#)
- [COVID-19 - Infection Prevention and Control Guidelines in Acute Care](#)
 - [IPAC Guidelines on Surgical Patients COVID-19 Testing Algorithm](#)
- [COVID-19 Response in Long Term Care \(LTC\) and Assisted Living \(AL\)](#)
- [Creutzfeldt-Jakob Disease \(CJD\)](#)
- [Cystic Fibrosis - Infection Prevention](#)

Page owner

IPAC

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Construction, Renovation, Maintenance and Design (CRMD)

Infection Prevention and Control (IPAC) is an active member of the Multidisciplinary Team (MDT). IPAC's dedicated Infection Control Practitioner (ICP) ensures that the appropriate preventative measures are initiated and adhered to during all phases of construction and engages other ICPs with expertise in the clinical areas. An Infection Control Risk Assessments (ICRA) is completed by the project manager and reviewed with the ICP. The ICP ensures that the proposed project aligns with the current Canadian Standards Association (CSA).

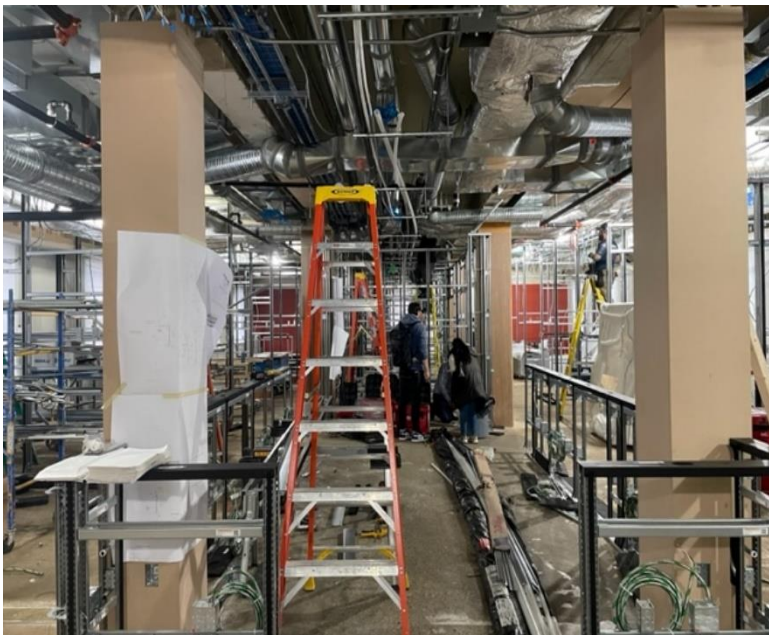
Throughout the year, the ICP has actively collaborated with project managers to carry out ICRA reviews, evaluate control measures, and ensure continuous monitoring of project sites.

IPAC partnered on the following projects/initiatives; some are completed, others approaching the final stages, and some still in progress:

- Upgrades to cooling systems
- Installing additional washers, disinfectors, and HH sinks
- Flooring redesign and removal of carpets
- Enhancing Nuclear Medicine and MRI
- Improving sterilizers at SPH and MSJ MDRD
- Creating single occupancy rooms at SVL
- Replacing flooring at Richmond CDU
- MSJ wallaroo project
- Establishing airborne isolation room at Cathlab
- Updating the MSJ laundry room
- MSJ re-piping project
- Improving heating systems and HVAC at MSJ
- Youville updates: Enhancing call bell systems, converting offices into patient rooms
- Designing All Nations Sacred Space
- Relocating Crosstown
- SPH Road to Recovery project

IPAC has the following responsibilities:

- Conducting educational programs for internal and external CRMD stakeholders.
- Collaborating with the Facilities Management Office (FMO) to monitor the performance of heating, ventilation, and air conditioning (HVAC) systems at PHC.
- Assessing indoor spaces as necessary to measure Co2 levels, relative humidity, and temperature.
- Working with FMO to place Portable Air Handling Units (AHU) where needed.
- Ensuring proper positioning of hand hygiene products in collaboration with the respective units and FMO.



