



Providence Health Care

Infection Prevention & Control

IPAC Annual Report

2023/24



Table of Contents

Executive Summary.....	1
Who We Are	2
What We Do	3
Surveillance.....	3
Outbreak Management.....	23
Projects and Collaborations	26
Hand Hygiene	32
Education and Training	36
Construction, Renovation, Maintenance and Design (CRMD)	37
Physical Environment	38
Appendix	41

Executive Summary

Infection Prevention and Control (IPAC) at Providence Health Care (PHC) strives to provide the highest quality care to the patients we serve by preventing hospital-associated infections.

IPAC is actively involved in preventing infection by developing and maintaining of surveillance systems, responding to outbreaks, providing infection prevention expertise and guidelines to the PHC community, and using a continuous quality improvement approach to practical IPAC challenges.

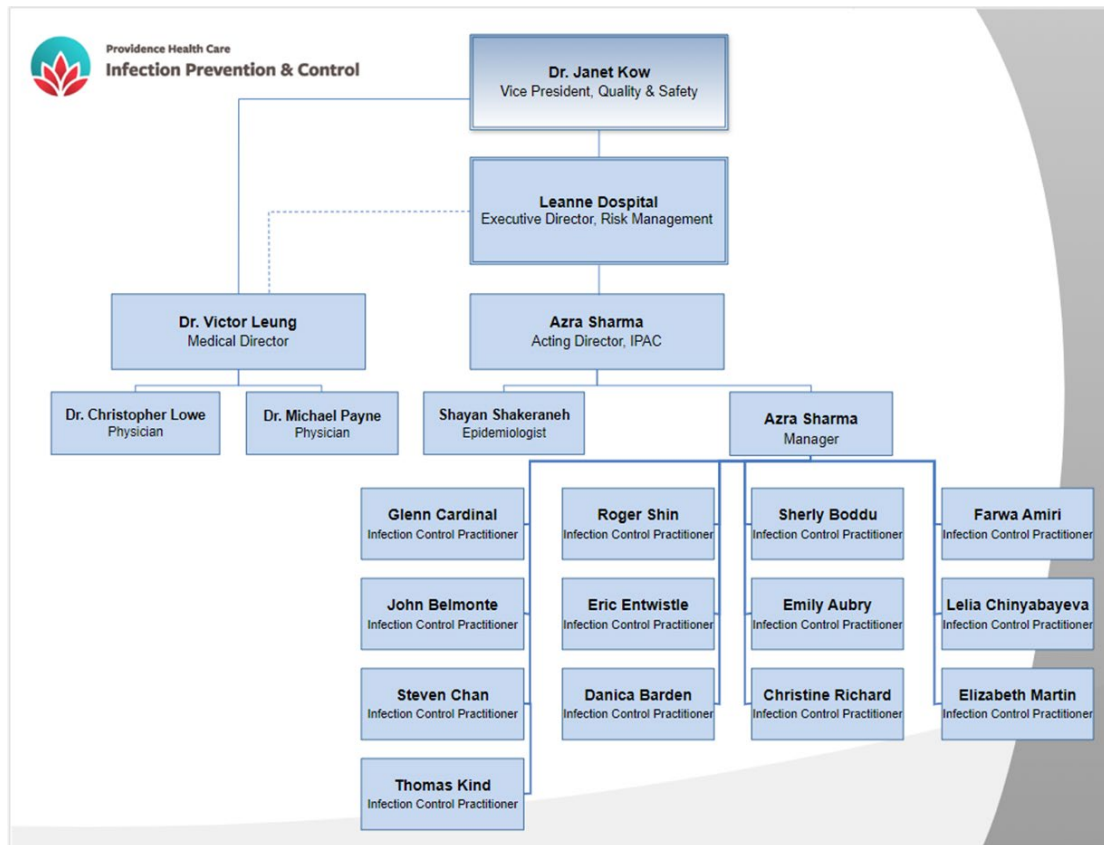
We would like to thank our clinical and operations team and all the front-line staff members at Providence Health Care for doing their part in reducing health care associated infections.

Highlights

- Planned a pilot project for discontinuation of additional precautions for patients with documented clearance of previous MRSA colonization/infection for HFH Rehabilitation Units 1&2.
- Achieved the lowest PHC-associated incidence rate of Vancomycin Resistant Enterococcus (VRE) infection in the last 5 fiscal years (17.9 cases/10,000 patient days).
- Achieved the lowest PHC-associated incidence rate of cardiac surgical site infection in the last 3 fiscal years (1.6 per 100 procedures).
- Achieved the lowest PHC-associated CLABSI incidence rate at SPH ICU in the last 5 fiscal years (1.4 cases per 1,000 central line days).
- Transitioned to automated reporting of CLABSI central line days from Cerner to enhance timely reporting, eliminate the need for extensive manual chart reviews, and establish a foundation for future expansion of CLABSI surveillance beyond the ICU.
- Reduced by 53% the inappropriate use of non-surgical gloves in CSICU from July to December 2023 in a pilot project with the Waste Working Group and CSICU.



Who We Are



IPAC is a team of 18 people primarily located at 1190 Hornby Street in Vancouver. We serve all 18 PHC sites.

What We Do

Preventing infections is a shared goal of all PHC staff. 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, thorough:

- 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

IPAC Website

On the IPAC section on PHC Connect, staff can find the latest IPAC updates, 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.

<https://connect.phcnet.ca/clinical/ipac>

IPAC Metrics on Quality & Safety and Flow Dashboard

This dashboard displays key IPAC metrics and performance over time and is accessible by anyone connected to PHC Connect.

<http://spdbdssoo1/Reports/report/Indicators/DashBoard>

Surveillance

Surveillance is the systematic and consistent collection, analyses, and interpretation of data with timely dissemination of actionable results.

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 include:

- Antibiotic-resistant organisms (ARO): Methicillin Resistant *Staphylococcus aureus* (MRSA), Vancomycin Resistant Enterococci (VRE), Carbapenemase-producing Organisms (CPO), and *Candida auris*
- *Clostridioides difficile* infection (CDI)
- *Mycobacterium tuberculosis* (TB) – Active infections
- Surgical Site Infections in Cardiac Surgery and Renal Transplant
- Central line-associated bloodstream infection (CLABSI) in the Intensive Care Unit
- Healthcare-associated *Staphylococcus aureus* bloodstream (HA-SAB) infection

Methicillin Resistant *Staphylococcus aureus* (MRSA)

Background

- MRSA is transmissible in hospital, long-term care and community settings. MRSA has the potential to cause serious infections for which treatment options are limited.
- 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. 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 577 new cases of MRSA identified at PHC in 2023/24.

- In 2023/24, 81 (14%) were classified as PHC-associated cases. Of these, 70 (86%) were from acute-care facilities (Figure 1).
- The PHC-associated incidence rate in 2023/24 was 4.4 cases/10,000 patient days (95% CI: 3.4-5.5). This rate was higher than last fiscal year (3.6 cases/10,000 patient days (95% CI: 2.7-4.7, $p=0.30$).
- The MRSA incidence rate at SPH in 2023/24 was 4.8 cases/10,000 patient days (95% CI: 3.7-6.2). This rate was higher than last fiscal year (3.9 cases/10,000 patient days, 95% CI: 2.9-5.2, $p=0.27$).
- The MRSA incidence rate at MSJ in 2023/24 was 1.9 cases/10,000 patient days (95% CI: 0.6-4.4). This rate was similar to last fiscal year (2.0 cases/10,000 patient days, 95% CI: 0.6-4.6, $p=0.94$).
- In 2023/24, 57% of PHC-associated cases were identified through hospital admission screening programs, while remaining cases were identified from clinical specimens.

Working on

IPAC is working on a pilot project for discontinuation of additional precautions for patients with documented clearance of previous MRSA colonization/infection for HFH Rehabilitation Units 1&2.

Figure 1: PHC-associated MRSA incidence rate in acute care facilities, 2007/08 to 2023/24

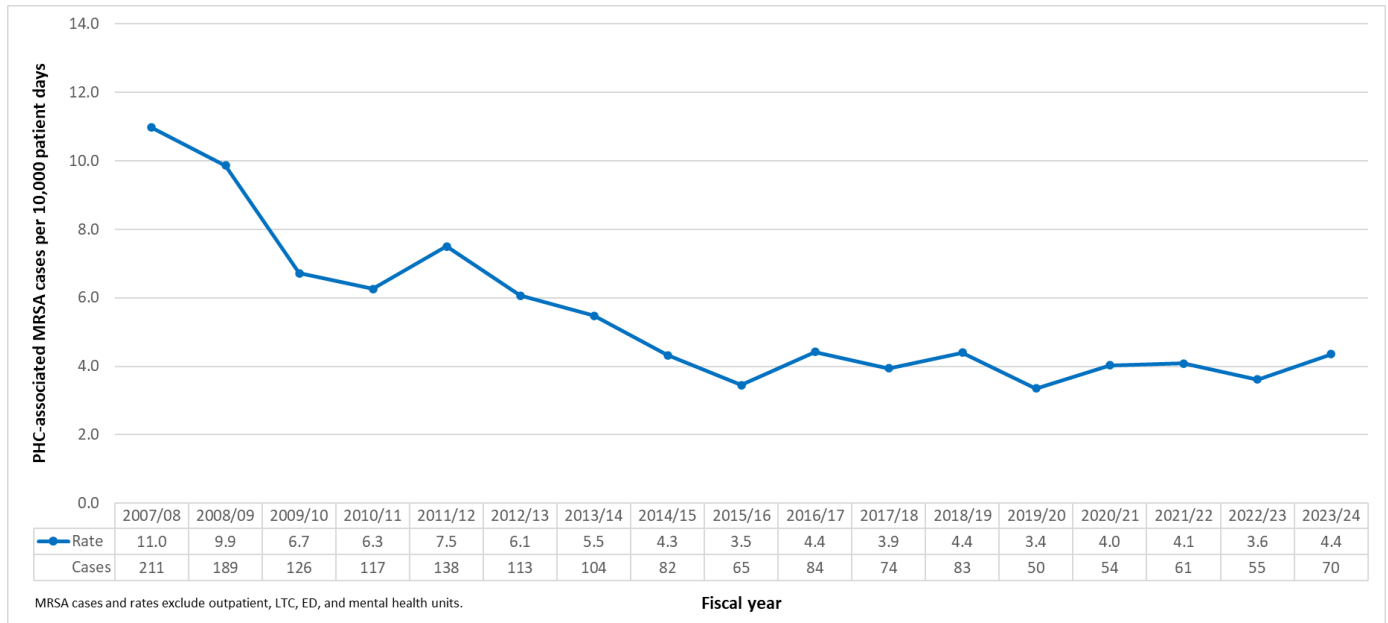
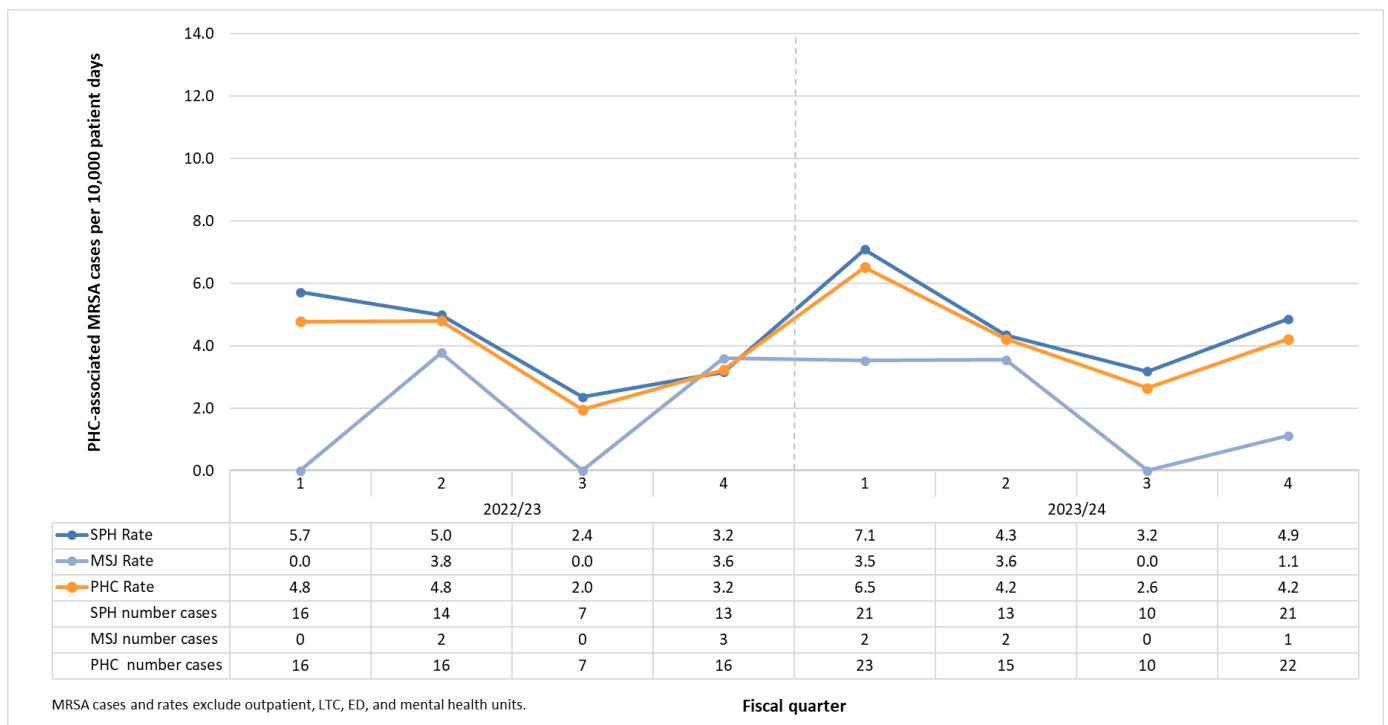


Figure 2: PHC-associated MRSA incidence rate by acute care facility site and fiscal quarter, 2022/23 to 2023/24



Vancomycin Resistant Enterococci (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 514 new cases of VRE identified at PHC in 2023/24.

- In 2023/24, 292 (57%) were classified as PHC-associated cases. Of these, 287 (98%) were from acute-care facilities (Figure 3).
- The PHC-associated incidence rate in 2023/24 was 17.9 cases/10,000 patient days (95% CI: 15.9-20.0). This rate was lower than last fiscal year (19.5 cases/10,000 patient days (95% CI: 17.4-21.9, $p=0.28$).
- The VRE incidence rate at SPH in 2023/24 was 19.7 cases/10,000 patient days (95% CI: 17.4-22.2). This rate was similar to last fiscal year (20.6 cases/10,000 patient days, 95% CI: 18.2-23.2, $p=0.61$).
- The VRE incidence rate at MSJ in 2023/24 was 8.6 cases/10,000 patient days (95% CI: 5.5-13.0). This rate was lower than last fiscal year (14.3 cases/10,000 patient days, 95% CI: 10.0-19.7, $p=0.06$).
- In 2023/24, 81% 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 the most vulnerable patients we serve.

Figure 3: PHC-associated VRE incidence rate in acute care facilities, 2007/08 to 2023/24

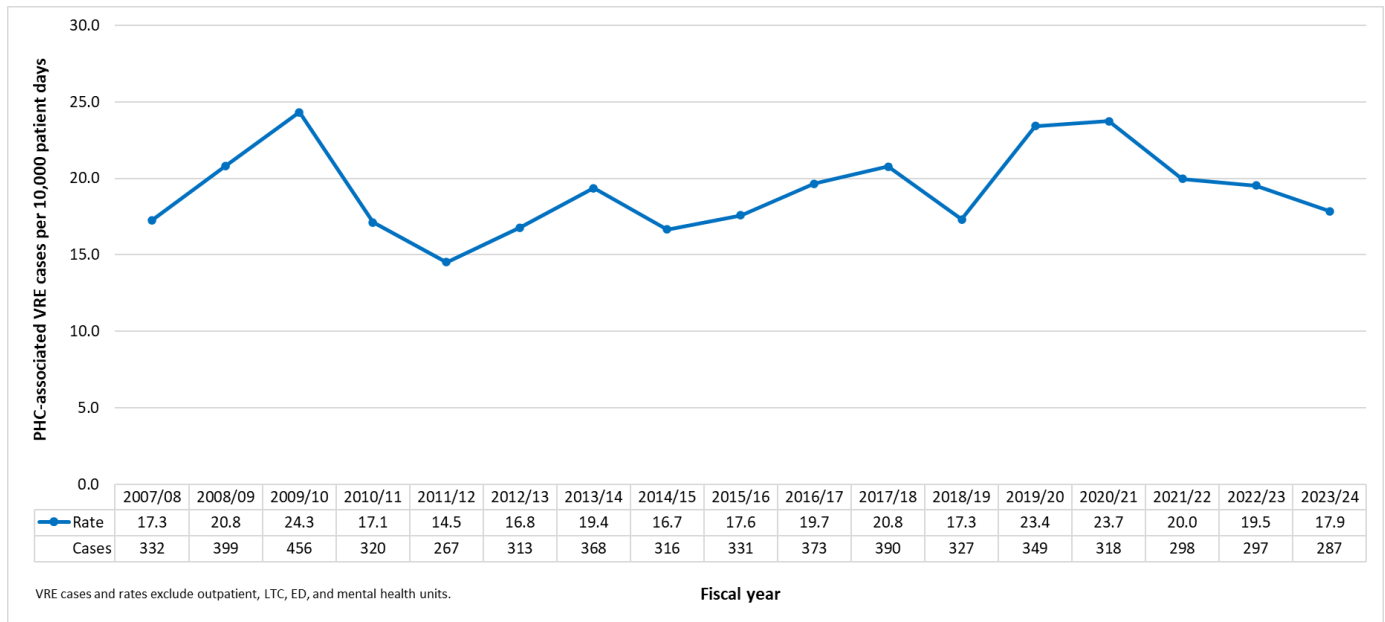
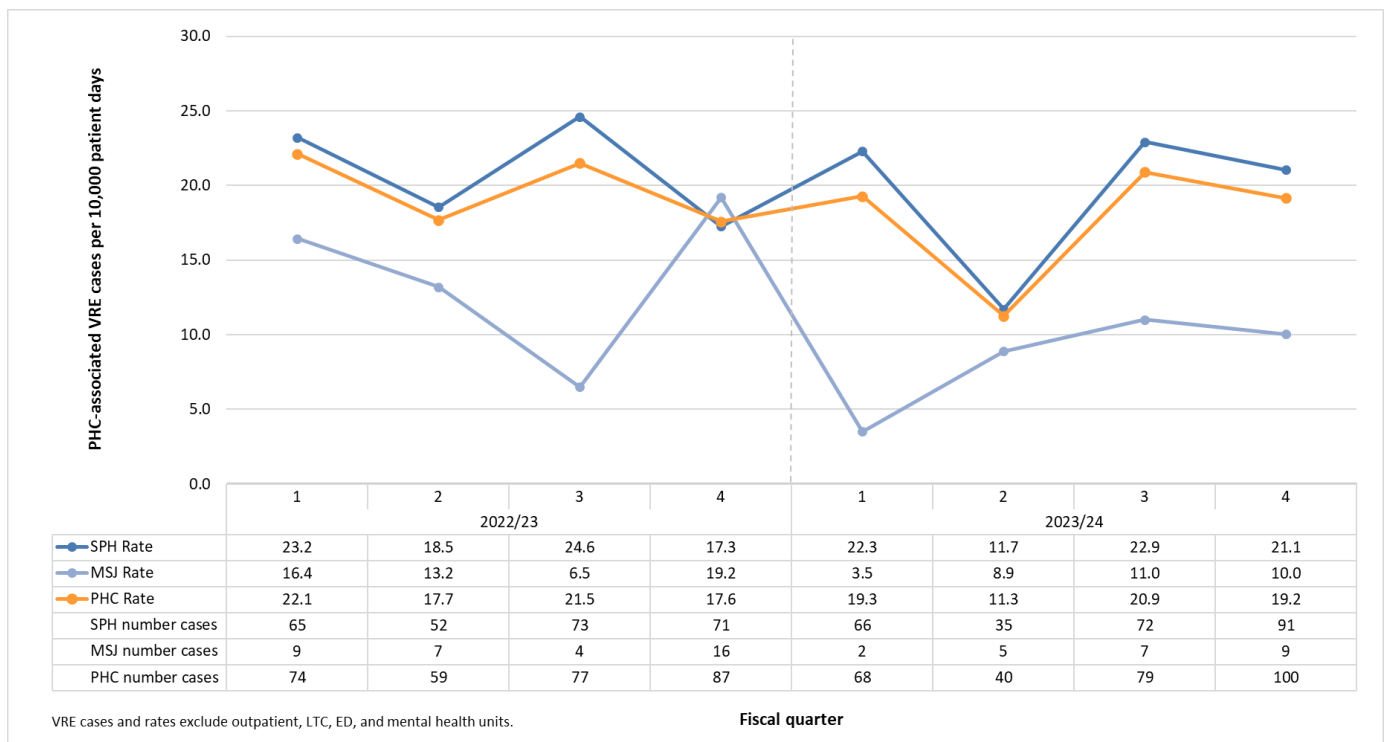


Figure 4: PHC-associated VRE incidence rate by acute care facility site and fiscal quarter, 2022/23 to 2023/24



Clostridioides difficile Infection (CDI)

Background

CDI is the most common cause of healthcare-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 sporicidal disinfection;
- Creating a process for environmental cleaning staff to inform unit staff upon completion of sporicidal disinfection; and
- Notifying the Antimicrobial Stewardship Program (ASP) of cases to ensure patients and residents receive timely, effective and optimal antimicrobial therapy and management.