Physical Environment

Along with consistent hand hygiene practices, ensuring effective surface cleaning and disinfection is crucial for preventing and controlling the transmission of AROs and *C. difficile*. These microorganisms can persist and continue to be a source of transmission without thorough and regular surface cleaning and disinfection.

On October 14, 2022, PHC officially welcomed over 300 workers supporting Environmental Services (EVS) at PHC sites. IPAC collaborated with EVS on the transition to in-house EVS processes, new cleaning and disinfection methodologies, and quality control initiatives.

In July 2022, we resumed ultraviolet marking (UVM) audits in patient rooms in acute care. This simple method serves as an additional means to evaluate the effectiveness of room cleaning. The goals of the UV auditing program are to establish a quality control measure for cleaning and disinfection of high-touch surfaces in acute care patient rooms, evaluate the thoroughness of environmental cleaning, and provide feedback to the unit and housekeeping stakeholders.

Results

At SPH, the overall compliance rate for the 44 audited rooms was 74%. Among these, 19 rooms (43%) had compliance rates below 80%. Of the audited rooms, 17 were occupied by patients on additional precautions (CPO, CDI, and ARO), with an overall compliance rate of 72%. Among the rooms with additional precautions, nine had compliance rates below 80%.

At MSJ, the overall compliance rate for the 32 audited rooms was 80%. The range of compliance percentages varied from 17% to 100%. Among these, 15 rooms (47%) had compliance rates below 80%. Out of the audited rooms, eight were occupied by patients on additional precautions, with an overall compliance rate of 79%. The compliance for these rooms ranged from 17% to 100%. Among the rooms with patients on additional precautions, three had compliance rates below 80%.

Variable	SPH	MSJ
Date Range	Jul-Nov 2022	Jul-Nov 2022
Number of Rooms Audited	44	32
Overall Percent Compliance	74%	80%
Range	0-100%	17-100%
Below 80% Compliance	19 (43%)	15 (47%)
Number of additional precautions (AP) * rooms audited	17	8
Overall Percent Compliance for AP rooms	72%	79%
Range for AP rooms	13-100%	17-100%
Below 80% compliance for AP rooms	9 (53%)	3 (38%)
*Additional precautions (ARO/CDI/CPO)		

Education

IPAC conducts refresher sessions with the EVS team to address key topics such as hand hygiene, additional precautions, and proper usage of personal protective equipment (PPE). These educational sessions serve to reinforce and enhance their understanding of these critical infection control practices.

It is essential to emphasize the significant role that environmental services personnel play in preventing healthcare-associated infections (HAIs). By providing education, IPAC highlights the direct impact that the EVS team has on maintaining a clean and safe healthcare environment. They contribute to reducing the transmission of pathogens and minimizing the risk of HAIs through their diligent adherence to proper cleaning, disinfection, and infection control protocols.



Engineered Improvements in Long-Term Care

The COVID-19 pandemic has taught us the importance of improving indoor air quality as an intervention to mitigate the airborne transmission risk of respiratory viruses. IPAC applied to the SPH Foundation for a grant to fund the procurement of more appropriate portable HEPA units. The \$40,000 grant enabled the purchase of 94 Honeywell HPA-300C portable HEPA units. These units were allocated to the long term care facilities in collaboration with FMO.

Appendix

Clostridioides difficile Infection (CDI)

Table 4: Distribution of all CDI episodes meeting PHC-associated temporal criteria*

* Includes all colonizations, relapses, new infections, and re-infections; reported PHC-associated cases are only new infections and re-infections that are non-duplicates and meet the temporal criteria.