Outcome

There were 155 new cases of CDI identified at PHC in 2023/24.

- In 2023/24, 86 (55%) were classified as PHC-associated cases. Of these, 82 (95%) were from acute-care facilities.
- The incidence rate of PHC-associated CDI in acute care facilities in 2023/24 was 4.1 cases/10,000 patient days (95% CI: 3.3-5.1). This rate was statistically significantly higher than last fiscal year (2.9 cases/10,000 patient days, 95% CI: 2.1-3.9, $p < 0.05$).
- The CDI incidence rate at SPH in 2023/24 was 4.8 cases/10,000 patient days (95% CI: 3.8-6.0). This rate was statistically significantly higher than last fiscal year (2.8 cases/10,000 patient days, 95% CI: 2.0-3.9, $p < 0.05$).
- The CDI incidence rate at MSJ in 2023/24 was 0.9 cases/10,000 patient days (95% CI: 0.2-2.7). This rate was statistically significantly lower than last fiscal year (3.3 cases/10,000 patient days, 95% CI: 1.5-6.3, $p < 0.05$).
- The unadjusted incidence, which includes patients colonized with CDI in 2023/24, was 7.4 per 10,000 patient days (95% CI: 6.3-8.7). This rate was statistically significantly higher than the unadjusted incidence from last fiscal year (5.5 cases/10,000 patient days, 95% CI: 4.5-6.8, $p < 0.05$).

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 6 years, although indeterminate results from the 2-step algorithm contributed to PHC-associated rates, positive test results continued to be the key driver.
- In 2023/24, both positive and indeterminate rates increased compared to 2022/23 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.
- 2023/24 was the seventh year that the IPAC 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. The role of reviewing infection versus colonization status will be transferred to IPAC with secondary support from ASP.
- 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 2023/24

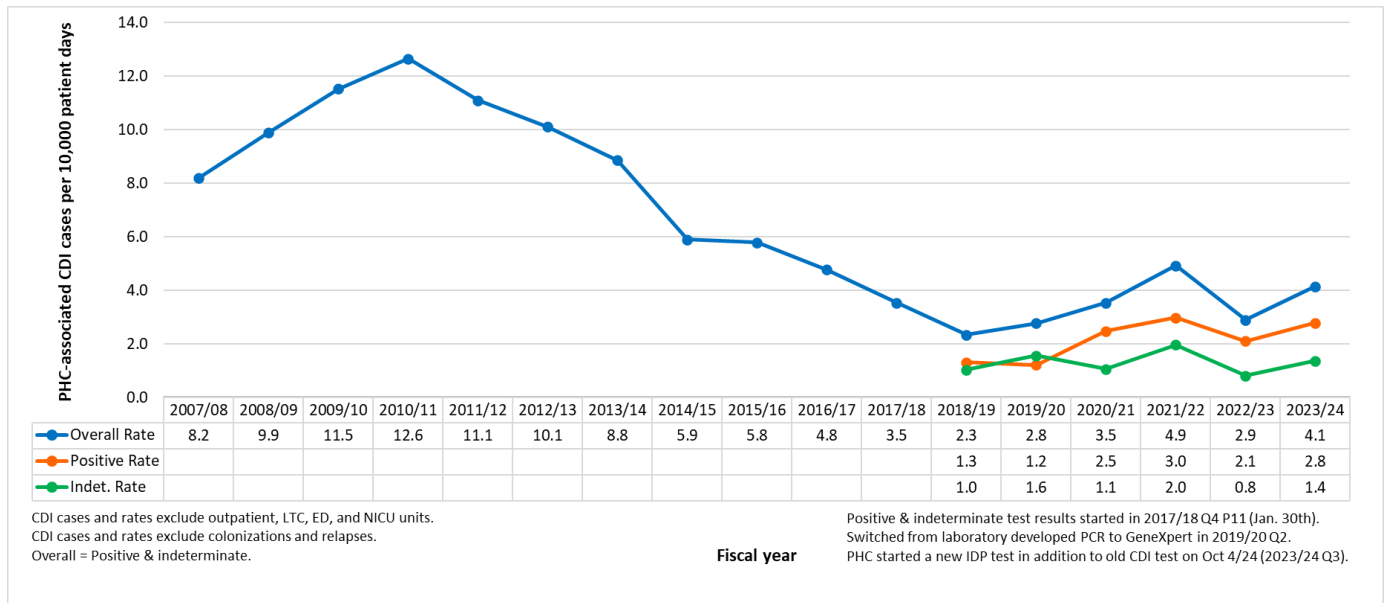
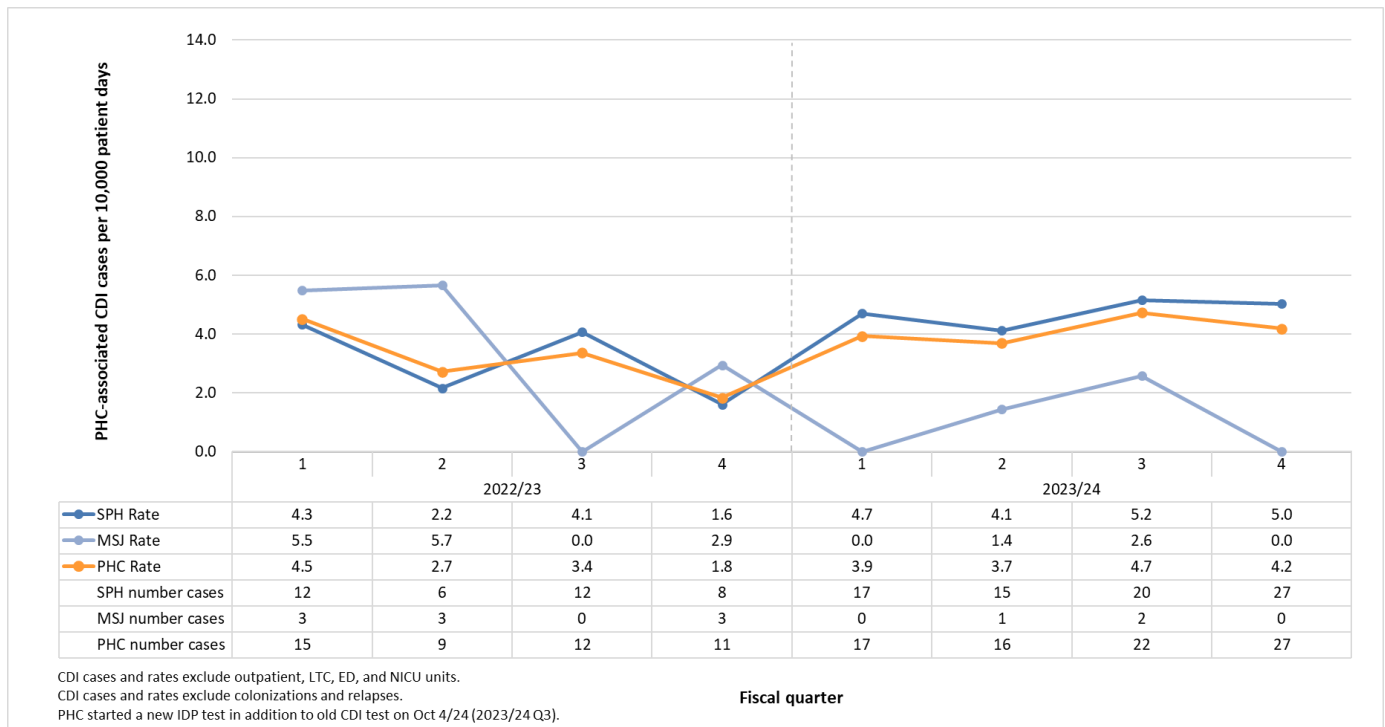


Figure 6: PHC-associated CDI incidence rate by acute care facility site and fiscal quarter, 2022/23 to 2023/24



Carbapenemase-Producing Organisms (CPO)

Background

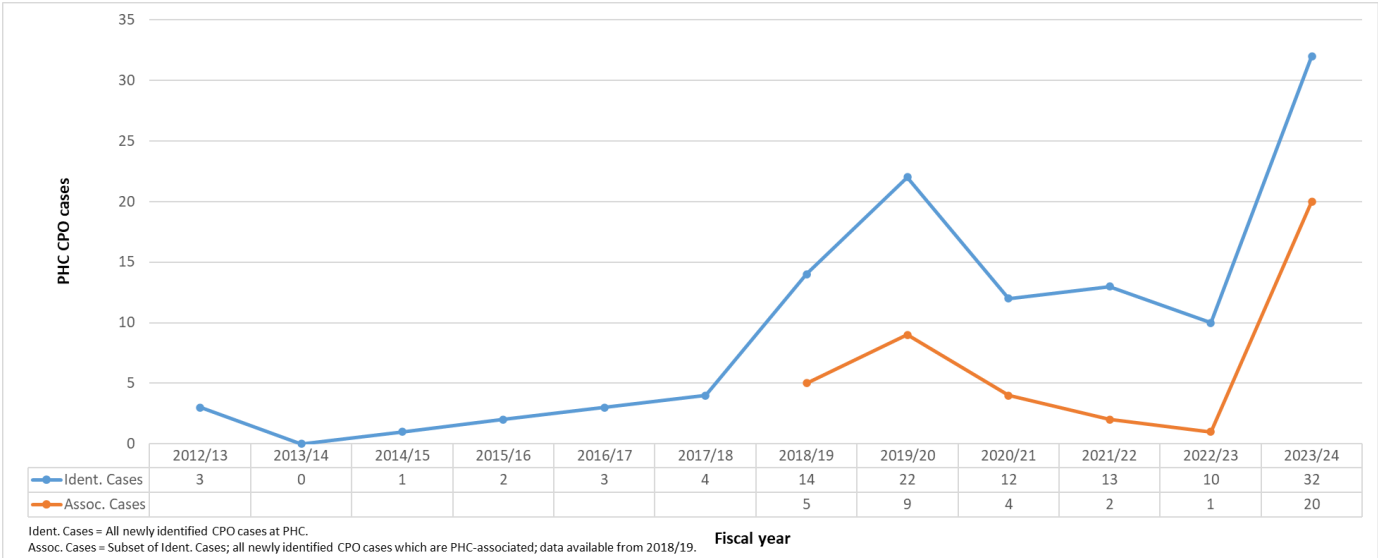
- CPO are Gram-negative bacteria that are resistant to carbapenems (considered antibiotics of last resort) and many other antibiotic classes. CPO infections are associated with high morbidity and mortality.
- In Canada, cases (infection or colonization) have primarily been identified in patients previously hospitalized in endemic countries. 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. PHC IPAC collaborates with other health authorities to refine infection prevention measures for CPO, such as risk-factor based screening, investigation of clusters and surveillance of CPO.

Outcome

A total of 1755 screening swabs were collected for CPO at PHC in 2023/24, which was higher than in 2022/23 (403).

- Thirty-two new CPO cases were identified at PHC in 2023/24 which was higher than in 2022/23 (10) (Figure 7). Of these, 20 (63%) were PHC-associated.
- NDM (78%) was the most prevalent carbapenemase gene identified in 2023/24 and cumulatively over the last twelve years (Table 6, Appendix).
- In 2023/24, 3 (9%) patients reported a healthcare encounter outside of Canada in the 12 months prior to detection; 12 (38%) 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 and associated CPO cases by fiscal year: 12-year trend



Mycobacterium tuberculosis (TB)

Outcome

In 2023/24, there were 24 cases of active pulmonary TB diagnosed at PHC acute care facilities. Of these, 13 (54%) cases were inpatients resulting in 3 exposed patients upon contract tracing.

- This is lower than **2022/23 where 27 new cases were identified** with 18 (67%) inpatient cases identified resulting in 12 exposed patients upon contract tracing.
- On follow-up, Vancouver Coastal Health (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 are clinical and epidemiologic risk factors. IPAC should be consulted before discontinuing airborne precautions.
- We continue to 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 2022/23 to 2023/24

	2022/23	2023/24
Renal transplant surgeries performed at PHC	147	164
Renal transplant SSI cases (Number and incidence)	4 (2.7 per 100 procedures)	5 (3.0 per 100 procedures)
Infection classification	4 (100%) organ space	5 (100%) organ space
Infection within 30 days of surgery	3 (75%)	2 (40%)
Infection beyond 30 days of surgery	1 (25%)	3 (60%)
Infection before ureteric stent removal	2 (50%)	2 (40%)
Infection after ureteric stent removal	2 (50%)	3 (60%)
Preoperative antibiotics used	4 (100%)	5 (100%)

The most prevalent sources of organisms in renal transplant SSIs cumulatively over the last 4 years were *E. coli* and *K. pneumoniae* (Figure 19, Appendix).

Figure 8: SSI rate per 100 procedures following renal transplant surgery, 2020/21 to 2023/24



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.

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.

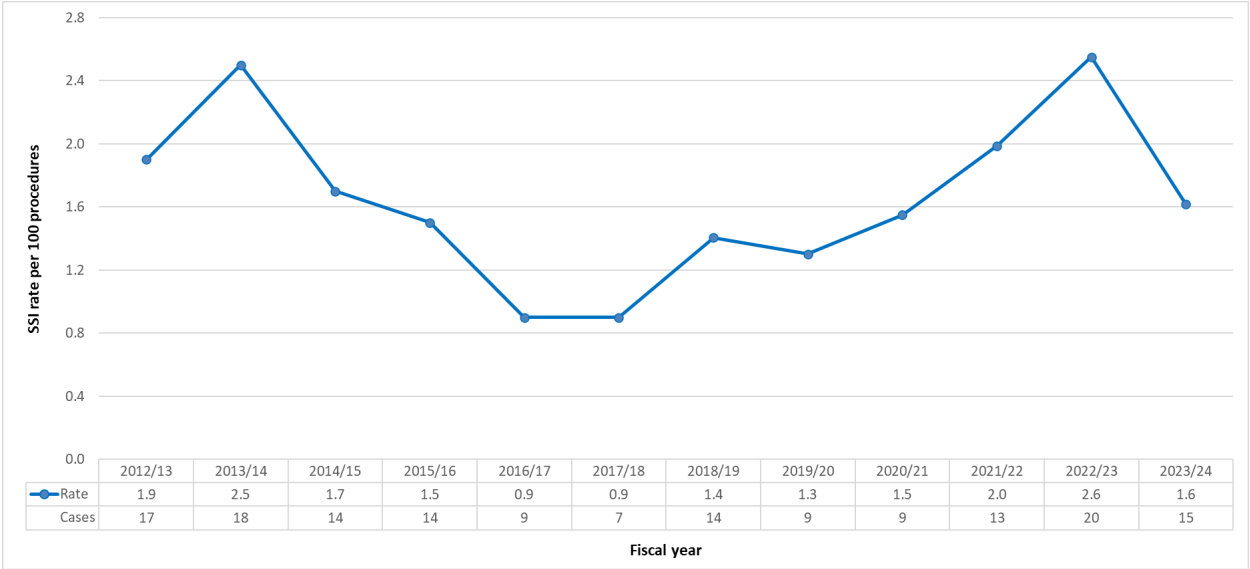
Outcome

Table 2: Summary of cardiac surgical infections 2022/23 to 2023/24

	2022/23	2023/24
Cardiac surgeries performed at PHC	784	927
Cardiac SSI cases	20 (2.6 per 100 procedures)	15 (1.6 per 100 procedures)
Infection classification	8 (40%) superficial 10 (50%) organ space 2 (10%) deep incisional	8 (53%) superficial 6 (40%) organ space 1 (7%) deep incisional
Location of infections	18 (90%) sternum 1 (5%) donor site (leg) 1 (5%) sternum + leg	7 (47%) sternum 8 (53%) donor site (leg)
Preoperative antibiotics used	20 (100%)	15 (100%)

The most prevalent sources of organisms in cardiac SSIs cumulatively over the last 6 years were coagulase-negative *Staphylococcus* (CoNS) and *S. aureus* (Figure 20, Appendix).

Figure 9: SSI rate per 100 procedures following CABG and valve surgery, 2012/13 to 2023/24



Central Line-Associated Bloodstream Infection (CLABSI)

Background

Central Line-Associated Bloodstream Infection (CLABSI) continues to be one of the costliest 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 for Disease Control and Prevention's (CDC) National Healthcare Safety Network.

This was our second year of using an in-house developed CLABSI application to improve surveillance efficiency.

Suspected cases are reviewed by Infection Control Practitioners (ICPs) and IPAC physicians.

Outcome

PHC-associated CLABSI incidence rate at SPH ICU was 1.4 cases per 1,000 central line days which was lower than the previous year (2.6) (Figure 10).

Most cases were clustered in quarter 1 (33%) and quarter 4 (33%) (Figure 11).

The most prevalent sources of organisms in CLABSI cumulatively over the last 6 years were *C. albicans*, *C. glabrata*, *E. faecalis*, and VRE (Figure 21, Appendix).

Working on

We have completed the validation of obtaining the denominator, Central Line Days, electronically. The 2024/25 year will be our first year of using this automated reporting. 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 10: PHC-associated ICU CLABSI incidence rate by fiscal year, 2009/10 to 2023/24

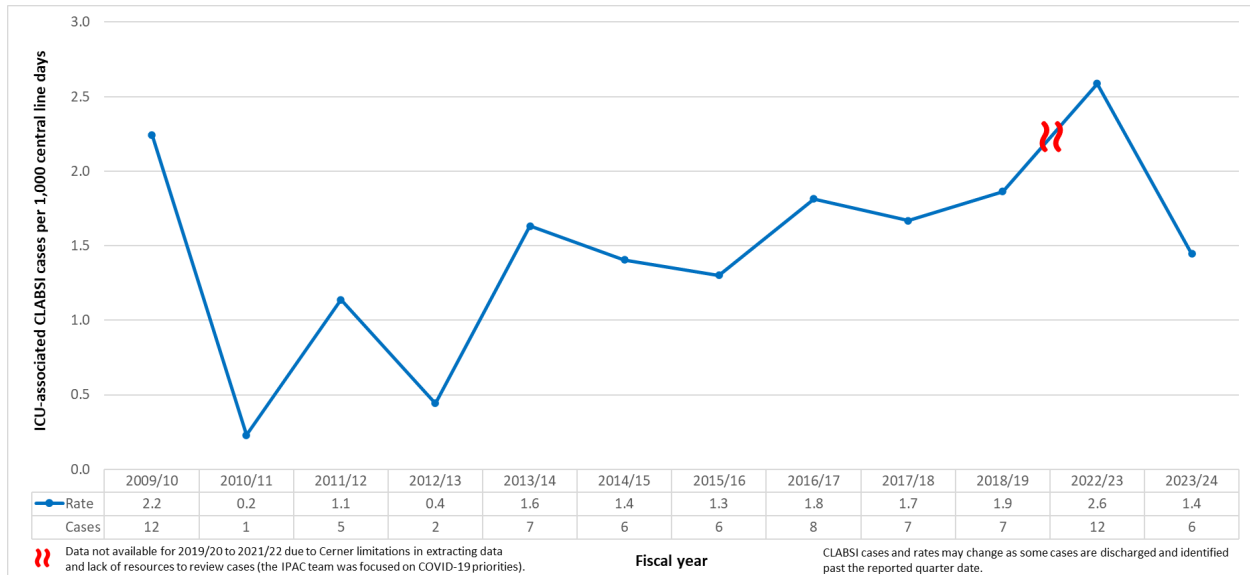
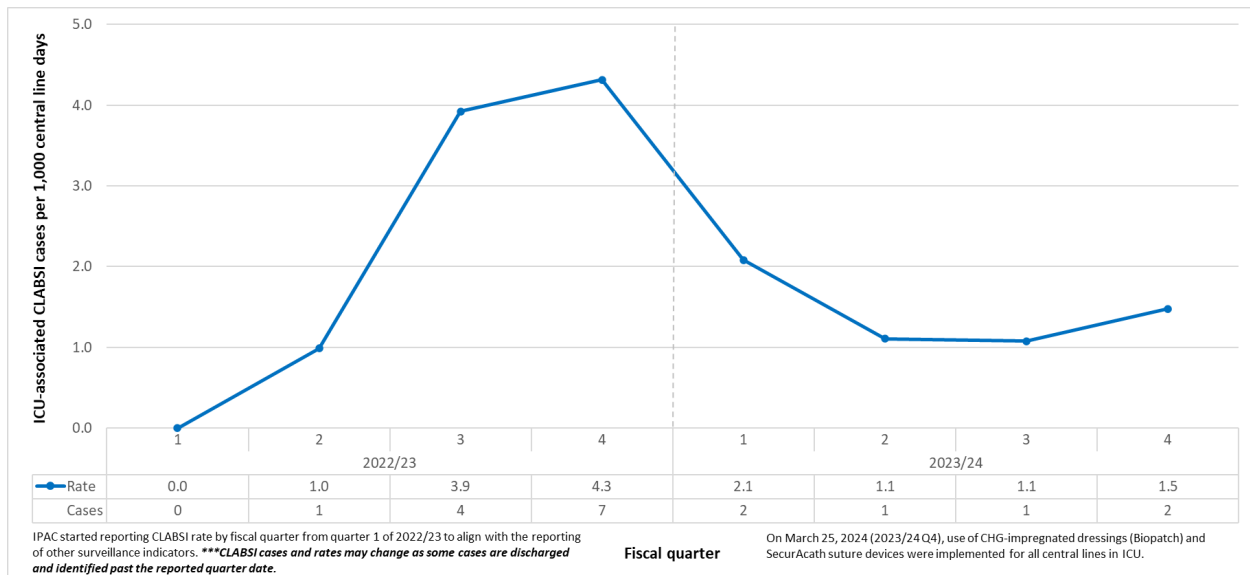


Figure 11: PHC-associated ICU CLABSI incidence rate by fiscal quarter, 2022/23 to 2023/24



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

Background

Hospital-Associated *Staphylococcus aureus* Bloodstream (HA-SAB) Infection is 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.