2022/23 CDI	Count	%
All Episodes	119	
Duplicates	24	20.2%
Unique	95	79.8%

2022/23 CDI	Count	%
Duplicates	24	
Colonizations	14	58.3%
Relapses	3	12.5%
New Infections	6	25.0%
Re-Infections	1	4.2%

2022/23 CDI	Count	%
Unique	95	
Colonizations	43	45.3%
Relapses	5	5.3%
New Infections	45	47.4%
Re-Infections	2	2.1%

Table 4 shows that ~20% of all episodes meeting PHC-associated temporal criteria were duplicates and thus excluded from PHC-associated case count. Among the unique episodes, new infections and colonization were about equal. PHC-associated cases included new infections and re-infections meeting the temporal criteria minus the duplicates; in 2022/23, PHC-associated cases = 45 (new infections) + 2 (re-infections) = 47.

CDI Episode Definitions

- **Duplicate** = previous collection is <2 weeks before the current collection & CDI episodes are the same (hence, duplicate)
- **Relapse** = previous collection is 2 to 8 weeks before the current collection
- **Re-Infection** = previous collection is >8 weeks before the current collection

PHC-Associated Temporal Criteria of Cases & Excluded Units

- Collection date ≥ 72 hours after admission and/or
- Collection date within 4 weeks of previous PHC admission (≥ 24 hours)
- Excluded units = outpatients, LTC, ED, NICU, HFH RB1&2

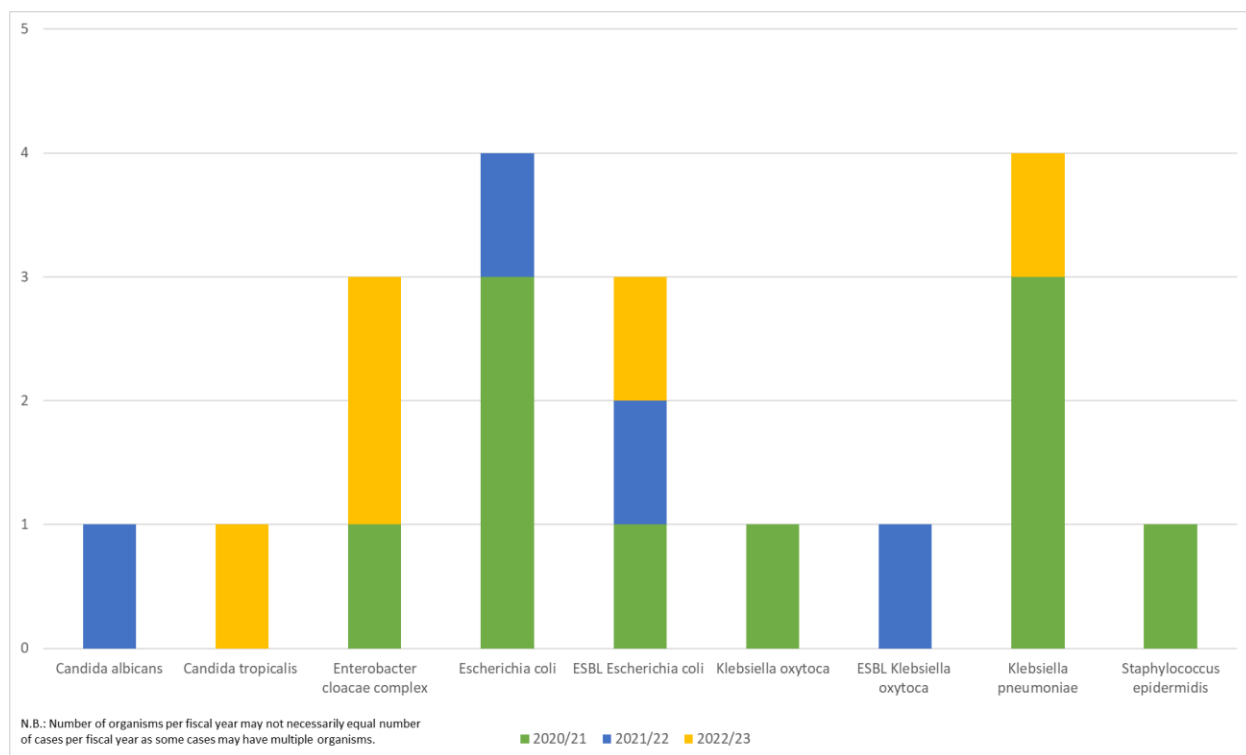
Carbapenemase Producing Organisms (CPO)

Table 5: Distribution of genes identified in CPO positive patients from 2012/13 to 2022/23

Fiscal year	KPC	NDM	OXA-48	VIM	IMP	Patients with multiple genes
Total (n=84)	27 (32%)	37 (44%)	7 (8%)	3 (4%)	3 (4%)	7 (8%)
2022/23 (n=10)	2 (20%)	7 (70%)	1 (10%)	0	0	0
2021/22 (n=13)	4 (31%)	6 (46%)	1 (8%)	0	0	2 (15%)
2020/21 (n=12)	6 (50%)	5 (42%)	0	0	1 (8%)	0
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

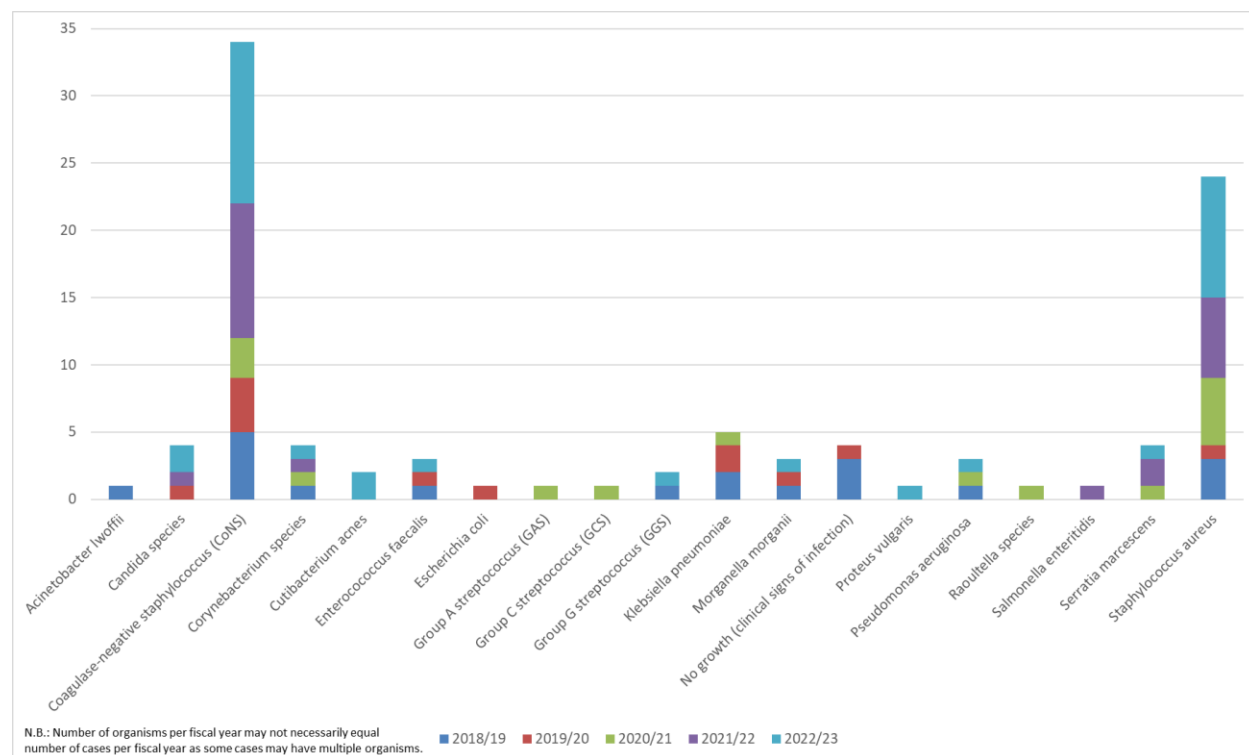
Surgical Site Infection (SSI) – Renal Transplant Surgery