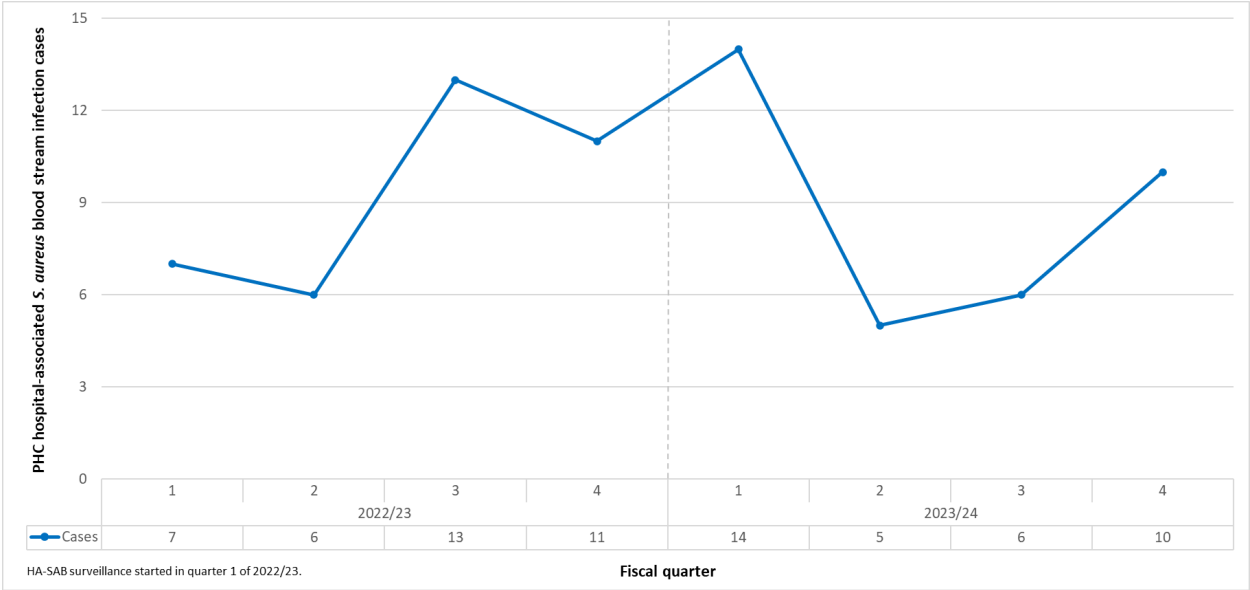
In the 2020/21 and 2021/22 fiscal year, we worked in collaboration with PHC Data Analytics to develop a semi-automated system to identify possible HA-SAB cases at PHC acute care facilities. Each case is reviewed by an ICP and IPAC physician.

Outcome

2023/24 marked our second year of HA-SAB surveillance. We identified a total of 35 cases in 2023/24 vs. 37 cases in 2022/23 (Figure 12). The most common sources of HA-SAB were peripheral intravenous catheter (PIVC) and skin and soft tissue infection (SSTI) (Figure 22, Appendix).

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

Figure 12: Number of hospital-associated *S. aureus* blood stream infections, 2022/23 to 2023/24



Outbreak Management

ASSESS → CONTAIN → COMMUNICATE

IPAC leads the work for 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.

Control measures are promptly implemented when each outbreak is declared.

Outcome

In 2023/24, there were a total of 4 influenza A and zero gastrointestinal illness (GI) outbreaks in Providence Health Care facilities (Table 3). Of these, all were in acute care facilities.

All influenza A outbreaks occurred in quarter 4 of 2023/24.

- HFH Rehab involved 3 patients and lasted 12 days;
- SPH 5A involved 12 patients and lasted 11 days;
- Youville Parkview (5th floor) involved 8 patients and lasted 15 days; and
- SPH 6B involved 5 patients and lasted 16 days.

Table 3: Summary of influenza A outbreaks in 2023/24

Unit	AC/LTC	Pathogen	Onset Date	End Date	#Pt./Res. Affected	Census	Attack Rate	# Deceased
HFH Rehab	AC	Influenza A	1-Jan-24	13-Jan-24 ¹	3	59	5%	0
SPH 5A	AC	Influenza A	18-Jan-24	29-Jan-24	12	24	50%	1
Youville Parkview (5th fl.)	AC	Influenza A	18-Jan-24	2-Feb-24	8	14	57%	2
SPH 6B	AC	Influenza A	19-Jan-24	4-Feb-24	5	12	42%	1

¹ For influenza outbreaks, the expected end date is after day 6 from the last case (day 6 = 2 incubation periods; 1 incubation period = 3 days) and/or at the discretion of MHO.

COVID-19

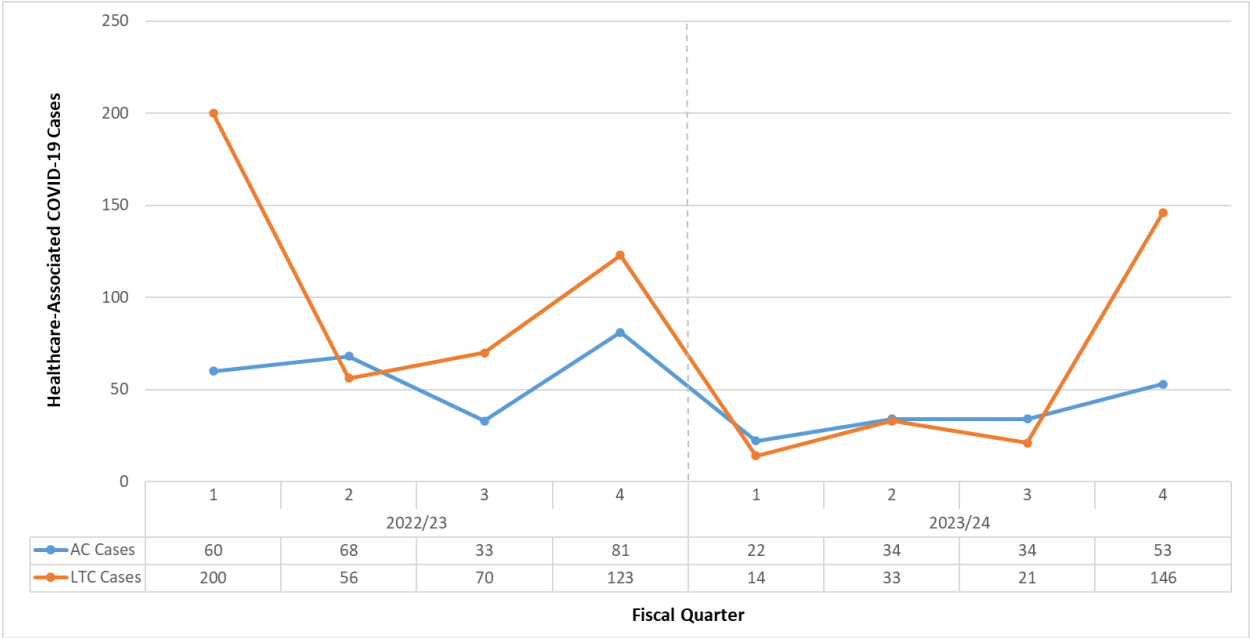
In 2023/24, there were 36 COVID-19 clusters* across acute and long-term care (Table 4). There were 303 patients/residents and 110 staff who tested positive for SARS-CoV-2. Most of the clusters and cases were from quarter 2 (9 clusters) and quarter 4 (15 clusters). There were also 54 COVID-19 cases from non-clusters for a total of 357 healthcare-associated COVID-19 cases (Figure 13).

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.

Table 4: PHC-associated COVID-19 clusters, 2020/21 to 2023/24

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
2023/24	Acute	21	63	92	8
	LTC	15	199	211	18

Figure 13: PHC healthcare-associated COVID-19 cases by care level and quarter, 2022/23 to 2023/24



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's: Langara. 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.

As of March 2024, **we have continued to see a sustained, significant decrease in urine cultures collected from all residential care sites since 2011/12** (Figure 14). Antimicrobial use has also decreased for suspected UTIs. All sites have had a significantly lower rate of urine cultures collected since 2011/12 (Figure 15). Antimicrobial use also decreased for suspected UTIs.

Figure 14: Number of urine cultures collected at PHC long-term care homes, 2008/09 to 2023/24