Figure 15: Cumulative renal transplant SSI organisms from 2020/21 to 2022/23: 3-year trend



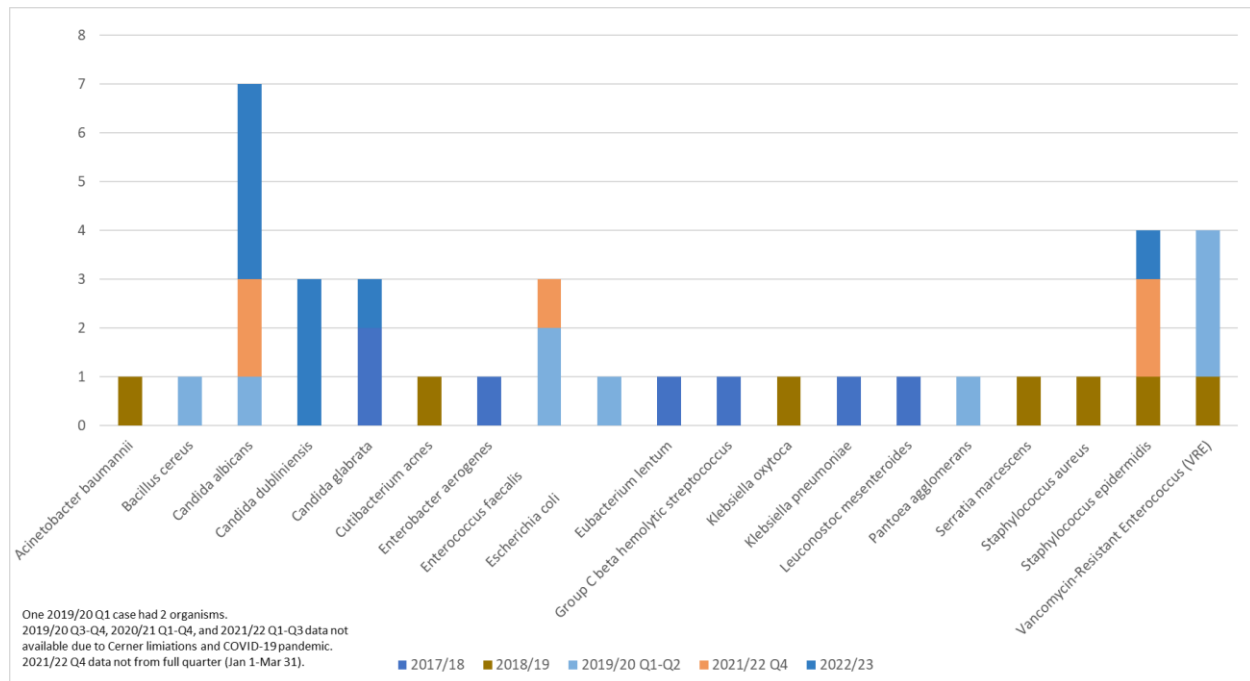
Surgical Site Infection (SSI) – Cardiac Surgery

Figure 16: Cumulative cardiac SSI organisms from 2018/19 to 2022/23: 5-year trend