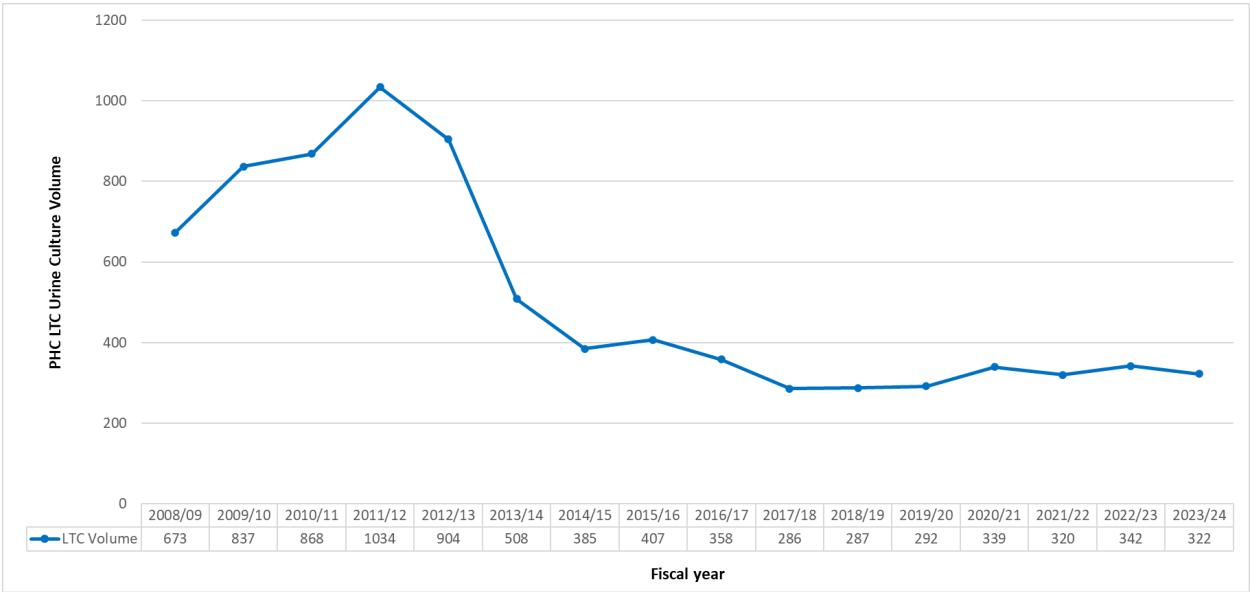
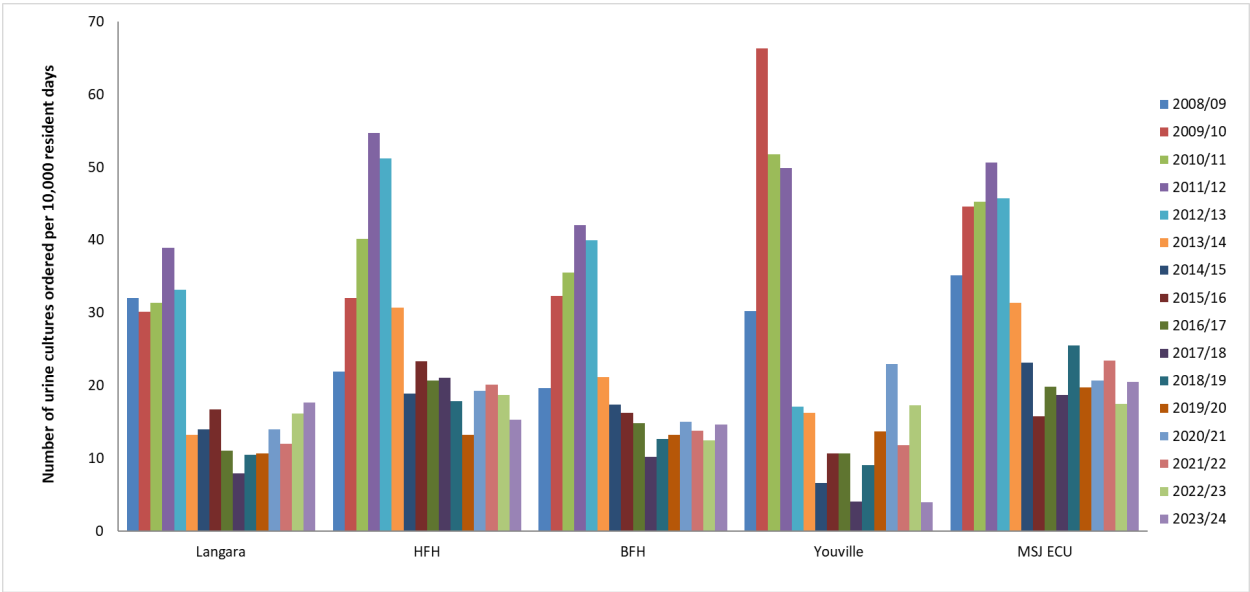


Figure 15: Urine culture rates by PHC long-term care homes, 2008/09 to 2023/24



Glove Smart Project in CSICU: Reducing Waste One Glove at a Time

While working as a Registered Nurse at the Cardiac Surgery Intensive Unit (CSICU) in SPH, Chandell Kelly, a member of the Waste Working Group (part of the Environmental Stewardship Team – ESTeam), observed that staff often wear non-surgical gloves when the task they would perform did not necessarily require it. This was an unintended consequence of the COVID-19 pandemic, during which there was a forced increase in the use of Personal Protective Equipment (PPE) among clinical staff across the health care system. Besides the financial cost, excessive and unnecessary use of PPE has an environmental impact.

With this in mind, the Waste Working Group performed a quantitative analysis on the use of non-surgical gloves in the CSICU. The analysis showed that in the years before the pandemic (2017-2019), the unit would use, on average, 32,003 non-surgical gloves per month. From January to October 2022, however, the use of non-surgical gloves was 33,596, a 5% increase since the COVID-19 pandemic.

Based on these numbers, CSICU at SPH committed to a Quality Improvement pilot project to reduce the inappropriate use of non-surgical gloves by 10% by December 31, 2023. To achieve this target, the Waste Working Group and CSICU worked collaboratively by:

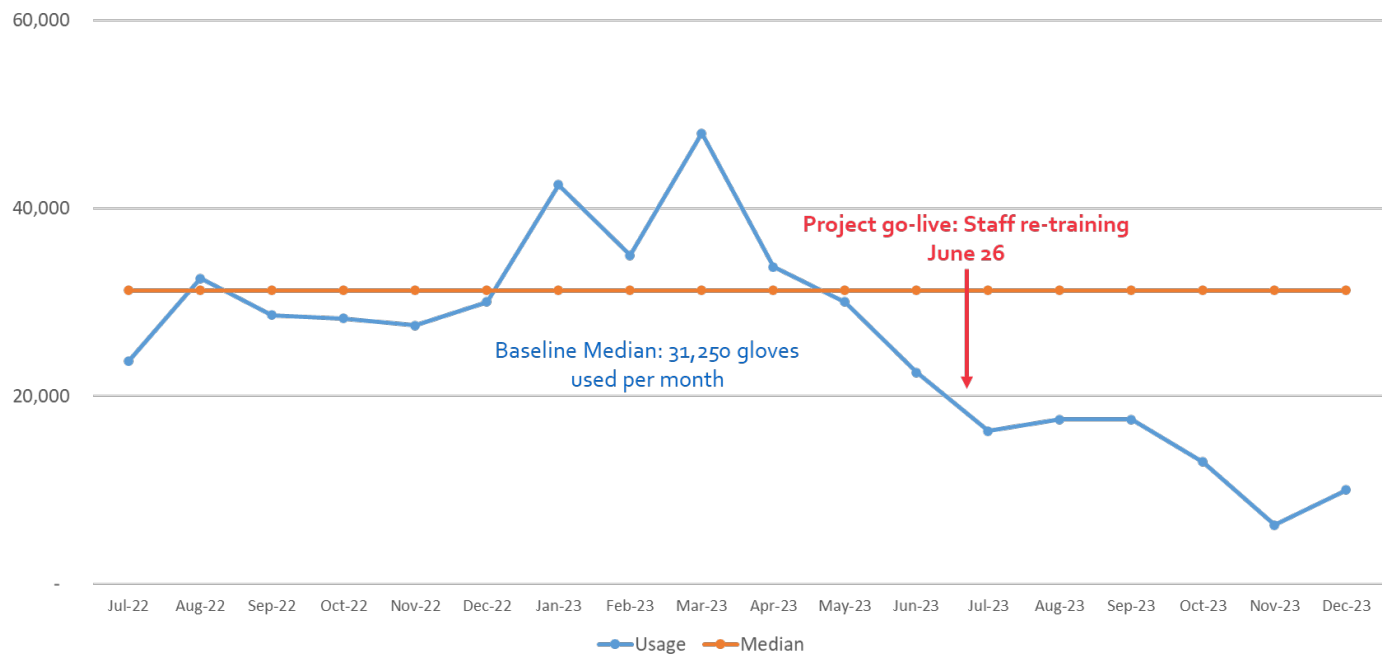
- Performing literature reviews and obtaining expert advice from international colleagues who have run similar projects with successful results;
- Developing educational material to increase awareness of the appropriate use of non-surgical gloves based on the standards and best practices in current policies at PHC;
- Creating an audit tool, with the guidance of our own IPAC representative, Sherly Boddu, to measure the effectiveness of the staff education campaign and compliance with the PHC standards of appropriate use of non-surgical gloves;
- Ongoing peer education; and
- Monitoring the monthly usage of non-surgical gloves in the unit



CSICU team members

The results of the pilot project in CSICU could not be any better; comparing the numbers from the pilot (July-Dec) with the same timeframe from last year (2022), we can see that there was a reduction of 53% in the use of gloves. **That is 43% over the original aim!**

Figure 16: Non-surgical glove monthly usage in CSICU, July 2022 to December 2023

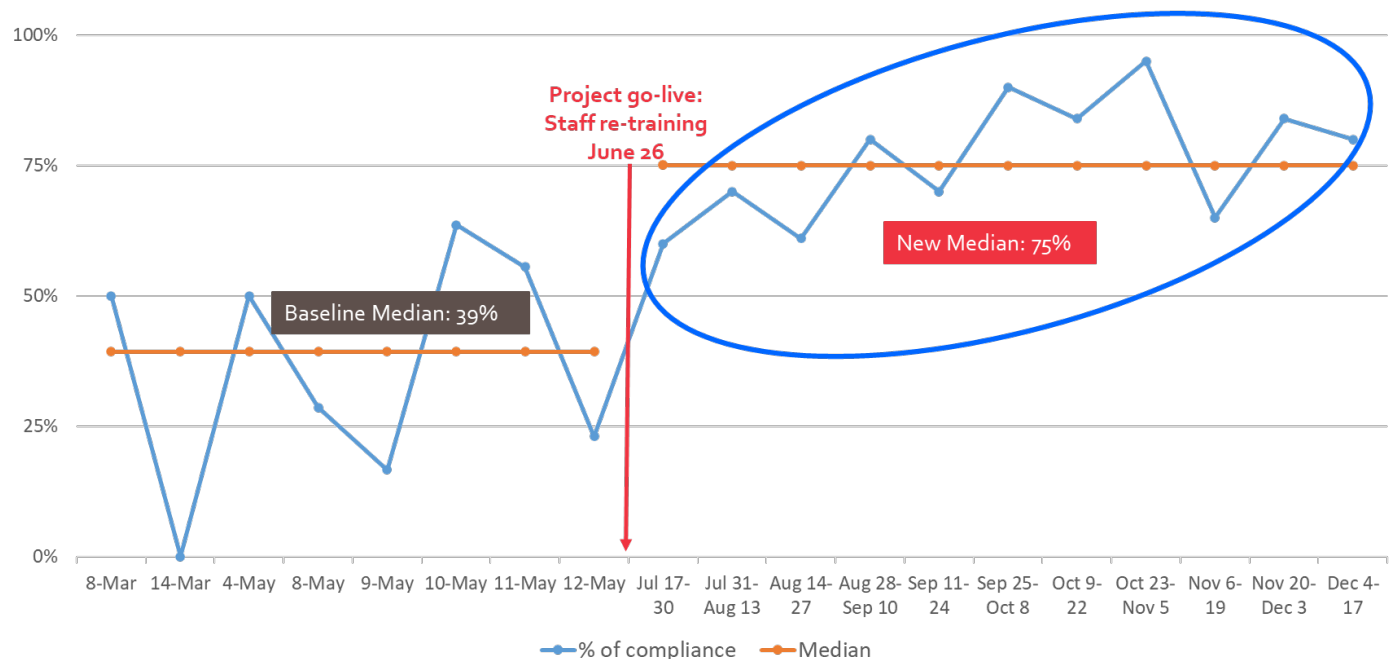


In plain numbers, **this pilot project saved 90,100 non-surgical gloves**, which represent 2,342.6 Kg of CO₂e, equivalent to 998 litres of gas consumed, or put differently, the gas needed to drive from Vancouver, BC to Tampa, Florida and back!