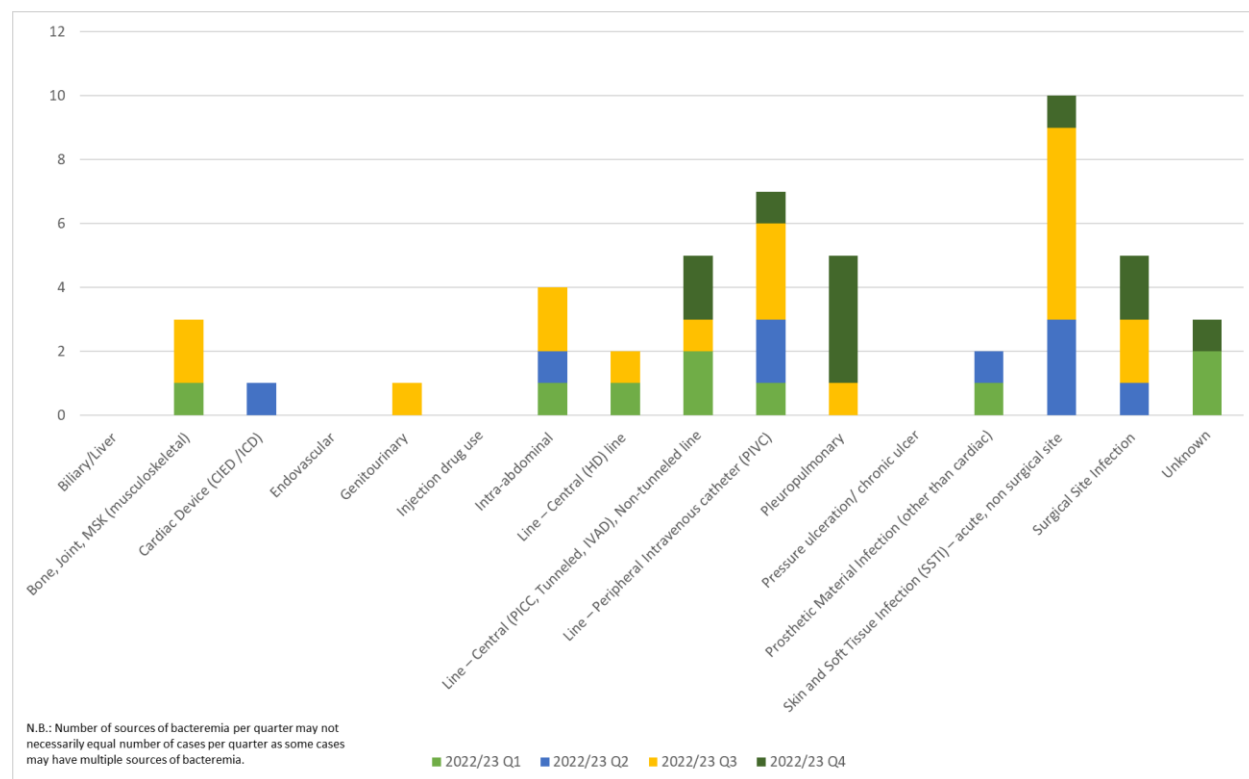
Central Line-Associated Bloodstream Infection (CLABSI)

Figure 17: Cumulative distribution of organisms for SPH ICU-associated CLABSI, 2017/18 Q1 to 2022/23 Q4



Hospital-Associated *Staphylococcus aureus* Bloodstream Infections (HA-SAB)

Figure 18: Cumulative sources of bacteremia for hospital-associated *S. aureus*, 2022/23 Q1 to Q4



Outbreak Management

Table 6: PHC-associated COVID-19 clusters in acute care, 2022/23 Q1-4

Acute Care COVID-19 Clusters, 2022/23 Q1-4										
#	Fiscal quarter	Site	Unit	Period	Duration (days)	# Patients	# HCWs	# Patient Deaths	Attack rate (%)	Source
1	Q1	HFH	Rehab 1&2	Apr 8-May 17	39	13	7	0	20%	Various - patient outings, visitors
2	Q1	YRH	Parkview	Apr 9-May 2	23	10	5	2	31%	Visitor
3	Q1	SPH	9A	Apr 13-19	6	9	0	0	60%	Family member
4	Q1	HCF	Assisted living	Apr 19-23	4	6	0	0	10%	Patient outing
5	Q1	MSJ	1 South	May 1-19	18	11	1	1	69%	Visitor
Q1 Totals					90	49	13	3		
1	Q2	SPH	9A	Jun 27-Jul 5	8	6	1	0	40%	Patient/HCW
2	Q2	YRH	Parkview (4 th floor only)	Aug 14-18	4	8	2	2	50%	Visitor
3	Q2	HCF	Assisted living	Sep 15-18	3	3	0	0	5%	Patient outings
Q2 Totals					15	17	3	2		
1	Q3	MSJ	1 South	Sep 21-25	4	3	0	0	19%	Visitors
2	Q3	SPH	2 North	Oct 17-Nov 1	15	14	0	0	78%	Unknown
Q3 Totals					19	17	0	0		
1	Q4	YRH	Parkview (5 th floor only)	Dec 19	0	2	0	0	13%	Unknown
2	Q4	HFH	Rehab 1&2	Dec 20-Jan 6	17	3	1	0	5%	Visitor
3	Q4	HFH	Rehab 1&2	Jan 17-23	6	3	0	0	5%	Patient outing
4	Q4	SPH	7D	Feb 6-25	19	18	0	0	75%	Visitors
5	Q4	HFH	Rehab 1&2	Feb 13-23	10	5	2	0	8%	HCW
6	Q4	SPH	5A&B, CSICU	Feb 13-Mar 3	18	18	2	0	32%	Visitor/HCW
7	Q4	MSJ	1 South	Mar 21-Apr 3	13	8	0	0	50%	Patient outings
Q4 Totals					83	57	5	0		

Table 7: PHC-associated COVID-19 clusters in long-term care, 2022/23 Q1-4

Long-Term Care COVID-19 Clusters, 2022/23 Q1-4										
#	Fiscal quarter	Site	Unit	Period	Duration (days)	# Residents	# HCWs	# Resident Deaths	Attack rate (%)	Source
1	Q1	HFH	Extended care	Apr 1-14	13	17	8	2	13%	Visitor/HCW
2	Q1	LRH	Aspen, Birch & Cedar	Apr 6-May 13	37	44	8	3	22%	Visitor
3	Q1	YRH	Extended care	Apr 7-27	20	35	8	3	83%	Group activity
4	Q1	MSJ	Extended care	Apr 15-Jun 3	49	78	19	5	78%	Unknown
5	Q1	HFH	Extended care	Apr 28-May 13	15	20	5	0	16%	Previous cluster, outing, visitor
Q1 Totals					134	194	48	13		
1	Q2	LRH	Aspen, Birch & Cedar	Jun 14-28	14	4	3	0	2%	HCW
2	Q2	BFH	Extended care (4 th fl. only)	Jun 28-Jul 9	11	6	0	0	8%	Resident outings
3	Q2	LRH	Cedar	Aug 1-5	4	5	0	0	7%	Resident/visitor
4	Q2	HFH	Extended care	Aug 4-26	22	29	4	0	23%	Visitor/HCW
5	Q2	LRH	Birch & Cedar	Sep 4-12	8	9	1	0	6%	Resident outing, family member
Q2 Totals					59	53	8	0		
1	Q3	BFH	Extended care (4 th fl. only)	Oct 1-18	17	51	7	10	69%	Visitor, HCW, outing
2	Q3	LRH	Aspen	Oct 3-Nov 2	30	19	2	1	40%	Resident outings
Q3 Totals					47	70	9	11		
1	Q4	BFH	Extended care	Dec 9-21	12	12	4	1	8%	Visitor
2	Q4	MSJ	Extended care	Dec 16-29	13	18	2	0	23%	Visitor, family member
3	Q4	HFH	Extended care	Dec 18-Jan 5	18	8	2	0	6%	Visitor
4	Q4	LRH	Aspen, Birch & Cedar	Dec 22-Jan 8	17	21	4	0	11%	Visitor/HCW
5	Q4	HFH	Extended care	Feb 13-Mar 7	22	25	4	2	20%	Visitor
6	Q4	YRH	Extended care (2 nd fl. only)	Feb 22-Mar 1	7	6	2	0	29%	HCW
7	Q4	LRH	Aspen, Birch & Cedar	Mar 15-Apr 11	27	25	5	3	13%	VGH acute stay, outing, visitor
8	Q4	BFH	Extended care (3 rd fl. only)	Mar 22-28	6	8	1	0	11%	Visitor
Q4 Totals					122	123	24	6		