During these six months, the staff compliance with the PHC standards of appropriate use of gloves, measured by the audit, also increased from **39% median baseline to 75%!**

Figure 17: Percentage of compliance with appropriate use of gloves in CSICU, March to December 2023



One of the most valuable lessons learned during the development of this project was the importance of staff champions who would lead efforts to change the status quo and work collaboratively to accomplish their goal. We give a huge acknowledgment of the tireless work from Chandell Kelly, Marianne Lesage, Hecel Peakman, Ann Gibb and Caitlin Brown from the CSICU team as well as the collaboration of Leyla Khosrovpour, Karmen Wong, Theresa McElroy, Julie Werry, Andrew Mendes, Sherly Boddu, Ramses Prado and our patient partners, Kyle Warkentin and Irene Toy, to make this happen.

New St. Paul's Hospital (NSPH) Project

The design of the new hospital is now complete, and construction continues to progress on schedule for opening in early 2027. IPAC's work related to the New St Paul's Hospital Project is now shifting to support Operational Readiness to strategically plan for how staff will deliver the best care we can. IPAC is also deeply involved with the work of the NSPH Site Multidisciplinary Team (MDT) to ensure the construction practices and materials handling on site follow the applicable Canadian Standards Association (CSA) Standards and will result in a sanitary facility safe for use as a health care facility. In addition, IPAC continues to work closely with and advise the NSP Equipment Team and Clinical Leads as final equipment selections and fit out decisions are made.

Design work for the Clinical Support & Research Centre (CSRC) is now well under way and site preparation work for its construction will be starting this fall. Although the CSRC is a separate building adjacent to the NSPH facility, it will be connected by a sky bridge walkway on two levels. IPAC is similarly involved with the CSRC Site MDT and is contributing to the building design.



Support for Providence Living (PL)

Providence Living (PL) is a newly established non-profit, Catholic-sponsored healthcare organization dedicated to long-term care, assisted living, housing, and other community services that support seniors and their families. PL currently operates three sites: The Views at St. Joseph's in Comox, and Central City Lodge and Cooper's Place in Vancouver. In the fall of 2023, plans were announced for a new 200-bed long-term care village in Prince George. This year, our team played a crucial role in the opening of the new building at The Views at St. Joseph's by providing guidance on workflows, furnishings, equipment, and conducting a final walkthrough before its opening.

In August 2024, IPAC and Providence Living signed a renewed Memorandum or Understanding to continue our 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; and
- Consultation on the concept design for the Prince George build.

Hand Hygiene

Background

Hand hygiene [handwashing with soap and water or using an alcohol-based hand rub (ABHR)] is important for preventing many healthcare-associated infections. However, overall adherence 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 adherence.

Goals/Successes/Innovations	Risks/Weaknesses/Threats & Mitigation Plans
- 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>) - Reporting via unit feedback boards, facility posters, and the dashboard - Innovation: SpeedyAudit app captures hand hygiene moments - Goal: Electronically accessible data	- Hawthorne Effect (behaviour change due to awareness of being observed) - Minimized by conducting audits throughout the quarter and rotating auditors - Comparison to other health authorities is difficult - Methodology is variable - 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 healthcare workers in acute care facilities:

75% in 2023/24

63% before patient contact

81% after patient contact

76% in 2022/23

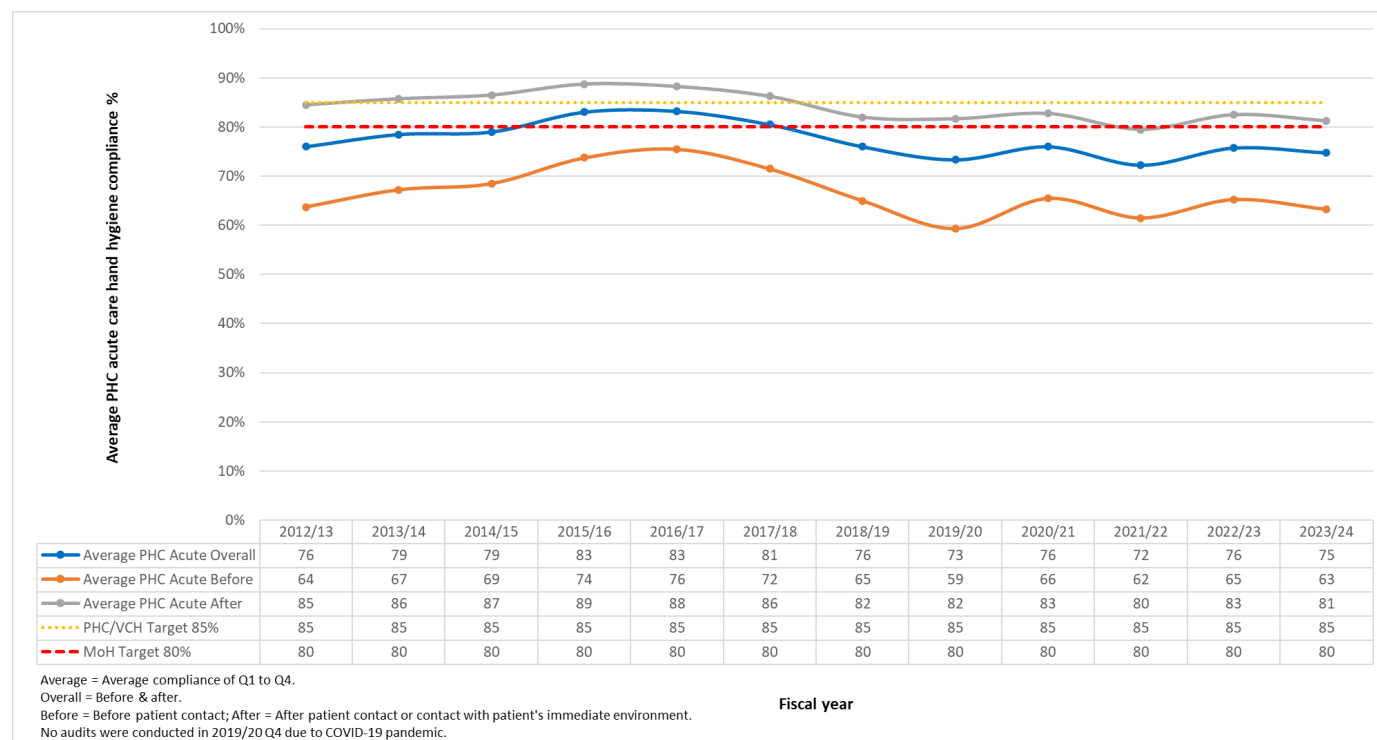
65% before patient contact

83% after patient contact

Both before and after patient-contact compliance was lower in acute care compared to 2022/23.



Figure 18: Average PHC acute care hand-hygiene compliance by fiscal year: 12-year trend

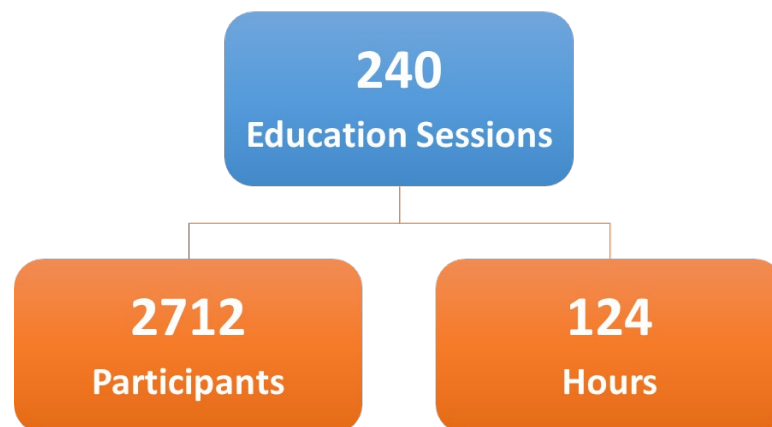


Education and Training

IPAC provides education to staff, physicians, patients and visitors to increase awareness of infection prevention and control measures. Education is provided during unit huddles, 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 new employee orientation (NEO) 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; and
- Celebrate IPAC Week and Hand Hygiene Day with a travelling road show.

IPAC Education, 2023/24



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 CSA standards.

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 are approaching the final stages, and some are still in progress:

- St. Vincent's Heather LTC Final Design;
- SPH Road to Recovery Units - Burrard 5 and 2;
- SPH Comox Road to Recovery renovation;
- OPS – 4th floor roof top garden;
- New SPH IWR Offices Burrard 4th floor;
- Upgraded AHUs install to exterior of the ED;
- MSJ ED expansion project;
- MSJ Clinical Trials Unit;
- SVL – Building 2 private resident rooms – phase 2;
- Youville – Building 6 private resident rooms;
- Youville – All Nations Sacred Space 6th floor
- HFH resident window replacement – phase 2;
- HFH resident washroom upgrades;
- Prince George LTC - Concept Design; and
- Shoreline Space – MAID.

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;
- Working with FMO to place Portable Air Handling Units (AHU) where needed; and
- Ensuring proper positioning of hand hygiene products in collaboration with the respective units and FMO.

Physical Environment

In 2023, we used Ultraviolet Marking to evaluate cleaning practices on high-touch surfaces. This method helps us improve cleaning standards and reduce the risk of healthcare-associated infections.

At SPH, the overall cleaning compliance rate for 2023 was 77%, just below the 80% target. Out of the 105 in-patient rooms audited, 42% did not meet the 80% compliance threshold. Among rooms requiring additional precautions, including those occupied by patients with Antibiotic-Resistant Organisms (MRSA, VRE and CPO) and *C. difficile*, overall compliance was 80%, though 15 of these rooms fell short of the target.

Mount Saint Joseph (MSJ) Hospital achieved an overall cleaning compliance rate of 81% in 2023, successfully meeting the 80% target. Among the 95 in-patient rooms audited, 33% were below the 80% compliance level. For additional precautions rooms, the compliance rate was 81%, with 11 rooms not reaching the 80% target.

A total of 200 inpatient rooms at SPH and MSJ were audited over the year. Although many units demonstrated effective compliance, some areas still need improvements to enhance cleaning practices.

Table 5: SPH and MSJ ultraviolet marking results, 2023/24

Variable	SPH	MSJ
Number of Rooms Audited	105	95
Overall Percent Compliance	77%	81%
Range	0-100%	0-100%
Below 80% Compliance	35 (33%)	29 (33%)
Number of AP* rooms audited	40	34
Overall Percent Compliance for AP rooms	80%	81%
Range for AP rooms	8-100%	0-100%
Below 80% compliance for AP rooms	15 (38%)	11 (32%)
*Additional precautions (ARO/CDI)		

Environmental Sustainability

In collaboration with IPAC, EVS planned a key change by transitioning from Quaternary Ammonium Compound (commonly known as 'Quat') to Accelerated Hydrogen Peroxide (AHP) as the primary cleaning and disinfectant agent beginning April 2024. Additionally, sodium hypochlorite, or bleach, was also replaced with AHP-based disinfectant which has sporicidal properties. This shift was intended to improve efficacy, safety, and environmental sustainability. AHP is noted for being non-toxic, non-irritating when diluted, and biodegradable. Additionally, its shorter contact time may help expedite bed turnovers, potentially optimizing hospital operations.

Education

Environmental Services (EVS) is strengthening its new-hire training programs by incorporating infection prevention and control orientation, with a deeper focus on environmental services. Monthly sessions are conducted, with EVS Quality Standards & Innovation Leadership inviting IPAC representatives to participate, ensuring continuous collaboration and alignment with best practices.



Engineered Improvements in Long-Term Care

The COVID-19 pandemic has taught us the importance of improving indoor air quality as a way to mitigate the airborne transmission risk of respiratory viruses. IPAC applied to the St. Paul's 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, and infection control practitioners (ICPs) have continued to send maintenance requests to FMO for deployment of the units to patient spaces.

Appendix

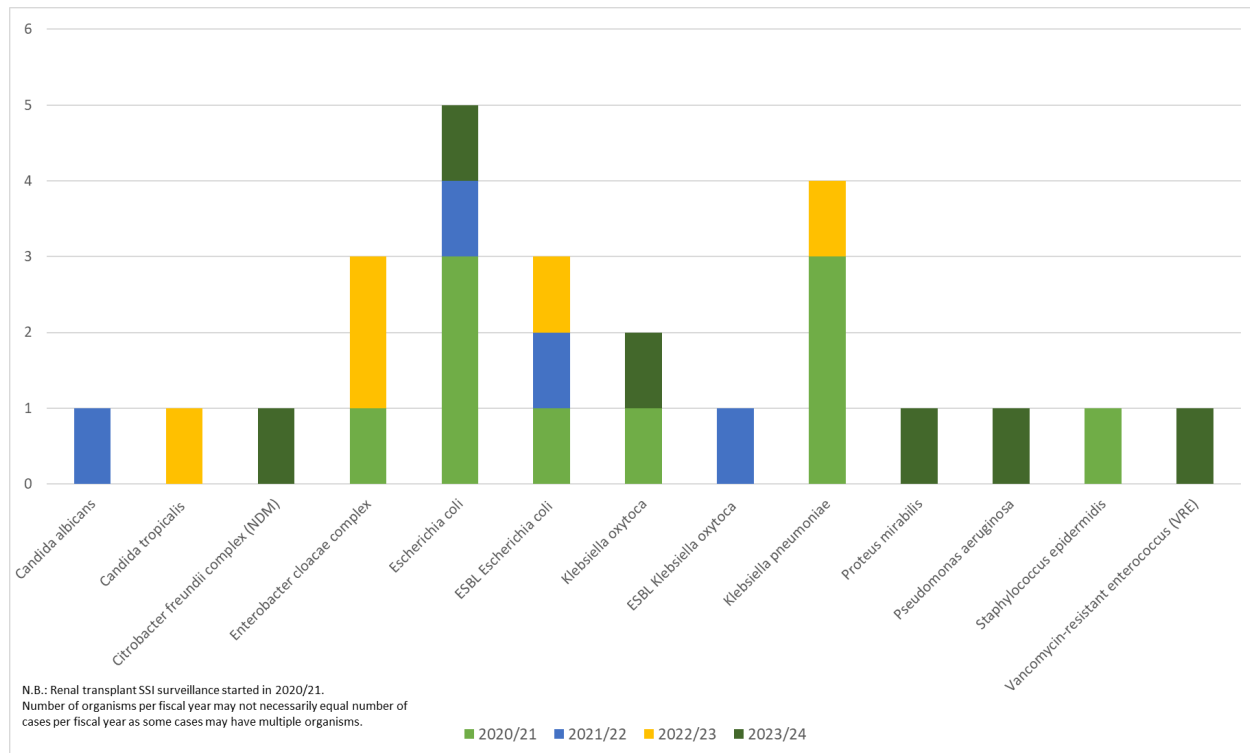
Carbapenemase-Producing Organisms (CPO)

Table 6: Distribution of genes identified in CPO positive patients from 2012/13 to 2023/24

Fiscal year	KPC	NDM	OXA-48	VIM	IMP	Patients with multiple genes
Total (n=116)	32 (28%)	62 (53%)	8 (7%)	3 (3%)	3 (3%)	8 (7%)
2023/24 (n=32)	5 (16%)	25 (78%)	1 (3%)	0	0	1 (3%)
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

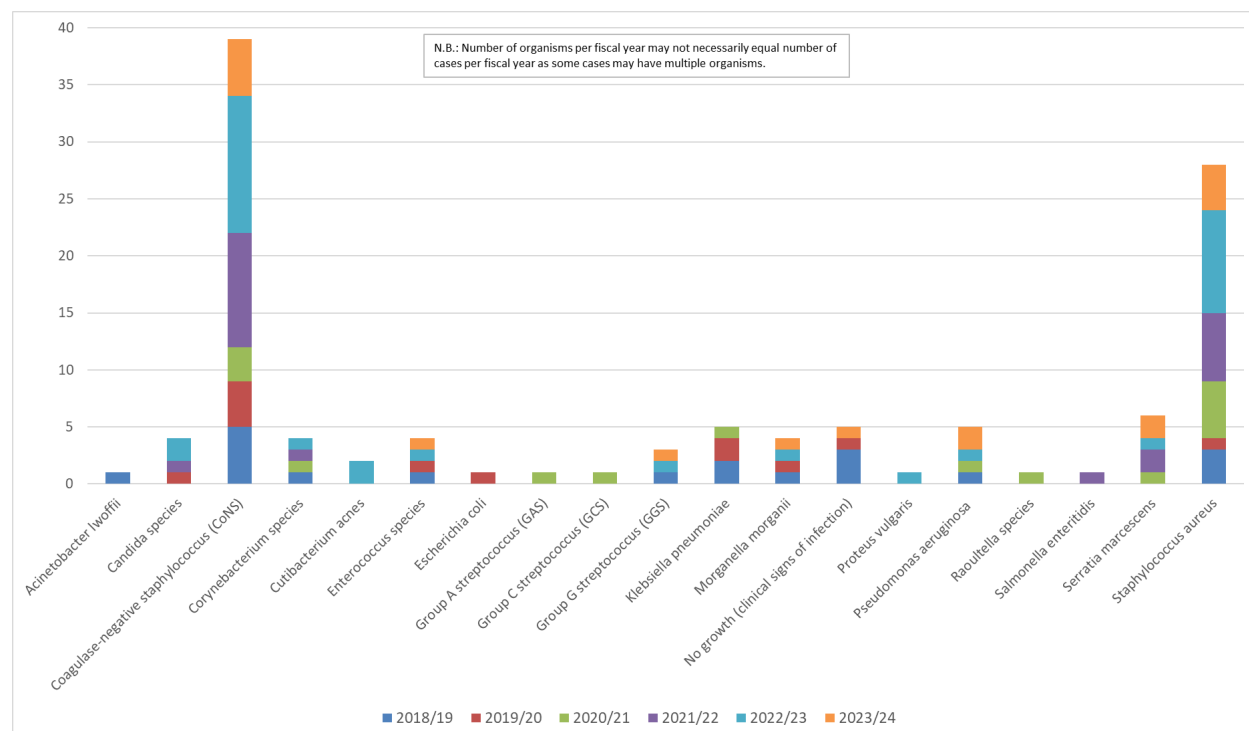
Surgical Site Infection (SSI) – Renal Transplant Surgery

Figure 19: Cumulative renal transplant SSI organisms from 2020/21 to 2023/24: 4-year trend



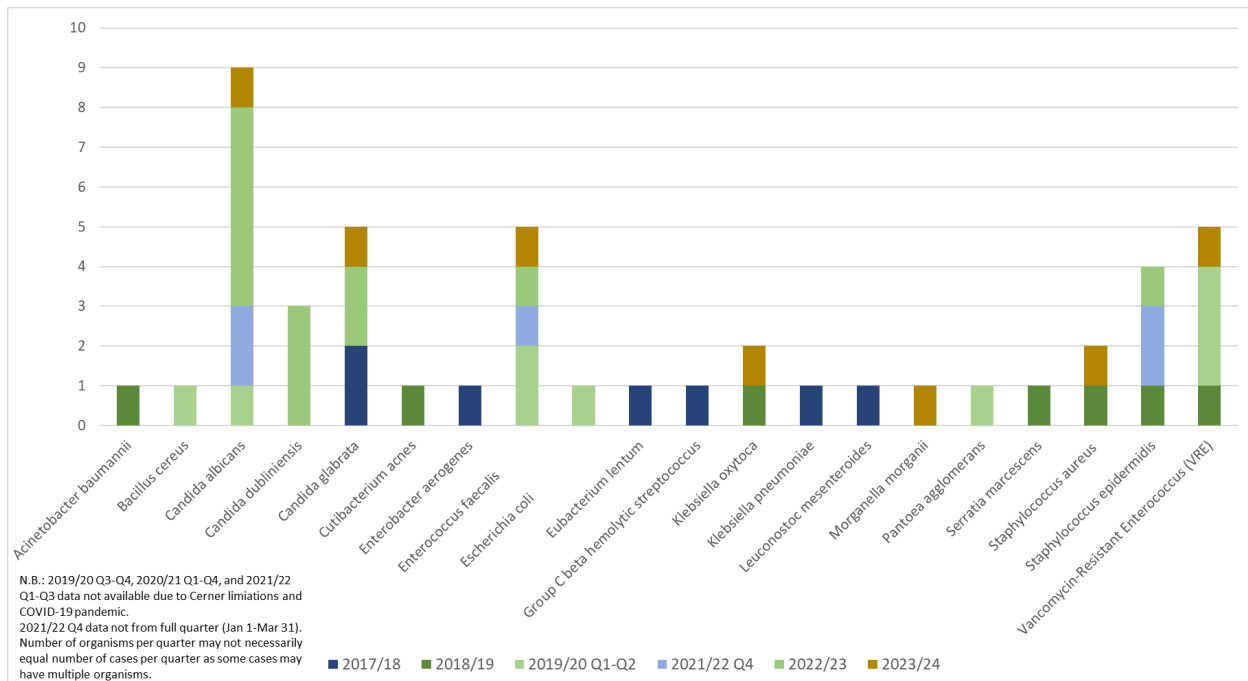
Surgical Site Infection (SSI) – Cardiac Surgery

Figure 20: Cumulative cardiac SSI organisms from 2018/19 to 2023/24: 6-year trend



Central Line-Associated Bloodstream Infection (CLABSI)

Figure 21: Cumulative distribution of organisms for SPH ICU-associated CLABSI, 2017/18 to 2023/24



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

Figure 22: Cumulative sources of bacteremia for hospital-associated *S. aureus*, 2022/23 to 2023/24

